

A5036 Port of Liverpool Access

Preliminary Ground Investigation
Interpretative Report

Highways England

March 2016

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1. Introduction

1.1. Scheme Description

The Port of Liverpool is an expanding port and continues to be an important transit point for freight for short distance sea, Transatlantic and Global trade. It is the busiest sea-port in the North West and the sixth largest nationally in terms of total freight tonnage. The port currently handles about 800,000 TEU (Twenty-Foot Equivalent Unit) a year and this is expected to increase to 3 million TEU by 2030 following the DfT's approval to provide a deep-sea container berth which is currently under construction.

Access to the port from the motorway network is via the existing A5036 which links the port with the Switch Island Interchange of the M57 and M58, which in turn links to the M62 and M6 respectively. The A5036 is urban in character and of dual carriageway standard. It already suffers from a high level of congestion and significant development pressures on the route for much needed regeneration.

The access to the port has been subject to a number of studies, with a Feasibility Study completed for the Port Access Steering Group by Atkins in 2014, which examined earlier work and developed the options for highway improvements further. This study concluded that there was a need for an increased highway capacity between the port and the motorway network.

A proposed highway improvement to improve access to the Port of Liverpool was included in the 2014 Autumn Statement, following which the scheme entered PCF Stage 1.

Currently there are two proposed routes for a new access road in the Litherland area of Liverpool:

- Online route: widening of the existing A5036, extending from the M57/M58 Switch Island Junction (approximate national grid reference (NGR) 336997, 400280) to the railway bridge beyond the junction roundabout with the A567 (approximate NGR 333318, 397167).
- Offline route: construction of a new road through Rimrose Valley Country Park, extending in a rough horseshoe shape, extending to the north west from the M57/M58 Switch Island Junction (NGR 336997, 400280) to the railway line beyond the junction roundabout with the A567 (approximate NGR 333318, 397167). An overview plan of the potential offline route through Rimrose Valley is provided in Appendix A.

1.2. Purpose of report

A historical landfill site is known to be present within the Rimrose Valley Park along the offline route, however very little information was available about the nature, quality and contamination state of the materials present within this landfill. This uncertainty was therefore deemed to represent a very high project risk and a specific ground investigation was undertaken in 2015 within accessible land covering the footprint of the landfill site to gain sufficient information to assess this risk.

This report presents the findings from the aforementioned ground investigation.

1.3. Site Description

The area investigated ("the site") lies within the Rimrose Valley Park approximately 7.5km north of Liverpool City Centre within Rimrose Valley Park, at approximate National Grid Reference SJ 330 985.

The boundaries to the site consist of the following:

- East – the Leeds-Liverpool Canal, beyond which is suburban housing (Litherland)
- South – the Liverpool to Southport Railway beyond which a mixture of suburban housing and industrial land (Waterloo & Seaforth)
- West – the park is bounded by various types of fencing beyond which is suburban development (Crosby)

- North – the northern boundary is a tarmac road, beyond which lies open fields and some suburban development (Thornton)

The Rimrose Valley area is shown on maps dating from 1850 to be rural agricultural land with Rimrose Brook flowing through the site in north to west direction. The area is undeveloped with the exception of a number of farm houses and access roads, and is bounded to the east by the Leeds and Liverpool Canal. The eastern half of the route area remains predominantly unchanged to present day. The western half of the site is noted to have undergone land use changes over the period with maps dating from 1928 showing the area has been used as allotment gardens and recreation grounds. Some development is also apparent including a factory and some residential development. By 1965 the allotment gardens are no longer apparent and Whabbs Tip is apparent on the maps extending from the western boundary of the site. Review of the Environment Agency website historical landfill maps indicates that the Whabbs Tip received commercial and household waste between 1951 and 1975, extending over a wider area than shown on the historical maps. Whabbs Tip is not apparent on maps dating from 1989, with the area marked as Rimrose Valley Country Park on historical maps from 2006.

1.4. Report Scope

This report has been compiled for the following purposes:

- To better define the risk associated with contaminated land issues;
- To assess the variation in baseline geo-environmental conditions across the site with respect to contamination and the presence of landfilled domestic, commercial and industrial wastes;
- To assess and confirm the depth and extent of Whabbs Tip across the site; and
- To provide a qualitative geotechnical assessment of the ground and groundwater conditions on along the section of offline route investigated.

The current report is not intended to be a full Eurocode 7 or HD22/08 compliant Ground Investigation Report. As indicated above, it is anticipated that such a report would be produced at a later stage, further to a detailed design ground investigation for the route and option selected.

This report has been mainly based on the results of the recent ground investigation undertaken by Geotechnics Ltd and reported in a factual report.

2. Field and Laboratory Studies

2.1. Site Works

A ground investigation was designed to establish the depth and confirm the extent of the waste in Whabb's tip. Geotechnics were appointed by Atkins as the contractor for this ground investigation work. An Atkins engineer attended site throughout the investigation to oversee the site works. The ground investigation took place between 22 September 2015 and 8 October 2015, comprising:

- 7 No. exploratory boreholes advanced using two cable percussion rigs, from 22 September 2015 to 30 September 2015. Cable percussion boreholes were located along the centre of the park.
- 12 No. exploratory holes advanced using a dynamic window sampler rig, from 1 October 2015 to 8 October 2015 (excluding the first two attempts at the location of WS01: WS01A and WS01B). Window sample holes were located either side of the park, to confirm the lateral extents of the historical landfill and the lateral thickness, depth and nature variation of the landfill materials.
- 11 No. ground gas and groundwater monitoring installations were fitted, 6 No. in cable percussive holes and 5 No. in window sample holes.
- Soil samples were taken at regular intervals from the full depth of each hole for the purpose of soil and soil leachate chemical and geotechnical analysis.
- Bulk bags and UT100 samples were collected for geotechnical analysis.
- Three rounds of ground gas and groundwater monitoring were carried out in the six weeks post completion of the GI.
- One round of groundwater sampling was carried out on 3 November 2015.
- One round of surface water samples were collected from four locations around the site on 3 November 2015.

The results from the GI are summarised in Section 3 and the factual report issued by the contractor Geotechnics can be found in Appendix C.

2.2. In situ Testing

2.2.1. Geotechnical Testing

2.2.1.1. Standard Penetration Testing

SPT testing was carried out at approximately 1 m intervals for each of the nineteen exploratory holes (cable percussion and window sample). Testing is reported to have been undertaken in accordance with BS EN ISO 22476-3:2005+A1:2011 (Geotechnics, 2016).

2.2.1.2. Hand Shear Vane Testing

Three in situ hand shear tests were carried out in the window sample exploratory hole WS03.

2.2.2. Environmental Testing

With the exception of CP5 Photo Ionisation Detection (PID), screening was carried out on soil samples recovered every one metre from each all exploratory hole location. The results of this screening are presented in Table 4-2 in Section 4.

2.3. Laboratory Testing

Representative soil samples were collected by the on-site Geotechnics engineer and scheduled for analytical chemical and geotechnical testing by Atkins. Analytical testing was carried out by Jones Environmental. Jones Environmental carry both United Kingdom Accredited Service (UKAS) and Monitoring Certification Scheme (MCERTS) accreditation. All geotechnical testing was undertaken by Geotechnics Ltd's laboratories.

2.3.1. Geotechnical Testing

Geotechnical testing was scheduled in two batches, for cable percussion borehole samples on 11 November 2015 and for the window samples on 17 November 2015, based on the draft borehole logs issued to Atkins by Geotechnics. The scheduled testing is summarised in Table 2-1.

Table 2-1 Summary of geotechnical laboratory testing scheduled

Testing type	Number specified for borehole samples	Number specified for window samples	Total number specified
Moisture Content	37	26	63
Atterberg Limits	7	7	14
Particle Size Distribution	29	8	37
Sedimentation	For all PSDs >10% fines	For all PSDs >10% fines	For all PSDs >10% fines
Bulk Density	21	-	21
BRE Suite A	4	-	4
BRE Suite C	18	13	31
Undrained triaxial	3	-	3

2.3.2. Environmental Testing

2.3.2.1. Environmental Soil Analysis

Soil samples were scheduled for analysis of the following:

On all scheduled soil sample testing for the following determinands:

- Metals including: *arsenic, cadmium, chromium (VI), chromium (total), copper, iron, lead, mercury, nickel, vanadium, selenium and zinc*
- 16 Speciated Polycyclic Aromatic Hydrocarbons (PAHs) (US EPA priority list) including: *naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(bk)fluoranthene, benzo(a)pyrene, indeno(123cd)pyrene, dibenzo(ah)anthracene, benzo(ghi)perylene, benzo(b)fluoranthene, benzo(k)fluoranthene and PAH 16 total*
- pH
- Soil Organic Matter (SOM)
- Cyanide (total)
- Cyanide (free)
- Asbestos (presence/absence screen) – where present, asbestos quantification was carried out.

On selected scheduled soil samples: testing for the following determinands

- Speciated Total Petroleum Hydrocarbons (criteria working group) (TPH (CWG)) including: *aliphatic/aromatic separation and carbon banding C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21 and C21-C35*
- Sulphate (total)
- Polycyclic Biphenyls (PCBs) (WHO12)
- Volatile Organic Compounds (VOCs)
- BTEX including: *benzene, toluene, ethylbenzene and xylene*
- Asbestos (Quantification) – where the presence of asbestos was detected.
- Ammoniacal Nitrogen (NH₄)
- Water Soluble Boron

2.3.2.2. Soil Leachate Analysis

Five soil samples were scheduled for soil leachate analysis of the following determinands:

- Dissolved metals including: *arsenic, cadmium, chromium (VI), chromium (total) copper, iron, lead, mercury, nickel, selenium, vanadium and zinc.*
- 16 Speciated PAHs (US EPA priority list)
- Sulphate (total)
- Cyanide (total)
- Cyanide (free)
- pH.

2.3.2.3. Groundwater and Surface Water Analysis

Six groundwater samples were taken and analysed for the following determinands:

- Dissolved metals including: *arsenic, boron, cadmium, chromium (VI), chromium (total) copper, iron, lead, mercury, nickel, selenium, vanadium and zinc.*
- Sulphate (total)
- Cyanide (total)
- Cyanide (free)
- pH
- Ammoniacal Nitrogen (NH₄)
- 16 Speciated PAHs (US EPA priority list)
- TPH (CWG) with aliphatic and aromatic split and BTEX
- VOCs
- SVOCs.

Four surface water samples were taken and analysed for the above suite with the addition of the following determinands:

- Hardness (CaCO₃)
- Alkalinity
- Chloride
- Orthophosphate as PO₄ (soluble reactive phosphorous)
- Suspended solids
- E. Coli and Intestinal Enterococci

3. Ground Summary and Material Properties

3.1. Published Geology

A review of both the published geology and the existing ground investigation data for the site was undertaken. The findings from this are summarised below.

3.1.1. Superficial Deposits

The approximately 500 m long section between the southern edge of the site near the Port Roundabout (chainage 0) and the anticipated southern edge of Whabb's Tip was anticipated to comprise Made Ground, Alluvium and Peat of generally poor quality and strength, underlain by more competent Glacial deposits.

Alluvial deposits are associated with watercourse and are likely variable in nature. Typically they comprise soft clay and silt but can also contain lenses of sand, peat and gravel. The BGS geology map suggests that Shirdley Hill Sand may also still be present under the Made Ground of the landfill. The BGS Lexicon describes the Shirdley Hill Sand Formation to also have "peat layers in the lower part" (British Geological Survey, 2015). The distinction between what may be Shirdley Hill Sand or granular Alluvium can be difficult.

3.1.2. Solid Geology

The offline route is shown to be underlain predominantly by the Helsby Sandstone Formation of the Sellafeld Member (1 km²), with a short section in the southwest underlain instead by the Wilmslow Sandstone Formation (0.13 km²). Both are red-brown, fine to medium grained sandstones belonging to the Sherwood Sandstone Group. The Sidmouth Mudstone Formation underlies an area of the Sellafeld Member (0.13km²) at or near the centre of the site.

3.2. Published Hydrogeology

The superficial deposits contain both Shirdley Hill Sand which is designated by the Environment Agency as a Secondary A aquifer (previously a minor aquifer), and Alluvium which is designated as a Secondary Undifferentiated aquifer (previously described as either a minor or non-aquifer depending on the rock porosity).

The Sherwood Sandstone Group bedrock is designated as a Principal Aquifer, meaning that it is likely to provide a high level of water storage which "may support water supply and/or river base flow on a strategic scale". (Environment Agency, 2015).

3.3. Geotechnics Ltd 2015 Ground Investigation

Generally, the nature of the strata encountered during the 2015 ground investigation (see Section 2) are consistent with anticipated ground conditions. Strata summaries are given in Section 3.4. However, the extent of each stratum was not always consistent with available geological records for the area, which is discussed further in Section 4.2 of this report.

Table 3.1 below summarises the strata encountered during the 2015 ground investigation.

Interpreted geological long-sections are provided in Appendix B.

Table 3-1 2015 ground investigation strata summary

Stratum	Shallowest elevation encountered from (m AOD)	Deepest elevation encountered to (m AOD)	Location of maximum thickness	Maximum thickness proven (m)
Topsoil	18.38	6.94	WS08	0.90
Made Ground	17.98	4.03	CP2	9.20
Alluvium	15.08	-2.16	CP1	4.50
Peat	6.87	2.34	CP1	2.90
Shirdley Hill Sand (possible) *	12.02	6.68	CP4	2.10
Glacial Deposits (granular & cohesive)	13.48	-2.61	CP2	3.90
Bedrock (mudstone, sandstone)	9.48	3.63	CP4	2.77

(*) interpretation to be reconsidered after “detailed design” ground investigation

3.4. Strata Description

3.4.1. Topsoil

Topsoil was noted in sixteen of the exploratory holes on-site. The depth of topsoil is typically 0.15 to 0.40 m across the site, with one location recording thicker topsoil (0.90 m in WS08). At four locations grass is recorded as directly above the Made Ground, and no topsoil was recorded in these locations.

Topsoil is generally thicker in the eastern half of the site, with window samples WS05 to WS12 recording at least 0.3 m of topsoil and CP6 and CP7 recording at least 0.4 m. Topsoil was generally described as soft, dark brown, sandy silt or silty sand, with some brick or natural gravel content noted at five locations. Natural gravels typically comprised angular to subrounded, fine to coarse sandstone and other mixed lithologies.

3.4.2. Made Ground

Made Ground was found in all exploratory holes on site with the exception of boreholes WS12, CP6 and CP7. WS12 and CP7 are situated beyond the previously anticipated landfill boundary and CP6 is located just within.

The thickness of Made Ground was found to be comprised between 0.4 m and 9.2 m. The Made Ground is predominantly granular in nature, with only WS06 recording clay. Material descriptions are typically of a silty sand or sandy silt, usually gravelly, with occasionally high cobble content. The gravel and cobbles are occasionally natural rock but the Made Ground more typically comprise fragments of anthropogenic materials, including: brick, concrete, ash clinker, ceramic, timber, glass, plastic, metal, pottery, masonry, paper, newspaper, rope and bone.

3.4.3. Natural Strata

Natural deposits consisting of superficial deposits and bedrock were noted beneath the Made Ground on site. These consisted of sands, gravels, clays, silts and peat. These deposits are described below.

3.4.3.1. Alluvium

Granular Alluvium was interpreted from the records of ten exploratory hole locations, and generally comprised very loose, brown or yellowish / orangish brown, silty, fine to medium sand with occasional dark brown organic or peaty material. Pockets of cohesive material were recorded in CP1. Nineteen SPTs were undertaken in granular Alluvium, see section 3.5 below.

Cohesive Alluvium was interpreted from the records of two exploratory hole locations, and generally comprised soft dark grey to brown, sandy silt or organic clay. No SPTs were undertaken in cohesive Alluvium.

3.4.3.2. Shirdley Hill Sand

Possible Shirdley Hill Sand has been interpreted from records in four cable percussion boreholes, CP2, CP4, CP6 and CP7, and generally comprised brown to grey, occasionally organic, fine to coarse sand. Density descriptions range from very loose to medium dense. Three SPTs were undertaken in the interpreted Shirdley Hill Sand, one of these penetrated into the underlying sandstone bedrock, see section 3.5 below.

As indicated above, the distinction between what may be Shirdley Hill Sand deposits and granular alluvium can be difficult to make, and these materials will require additional more detailed consideration if the offline route is selected. Should the offline route be selected, the proposed interpretation will need to be reviewed in light of the additional information that will be collected during a “detailed design” phase of ground investigation as part of a later stage in the project, in particular as part of the geotechnical risk management process.

3.4.3.3. Peat

A band of very soft, spongy, dark brown Peat was encountered in CP1 and WS02. The two records show a 0.7 m to 2.9 m thick peat stratum between the elevations of +2 mOD and +7 mOD (top of stratum 2.30m to 4.30m below existing ground level). Although these records of Peat are confined to the south-west of the site, three Granular Alluvium descriptions (WS08, WS10 and WS12) and one Shirdley Hill Sand description (CP7) record organic material or peat and these locations are located across the site area.

3.4.3.4. Glacial Deposits

Granular Glacial Till is interpreted to have been encountered in five exploratory hole locations, and generally comprised medium dense, greyish brown, gravelly, fine to coarse sand with an occasional low cobble content or clay bands. Gravel is angular to rounded, fine to coarse of various lithologies. Eight SPTs were undertaken in granular Glacial Till, see section 3.5 below.

Cohesive Glacial Till is interpreted to have been encountered in five exploratory holes, and generally comprised firm to stiff, reddish brown, slightly sandy, slightly gravelly clay. Gravel is described as angular to subrounded, fine to coarse of various lithologies. Six SPTs were undertaken in the Cohesive Glacial Till, see section 3.5 below.

3.4.3.5. Bedrock

Weathered Sandstone was encountered in two exploratory holes CP4 and CP5 at a level of +6.68 mOD and +6.35 mOD, respectively. The weathered Sandstone is recorded as extremely weak greyish brown or reddish grey, fine to coarse grained sandstone and in CP4 it was recovered as sand and gravel. In both cases the borehole terminated within the weathered Sandstone, proving at least a 3.15 m thickness and the deepest borehole reaching +3.5 mOD. Five SPTs were undertaken in the Sandstone, see section 3.5 below.

Weathered Mudstone was encountered in three exploratory holes CP3, CP6 and CP7 and intact Mudstone was recorded in one location, CP3, underlying the weathered Mudstone. Weathered Mudstone is recorded as a stiff brown bluish grey gravelly clay to an extremely weak bluish or reddish brown mudstone recovered as gravel and clay. Mudstone is recorded as weak brown mudstone. Five SPTs were undertaken in the weathered Mudstone and Mudstone, see section 3.5 below.

3.5. Soil Properties

3.5.1. Standard Penetration Testing

Standard Penetration Tests (SPTs) were carried out during the GI to provide an indication of in situ density for granular materials and in situ stiffness for cohesive materials. The data has been categorised by material type, as described above and the results have been treated as follows:

- The raw SPT N values have been extrapolated for results which did not achieve a test depth penetration of 300mm within 50 blow counts.
- For tests in the superficial deposits where the initial 150 mm seating depth has not been achieved or where the extrapolated SPT exceeds 200 blows, the result has been omitted as it is likely that the test has encountered an obstruction which has given an unrepresentative result.
- For tests in the sandstone and mudstone, the number of blow counts was not limit for the extrapolation purposes and where the penetration of 150 mm was not achieved during the seating blows, an extrapolated N has been calculated based on the penetration for the final 50 blows reported. This is acceptable for this preliminary report but may be reassessed for future applications of the data.

In addition, two SPT results have been omitted from the summary as they have been interpreted as outliers:

- CP4 10m SPT N=125 in Shirdley Hill Sand, this is close to the sandstone bedrock
- CP3 2m SPT N=67 in Made Ground, this is likely to be the result of the gravel of limestone and clinker, rather than being a representative value (next highest SPT N=47)

Plots of the extrapolated SPT N values are provided in the Figures section at the end of this report and a summary of the results is given in Table 3-2. Results have been interpreted in accordance the guidance in Table 13 of BS5930:1999 and BS EN ISO 14688.

Table 3-2 Summary of extrapolated SPT N results

Stratum	No. of SPT results summarised (total)*	Range of SPT N values	Mean SPT N value	Material description at SPT test depth
Made Ground	65 (68)	0-47	11	Predominantly very loose to medium dense. Some dense to very dense.
Shirdley Hill Sand	2 (3)	2-18	10	Very loose to medium dense
Alluvium (Granular)	19 (19)	0-26	13	Very loose to medium dense
Alluvium (Cohesive)	No testing	No testing	No testing	-
Peat	1 (1)	n/a	1	Very soft
Glacial Till (Granular)	8 (11)	0-44	20	Very loose to very dense
Glacial Till (Cohesive)	6 (6)	14-31	22	Stiff to very stiff
Weathered Mudstone	4 (4)	68-306	197	-
Mudstone	1 (1)	-	240	-
Sandstone	5 (5)	240-300	278	-

* The total number of SPT results given in brackets includes test results which have been omitted from the plots for the reasons given above.

The SPT N values presented in this report are the ‘raw’ extrapolated test data and no corrections have been applied. Therefore, they may not be suitable for direct application to geotechnical design.

3.5.2. Hand Shear Vane testing

The three tests undertaken in WS03 are all within strata interpreted as cohesive Glacial Till. The results are reported as an average of the measurements made at each depth, and are 41 kPa and 95 kPa (intact), and 18 kPa (remoulded).

3.6. Discussion on Landfill Extent and Composition

A review of historical mapping for the proposed alternative route, identified the presence of a large landfill in the western section of the route, see Appendix F. A review of the Environment Agency (EA) website indicates that the site was known as Whabbs Tip and received commercial and household waste between 1951 and 1975. When compared to historical mapping the EA site indicates that Whabbs tip is shown to extend over a wider area than that shown on the historical maps.

The 2015 ground investigation indicates that the extent of Whabbs Tip is further to the south-west than originally indicated on the available mapping. The indicative extent of Made Ground likely to be associated with the landfill is confirmed in exploratory holes CP1, CP2, CP3, CP4, CP5, WS01, WS01A, WS01B, WS5, WS6, WS7, WS9 and WS10 and shown in Appendix F. Domestic refuse comprising a varying mixture of clinker, ash, glass, metal, plastic, timber, bone, cloth and paper was noted in CP3, CP5, WS6 and WS7 to a maximum depth of 8.7m (CP3). The remaining exploratory holes noted as containing landfill wastes comprised of ash, clinker, brick, concrete, glass, plastic, metal and ceramic. It was noted in the Envirocheck Report (Envirocheck Report, 2015) that there was industrial activity in the area around WS01 and WS01A, with which Made Ground in this area may be associated, rather than the landfill-related depositing activities. The greatest thickness of Made Ground was noted as 9.20 m in CP2.

Groundwater was noted in the Made Ground, and is further discussed in Section 3.7.

3.7. Groundwater

3.7.1. Groundwater Strikes During Investigation

Groundwater was noted during drilling in several exploratory holes throughout the GI. A summary of the groundwater strikes is shown in Table 3-3 below.

Table 3-3 Summary of groundwater strikes during GI

Exploratory Hole	Groundwater strike depth (m bgl)	Strata encountered	Depth risen to after 20 mins (m bgl)
CP1	0.50	Made Ground	0.40
CP2	6.90 9.20	Made Ground Made Ground/ Shirdley Hill Sand boundary	DNR 8.75
CP3	8.70	Made Ground/ Alluvium boundary	7.20
CP4	7.90	Made Ground	7.10
CP5	4.75 7.60 8.75 9.00	Made Ground Glacial Till (cohesive) Glacial Till (cohesive) Glacial Till (cohesive)	4.50 7.45 DNR 8.70
CP6	2.80	Glacial Till (cohesive)/ Weathered Mudstone boundary	2.30

Exploratory Hole	Groundwater strike depth (m bgl)	Strata encountered	Depth risen to after 20 mins (m bgl)
CP7	1.20	Alluvium (granular)	1.15
WS01A	1.20	Made Ground	DNR
WS03	3.00	Glacial Till (cohesive) / Glacial Till (granular) boundary	WS
WS06	5.00	Made Ground	NR
WS08	3.00	Made Ground	NR
WS09	5.25	Made Ground/ Alluvium boundary	NR
WS10	2.10	Alluvium (granular)	2.05
WS11	1.85 3.30	Glacial Till (cohesive) Glacial Till (cohesive)	WS NR
WS12	2.00	Alluvium (granular)	NR

DNR= Did not rise
WS= Wet stratum
NR=Not reported

3.7.2. Groundwater Monitoring

Three rounds of groundwater level monitoring was carried out after completion of the GI site works. The groundwater levels in each installation are summarised in Table 3-4 for each round of monitoring.

Table 3-4 Summary of ground water monitoring

Exploratory borehole	Filter zone depth (m bgl)	Screened Strata	Round 1 20/10/15 m bgl (mAOD)	Round 2 3/11/15 m bgl (mAOD)	Round 3 19/11/15 m bgl (mAOD)
CP1	5.4-10.15	Alluvium (granular) & Glacial Till (granular)	0.17 (7.37)	Artesian (7.54+)	Artesian (7.54+)
CP2	5.85-8.00	Made Ground	8.00 (8.91)	DRY	8.00 (8.91)
CP4	6.10-8.30	Made Ground & Shirdley Hill Sand	6.51 (10.47)	6.48 (10.50)	6.54 (10.44)
CP5	6.75-8.90	Glacial Till (cohesive)	6.47 (9.13)	6.42 (9.18)	6.51 (9.09)
CP6	1.00-2.80	Alluvium (granular) & Glacial Till (cohesive)	1.80 (10.48)	1.73 (10.55)	1.28 (11.00)
CP7	4.90-7.20	Weathered Mudstone	1.26 (11.16)	1.08 (11.34)	0.98 (11.44)
WS02	1.00-3.00	Made Ground	3.00 (8.17)	3.00 (8.17)	3.00 (8.17)
WS05	3.00-5.00	Made Ground	5.00 (13.38)	5.00 (13.38)	4.99 (13.39)
WS06	2.70-5.70	Made Ground	5.26 (8.73)	5.30 (8.69)	5.28 (8.71)
WS09	0.80-3.80	Made Ground	3.50 (12.87)	DRY (n/a)	Flooded (16.37+)
WS10	0.90-2.00	Made Ground	1.78 (9.02)	1.70 (9.10)	1.51 (9.29)

4. Hazards and Risks

4.1. Geoenvironmental and Contaminated Land Discussion

4.1.1. Human Health

Detailed guidance on human health risk assessment is available in Science Report SR2 (Science Report 2), SR3 (Science Report 3, 2009) and the Contaminated Land Exposure Assessment (CLEA) Model v1.04 and v1.06 model. The Generic Quantitative Risk Assessment (GQRA) for identified human receptors has compared soil concentration data with Generic Assessment Criteria (GAC) to identify whether a potential risk is posed by the contaminant concentrations detected. The GAC are considered to include:

- **Soil Guideline Values:** The Environment Agency has published Soil Guideline Values (SGVs). SGVs are appropriate for screening out low risk areas of land contamination. They give an indication of representative average concentrations of chemicals in soil below which the long-term health risks are likely to be minimal. SGVs are available for arsenic, cadmium, mercury, nickel, selenium, benzene, toluene, ethylbenzene and xylenes (BTEX), phenols, and dioxins, furans and dioxin-like PCB substances for residential, allotments and commercial land-uses. The SGVs have been developed for a sandy loam soil with 6% soil organic matter (SOM) content;
- **Atkins' Soil Screening Values:** Atkins has derived a set of Soil-Screening Values (SSVs) to supplement the SGVs following the CLEA Model. Atkins'-derived SSVs are available for the CLEA standard land-uses listed above for a wider range of typical indicator contaminants. SSVs have also been derived for a sandy soil with 1% SOM and for parks, playing fields and open spaces; and
- **Category 4 Screening Values (C4SLs)** have recently been published for six contaminants (benzo (a) pyrene, benzene, lead, arsenic, cadmium and chromium) by DEFRA (DEFRA, 2014). The Statutory Guidance, 2012 includes four categories of contaminated land, ranging from Category 4 (low risk) to Category 1 (significant / high risk). C4SLs are low risk levels which are not representative of significant possibility of significant harm (SPoSH) and as such, if the C4SLs are not exceeded, land can be demonstrated as being in Category 4 and cannot be determined as contaminated land. To be suitably conservative only the C4SL for arsenic, hexavalent chromium and lead has been utilised in this assessment as all other values are higher than GAC used by Atkins.
- **Suitable for Use Levels (S4ULs):** In the absence of a SGV, SSV or C4SL for nickel the Land Quality Management Ltd (LQM) S4UL for nickel has been selected as a GAC. The S4UL is based on a sandy loam soil as defined in SR3 (Science Report 3, 2009) with 6 % SOM.

4.1.1.1. Soil Results

Representative soil samples were collected from each strata type and across a range of depths for environmental analysis. Atkins Soil Screening Values (SSVs) are used as GAC to screen the soil data and assess whether it poses a significant risk to human health.

The criteria values differ depending on the site situation and the soil organic matter (SOM) for a site. A total of 28 samples were analysed for SOM, with recorded values ranging from 0.2% to 68.4%. Of these samples 16 samples recorded SOM greater than 6%, with an average for all samples of 15.9%. Based on this information and given the low sensitivity of the end use it is not unreasonable to use SOM value of 6 % for this site. Due to the general use of the site as an area of open park land, the land use was judged to be best represented by the term Open Space. Therefore the appropriate criteria would be 6 % Open Spaces for analysing the soil data for this site.

Only six contaminants were found to exceed their GAC concentrations, these are summarised in Table 4-1 below.

Out of a total of 50 samples scheduled for analysis, elevated arsenic, lead and four PAHs were recorded. In all cases, exceedances were only marginally over their respective GAC concentrations. The majority of the recorded exceedances were from boreholes located within the central and southern areas of the landfill site area. Asbestos was recorded in nine of the 50 samples scheduled for asbestos identification. The exploratory holes where asbestos was recorded include WS01B (0.5m, 1.0m) to the extreme south of the site outside the

landfill area, WS2 (0.5m), on the southern boundary of the landfill, and WS09 (1.0m), CP2 (1.0m, 2.0m, 3.0m) and CP3 (2.8m, 8.7m) located within the landfill area itself.

Table 4-1 Soil Exceedances of the Open Space GAC

Contaminant	SSV concentration (mg/kg) unless otherwise stated	No of Samples	No of Exceedances	Maximum exceedance (mg/kg)	Borehole name and depth of exceedance (m bgl) [maximum exceedance location highlighted bold]
Arsenic	C4SL value: 79	50	3	190	WS07 – 3.5-3.7, CP1 – 0.2 , CP1 – 0.5
Lead	C4SL value: 630	50	7	3055	WS01B – 1.0, WS02 – 1.0, WS04 – 4.0-4.7, WS08 – 1.8-2.0, CP1 – 0.5, CP1 – 1.0, CP1 – 2.0
Benzo(a)anthracene	37.7	50	1	44.68	WS05 – 5.0-5.6
Benzo(a)pyrene	4.2	50	8	40.83	CP2 – 1.0, CP4 – 1.0 , CP4 – 4.0, CP4 – 6.0, WS02 – 1.0, WS05 – 2.3-2.5, WS08 – 1.8-2.0, WS10 – 1.0
Dibenzo(ah)anthracene	4.48	50	1	7.83	CP4 – 1.0, WS05 – 2.3-2.5
Benzo(b)fluoranthene	40.7	50	2	55.53	WS05 – 2.3-2.5

4.1.1.2. Photo Ionisation Screening (PID) Results

During the course of the ground investigation works PID readings were taken on all soil samples collected for analysis. Testing was undertaken to provide real time site data on the presence of volatile organic compounds (VOCs) and to assist in scheduling samples for analysis. All results that were greater than the detection limit of 0.1 ppm are summarised in Table 4-2 below.

The majority of PID results were minor (0.1 ppm or less), however there were some more elevated concentrations recorded (>5 ppm) in the Made Ground at boreholes CP1, CP2, CP3, CP4, and window samples WS01B and WS07. Elevated concentrations were also recorded in the superficial deposits of CP1, CP6 and CP7. The recorded PID results do not indicate that large quantities of waste containing volatiles were disposed within sampling locations. Elevated concentrations in the superficial deposits coincide mainly with granular Alluvium or cohesive Glacial Till and the possible Shirdley Hill Sands. Some organic material was recorded in the granular Alluvium of CP7.

Table 4-2 Summary of PID Results

Exploratory Hole No	PID Result (ppm)	Depth (m bgl)	Strata encountered	Visual / Olfactory Evidence
CP1	9.2	0.5	Made Ground	Clinker, glass, ceramic and bone
CP1	18.2	1.0	Made Ground	
CP1	12.2	2.0	Made Ground	

Exploratory Hole No	PID Result (ppm)	Depth (m bgl)	Strata encountered	Visual / Olfactory Evidence
CP1	17.9	3.0	Peat	-
CP2	12.7	3.0	Made Ground	Ash and clinker
CP2	9.8	4.0	Made Ground	Brick, concrete, timber and plastic
CP2	6.0	5.0	Made Ground	
CP3	13.7	1.0	Made Ground	-
CP3	18.4	2.5	Made Ground	Clinker
CP3	18.0	3.5	Made Ground	Clinker, glass, metal, plastic, timber and domestic refuse
CP3	17.0	4.8	Made Ground	
CP3	16.3	6.0	Made Ground	
CP3	14.2	7.0	Made Ground	
CP3	5.7	8.0	Made Ground	
CP4	18.2	3.0	Made Ground	Ash, brick and concrete
CP4	37.0	4.0	Made Ground	
CP4	23.1	5.0	Made Ground	Ash, plastic, metal and timber. Soft white paste at 7.3 – 7.9 m bgl
CP4	34.0	6.0	Made Ground	
CP4	15.8	7.0	Made Ground	
CP4	15.8	8.0	Made Ground	
CP4	13.4	8.3	Shirdley Hill Sand	-
CP6	18.3	0.2	Topsoil	-
CP6	16.2	0.3	Topsoil	-
CP6	20.1	1.0	Shirdley Hill Sand/ Alluvium (granular) boundary	-
CP6	18.5	1.5	Alluvium (granular)/ Glacial Till (cohesive) boundary	-
CP6	18.0	2.5	Glacial Till (cohesive)	-
CP7	53.4	0.2	Topsoil	-
CP7	64.4	0.5	Shirdley Hill Sand	-
CP7	66.6	1.0	Alluvium (granular)	-
WS01A	0.7	0.2	Made Ground	Brick
WS01A	0.3	0.3	Made Ground	Brick and concrete
WS01A	1	1.0	Made Ground	<i>Creosote odour</i>
WS01B	3.1	0.2	Made Ground	Brick
WS01B	47.2	0.5	Made Ground	Brick, concrete, glass, plastic, metal and ceramic
WS01B	205.0	1.0	Made Ground	
WS02	1.5	0.2	Topsoil/ Made Ground boundary	-
WS02	2.5	0.5	Made Ground	Ash, clinker and brick
WS02	2.7	1.0	Made Ground	
WS02	1.0	1.7 – 2.0	Made Ground	
WS02	0.1	2.7 – 3.0	Made Ground	

Exploratory Hole No	PID Result (ppm)	Depth (m bgl)	Strata encountered	Visual / Olfactory Evidence
WS02	0.9	3.7 – 4.0	Alluvium (granular)	-
WS02	1.1	4.7 – 5.0	Peat	-
WS03	0.3	0.2	Made Ground	Ash, concrete, brick and rope
WS03	0.3	1.0	Alluvium (granular)	-
WS03	0.3	1.4 – 1.7	Alluvium (granular)	-
WS03	0.9	4.2 – 4.7	Granular Till (cohesive)	-
WS04	0.3	1.0	Made Ground	-
WS04	0.4	1.5 – 1.8	Made Ground	Ash, clinker, brick and glass
WS04	1.6	2.4 – 2.7	Made Ground	Ash
WS04	0.4	4.0 – 4.7	Made Ground	Ash, clinker, brick and glass
WS04	0.3	5.0 – 5.7	Made Ground	
WS05	1.7	0.2	Topsoil	-
WS05	0.5	0.5	Made Ground	Ash, clinker, brick, glass and pottery
WS05	0.6	1.3 – 1.5	Made Ground	
WS05	0.6	2.3 – 2.5	Made Ground	
WS05	1.6	3.3 – 3.5	Made Ground	-
WS05	0.6	4.0 – 4.3	Made Ground	Brick
WS05	0.5	5.0 – 5.6	Made Ground	Brick and clinker
WS06	0.5	0.2	Topsoil	Brick
WS06	0.4	0.5	Made Ground	Plastic, metal, brick and concrete
WS06	0.4	1.0	Made Ground	Brick and concrete
WS06	0.2	1.4 – 1.9	Made Ground	Ash, clinker, brick and concrete
WS06	0.8	1.9 – 2.5	Made Ground	Ash and 7 mm long fibres
WS06	0.5	3.0 – 3.7	Made Ground	Ash, brick, glass and concrete
WS06	0.5	4.0 – 4.5	Made Ground	
WS06	0.6	5.0 – 5.7	Made Ground	Ash, brick, glass and concrete
WS07	0.2	0.2	Topsoil	-
WS07	0.7	0.5	Made Ground	Brick and concrete
WS07	17.0	1.0	Made Ground	Domestic refuse: ash, paper, plastic, glass, ceramic, fabric and timber
WS07	8.4	1.5 – 1.7	Made Ground	
WS07	7.1	2.5 – 2.7	Made Ground	
WS07	2.4	3.5 – 3.7	Made Ground	
WS07	16.4	4.0 – 4.5	Made Ground	
WS07	1.6	5.3 – 5.65	Made Ground	Timber
WS07	1.4	5.65 – 6.0	Alluvium (granular) and Glacial Till (cohesive)	-
WS10	2.5	1.8 – 1.95	Made Ground	Plastic and paper

4.1.2. Controlled Waters

The screening criteria selected for controlled waters assessment are dependent on the nature of the receptors. The underlying Shirdley Hill Sand is classified as a Secondary A aquifer and the bedrock is classified as a Principal Aquifer. They are therefore considered to be potential receptors to contamination derived from the site. There are two surface water features close to / on-site. The Leeds and Liverpool Canal runs along the western boundary of the site, and Rimrose Brook runs through the centre of the southern half of the site. The proximity and on-site status of these two water bodies therefore requires that these are considered as potential receptors. On this basis soil-derived leachate and groundwater samples have been screened against Environment Quality Standards (EQS), and/or UK Drinking Water Standards (DWS) (Water Quality Regulations, 2000) where no EQS are available. These standards are collectively termed 'Water Quality Standards' (WQS).

Certain metals toxicity varies with hardness concentration within a surface water body. Hardness as CaCO₃ was therefore analysed for to determine the correct screening values for these determinands.

The hardness value was analysed in four surface water samples and the geometric mean value of the four concentrations was calculated to give an overall hardness value of 260.77 mg/l. The results from this screening assessment are summarised in Table 4-3 below.

4.1.2.1. Soil Leachate

A total of five soil samples were scheduled by Atkins for soil leachate analysis from soil samples recovered from window samples WS01A, WS07, WS06 and two from WS04. Those results which exceeded the screening values are presented in Table 4.3 below.

Table 4-3 Summary of Soil Leachate Screening Results

Contaminant	EQS (µg/l unless stated otherwise)	No of Exceedances	Maximum exceedance (µg/l)	Borehole name [maximum exceedance location highlighted bold]
Arsenic	10*	1	10.1	WS07 – 1.00
Cadmium	0.15	5	0.78	WS07 – 1.00, WS04 – 3.30-3.70, WS04 – 4.00-4.70, WS06 – 1.00, WS06 – 4.00-4.50
Lead	7.2	1	8.7	WS07 – 1.00
Nickel	20	1	50.5	WS07 – 1.00
Zinc	75	1	514.4	WS07 – 1.00
Mercury	0.05	3	1.36	WS06 – 1.00, WS04 – 3.30 – 3.70, WS07 – 1.00
Fluoranthene	0.1	1	0.68	WS07 – 1.00
Benzo (a)pyrene	0.01*	4	0.24	WS06 – 1.00, WS04 – 3.30-3.70, WS04 – 4.00-4.70, WS07 – 1.00
Sulphate	250 mg/l	1	308.78	WS04 – 4.00-4.70
Free Cyanide	1.00	1	10	WS07 -1.00

*DWS value used

Elevated concentrations of arsenic, cadmium, lead, nickel, zinc, mercury, fluoranthene, benzo (a)pyrene, sulphate and free cyanide were measured at locations across the whole site. For three of these contaminants (zinc, nickel and free cyanide) significant exceedances over the GACs were recorded. The remainder of the exceedances do not greatly exceeded their GAC concentrations. Such recorded concentrations are considered to be typical of a domestic landfill site.

4.1.2.2. Groundwater

Groundwater samples were retrieved from six exploratory holes. The results of the groundwater samples were screened against the EQSs and the results are summarised in the table below.

Table 4-4 Summary of Controlled Water Screening Results ($\mu\text{g/l}$ unless stated otherwise)

Contaminant	EQS ($\mu\text{g/l}$)	No of Exceedances	Maximum exceedance ($\mu\text{g/l}$)	Borehole name [maximum exceedance location highlighted bold]
Arsenic	10*	2	18.5	CP4 , CP5
Boron (Dissolved)	1000	1	2532	CP4
Cadmium (Dissolved)	0.15	4	0.9	CP1, CP4, CP5 , CP7
Copper (Dissolved)	10	1	13	WS10
Iron (Dissolved)	200*	4	41840	CP1, CP4, CP6, WS10
Nickel (Dissolved)	20	1	29	CP5
Anthracene	0.1	1	0.39	CP4
Fluoranthene	0.1	1	0.76	CP4
Benzo(a)pyrene	0.01	3	0.03	CP4, CP5 , WS10
Phenol	0.5*	1	2	WS10
Sulphate	400 mg/l	1	503.45 mg/l	CP1
Ammoniacal Nitrogen as N	0.6 mg/l	3	240.7 mg/l	CP4 , CP5, WS10
Sum of Benzo(b)fluoranthene & Benzo(k)Fluoranthene	0.03	2	0.04	CP5 , WS10

*DWS value used

The exceedances noted in general from both leachate and groundwater analysis do not indicate highly elevated toxic metal or metalloid contamination and there is no evidence currently of widespread contamination by PAHs, TPH or VOCs.

It is notable that highly elevated iron and ammoniacal nitrogen concentrations have been encountered within groundwater from boreholes impacted by the presence of domestic wastes. The elevated results for both of these determinands are therefore almost certainly as a result of the presence of domestic wastes and it would be assumed that these will be encountered across the site if a further more detailed investigation of soil and groundwater is undertaken.

4.1.2.3. Surface Water

Surface water samples were retrieved from four locations across the site. No results in the surface water screening exceeded the respective EQSs. However, SW1 exceeds the DWS threshold for iron (200 $\mu\text{g/l}$), as it is recorded as 274 $\mu\text{g/l}$. This result is in all likelihood due to the presence of leachate derived from domestic wastes leaching into surface waters in proximity to this location.

4.1.3. Ground Gas Regime

Three rounds of ground gas monitoring were undertaken over a period of six weeks. Full results are included in Appendix D. Elevated levels of methane (>0.1 %) were recorded in five of the 11 boreholes that were installed on-site. The maximum methane recorded was 37 %v/v in CP4 on 3 November 2015. Carbon dioxide (CO₂) was recorded above the level of detection (0.1 %v/v) at eight of the installed boreholes. The maximum value recorded was 35 %v/v in CP4 on 3 November 2015. The lowest barometric pressure recorded during the three monitoring visits was on 3 round of monitoring where it was recorded at 1001 mmbar and therefore as this level is above 1000 mmbar these results may not represent the worst case conditions.

The monitoring results were screened in accordance with guidance given within CIRIA report C665 (CIRIA 665, 2007) which categorises the risks associated with a site according to its overall gas screening value (GSV). The calculation for the GSV is shown in the equation below.

$$GSV(l/hr) = \text{maximum borehole flow rate (l/hr)} \times \text{maximum gas concentration (\%)}$$

This GSV is used to assess the risk posed by ground gas to the site and the need for potential protection measures for any infrastructure on a site. The results from this monitoring is summarised in Table 4-5.

Review of the ground levels recorded and the derivation of GSVs indicate that compared with the guidance contained within CIRIA 665, the GSVs based on the data set currently available at the site represent a 'low risk' or characteristic situation (CS) 2.

Elevated levels of CO₂ and CH₄ were recorded at CP4 and CP5. Elevated levels of CO₂ recorded at WS05, WS06, WS09 and WS10 and elevated levels of CH₄ at WS09.

Table 4-5 Ground Gas Screening Results

Exploratory Hole	Minimum Oxygen (%)	Maximum Carbon Dioxide (%)	Maximum Methane (%)	Peak Flow (l/hr)	Individual GSV based on Borehole Readings	Overall Site GSV (worst case)
CP1	Artesian Water Level					CO₂ GSV: 0.49 CH₄ GSV: 0.53
CP2	20.8	0.4	0	1.0	0.0040	
CP4	0.9	35.0	38.0	1.4	0.5320	
CP5	17.9	9.4	5.5	1.1	0.1034	
CP6	20.9	0	0	0	0.0001	
CP7	21.4	0	0	0	0.0001	
WS02	18.3	3.5	0	0.6	0.0210	
WS05	12.2	8.3	0	0	0.0083	
WS06	1.9	25	0.4	0.3	0.0750	
WS09	0.8	30	34.5	1.4	0.4830	
WS10	3.3	18	4.3	0.3	0.0540	

GSV	Risk Classification	Characteristic Situation
<0.07	Very low risk	1
<0.7	Low risk	2
<3.5	Moderate risk	3
<15	Moderate to high risk	4
<70	High risk	5
>70	Very high risk	6

The ground gas regime based on the current limited data set does not indicate an elevated risk with regard to the construction of a road and indicates a low level of risk to residential housing located close to the site. The ground gas regime is indicative of a domestic waste landfill where deposits have undergone significant breakdown. These conditions are not unexpected as it is understood that the site last accepted domestic waste over 30 years ago.

Although not considered a significant constraint to the proposed development, appropriate management will be required to ensure safe working conditions for construction staff and to prevent creation of preferential pathways, i.e. along service runs for the off-site migration of such gases.

4.1.4. CAT Waste

Site-won materials which are deemed unsuitable for reuse on engineering or environmental grounds are strictly classified as waste and should be disposed of in accordance with current guidance and regulations.

Atkins, in conjunction with McArdle, has developed the Waste Soils Characterisation Assessment Tool (CAT-WASTESOIL) (Atkins and McArdle, 2014) which follows current regulations / guidance and provides a preliminary indication of whether or not soils are likely to be considered hazardous waste (if removed from site for disposal).

Reported concentrations of contaminants from the 52 soil samples taken during the ground investigation were entered into the CAT-WASTESOIL tool to provide an initial indication of possible waste class. Full results are included in Appendix E.

The output of the CAT-WASTESOIL tool indicates that some of the material likely to be encountered on site would be classified as containing hazardous wastes. Ten samples taken from WS01B, WS05, WS06, and WS07 exhibited hazardous concentrations of zinc, copper, benzo(a)anthracene and lead. The CATWaste tool does not include an assessment of waste class due to the presence of asbestos, which was recorded in nine samples from CP2, CP3, WS09 and WS01B. Presence of asbestos above 0.1% of soil mass would result in waste material being classified as hazardous waste. Further advice should be sought from an asbestos specialist to ascertain risks and mitigation measures required in relation to the asbestos recorded.

Further testing and assessment of spoil generated during the excavation phase of the construction works, including waste acceptance criteria (WAC) tests, will be required to fully characterise the soils in accordance with waste management procedures and to determine the potential for reuse of soils excavated as a result of the potential construction of a road.

The results of the CAT-WASTESOIL assessment are provided in Appendix E.

4.2. Geotechnical Discussion

4.2.1. Ground Conditions

At the time of writing, borehole descriptions, SPT N data and a small number of in situ shear vane tests are available from the site specific ground investigation. Eurocode 7 recommends that the use of SPT data "should be restricted to a qualitative evaluation of the soil profile or to a qualitative estimate of the strength properties of the soil". (BS EN 1997-2, 2007)

Strength and density descriptions have been assigned to each strata according to the range of SPT results in Table 3-2.

4.2.1.1. Superficial Deposits

Three exploratory holes were terminated prematurely in the 500 m stretch between south-west of the Port Roundabout (chainage 0) and the southern edge of Whabb's Tip due to the presence of concrete and other obstructions. Moving north, CP1 and WS02 were drilled successfully and confirmed expected ground conditions of generally Made Ground overlying granular Alluvium and Peat. Granular Glacial Till was also encountered at the base of CP1.

The thickness of landfill materials within Whabb's Tip typically exceeds 5 m and is recorded to a maximum depth of 9.2m bgl in CP2. Shirdley Hill Sand was anticipated to underlie the Made Ground and some instances of possible Shirdley Hill Sand have been interpreted, approximately along the line of proposed offline route (CP2, CP4, CP6 and CP7). As indicated above, the distinction between what may be Shirdley Hill Sand deposits and granular alluvium can be difficult to make, and these materials will require additional more detailed consideration if the offline route is selected. Should the offline route be selected, the proposed interpretation will need to be reviewed in light of the additional information that will be collected during a

“detailed design” phase of ground investigation as part of a later stage in the project, in particular as part of the geotechnical risk management process.

Alluvium or Glacial Till have also been identified underlying the Made Ground.

The density of the Made Ground and the granular superficial deposits is highly variable, ranging from very loose to very dense. Loose or loose material has been noted to the maximum depth of the landfill.

Peat was encountered up to 3 m thick in the west of the site and available geology maps suggest that Peat may also be present both north and south of this. Where encountered, Peat was noted to be very soft.

The cohesive Glacial Till is indicated to be stiff to very stiff, which is consistent with the borehole descriptions. The Glacial Till does not form a coherent stratum across the site, suggesting previous erosion prior to deposition of the shallower superficial deposits.

4.2.1.2. Bedrock

Sandstone is noted to underlie the cohesive Glacial Till in the zone where Mudstone was anticipated to underlie the Sandstone from available geological mapping information. Neither of the boreholes recording Sandstone (CP4 and CP5) encountered Mudstone, with the deepest (CP4) penetrating approximately 3 m into the Sandstone.

Boreholes which have recorded Mudstone (CP3 and CP6) are on the boundary of where this stratum is shown on the geological map. However, CP7 records Mudstone approximately 0.6 km north-east of where it is indicated on the published map. Furthermore, Sandstone was not shown to overly the Mudstone in these three locations. Neither was there any evidence that the Sandstone had been previously removed, e.g. deep Made Ground.

From the data collected it is not possible to identify how the Sandstone and Mudstone layers interact, but it is expected that the observed Sandstone forms part of the Sellafeld Member whilst the Mudstone is likely of the Sidmouth Mudstone Formation.

4.2.2. Groundwater Conditions

Groundwater strikes in the area of Whabb's Tip were common towards the base of the Made Ground, with strikes generally recorded at a depth of 7 to 8 m below ground level in boreholes (CP2, CP3, CP4 and CP5) and 3 to 5 m below ground level in window sample holes (WS03, WS08 and WS09). Outside of Whabb's Tip there were eight water strikes at much shallower depths, ranging from 0.50 to 3.30 m below ground level and averaging 1.90 m deep. These were encountered in a range of natural superficial deposits.

The Made Ground is predominantly granular, allowing run off to percolate through this strata, down to the level at which the strikes were recorded. The measurements taken twenty minutes after each strike suggest that, in general, the water in the Made Ground either remains static or dissipates after the surrounding ground has been disturbed.

Groundwater monitoring undertaken between 20 October 2015 and 19 November 2015 indicates relatively stable groundwater levels in each exploratory hole where a piezometer was installed. These levels are reflected on the geological cross-sections provided in Appendix B. The monitoring appears to indicate the presence of an established groundwater table located within an elevation range between 7.50mOD and 10.50mOD. Given the relative elevations of the various exploratory holes, particularly CP1 towards to the south of Whabbs Tip, this could explain the presence of high groundwater levels in the area to the south of Whabbs Tip. Groundwater monitoring ought to be continued in order to establish how influenced these levels are by seasonal variations.

5. Conclusions / Recommendations

5.1. Environmental Conclusions

A preliminary assessment for the offline route of the A5036 has been carried out in order to better characterise the environmental properties of the deposits present within the Rimrose Valley Park. Soil, leachate, groundwater, surface water and ground gas analysis and monitoring from the 21 exploratory holes advanced on-site have resulted in the following conclusions:

- The extent of the Whabbs Tip landfill site appears to extend further to the south west than originally thought and this will need to be borne in mind in order to determine the impact this will have on design of the road within this area.
- Based on the Atkins derived SGVs certain soil samples from the site failed due to heavy metal exceedances. These exceedance results are unlikely to pose a significant risk to human health for on-site users due to the minor nature of the exceedance.
- Analysis of leachate, surface water and groundwater samples indicates that the majority of contaminants are unlikely to pose a significant risk to surface waters or groundwater even where the results were elevated above the screening criteria. The exceptions are iron and ammoniacal nitrogen which are present within leachates and groundwater at levels and will have a detrimental impact. It would be expected that this impact would be most marked within surface water samples. Provision of impermeable liners may therefore be an option which should be considered for Rimrose Brook and ponds within the site if a road is to be constructed in this general area.
- Ground gas was monitored three times from the installed exploratory holes. Concentrations of CO₂ and CH₄ and the flow measurements were analysed using the ground gas screening sheet and the site given a CS₂ value. Appropriate gas mitigation measures will be required for construction of drainage and service runs.
- CAT Waste analysis of the soil results show that any unsuitable material proposed for off -site disposal may contain hazardous substances and should therefore be disposed of accordingly. Overall the current limited data set does not indicate the site represents a serious risk to current users of the site with respect to human health or to surrounding residential areas from ground gas although further investigation will be necessary if the offline route is selected. It is also notable that in a large number of locations domestic waste was not present within Made Ground (more typically ash, clinker, brick and concrete with paper and wood or the domestic waste was encountered at deeper depths (3.0m below ground level or deeper). It may therefore be possible, subject to more detailed testing, to excavate and reuse near surface materials within the proposed construction scheme, for example to form noise bunds.

5.2. Geotechnical Conclusions

Extensive testing in the Made Ground and granular superficial deposits has demonstrated very significant variability in the density of these strata, suggesting that they would likely be unsuitable as a founding stratum unless treated. A thick band of peat in the southwest of the offline route will also represent an unsuitable founding stratum, the lateral extents and thickness of which will require further investigation.

Although the variable and potentially weak deposits are underlain by more competent strata (Glacial Till, Sandstone and/or Mudstone), these materials were proven to lie at depth in the area of Whabb's tip. A conventional 'dig and replace' approach could be uneconomical in this instance due to the large volumes of material that may require disposing of, and resulting subsequent material importing volumes.

Possible engineering solutions such as ground improvement (for example deep soil mixing or stone columns), or spanning the areas of weak ground using piles, may be feasible for the section of the road along this route. The chosen solution would also need to be compatible with the environmental findings (e.g. minipiles must resist potentially aggressive ground conditions and stone columns may not be suitable if creation of pathways is a concern).

The ground water regime would also present some technical challenges in the southern part of the site where groundwater levels were observed to be high during the ground investigation works and subsequent monitoring. The groundwater monitoring data collected so far indicates that groundwater levels in the southern part of the site are likely to remain high, due to the possible presence of an established groundwater table within the landfill, which is within a range of levels close to the existing ground level in the southern part of the site. Temporary and permanent site drainage measures in this part of the site would need to be considered very carefully. High groundwater levels could also affect temporary works significantly, particularly if excavations are considered. Significant dewatering measures may be required in order to form excavations and maintain their stability.

5.3. Recommendations

In the event that the offline route is to be progressed further it is recommended that the piezometers installed in the exploratory holes during the recent ground investigation works continue to be monitored over a period of a few months (at least one year), to establish a baseline for ground gas and groundwater data and gain an understanding into the possible effects of seasonal variations on the ground gas and groundwater regimes observed so far.

Should the offline route be selected, further ground investigation works will be necessary to better assess the potential risks currently posed by the site and to support a future optioneering process to determine a suitable engineering solution.

Further investigation should be designed in order to:

- further characterise the ground conditions, in particular
 - determine the extent of the Peat in the south-west of the site, and
 - refine the interpretation of the superficial strata, in particular the distinction between Shirdley Hill Sand and granular alluvium deposits, and
 - investigate the discrepancies between the bedrock proven in preliminary ground investigation and the bedrock shown geology maps, and
 - determine the boundaries of Whabb's tip more fully;
- gain a better understanding of the hydrogeological regime on-site and how it may be affected in the long-term;
- assess the potential risks to controlled water receptors;
- refine the depth and extent of made ground and in particular the spatial extent of domestic waste;
- assist in the development of an appropriate reuse and disposal strategy, and determine whether a proportion of materials excavated to allow construction of the road can be reused within the construction of wider infrastructure within the proposed scheme;
- provide a comprehensive assessment of potential health and safety issues associated with construction works.

Also, it is to be noted that the recent ground investigation works have only focussed on the area within and in proximity to the Whabbs Tip, due to land access restrictions and because the main objective of these works was to gain a better understanding of ground and groundwater conditions within and close to the footprint of this historical landfill. Further ground investigation works will be required to assess ground and groundwater conditions further north and north-west, in the section of the offline route between the northern boundary of the area which has been investigated and Switch Island.

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Figures



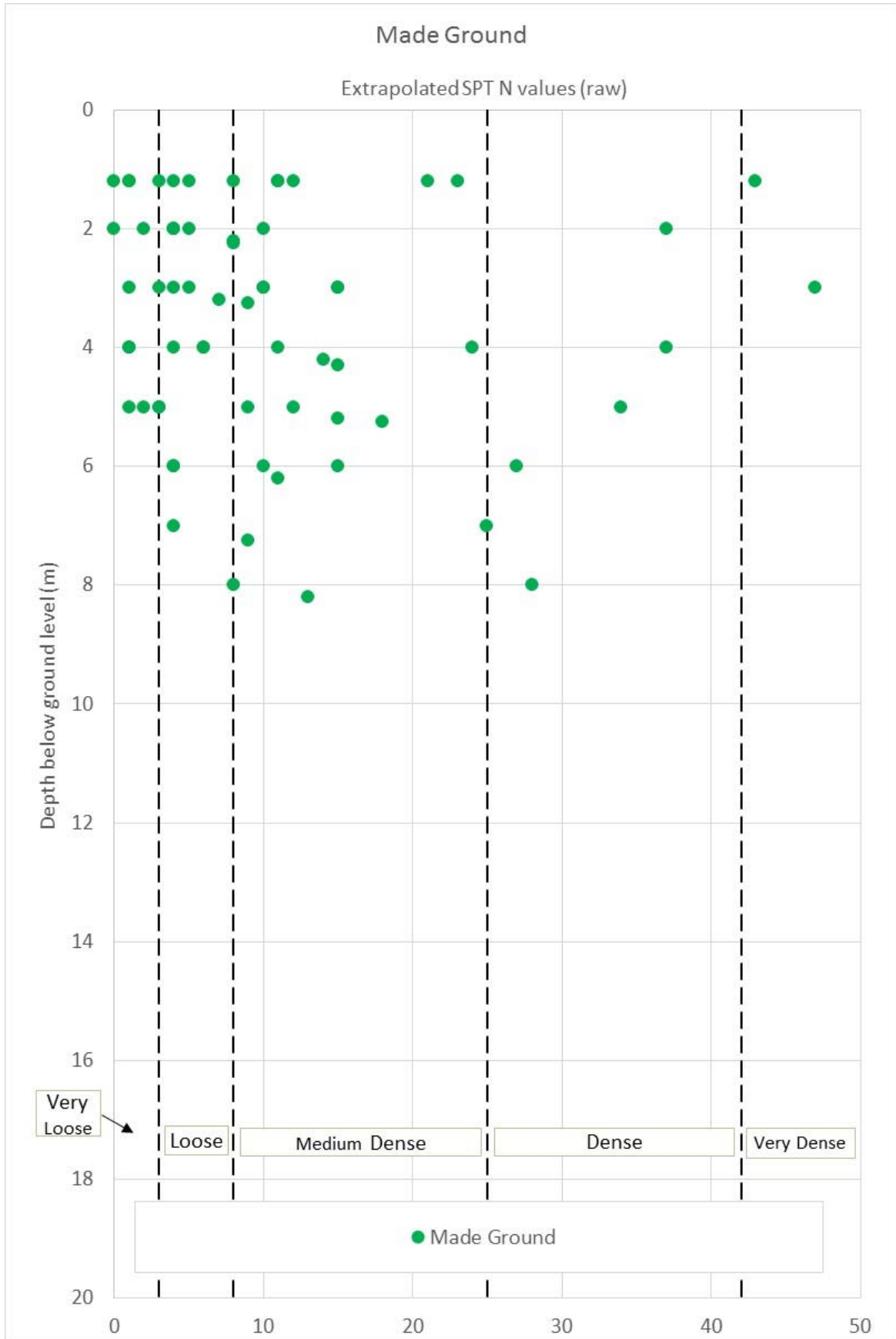


Figure 1 Extrapolated SPT N values for made ground

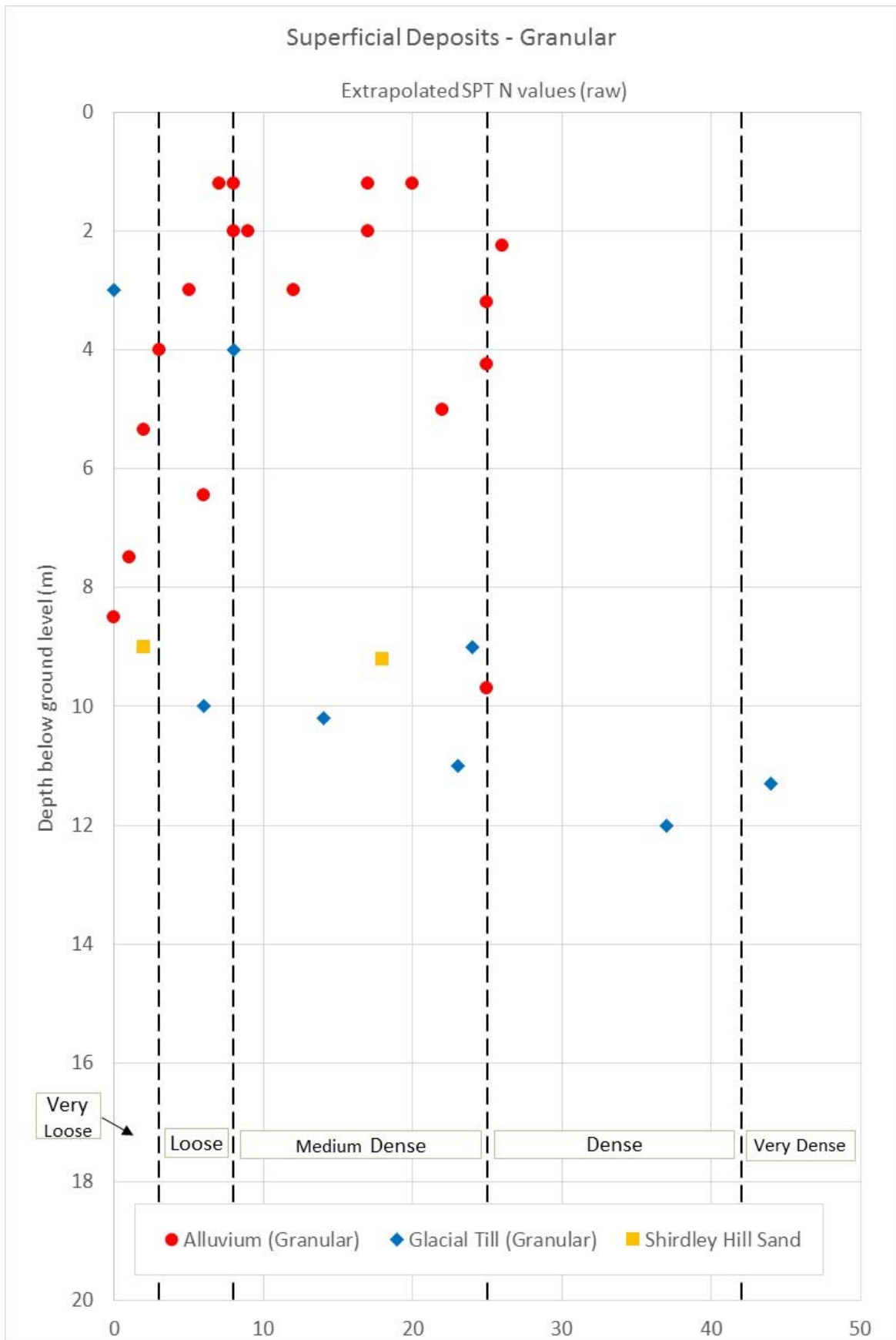


Figure 2 Extrapolated SPT N values for granular strata

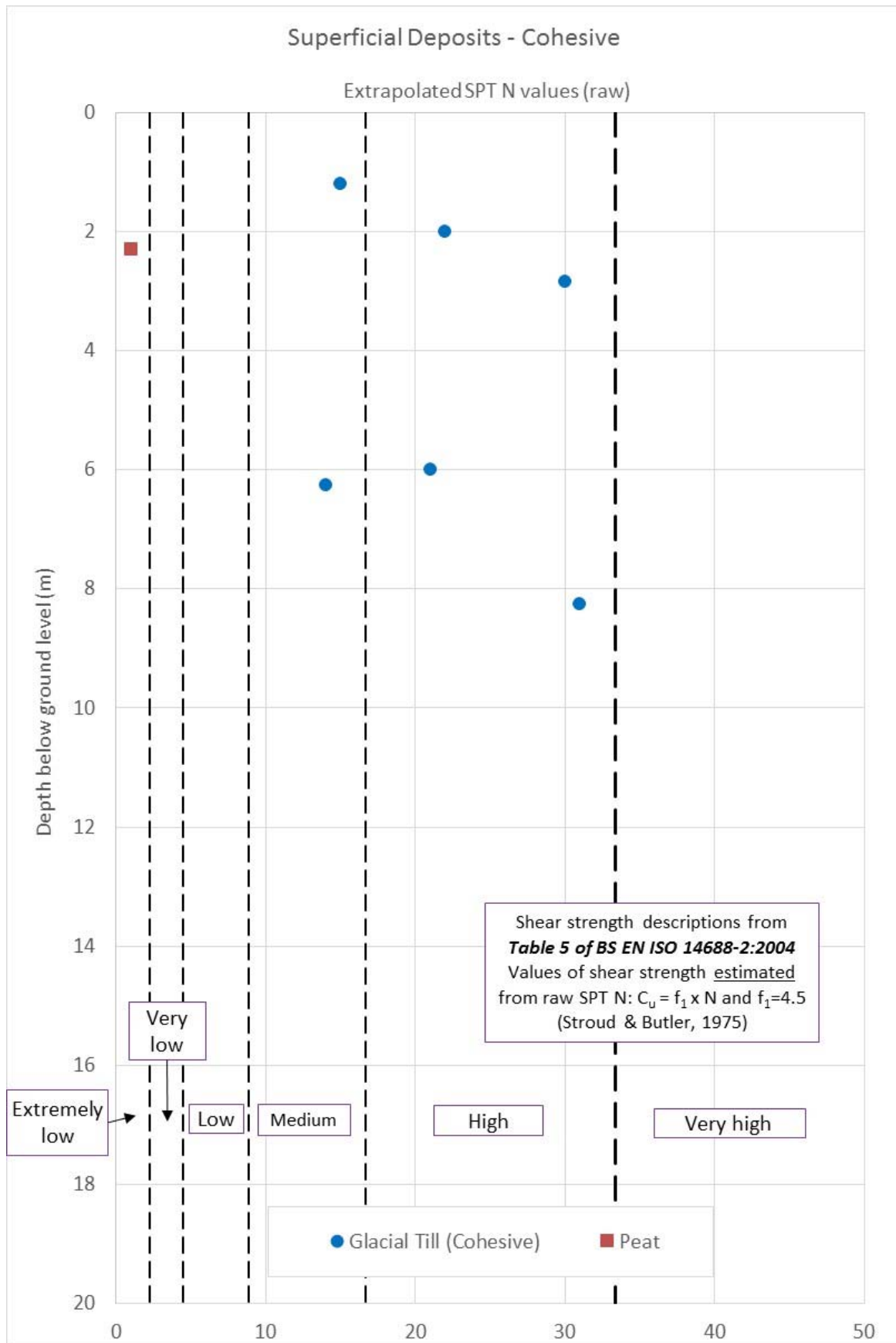


Figure 3 **Extrapolated SPT N values for cohesive strata**

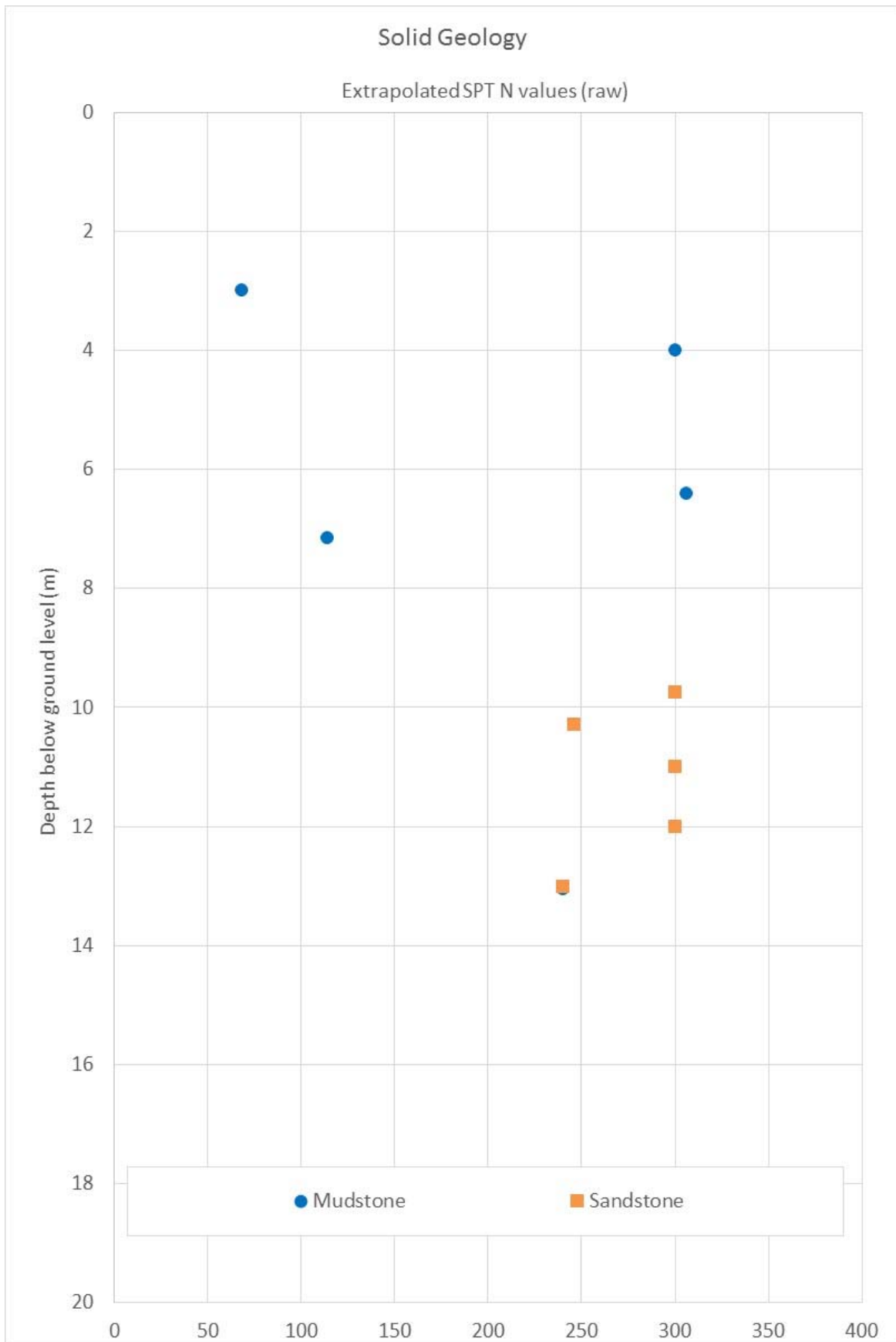
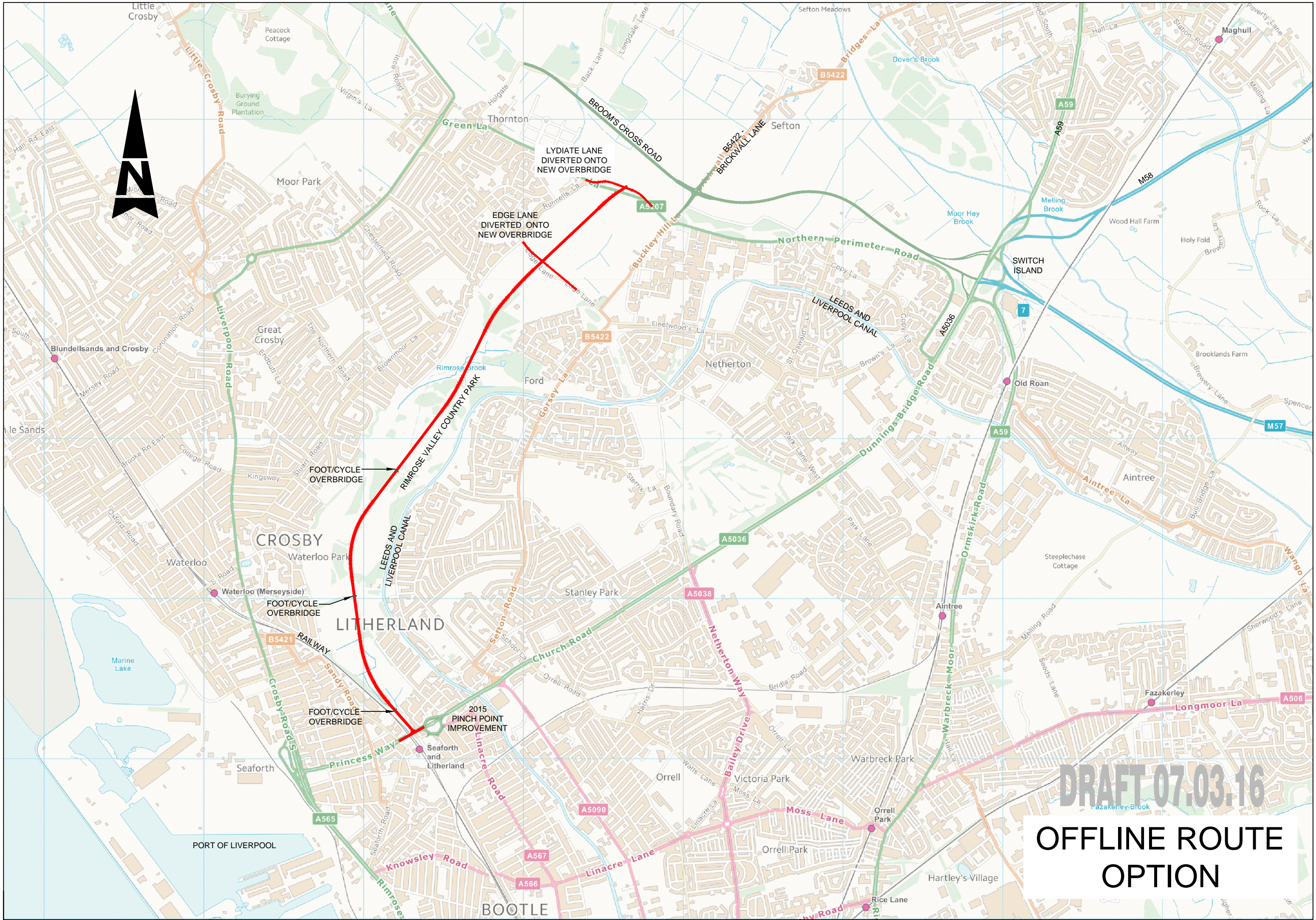


Figure 4 Extrapolated SPT N values for mudstone and sandstone

Appendices

The background features a dark teal upper section and a lower section composed of several overlapping, semi-transparent light blue and teal geometric shapes, creating a layered, abstract effect.

Appendix A. Outline Potential Route Through Rimrose Valley



DRAFT 07.03.16

OFFLINE ROUTE
OPTION

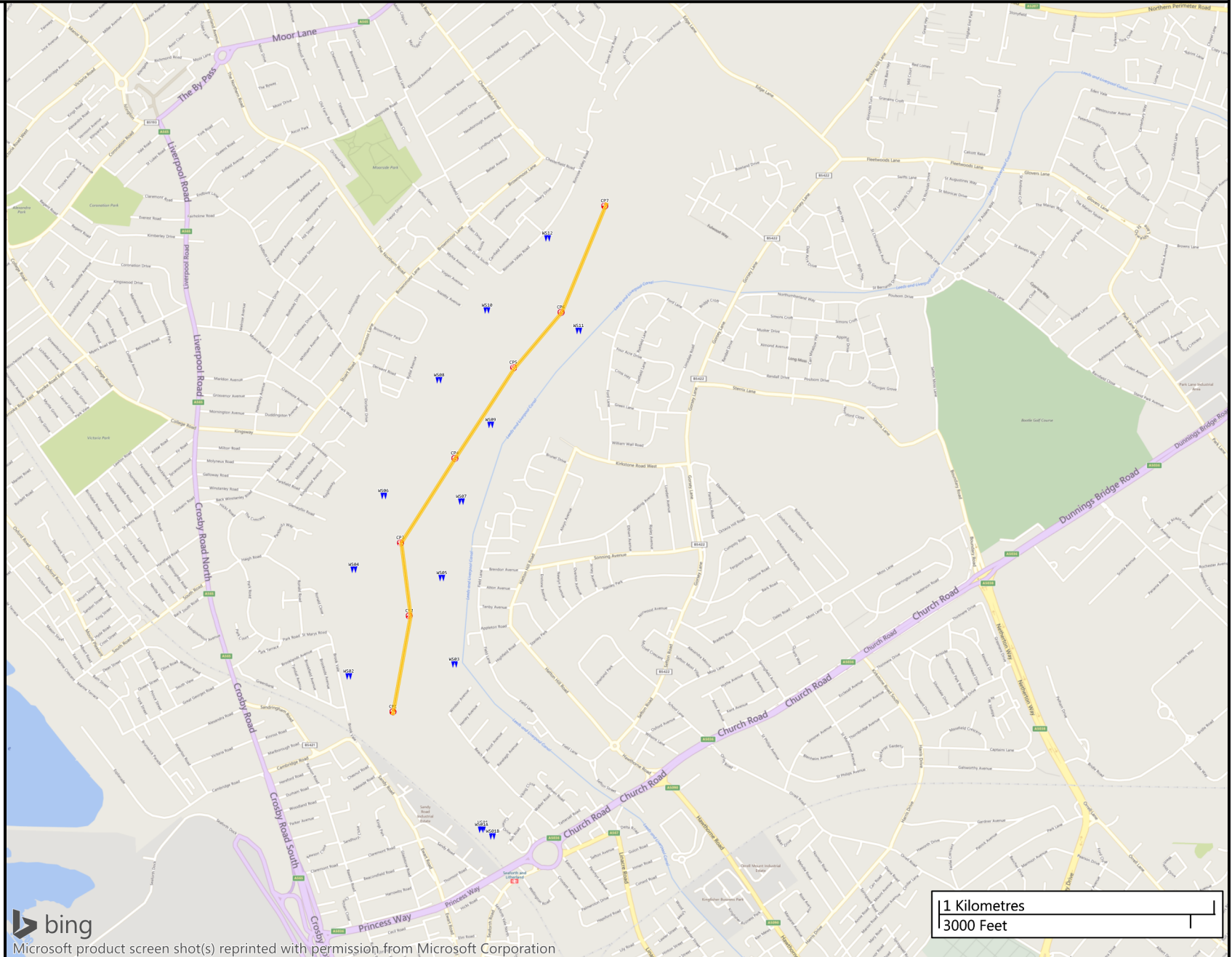
Appendix B. Borehole Location Plan and Geological Cross-Sections

Project Id: 20140566
Project Title: A5036 Port of Liverpool Relief Road
Location: Merseyside
Client: Highways England

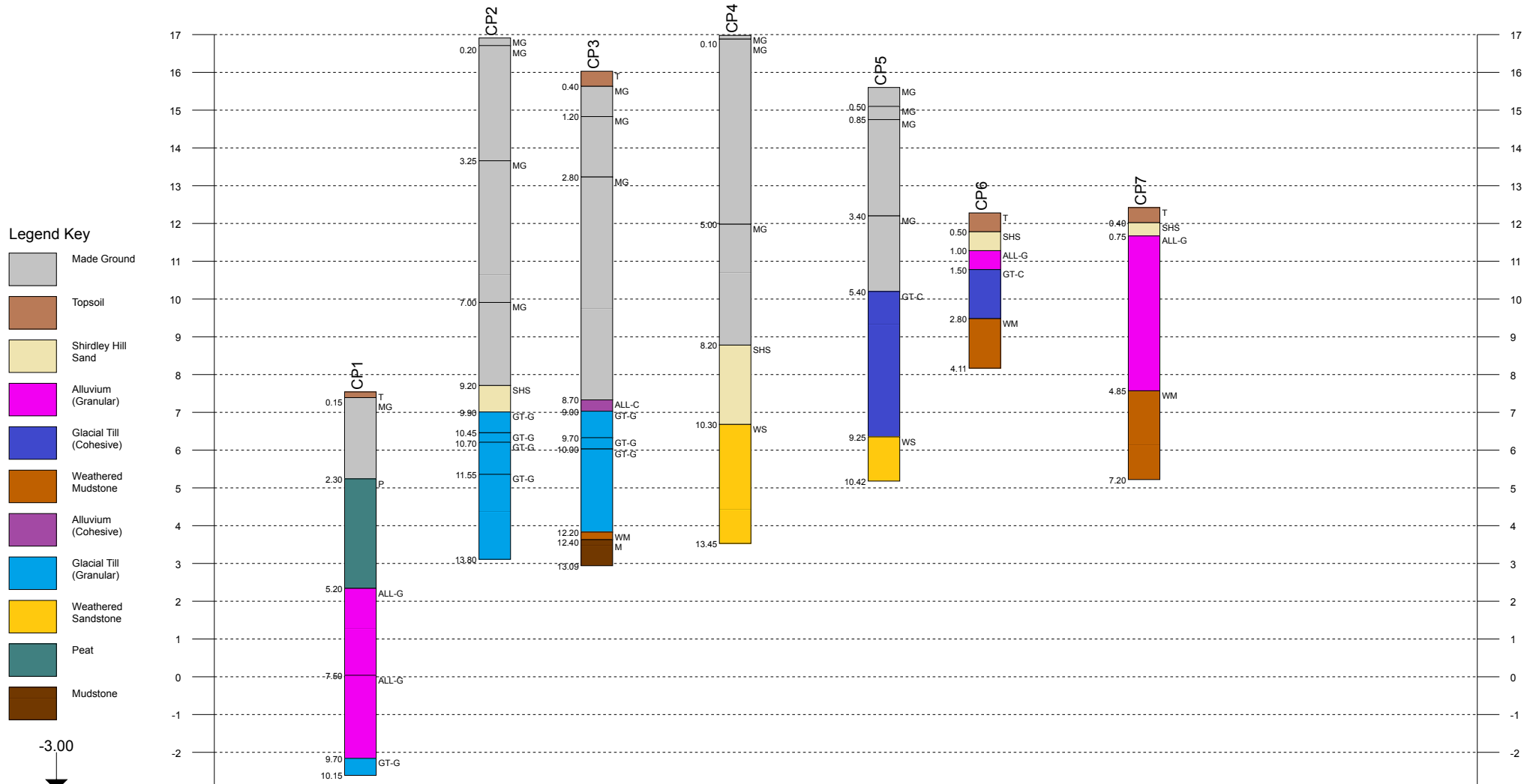
Title: Site Plan
Scale: 1:20000
Engineer: Atkins
Contractor: Geotechnics



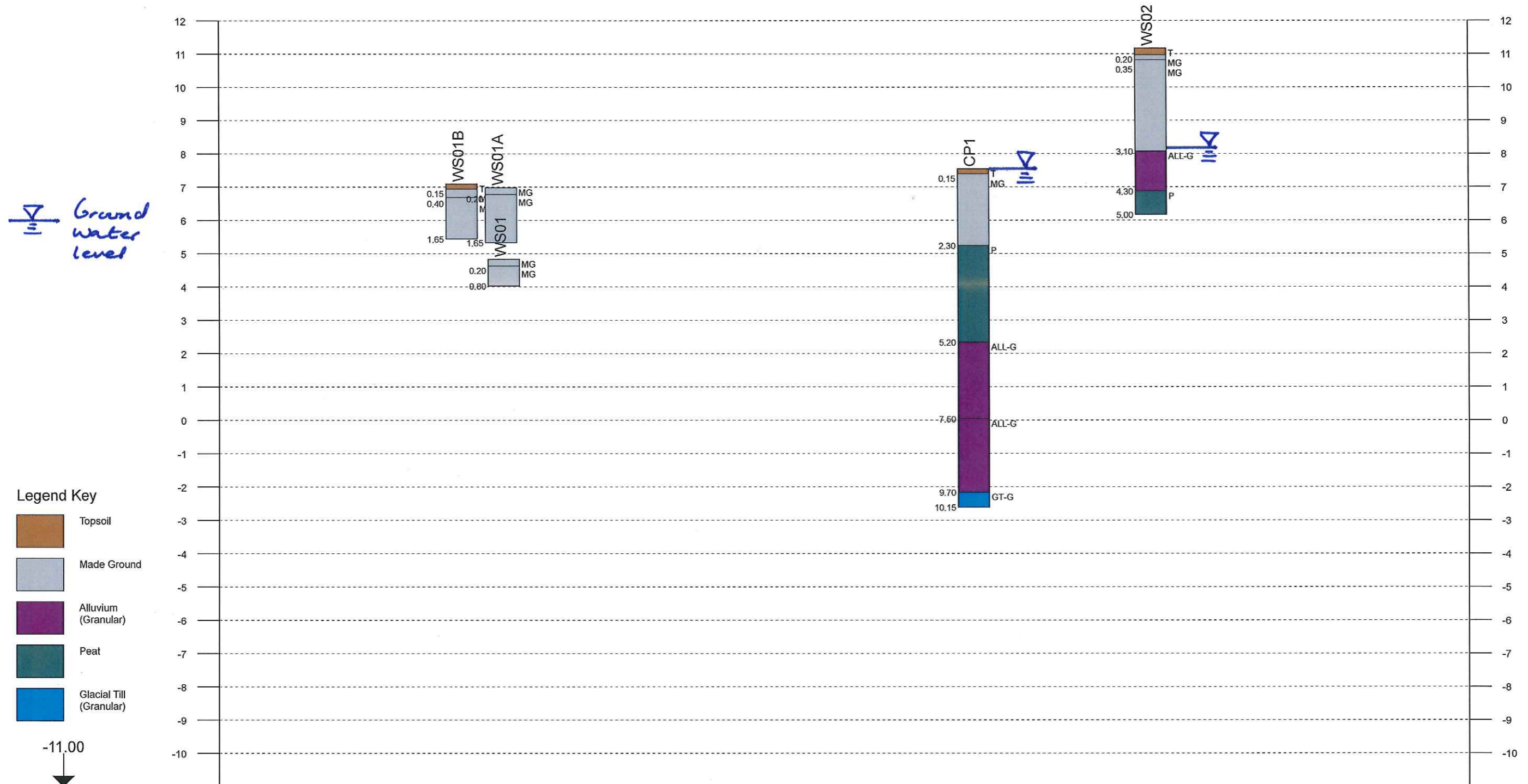
- Legend Key**
- Sections - Section line 1
 - Locations By Type - CP
 - Locations By Type - WS



Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation



Chainage (m)	10.05	366.83	636.12	1000.56	1396.57	1662.25	2083.53
Offset (m)	0.79	4.52	3.58	1.16	4.43	2.35	2.25
Elevation (mAOD)	7.54	16.91	16.03	16.98	15.60	12.28	12.42



-11.00

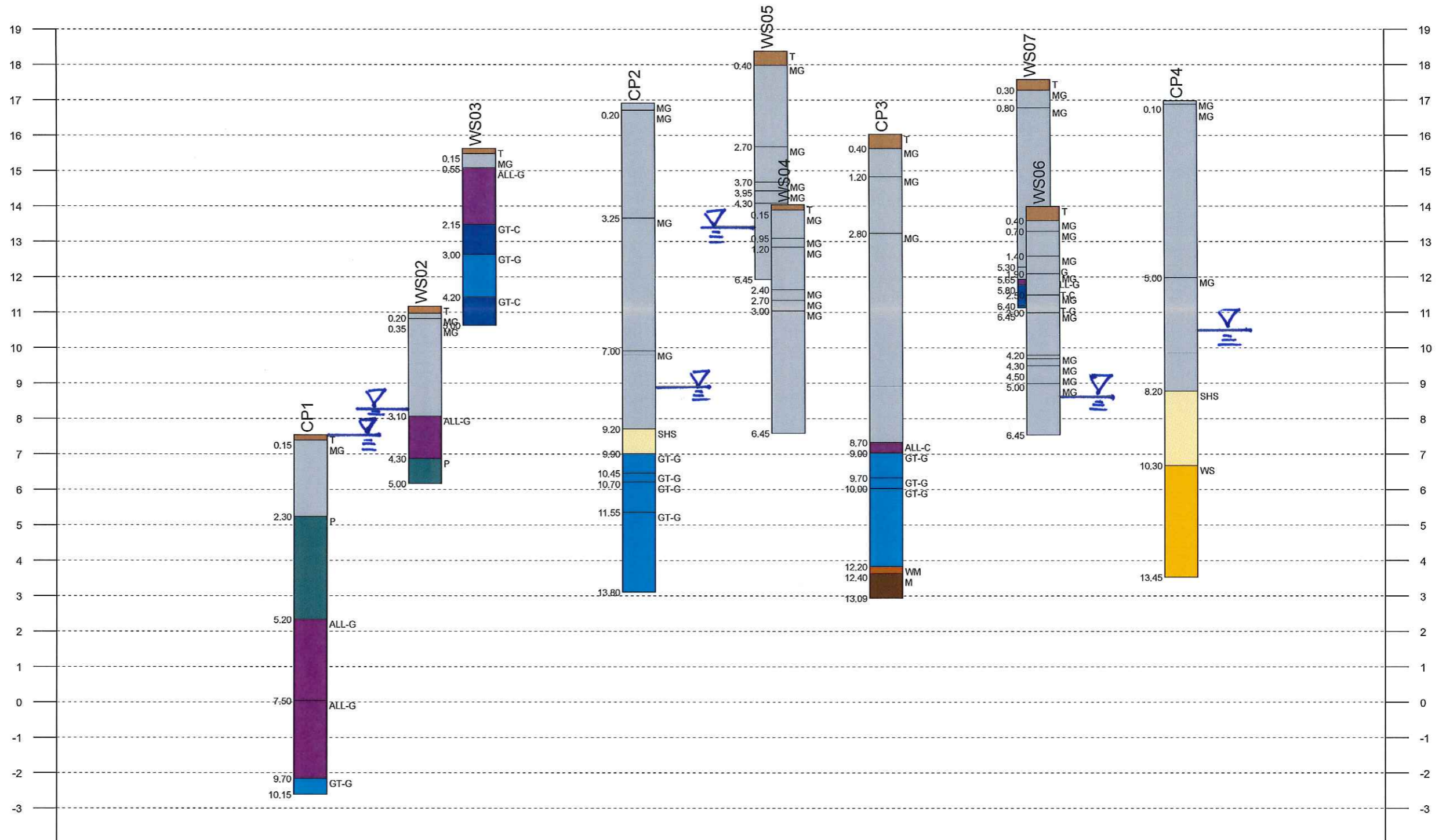
Chainage (m)	0.00	116.22	164.11	699.97	902.76	1037.04
Offset (m)		12.61	3.88	19.53	23.77	
Elevation (mAOD)		7.09	6.88	7.54	11.17	

Grand water level

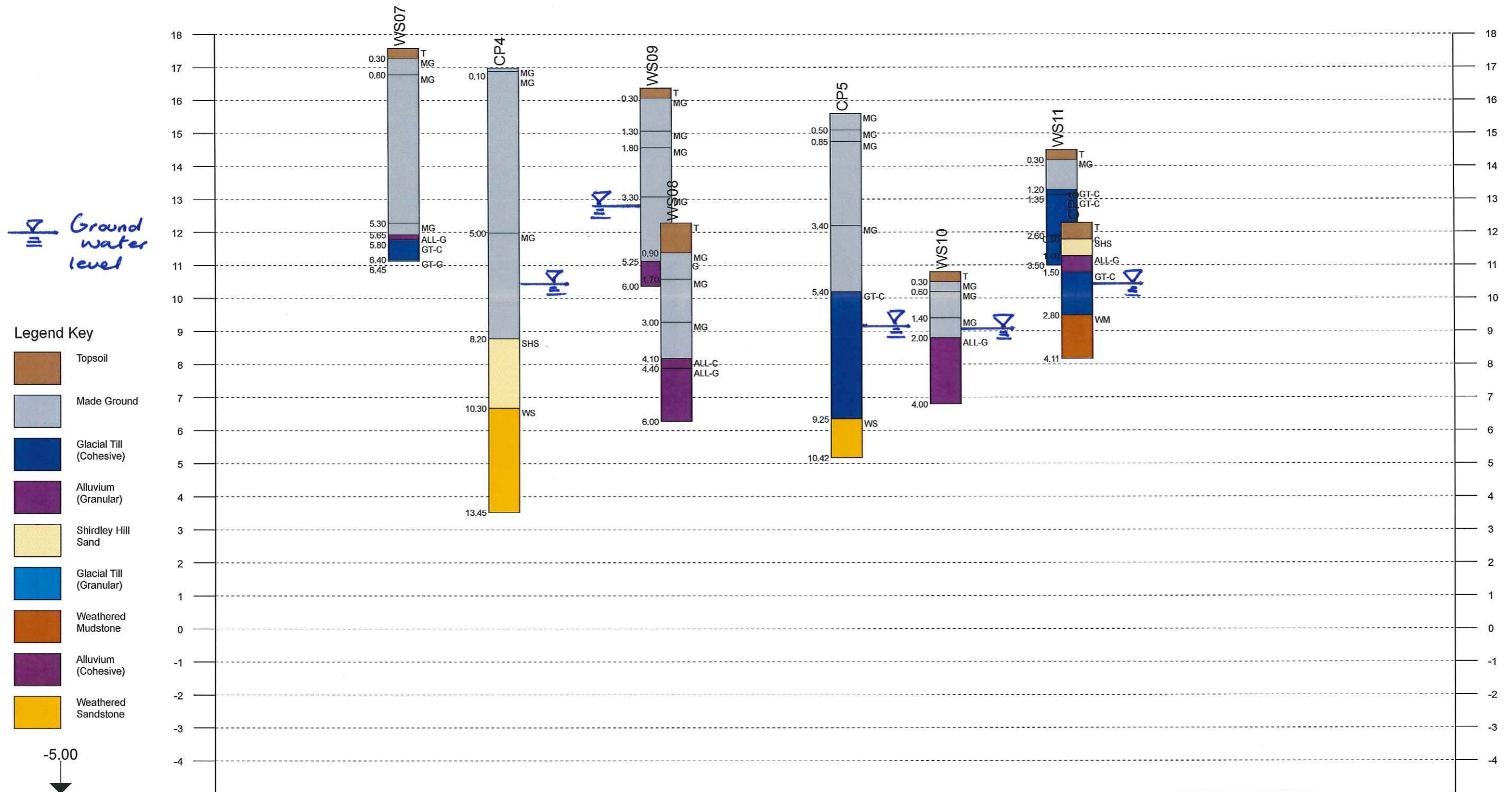
Legend Key

- Topsoil
- Made Ground
- Alluvium (Granular)
- Glacial Till (Cohesive)
- Glacial Till (Granular)
- Shirdley Hill Sand
- Alluvium (Cohesive)
- Peat
- Weathered Sandstone
- Weathered Mudstone
- Mudstone

-4.00



Chainage (m)	0.00	111.67	234.46	293.22	464.21	607.04	624.63	729.37	888.85	1046.00	1089.23
Offset (m)		31.79	198.89	185.37	14.25	127.97	195.30	29.34	188.12	158.22	
Elevation (mAOD)		7.54	11.17	15.63	16.91	18.38	14.04	16.03	17.58	16.98	

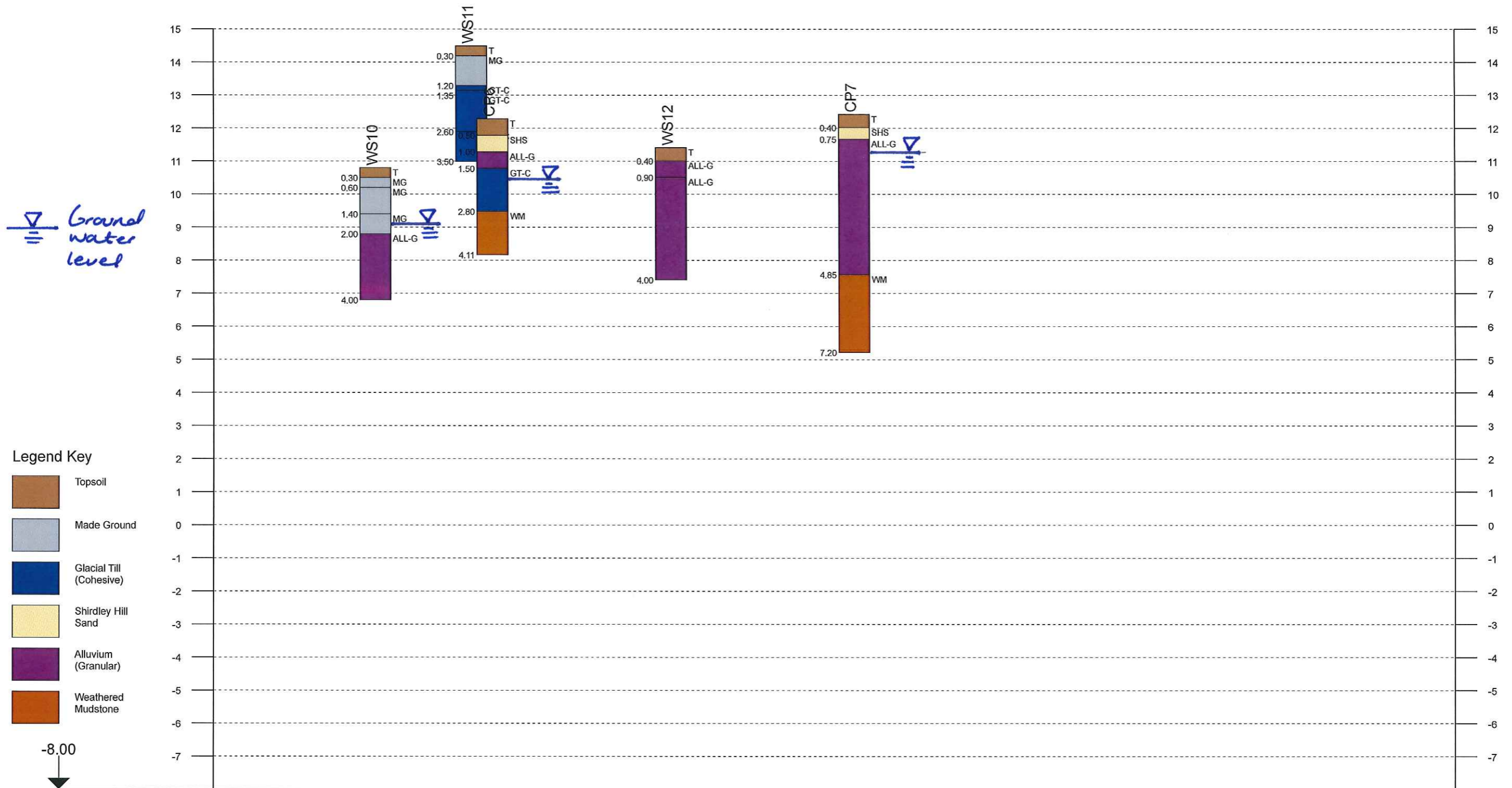


Legend Key

- Topsoil
- Made Ground
- Glacial Till (Cohesive)
- Alluvium (Granular)
- Shirdley Hill Sand
- Glacial Till (Granular)
- Weathered Mudstone
- Alluvium (Cohesive)
- Weathered Sandstone

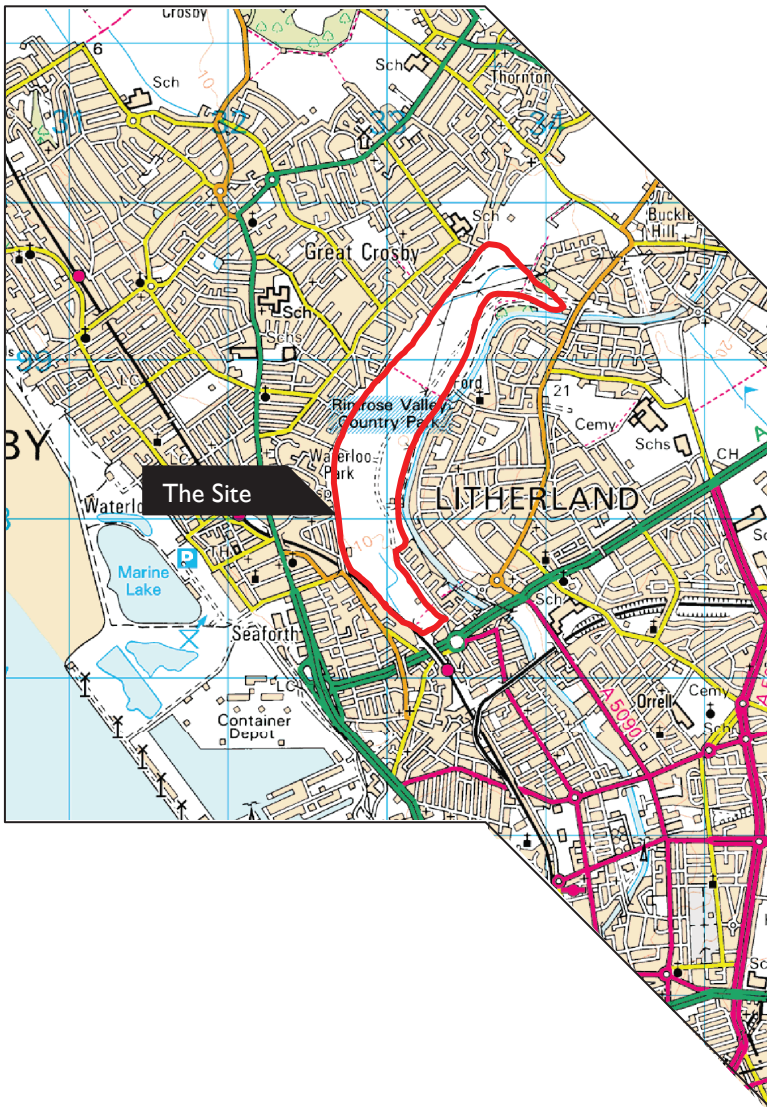
-5.00

Chainage (m)	0.00	56.66	171.37	346.97	369.63	565.15	679.13	813.58	830.86	923.26
Offset (m)		167.00	55.51	90.98	157.36	36.07	163.52	151.95	59.88	
Elevation (mAOD)		17.58	16.98	16.37	12.28	15.60	10.80	14.49	12.28	



Chainage (m)	0.00	24.97	135.22	159.40	364.55	574.83	711.83
Offset (m)		170.67	154.04	63.53	119.29	1.48	
Elevation (mAOD)	10.80		14.49	12.28	11.41	12.42	

Appendix C. Geotechnics Ltd Factual Report



**Ground Investigation
at**

**A5036 Port of Liverpool
Access Study**

Factual Report

For
Atkins Limited

Engineer:
Atkins Limited

Project Number: PNI53396

January 2016

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Factual Report

A5036 Port of Liverpool Access Study
for
Atkins Limited

Engineer :
Atkins Limited

Project No:
PNI53396
January 2016

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1.0 INTRODUCTION

A geotechnical and geo-environmental investigation was undertaken by Geotechnics Limited at Rimrose Valley Park, Liverpool as part of a feasibility study to determine the most suitable option for increased traffic flows from the Port of Liverpool to the motorway network. A new road through Rimrose Valley is one option being considered. The investigation was carried out to the instructions of Atkins Limited, acting in the role of both Engineer and Client. This report describes the work undertaken and presents the data obtained.

2.0 OBJECT AND SCOPE OF THE INVESTIGATION

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

3.0 PRESENTATION

A description of the site and a summary of the procedures followed during the investigation process are presented in Sections 4 to 6. The factual data so obtained are presented in Appendices 2 to 8 of this report. Attention is drawn to the General Notes and Investigation Procedures presented in Appendix 9 to aid an understanding of the procedures followed and the context in which the report should be read.

In addition, data in electronic format in accordance with "The Electronic Transfer of Geotechnical Data from Ground Investigations" (Third Edition)

published by the AGS (the AGS Format) are presented separately on disk together with a copy of the report in electronic PDF format.

4.0 THE SITE

4.1 Location

The site is located within Rimrose Valley Park approximately 7.5km north of Liverpool City Centre. The approximate Ordnance Survey National Grid Reference for the centre of the site is SJ 330 985 and an extract from the relevant 1:50,000 Scale O.S. Map is included as Appendix I.

4.2 Description

The investigation was undertaken within Rimrose Valley Park. The park is 'dog-legged' in shape, generally trending in a south-west to north-east orientation and is approximately 3km long by 0.5km wide. Various access points are located around the park from residential roads. The park is generally flat and comprises grassland, overgrown vegetation and areas of woodland, all interspersed with tarmac and grass footpaths.

The Leeds & Liverpool Canal bounds the site to the east. The Liverpool, Crosby & Southport railway line bounds the site to the south-west and residential properties to the west and north-west.

4.3 Site Geology

The 1:50,000 scale maps of Formby published by the British Geological Survey, Sheet 83 dated 1974 (Drift edition) and 1976 (Solid edition), show the site to be underlain by Blown Sand towards the boundary with the canal and Freshwater Alluvium over much of the remainder of the site. Glacial Till (Boulder Clay) is indicated to be present towards the northernmost tip of the site and to the south-east of the site. An area of Peat is also indicated below the southernmost part of the site.

The solid geology is indicated to primarily comprise rocks of Keuper Sandstone (now the Sellafeld Member - part of the Sherwood Sandstone Group). A change to Bunter Sandstone (now the Wilmslow Sandstone Formation - also part of the Sherwood Sandstone Group) is shown below the southernmost part of the site. These rocks are of Triassic age.

The conjectured trace of the Crosby Fault is shown to pass through the northern end of the site, the fault trending roughly north-west to south-east. The strata to the south-west of the fault are shown to be downthrown. The conjectured trace of the Litherland Fault is shown to pass through the central part of the site and close to the eastern boundary of the southernmost part of the site. This fault trends roughly north-north-west to south-south-east and the strata to the east are shown to be downthrown. Between these two faults and close to/beyond the north-western site boundary, a change in solid strata to Keuper Marl (now the Sidmouth Mudstone Formation - part of the Mercia Mudstone Group) is indicated, this again being of Triassic age.

5.0 PROCEDURE

5.1 Commissioning

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

5.2 General

The procedures followed in this site investigation are based on *BS 5930:1999 + A2:2010 – Code of Practice for Site Investigations* and *BS 10175:2011 Investigation of Potentially Contaminated Sites*. The soils and rocks encountered have been described in accordance with *BS5930:1999+A2:2010* and *BS EN ISO 14688-1:2002+A1:2013*. The Cable Percussive Borehole and Dynamic Sample Borehole Records are included in Appendices 2 and 3 and their positions are shown on the Exploratory Hole Location Plan in Appendix 8.

The Exploratory Hole locations were specified by Atkins Limited. The co-ordinates and levels shown on the Exploratory Hole Records were measured using a Leica GPS survey device. The depths quoted on the exploratory hole records are in metres below ground level.

At each exploratory hole location an inspection pit was excavated using hand tools to a depth of 1.20m below ground level to check for the presence of underground services. Prior to and on completion of the excavation, the location was scanned using a cable avoidance tool (CAT).

Aquifer protection measures were employed when drilling cable percussion boreholes CPI to CP5 in order to preclude the creation of a pathway for contamination to migrate down towards the underlying aquifer. These protection measures comprised using 200mm diameter casing and tools to drill to the base of the Made Ground, then by installing a 1m thick bentonite plug, prior to reducing to 150mm diameter casing and tools and re-commencing drilling.

5.3 Cable Percussion Boreholes

Seven (7 No.), 150mm diameter boreholes (numbered CPI to CP7) were sunk by Cable Percussion Tool techniques to depths varying between 4.11m and 13.80m below ground level. The work was carried out between 22nd and 30th September 2015.

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

On encountering groundwater, boring operations were suspended for 20 minutes in order to record any rise in water level. Full details of groundwater observations during site work are included on the Borehole Records. It should be noted that the addition of water to the borehole as part of the drilling process may have masked the presence of groundwater in the borehole. Where water was added it has been noted on the Borehole Records.

On completion, standpipes were installed in Boreholes CPI, CP2 and CP4 to CP7 (see Section 5.5). Borehole CP3 was backfilled with bentonite.

5.4 Dynamic Sample Boreholes

Fourteen (14 No.) Dynamic Sample Boreholes (numbered WS01, WS01A, WS01B and WS02 to WS12) were undertaken at the site to depths varying between 0.80m and 6.45 below ground level. The work was carried out between 1st and 8th October 2015.

The Dynamic Samples were taken using the super-heavy apparatus which drives lined steel tubes into the ground in 1m lengths. Samples are retrieved in the plastic liners. The hole is cased and progress depends on the nature of the strata penetrated. Full details of the casing used are included on the Borehole Records.

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

Groundwater observations are included on the Borehole Records where appropriate and any rise in water level was recorded over 20 minutes whilst drilling operations were suspended.

On completion, standpipes were installed in Boreholes WS02, WS05, WS06, WS09 and WS10 (see Section 5.5). The other boreholes were backfilled with arisings and bentonite.

5.5 Instrumentation and Monitoring

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

Exploratory Hole	Standpipe Slotted Pipe (Filter Zone) (m)
CP1	5.50m to 9.50m (5.40m to 10.15m)
CP2	6.00m to 8.00m (5.85m to 8.00m)
CP4	6.20m to 8.20m (6.10m to 8.30m)
CP5	6.90m to 8.90m (6.75m to 8.90m)
CP6	1.00m to 2.80m (1.00m to 2.80m)
CP7	5.00m to 7.00m (4.90m to 7.20m)

WS02	1.00m to 3.00m (1.00m to 3.00m)
WS05	3.00m to 5.00m (3.00m to 5.00m)
WS06	2.70m to 5.70m (2.70m to 5.70m)
WS09	1.00m to 3.50m (0.80m to 3.80m)
WS10	1.00m to 2.20 (0.90m to 2.20m)

Monitoring of the gas and groundwater levels at the site commenced on 20th October 2015 with further visits on 3rd and 19th November 2015.

On each of the monitoring visits a record of the groundwater level in each standpipe was obtained. On the second visit where water was recorded, samples were obtained (where possible) following purging of water in the standpipes.

The following parameters were recorded using a multi-parameter flow cell during the collection of the surface water samples, which continued until such time as the parameters reached a steady level.

- Temperature (°C)
- Electrical Conductivity (mS/cm)
- Dissolved Oxygen Concentration (%)
- pH
- Redox Potential (mV)

In addition to the groundwater levels, the following parameters were measured and recorded in each standpipe using a Gas Data LMSxi Gas Analyser:-

- Concentrations (% Vol) of CH₄, O₂, CO₂, along with (% LEL) CH₄ and (ppm) H₂S, CO
- Flow Rate
- Barometric Pressure

The results of the monitoring are presented in Appendix 4.

6.0 LABORATORY TESTING

6.1 Geotechnical

The laboratory testing schedule was specified by Atkins Limited. Unless otherwise stated, the tests were carried out in Geotechnics Limited's UKAS accredited Laboratory (Testing No. 1365) and were undertaken in accordance with the appropriate Standards as indicated below and on the Laboratory

Summary Sheets in Appendix 5. Any descriptions, opinions and interpretations are outside the scope of UKAS accreditation.

The tests undertaken can be summarised as follows:-

BS EN ISO 17892-1:2014

42 No. Water Content Determination

BS EN ISO 17892-2:2014

1 No. Bulk Density Determination

BS 1377:1990

Test No. Test Description

Part 2

4.3 & 5.3 10 No. Liquid and Plastic Limit Determination

8.3 19 No. Particle Density Determination.

9.2 & 9.3 25 No. Mechanical Analysis – Wet Sieving

9.4 14 No. Mechanical Analysis - Sedimentation

Part 7

9 3 No. Shear Strength Measurement - 100mm diameter (Multi-Stage) Quick Undrained Triaxial Compression Test.

The results of these tests are presented in Appendix 5.

The following testing was carried out at the laboratories of Jones Environmental Laboratory Limited (UKAS Accredited Laboratory, No. 4225).

BRE Special Digest I Suite

17 No. Suites comprising:-
Soluble Sulphate
pH

The results of these BRE tests are presented in Appendix 6.

6.2 Contamination

Selected samples of soil and groundwater were tested at the laboratories of Jones Environmental

Laboratory Limited (UKAS No. 4225) for a number of determinants in order to check on potential site contamination. The determinants were specified by the Atkins Limited. The selected determinants are detailed on the results sheets in Appendix 6 together with the test result as well as the test method, accreditation and detection limit. In addition, a number of leachate samples were also prepared from selected soil samples in accordance with the NRA Leachate Protocol and analysed for the determinants detailed on the results sheets.

In addition, some of the samples scheduled for geotechnical testing were suspected to contain Asbestos. These samples were submitted to the laboratories of Derwentside Environmental Testing Services Limited (UKAS No. 2139) for Asbestos screening prior to any geotechnical testing being carried out on the samples. The results of this Asbestos screening have also been included in Appendix 6.

6.3 Bacteriological

Selected samples of surface water were tested at the laboratories of Cheshire Scientific Limited (UKAS No. 4145) for a number of determinants to check on the bacteriological status of the surface water. The determinants were specified by Atkins Limited and are detailed on the results sheets in Appendix 7 together with the test result as well as the test method, accreditation and detection limit.

Signed for and on behalf of Geotechnics Limited.

Prepared by:
Steph Goldie MGeol, FGS
Graduate Engineer

Reviewed by:
Colin Dodd, BSc (Hons), MSc, CEng, MICE
Principal Engineer

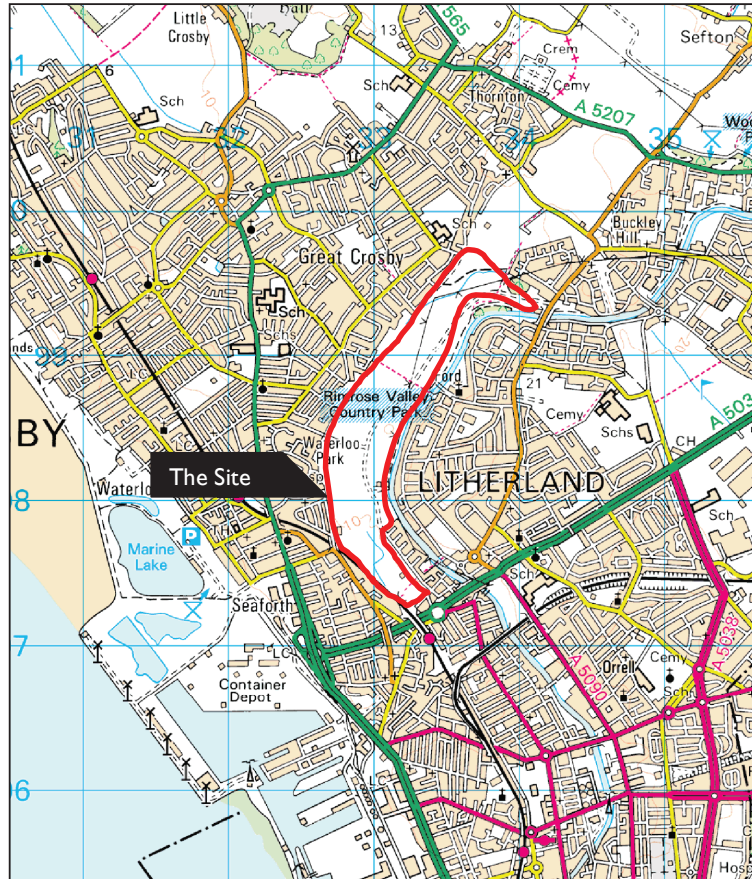
APPENDIX I

Site Location Plan

SITE LOCATION PLAN

PN153396

Ground Investigation
At
A5036 Port of Liverpool Access Study
for
Atkins Limited



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APPENDIX 2

Cable Percussion Borehole Records

DATA SHEET - Symbols and Abbreviations used on Records



Sample Types

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

Insitu Testing / Properties

CBRP	CBR using TRL probe
CHP	Constant Head Permeability Test
COND	Electrical conductivity
HV	Strength from Hand Vane
ICBR	CBR Test
IDEN	Density Test
IRES	Resistivity Test
MEX	CBR using Mexecon Probe Test
PKR	Packer Permeability Test
PLT	Plate Load Test
PP	Strength from Pocket Penetrometer
Temp	Temperature
VHP	Variable Head Permeability Test
VN	Strength from Insitu Vane
w%	Water content

(All other strengths from undrained triaxial testing)

S	Standard Penetration Test (SPT)
C	SPT with cone
N	SPT Result
-/-	Blows/penetration (mm) after seating drive
-*/-(mm)	Total blows/penetration
()	Extrapolated value

Groundwater

Water Strike	
Depth Water Rose To	

Instrumentation

Seal	
Filter	
Seal	

Strata

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

Note: Composite soil types shown by combined symbols

Chalk	
Limestone	
Sandstone	
Coal	

Strata, Continued

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

Backfill Materials

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

Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	
Fractures/metre	
FRACTURE SPACING (m)	Maximum
NI	Non-intact core
NR	No core recovery
AZCL	Assumed zone of core loss

(where core recovery is unknown it is assumed to be at the base of the run)

BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No CP1 PN153396

Client ATKINS LIMITED

National Grid Coordinates 332889.31 E 397727.29 N

Ground Level 7.54 m OD

Sampling			Properties			Strata			Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD		
0.20	ES					Grass over TOPSOIL: Brown fine sand.	G.L. 7.54		7.54		
0.25- 1.00	B					MADE GROUND: Very loose dark brown and black sandy angular fine to coarse gravel of clinker, glass, ceramic and bone. Ash present.	0.15		7.39		
0.40	W										
0.50	ES										
0.50			PID=9.2ppm								
1.00	ES										
1.00			PID=18.2ppm		C1						
1.20- 1.65	B	1.20 (0.70)									
2.00	D					Very soft spongy dark brown pseudofibrous PEAT.	2.30		5.24		
2.00	ES										
2.00			PID=12.2ppm		C1						
2.30- 2.75	B	2.30 (2.00)									
2.75- 3.15	B										
3.00	ES										
3.00			PID=17.9ppm								
3.15- 3.60	UT5	3.15 (WET)									
3.60	D										
3.75- 4.25	B										
4.00			PID=0.0ppm								
4.25- 4.70	UT4	4.25 (WET)									
4.70	D			555							
5.00			PID=0.0ppm								
5.15	D					Very loose grey slightly silty slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse of various lithologies.	5.20		2.34		
5.35- 5.80	B	5.35 (4.70)			S2						
5.80- 6.45	B			37							
6.00			PID=0.0ppm								
6.45- 6.90	D	6.45 (2.70)			S6						
6.90- 7.50	B										
7.00			PID=0.0ppm								
7.50- 7.95	D	7.50 (2.50)			S1						
7.95- 8.50	B			24							
8.00			PID=0.0ppm								
8.50- 8.95	D	8.50 (2.80)			S0						
9.00- 9.70	B										
9.00			PID=0.0ppm								
9.70-10.15	D	9.70 (1.70)			S25				0.04		
						At 9.95m, becoming medium dense and gravelly. Gravel is subangular to rounded fine to coarse of various lithologies.					

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit		G.I.			28/09/15	08:00	0.50		0.40	20		Medium inflow
3.20	0.20	Cable Percussion	KP/LP	10.15	9.70	1.70	28/09/15	18:00						
10.15	0.15	Cable Percussion	KP/LP											

Remarks Inspection pit hand excavated to 1.20m depth. Water was added to assist boring between 5.50m and 7.00m. ES sample = 1 x vial, 1 x plastic jar and 1 amber jar. A 50mm standpipe was installed to 9.50m with a geowrapped slotted section from 5.50m to 9.50m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 5.50m, sand filter up to 5.40m, bentonite seal up to 1.00m, arisings up to 0.20m, concrete up to ground level.

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Figure 1 of 2
21/01/2016

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No CP1 PN153396


Client ATKINS LIMITED

National Grid Coordinates 332889.31 E 397727.29 N

Ground Level 7.54 m OD

Sampling			Properties			Strata			Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD		
						End of Borehole	10.15		-2.61		


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

Remarks 

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by LP
Figure 2 of 2
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BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS Borehole Project No CP2 PN153396
 Client ATKINS LIMITED National Grid Coordinates 332954.11 E 398076.86 N Ground Level 16.91 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.20- 1.00	B					Grass over MADE GROUND: Brown slightly gravelly fine to coarse sand. Gravel is angular fine to coarse of sandstone, brick and clinker.	G.L.		16.91	
0.20	ES						0.20		16.71	
0.50	ES		PID=0.0ppm			MADE GROUND: Very loose to loose black and brown silty very sandy angular fine to coarse gravel of clinker. Ash present.				
0.50										
1.00	ES		PID=0.0ppm		C3					
1.20- 1.65	B	1.20 (DRY)								
2.00	D					MADE GROUND: Loose to medium dense brown clayey gravelly fine to coarse sand with a high cobble content of brick, timber, concrete and plastic. Gravel is angular fine to coarse of concrete and brick.				
2.00	ES		PID=0.0ppm	41	C8					
2.25- 2.70	B	1.70 (DRY)								
3.00	D					MADE GROUND: Loose to medium dense brown clayey gravelly fine to coarse sand with a high cobble content of brick, timber, concrete and plastic. Gravel is angular fine to coarse of concrete and brick.				
3.00	ES		PID=12.7ppm		C9		3.25		13.66	
3.25- 3.70	B	3.00 (DRY)								
4.00	D					MADE GROUND: Loose to medium dense dark brown and black gravelly clayey fine sand with black organic debris. Gravel is angular to subangular fine to coarse of brick, ceramic and various lithologies. Ash present.				
4.00	ES		PID=9.8ppm	16	C14					
4.20- 4.65	B	4.20 (DRY)								
5.00	D					Between 8.20m and 8.65m, locally grading to very sandy gravel with a medium cobble content.				
5.00	ES		PID=6.0ppm		C18					
5.25- 5.70	B	4.50 (DRY)								
6.00	D					MADE GROUND: Loose to medium dense dark brown and black gravelly clayey fine sand with black organic debris. Gravel is angular to subangular fine to coarse of brick, ceramic and various lithologies. Ash present.				
6.00	ES		PID=0.0ppm		C11					
6.20- 6.65	B	6.00 (DRY)								
6.20- 6.65										
7.00	D					MADE GROUND: Loose to medium dense dark brown and black gravelly clayey fine sand with black organic debris. Gravel is angular to subangular fine to coarse of brick, ceramic and various lithologies. Ash present.				
7.00	ES		PID=0.0ppm		C9		7.00		9.91	
7.25- 7.70	B	7.00 (WET)								
8.00	D					Between 8.20m and 8.65m, locally grading to very sandy gravel with a medium cobble content.				
8.00	ES		PID=0.0ppm	52	C13					
8.00										
8.20- 8.65	B	7.50 (DRY)								
9.00	D					Medium dense greyish brown clayey gravelly fine to coarse SAND. Gravel is subangular to rounded fine to coarse of various lithologies.				
9.00	ES		PID=0.0ppm	19	C18		9.20		7.71	
9.20- 9.65	B	8.50 (8.75)								
9.90	D								7.01	

Boring				Progress				Groundwater						
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	KP/LP	G.L.			24/09/15	08:00	6.90	6.50			7.50	Seepage - no rise Slow inflow
10.00	0.20	Cable Percussion	KP/LP	13.30	13.20	10.10	24/09/15	18:00						
13.80	0.15	Cable Percussion	KP/LP	13.30	13.20	8.25	25/09/15	08:00	9.20	8.50	8.75	20		
				13.80	13.50	9.40	25/09/15	18:00						

Remarks Inspection pit hand excavated to 1.20m depth.
 Water was added to assist boring between 1.20m and 6.50m.
 ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
 A 50mm standpipe was installed to 8.00m with a geowrapped slotted section from 6.00m to 8.00m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 8.00m, gravel filter up to 6.00m, sand filter up to 5.85m, bentonite seal up to 0.40m, concrete up to ground level.
 Chiselling: 3.80-3.90m for 15 minutes and 4.80-4.90m for 30 minutes and 13.30-13.70m for 60

Logged by LP
 Figure 1 of 2
 21/01/2016

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole CP2
Project No PN153396

Client ATKINS LIMITED

National Grid Coordinates 332954.11 E
398076.86 N

Ground Level 16.91 m OD

Sampling			Properties			Strata	Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
10.00	ES					Medium dense light greyish brown slightly gravelly fine to coarse SAND. Gravel is subangular to rounded fine to coarse of various lithologies.			
10.00									
10.20-10.65	B	10.20 (9.00)	PID=0.0ppm		C14	Soft to firm brown sandy CLAY.	10.45		6.46
10.70-11.30	B					Medium dense greyish brown clayey very gravelly fine to coarse SAND. Gravel is subangular to rounded fine to coarse of various lithologies. At 11.30m, grading to very sandy gravel.	10.70		6.21
10.70-11.30	UF94		PID=0.0ppm						
11.00									
11.30-11.75	B	11.30 (8.90)		9.5	C44	Very dense light greyish brown gravelly fine to coarse SAND. Gravel is subangular to rounded fine to medium of various lithologies.	11.55		5.36
12.00	D								
12.00			PID=0.0ppm						
12.25-12.45	B	12.00 (9.40)			C50/90				
13.00	D					End of Borehole			
13.00			PID=0.0ppm						
13.20-13.31	D	13.20 (10.10)			C50/38				
13.50-13.60	D								
13.70-13.80		13.50 (9.40)			S50/28		13.80		3.11

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

Remarks minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010



Logged by LP
Figure 2 of 2
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BOREHOLE RECORD - Cable Percussion


Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS Borehole CP3
 Project No PN153396
 Client ATKINS LIMITED National Grid Coordinates 332924.75 E 398343.97 N Ground Level 16.03 m OD

Sampling			Properties			Strata			Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD		
0.20	D					Grass over TOPSOIL: Brown silty sand.	G.L.		16.03		
0.20	ES										
0.40	D					MADE GROUND: Grey sandy angular medium to coarse gravel of limestone.	0.40		15.63		
0.40	ES										
0.45- 0.85	B										
0.50					PID=0.0ppm						
1.00	D										
1.00	ES										
1.00					PID=13.7ppm						
1.20- 1.34	B	(DRY)			C50/40	MADE GROUND: Very dense grey and black sandy angular fine to coarse gravel of limestone and clinker. Ash present.	1.20		14.83		
1.20	D				16						
2.00- 2.38	B	1.60 (DRY)			C50/225						
2.00	D										
2.00	ES										
2.50					PID=18.4ppm						
2.80	D										
2.80	ES										
3.00- 3.45	B	3.00 (DRY)			S10	MADE GROUND: Medium dense black silty very sandy angular fine to coarse gravel of clinker, glass, metal, plastic and timber. Domestic refuse present throughout.	2.80		13.23		
3.50											
3.50					PID=18.0ppm						
3.80	D										
3.80	ES										
4.00- 4.45	B	4.00 (DRY)			C11						
4.80	D										
4.80	ES										
4.80					PID=17.0ppm						
5.00- 5.45	B	4.00 (DRY)			C12						
5.80	D										
6.00- 6.45	B	6.00 (DRY)			C27						
6.00											
6.00					PID=16.3ppm						
6.80	D										
6.80	ES										
7.00- 7.45	B	7.00 (DRY)			C25						
7.00											
7.00					PID=14.2ppm						
7.80	D										
8.00- 8.45	B	7.60 (DRY)			C28						
8.00											
8.00					PID=5.7ppm						
8.70	D										
8.70	ES				64	Soft dark grey and black organic CLAY with pockets of amorphous peat.	8.70		7.33		
8.80	D										
9.00- 9.45	B	9.00 (7.30)			S24	Medium dense greyish brown stained orange and black gravelly fine to coarse SAND with a low cobble content. Gravel is subangular to rounded fine to coarse of various lithologies.	9.00		7.03		
9.00- 9.45	D										
9.70	D										
10.00-10.45	#	10.00 (7.80)			S6	Dark brown silty slightly gravelly fine to medium SAND. Gravel is subangular fine to medium of various lithologies.	9.70		6.33		
10.00									6.03		

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit		G.I.			24/09/15	08:00	8.70	8.50	7.20	20		Medium inflow.
9.10	0.20	Cable Percussion	NF/SM	10.00	10.00	7.90	24/09/15	18:00						
13.09	0.15	Cable Percussion	NF/SM	10.00	10.00	8.10	25/09/15	08:00						
				13.09	12.80	11.30	25/09/15	18:00						

Remarks  Inspection pit hand excavated to 1.20m depth.
 ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
 Backfill details from base of hole: bentonite seal up to ground level.
 Chiselling: 1.20-1.60m for 60 minutes and 2.30-2.50m for 30 minutes and 12.80-13.00m for 60 minutes.
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by LP
 Figure 1 of 2
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BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole CP3
Project No PN153396

Client ATKINS LIMITED

National Grid Coordinates 332924.75 E
398343.97 N

Ground Level 16.03 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
10.00-10.45 10.20 10.20	B D ES			9.0		Loose to medium dense greyish brown silty very sandy rounded to subangular fine to coarse GRAVEL of various lithologies, with a low cobble content.	10.00		6.03	
11.00-11.45	B	11.00 (9.40)		C23						
11.70	D									
12.00-12.45 12.20	B D	12.00 (10.80)		C37	Stiff brown mottled bluish grey gravelly CLAY. Gravel is tabular angular and fine to coarse of mudstone.		12.20 12.40		3.83 3.63	
12.80-13.00 13.00-13.09	D #	12.80 (11.20)		C50/40	Weak brown MUDSTONE.	13.09		2.94		
						End of Borehole				

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

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by LP
Figure 2 of 2
21/01/2016

BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS Borehole Project No CP4 PN153396
 Client ATKINS LIMITED National Grid Coordinates 333128.95 E 398650.13 N Ground Level 16.98 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.20	D					Grass over MADE GROUND: Brown gravelly silt. Gravel is angular fine to coarse of brick and concrete.	G.L. 0.10		16.98	
0.20	ES								16.88	
0.50	D					MADE GROUND: Medium dense grey and black gravelly medium to coarse sand with a low angular cobble content of brick and concrete. Gravel is angular and fine to coarse of brick and concrete. Ash present.				
0.50	ES									
1.00	D					Between 1.20m and 1.65m, locally silty sand and gravel with a high cobble content.				
1.00	ES									
1.20-1.65	B	(DRY)		15	S21					
2.00-2.45	B	1.60 (DRY)			C37	At 2.00m, dense.				
2.00	D									
2.00	ES					PID=0.0ppm				
3.00-3.45	B	2.80 (DRY)			C47					
3.00	D									
3.00	ES					PID=18.2ppm				
4.00-4.45	B	4.00 (DRY)			C37					
4.00	D									
4.00	ES					PID=37.0ppm				
5.00-5.45	B	4.60 (DRY)		21	C9	MADE GROUND: Loose black fine to coarse locally clayey sand with plastic, metal and timber fragments. Ash present.	5.00		11.98	
5.00	D									
5.00	ES					PID=23.1ppm				
6.00-6.45	B	6.00 (DRY)			C15	Between 6.00m and 6.45m, locally medium dense.				
6.00	D									
6.00	ES					PID=34.0ppm				
7.00-7.45	B	6.00 (DRY)			C4	Between 7.30m and 7.90m, pockets of a soft white paste-like substance.				
7.00	D									
7.00	ES					PID=15.8ppm				
8.00-8.45	B	7.60 (7.10)			C8	Very loose to loose brownish grey fine to coarse SAND.	8.20		8.78	
8.00	D									
8.00	ES					PID=15.8ppm				
8.30	D									
8.30	ES					PID=13.4ppm				
9.00-9.45	#	9.00 (8.50)			S2	Below 9.00m, becomes grey clayey with some peaty layers.				
9.00-9.45	B									
9.30	D									
10.00-10.45	B									

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit		G.I.			22/09/15	08:00	7.90	7.60	7.10	20		Medium inflow.
9.00	0.20	Cable Percussion	NF/SM	9.00	9.00	8.60	22/09/15	18:00						
13.07	0.15	Cable Percussion	NF/SM	9.00	9.00	6.90	23/09/15	08:00						
				13.07	13.00	9.70	23/09/15	18:00						

Remarks Inspection pit hand excavated to 1.20m depth.
 ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
 A 50mm standpipe was installed to 8.20m with a geowrapped slotted section from 6.20m to 8.20m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 8.30m, sand filter up to 8.20m, gravel filter up to 6.20m, sand filter up to 6.10m, bentonite seal up to 0.20m, concrete up to ground level.
 Chiselling: 2.30-2.60m for 60 minutes and 3.40-3.60m for 30 minutes and 11.40-11.60m for 30 minutes and 12.00-12.20m for 30 minutes.
 Logged in accordance with BS5930:1999 + A2:2010

Logged by LP
 Figure 1 of 2
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BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole CP4
Project No PN153396

Client ATKINS LIMITED

National Grid Coordinates 333128.95 E
398650.13 N

Ground Level 16.98 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
10.00-10.27	D	10.00 (8.10)		33	S50/ 120	Extremely weak greyish brown SANDSTONE recovered as sand and gravel.	10.30		6.68	
10.30	D									
10.30	ES									
11.00-11.45	B	11.00 (9.10)			S50/50					
11.00-11.10	D									
11.30	D									
12.00-12.45	B	12.00 (9.60)			S50/50					
12.00-12.08	D									
12.30	D									
12.30	ES									
13.00-13.07	D	13.00 (9.50)			S50/40	End of Borehole	13.07		3.91	

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

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by LP
Figure 2 of 2
21/01/2016

BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS Borehole CP5
 Project No PN153396
 Client ATKINS LIMITED National Grid Coordinates 333347.40 E 398978.34 N Ground Level 15.60 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.10- 0.40	B					Grass over MADE GROUND: Brown sandy gravelly silt. with rootlets. Gravel is angular fine to coarse of brick, concrete and limestone.	G.L.		15.60	
0.20	ES						0.50		15.10	
0.50- 0.80	B					MADE GROUND: Dark brown and black gravelly fine to coarse sand with pockets of clay and a low to medium cobble content of brick and concrete. Gravel is angular fine to coarse of brick, concrete and sandstone. Ash present.	0.50		15.10	
0.50	ES						0.85		14.75	
0.85	D					MADE GROUND: Loose to medium dense black gravelly fine to coarse sand. Gravel is angular and fine to coarse of concrete, timber and plastic. Ash present. Between 1.20m and 1.65m, locally silty very sandy gravel with a low cobble content.	0.85		14.75	
1.00	ES						1.20- 1.65		12.20	
1.20- 1.65	B	1.20 (DRY)		14	C23					
2.00	D					MADE GROUND: Domestic refuse including plastic, ceramic, cloth, glass and timber with occasional sand and gravel.	3.40		12.20	
2.00	ES						4.00		10.20	
2.20- 2.65	B	1.70 (DRY)			C8					
3.00	D					Between 4.75 and 5.10m, driller denotes **large obstructions.	5.40		10.20	
3.00	ES						5.00		6.35	
3.20- 3.65	B	3.00 (DRY)		43	C7					
4.00	D					Firm to stiff brown slightly sandy to sandy slightly gravelly CLAY. Gravel is subangular fine to coarse of sandstone.	9.25		6.35	
4.00	ES						9.70			
4.30- 4.75	B	4.30 (DRY)			C15					
5.00	D					From 7.15m, with closely spaced bands of brown sand. At 7.15m, very high strength	9.25		6.35	
5.20- 5.65	B	5.20 (4.95)			C15					
5.65- 6.00	B			22						
6.00	ES					Extremely weak reddish grey fine to coarse grained SANDSTONE.	9.25		6.35	
6.10	D						9.70			
6.25- 6.70	D	6.00 (DRY)			C14					
6.75- 7.15	B									
7.15- 7.60	UT63	7.00 (DRY)	182	12						
7.60	D									
7.75	D									
7.85- 8.25	B			15						
8.25- 8.70	D	8.25 (DRY)			S31					
9.00	D									
9.25- 9.70	UT89	9.00 (8.70)	442	14						
9.70	D									
9.75- 9.95	D	9.00 (8.70)			S50/102					
10.00-10.30	B									

Boring				Progress				Groundwater						
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	KP/LP	G.I.			22/09/15	08:00	4.75	4.30	4.50	20	6.00	Slow inflow.
6.00	0.20	Cable Percussion	KP/LP	6.70	6.00	DRY	22/09/15	18:00	7.60	7.00	7.45	20	8.25	Slow inflow
10.42	0.15	Cable Percussion	KP/LP	6.70	6.00	DRY	23/09/15	08:00	8.75	8.25			9.00	Seepage - no rise
				10.42	10.30	8.85	23/09/15	18:00						Slow inflow

Remarks Inspection pit hand excavated to 1.20m depth.
 Water was added to assist boring between 1.20m and 4.30m.
 ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
 A 50mm standpipe was installed to 8.90m with a geowrapped slotted section from 6.90m to 8.90m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 8.90m, gravel filter up to 6.90m, sand filter up to 6.75m, bentonite seal up to 0.45m, concrete up to ground level.
 Chiselling: 4.80-5.10m for 30 minutes and 10.05-10.30m for 30 minutes.
 Logged in accordance with BS5930:1999 + A2:2010

Logged by LP
 Figure 1 of 2
 21/01/2016

BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole CP5
Project No PN153396

Client ATKINS LIMITED

National Grid Coordinates 333347.40 E
398978.34 N

Ground Level 15.60 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
10.30-10.42	D	10.30 (8.85)			S50/41	End of Borehole	10.42		5.18	

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

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by LP
Figure 2 of 2
21/01/2016

BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No CP6 PN153396


Client ATKINS LIMITED

National Grid Coordinates 333524.49 E 399177.85 N

Ground Level 12.28 m OD

Sampling			Properties			Strata	Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
0.20	D					Grass over TOPSOIL: Dark brown slightly silty sand.	G.L.		12.28
0.20	ES								
0.20			PID=18.3ppm						
0.50	D					Dark brown very clayey gravelly fine to coarse SAND.	0.50		11.78
0.30			PID=16.2ppm						
0.50	ES			15					
0.55- 0.95	B					Loose brown slightly silty fine to coarse SAND.	1.00		11.28
1.00	D								
1.00	ES								
1.00			PID=20.1ppm						
1.20- 1.65	B	200.00 (DRY)			S7	Soft to firm reddish brown mottled bluish grey CLAY.	1.50		10.78
1.20- 1.65	D								
1.50	D			21					
1.50	ES					Below 1.80m, becomes gravelly. Gravel is angular fine to coarse of mudstone.			
1.50			PID=18.5ppm						
2.00- 2.45	UT19	1.60 (Dry)	17	16		At 2.00m, very low strength			
2.50	C								
2.50	D			19					
2.50	ES								
2.50			PID=18.0ppm						
2.80	D					Extremely weak bluish grey MUDSTONE recovered as gravel.	2.80		9.48
3.00- 3.37	B	150.00 (2.30)			S50/220				
3.00- 3.45	D								
3.70- 4.00	B								
4.00- 4.11		150.00 (3.40)			S50/50				
						End of Borehole	4.11		8.17

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit		G.L.	200	DRY	29/09/15	09:30	2.80	2.6	2.30	20		Medium inflow.
4.11	0.15	Cable Percussion	NF/SM	4.11	3.70		29/09/15	16:20						


Remarks  Inspection pit hand excavated to 1.20m depth.
 ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
 A 50mm standpipe was installed to 2.80m with a geowrapped slotted section from 1.00m to 2.80m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 2.80m, gravel filter up to 1.00m, bentonite seal up to 0.20m, concrete up to ground level.
 Chiselling: 3.70-4.00m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by JG
 Figure 1 of 1
 21/01/2016



BOREHOLE RECORD - Cable Percussion

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No CP7 PN153396


Client ATKINS LIMITED


National Grid Coordinates 333690.47 E 399564.19 N

Ground Level 12.42 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.20	D					Grass over TOPSOIL: Dark brown silty sand.	G.L.		12.42	
0.20	ES									
0.20			PID=53.4ppm			Dark brown organic fine to coarse SAND.	0.40		12.02	
0.40	D									
0.50	ES		PID=64.4ppm			Medium dense brown to greyish brown slightly silty slightly gravelly fine to coarse SAND.	0.75		11.67	
0.50										
0.75- 1.20	B		PID=66.6ppm							
1.00	ES									
1.00										
1.20- 1.65	B	1.20 (WET)		17	S17					
1.20	W									
2.00	D									
2.25- 2.70	D	2.25 (1.50)			S26					
2.75- 3.20	B									
3.20- 3.65	D	3.20 (1.90)			S25					
3.70- 4.25	B			15						
4.25- 4.70	D	4.25 (2.35)			S25					
4.70	D									
4.85- 5.30	B					Extremely weak reddish brown mottled green and grey MUDSTONE locally grading to sandstone and siltstone. Recovered as gravel and clay.	4.85		7.57	
5.30- 5.75	UT42	5.30 (3.05)								
5.75	D									
6.00- 6.40	B									
6.40- 6.60	D	6.40 (2.15)			C50/90					
6.80- 7.15	B									
7.15- 7.20		6.80 (1.90)			C50/19	End of Borehole	7.20		5.22	

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	KP/LP	G.I.			29/09/15	08:00	1.20		1.15	20		Slow inflow.
7.25	0.15	Cable Percussion	KP/LP	6.00	6.00	1.90	29/09/15	18:00						
				6.00	6.00	1.20	30/09/15	08:00						
				7.20	6.80	1.90	30/09/15	18:00						

Remarks  Inspection pit hand excavated to 1.20m depth.
 ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
 Water was added to assist boring between 1.20m and 4.50m.
 A 50mm standpipe was installed to 7.00m with a geowrapped slotted section from 5.00m to 7.00m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 5.00m, sand filter up to 4.90m, bentonite seal up to 0.50m, concrete up to ground level.
 Chiselling: 6.45-6.60m for 30 minutes and 6.80-7.15m for 60 minutes.
 All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by LP
 Figure 1 of 1
 21/01/2016


Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
CP1	1.20	6.34	C	-	-	-	-	-	-	1	1	*					
CP1	2.30	5.24	C	-	-	-	-	-	1	-	1	*					
CP1	5.35	2.19	S	-	-	-	-	-	1	1	2	*					
CP1	6.45	1.09	S	-	1	-	-	-	2	4	6	*					
CP1	7.50	0.04	S	-	1	1	1	-	-	-	1	*					
CP1	8.50	-0.96	S	-	1	1	-	-	-	-	0	*					
CP1	9.70	-2.16	S	-	1	-	-	3	15	7	25			*			
Driller			Keith Pemberton				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			BL01														
Energy Ratio, Er (%)			65.00														
Calibration Date			17/10/2014														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'						
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50		
CP2	1.20	15.71	C	-	1	1	-	1	1	1	3	*						
CP2	2.25	14.66	C	-	1	2	3	3	1	1	8	*						
CP2	3.25	13.66	C	-	2	4	4	1	2	2	9	*						
CP2	4.20	12.71	C	-	2	5	5	2	3	4	14		*					
CP2	5.25	11.66	C	-	6	10	5	5	4	4	18			*				
CP2	6.20	10.71	C	-	4	5	4	2	3	2	11		*					
CP2	7.25	9.66	C	-	1	1	2	2	3	2	9		*					
CP2	8.20	8.71	C	-	1	2	3	2	3	5	13			*				
CP2	9.20	7.71	C	-	1	2	3	4	5	6	18			*				
CP2	10.20	6.71	C	-	2	3	5	3	3	3	14			*				
CP2	11.30	5.61	C	-	3	5	5	9	14	16	44						*	
CP2	12.25	4.66	C	-	13	12/39	38	12/15			50/90							>
CP2	13.20	3.71	C	-	25/74		50/38				50/38							>
CP2	13.70	3.21	S	-	25/69		50/28				50/28							>
Driller			Keith Pemberton				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005											
Hammer No.			BL01															
Energy Ratio, Er (%)			65.00															
Calibration Date			17/10/2014															

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
CP4	1.20	15.78	S	-	4	3	4	7	5	5	21		*				
CP4	2.00	14.98	C	-	6	3	3	9	15	10	37				*		
CP4	3.00	13.98	C	-	9	9	5	22	10	10	47						*
CP4	4.00	12.98	C	-	10	10	7	8	9	13	37				*		
CP4	5.00	11.98	C	-	2	2	2	3	2	2	9	*					
CP4	6.00	10.98	C	-	2	4	3	5	3	4	15		*				
CP4	7.00	9.98	C	-	2	1	1	1	1	1	4	*					
CP4	8.00	8.98	C	-	3	4	2	2	2	2	8	*					
CP4	9.00	7.98	S	-	2	1	1	-	1	-	2	*					
CP4	10.00	6.98	S	-	9	12	22	28/45			50/120						>
CP4	11.00	5.98	S	-	25/50		50/50				50/50						>
CP4	12.00	4.98	S	-	25/30		50/50				50/50						>
CP4	13.00	3.98	S	-	25/30		50/40				50/40						>
Driller			Neil Forrester				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			SPT4														
Energy Ratio, Er (%)			75.00														
Calibration Date			29/01/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
CP5	1.20	14.40	C	-	4	3	5	5	6	7	23		*				
CP5	2.20	13.40	C	-	3	2	2	2	2	2	8	*					
CP5	3.20	12.40	C	-	1	2	2	1	2	2	7	*					
CP5	4.30	11.30	C	-	1	2	4	2	4	5	15		*				
CP5	5.20	10.40	C	-	2	4	6	3	3	3	15		*				
CP5	6.25	9.35	C	-	1	1	2	3	4	5	14		*				
CP5	8.25	7.35	S	-	1	3	5	7	9	10	31			*			
CP5	9.75	5.85	S	-	12	13/23	30	20/27			50/102						>
CP5	10.30	5.30	S	-	25		50/41				50/41						>
Driller			Keith Pemberton				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			BL01														
Energy Ratio, Er (%)			65.00														
Calibration Date			17/10/2014														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
CP6	1.20	11.08	S	-	1	1	1	2	2	2	7	*					
CP6	3.00	9.28	S	-	6	9	18	21	11/70	/0	50/220						>
CP6	4.00	8.28	S	-	25/60		50/50				50/50						>
Driller			Neil Forrester				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			SPT4														
Energy Ratio, Er (%)			75.00														
Calibration Date			29/01/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
CP7	1.20	11.22	S	-	1	1	3	3	5	6	17		*				
CP7	2.25	10.17	S	-	2	3	5	6	7	8	26			*			
CP7	3.20	9.22	S	-	1	2	4	6	7	8	25			*			
CP7	4.25	8.17	S	-	1	2	3	5	7	10	25			*			
CP7	6.40	6.02	C	-	13	12/34	39	11/15			50/90						>
CP7	7.15	5.27	C	-	25/30		50/19				50/19						>
Driller			Keith Pemberton				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			BL01														
Energy Ratio, Er (%)			65.00														
Calibration Date			17/10/2014														

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

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



APPENDIX 3

Dynamic Sample Borehole Records

DATA SHEET - Symbols and Abbreviations used on Records



Sample Types

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

Insitu Testing / Properties

CBRP	CBR using TRL probe
CHP	Constant Head Permeability Test
COND	Electrical conductivity
HV	Strength from Hand Vane
ICBR	CBR Test
IDEN	Density Test
IRES	Resistivity Test
MEX	CBR using Mexecon Probe Test
PKR	Packer Permeability Test
PLT	Plate Load Test
PP	Strength from Pocket Penetrometer
Temp	Temperature
VHP	Variable Head Permeability Test
VN	Strength from Insitu Vane
w%	Water content

(All other strengths from undrained triaxial testing)

S	Standard Penetration Test (SPT)
C	SPT with cone
N	SPT Result
-/-	Blows/penetration (mm) after seating drive
-*/-(mm)	Total blows/penetration
()	Extrapolated value

Groundwater

Water Strike	
Depth Water Rose To	

Instrumentation

Seal	
Filter	
Seal	

Strata

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

Note: Composite soil types shown by combined symbols

Chalk	
Limestone	
Sandstone	
Coal	

Strata, Continued

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

Backfill Materials

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

Rotary Core

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

BOREHOLE RECORD - Dynamic Sample




Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No WS01 PN153396


Client ATKINS LIMITED

National Grid Coordinates 333211.84 E 397299.11 N

Ground Level 4.83 m OD


Sampling			Properties		Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description		Depth	Legend	Level m OD
					Grass over MADE GROUND: Dark brown silty gravelly fine to medium sand. Gravel is angular fine of brick.		G.L.		4.83
					MADE GROUND: Greyish brown very silty very gravelly fine to coarse sand with a high angular cobble content of brick and concrete. At 0.60m, low boulder content.		0.20		4.63
					End of Borehole		0.80		4.03

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
0.90	0.40	Inspection Pit	PB/JG	G.I. 0.90			07/10/15 07/10/15	08:00 18:00						None encountered.

Remarks  The Window Sample Borehole was terminated within the inspection pit at a depth of 0.90m due to the presence of buried concrete and the rig was moved to WS01A.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.
All dimensions are in metres.

Logged by JG
Figure 1 of 1
21/01/2016



Logged in accordance with BS5930:1999 + A2:2010

BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No WS01A PN153396

Client ATKINS LIMITED

National Grid Coordinates 333207.33 E 397291.67 N

Ground Level 6.98 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.20- 0.70	B					Grass over MADE GROUND: Dark brown silty gravelly fine to medium sand. Gravel is angular fine of brick. MADE GROUND: Greyish brown very silty very gravelly fine to coarse sand with a high angular cobble content of brick and concrete. Between 1.00 and 1.20m, creosote odour. At 1.40m, with fragments of metal. End of Borehole	G.L.		6.98	
0.20	ES						0.20		6.78	
0.20			PID=0.7ppm							
0.50	D									
0.30			PID=0.3ppm							
0.50	ES									
0.70- 1.20	B									
1.00	D									
1.00	ES									
1.00			PID=1.0ppm		S43					
1.20- 1.65	D	(DRY)								
1.20	W						1.65		5.33	


Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	PB/JG	G.L.			07/10/15	08:00	1.20					No rise.
1.65	0.10	Dynamic Sampler	PB/JG	1.65		1.25	07/10/18	18:00						

Remarks The Window Sample Borehole was terminated at a depth of 1.65m due to an obstruction and the rig was moved to WS1B.
 ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
 Backfill details from base of hole: bentonite seal up to 0.30m, arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by JG
 Figure 1 of 1
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BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No **WS01B**
PN153396

Client **ATKINS LIMITED**

National Grid Coordinates 333247.91 E
397266.61 N

Ground Level 7.09 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.20- 0.50	B					Grass over TOPSOIL: Dark brown sandy silt.	G.L.		7.09	
0.20	ES					MADE GROUND: Brown silty slightly gravelly fine sand. Gravel is angular fine of brick.	0.15		6.94	
0.20			PID=3.1ppm				0.40		6.69	
0.50	D					MADE GROUND: Black sandy slightly gravelly silt. Gravel is angular fine to medium of brick, concrete, glass, plastic, metal and ceramic.				
0.50	ES									
0.50			PID=47.2ppm							
0.60- 1.20	B									
1.00	D					End of Borehole				
1.00	ES									
1.00			PID=205.0ppm							
1.20- 1.23		(DRY)			50/20		1.65		5.44	

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	SJ/MJ	G.I.			08/10/15	08:00						None encountered.
1.65	0.10	Dynamic Sampler	SJ/MJ	1.65		DRY	08/10/15	18:00						

Remarks The Window Sample Borehole was terminated at a depth of 1.65m due to an obstruction.
 Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.
All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by JG
Figure 1 of 1
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BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No WS02 PN153396

Client ATKINS LIMITED

National Grid Coordinates 332729.01 E 397858.82 N

Ground Level 11.17 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
						Grass over TOPSOIL: Dark brown sandy silt.	G.L.		11.17	
0.20	ES					MADE GROUND: Dark brown sandy slightly gravelly silt. Gravel is angular fine to medium of brick and concrete.	0.20		10.97	
0.20	D		PID=1.5ppm				0.35		10.82	
0.50	ES					MADE GROUND: Very loose to loose black gravelly fine to medium sand. Gravel is angular fine to medium of clinker and brick. Ash present.				
0.50	D		PID=2.5ppm							
0.70- 1.20	B									
1.00	D									
1.00	ES					At 2.00m, becomes silty.				
1.00	D		PID=2.7ppm							
1.20- 1.65	D	(DRY)		S1/450						
1.50- 1.70	D									
1.70- 2.00	ES					At 2.00m, becomes silty.				
1.70- 2.00	D	2.00 (DRY)	PID=1.0ppm	S5						
2.00- 2.45	D									
2.50- 2.70	D									
2.70- 3.00	ES					Very loose to loose yellowish brown locally grey slightly silty fine to medium SAND.				
2.70- 3.00	D	2.00 (DRY)	PID=0.7ppm	S10						
3.00- 3.45	D									
3.50- 3.70	D			33						
3.70- 4.00	ES					Dark brown spongy fibrous PEAT.				
3.70- 4.00	D	2.00 (DRY)	PID=0.9ppm	S3						
4.00- 4.45	D									
4.50- 4.70	D			344						
4.70- 5.00	ES					End of Borehole				
4.70- 5.00	D		PID=1.1ppm							

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	SJ/MJ	G.L.			08/10/15	08:00						None encountered.
5.00	0.10	Dynamic Sampler	SJ/MJ	4.45	2.00	DRY	08/10/15	18:00						

Remarks Inspection pit hand excavated to 1.20m depth. The Window Sample Borehole was terminated at 5.00m after the borehole collapsed in to 3.70m. Logged by JG

A 50mm standpipe was installed to 3.00m with a geowrapped slotted section from 1.00m to 3.00m with flush lockable protective cover. Backfill details from base of hole: collapsed material up to 3.70m, bentonite seal up to 3.00m, gravel filter up to 1.00m, bentonite seal up to 0.30m, concrete up to ground level. Figure 1 of 1 21/01/2016

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No **WS03**
PN153396

Client **ATKINS LIMITED**

National Grid Coordinates 333115.86 E
397896.98 N

Ground Level 15.63 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.15- 0.55	B					Grass over TOPSOIL: Dark brown sandy silt.	G.L.		15.63	
0.20	ES					MADE GROUND: Dark greyish brown slightly gravelly silty fine to coarse sand. Gravel is angular fine to coarse of concrete, brick and rope. Ash present.	0.15		15.48	
0.20										
0.50	D		PID=0.3ppm			Loose dark brown silty fine to medium SAND. Between 0.55 and 0.65m, brick fragments fallen into samples from above strata. At 1.00m, becomes orangish brown.	0.55		15.08	
0.50	ES		PID=0.1ppm							
0.70- 1.20	B					Soft to firm yellowish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies. At 2.50m, becomes reddish brown.	2.15		13.48	
1.00	ES		PID=0.3ppm		S8					
1.20- 2.15	B	(DRY)				Very loose reddish brown very clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of various lithologies.	3.00		12.63	
1.20- 1.65	D		PID=0.3ppm	13	S8					
1.40- 1.70	ES		PID=0.3ppm			Stiff reddish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of various lithologies.	4.20		11.43	
1.40- 1.70	D		PID=0.3ppm		S8					
1.80- 1.90	D	2.00 (DRY)				End of Borehole	5.00		10.63	
2.00- 2.45	D				S8					
2.15- 3.00	B			22						
2.40- 2.70	ES		PID=0.1ppm							
2.40- 2.70										
2.60- 2.80	HV		Av=41							
2.60- 2.80	HVR		Av=18							
2.80- 2.90	D									
3.00- 3.45	D	3.00 (DRY)			S0/450					
3.40- 3.70	ES		PID=<0.1ppm							
3.40- 3.70	D		PID=<0.1ppm	23						
3.70- 4.00	D									
4.00- 4.45	D	3.00 (DRY)			S8					
4.20- 4.70	ES		PID=0.9ppm							
4.20- 4.70										
4.70- 5.00	D			15						
4.70- 4.90	HV		Av=95							


Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	PB/JG	G.I.			06/10/15	08:00	3.00					Wet stratum
5.00	0.10	Dynamic Sampler	PB/JG	5.00	3.00	DRY	06/10/15	18:00						

Remarks Inspection pit hand excavated to 1.20m depth.
 The Window Sample Borehole was terminated at 5.00m after the borehole collapsed in to 4.60m.
 Backfill details from base of hole: collapsed material up to 4.60m, bentonite seal up to 0.30m, arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by JG
Figure 1 of 1
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BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No WS04 PN153396

Client ATKINS LIMITED

National Grid Coordinates 332753.43 E 398248.25 N

Ground Level 14.04 m OD

Sampling			Properties			Strata			Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD		
0.15- 0.60	B					Grass over TOPSOIL: Dark brown sandy silt.	G.L.		14.04		
0.20	ES					MADE GROUND: Black gravelly very silty fine to coarse sand with a high cobble content of brick and concrete. Gravel is angular to subrounded fine to coarse of clinker, brick, concrete and various lithologies. Ash present.	0.15		13.89		
0.20			PID=<0.1ppm								
0.50	D										
0.50	ES		PID=0.1ppm								
0.50											
0.60- 1.20	B					MADE GROUND: Reddish brown gravelly fine to medium sand. Gravel is angular fine of sandstone.	0.95		13.09		
1.00	D										
1.00	ES		PID=0.3ppm				1.20		12.84		
1.00											
1.20- 1.65	D	(DRY)			S11						
1.50- 1.80	ES		PID=0.4ppm			MADE GROUND: Loose to medium dense black silty sandy angular to subangular fine to coarse gravel of clinker, brick and glass. Locally grading to gravelly silt. Ash present.	2.40		11.64		
1.50- 1.80											
1.80- 1.90	D										
1.80- 1.90	D	2.00 (DRY)			S4						
2.00- 2.45	D										
2.40- 2.70	ES		PID=1.6ppm			MADE GROUND: Grey silty fine to medium sand with ash. At 2.60m, pocket of off-white silt.	2.70		11.34		
2.40- 2.70											
2.80- 2.90	D					MADE GROUND: Grey sandy silt.	3.00		11.04		
3.00- 3.45	D	3.00 (DRY)			S15						
3.30- 3.70	ES		PID=0.1ppm			MADE GROUND: Medium dense becoming very loose black silty sandy angular to subangular fine to coarse gravel of clinker, brick and glass. Locally grading to gravelly silt. Ash present.	6.45		7.59		
3.30- 3.70											
3.70- 4.00	D										
4.00- 4.45	D	3.00 (DRY)			S1		At 4.00m, very loose.				
4.00- 4.70	ES		PID=0.4ppm								
4.70- 5.00	D					MADE GROUND: Medium dense becoming very loose black silty sandy angular to subangular fine to coarse gravel of clinker, brick and glass. Locally grading to gravelly silt. Ash present.					
5.00- 5.45	D	3.00 (DRY)			S3						
5.00- 5.70	ES		PID=0.3ppm								
5.00- 5.70											
5.70- 6.00	D					End of Borehole					
6.00- 6.45	D	3.00 (DRY)			S4						


Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	PB/JG	G.I.			06/10/15	08:00						None encountered.
6.45	0.10	Dynamic Sampler	PB/JG	6.45	3.00	DRY	06/10/15	18:00						

Remarks: Inspection pit hand excavated to 1.20m depth. ABS sample = 1 x vial, 1 x plastic jar and 1 amber jar. Backfill details from base of hole: bentonite seal up to 0.30m, arisings up to ground level.

Logged by JG Figure 1 of 1 21/01/2016

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010



BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No WS05 PN153396

Client ATKINS LIMITED

National Grid Coordinates 333075.30 E 398213.42 N

Ground Level 18.38 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.00- 0.40	B					Grass over TOPSOIL: Soft dark brown slightly gravelly sandy silt. Gravel is angular to subrounded fine to coarse of various lithologies.	G.L.		18.38	
0.20	D				0.40		17.98			
0.20	ES		PID=1.7ppm			MADE GROUND: Very loose black angular fine to coarse gravel of clinker, brick, glass and pottery. Ash present.				
0.50- 1.00	B									
0.50	ES		PID=0.5ppm							
0.80	D									
1.00	ES		PID=0.1ppm							
1.20- 1.65	D	(DRY)			S1					
1.30- 1.50	ES									
1.30- 1.50			PID=0.6ppm							
1.50- 2.70	B									
1.80- 1.90	D									
2.00- 2.45	D	2.00 (DRY)			S1/450					
2.30- 2.50	ES					MADE GROUND: Very loose reddish brown slightly silty very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of sandstone.				
2.30- 2.50			PID=0.6ppm							
2.80- 2.90	D									
3.00- 3.45	D	3.00 (DRY)			S3					
3.30- 3.50	ES									
3.30- 3.50			PID=1.6ppm							
3.50- 3.80	D									
4.00- 4.45	D						MADE GROUND: Black angular fine to coarse gravel of clinker, brick, glass and pottery.			
4.00- 4.30	ES	4.00 (DRY)			S6					
4.00- 4.30			PID=0.6ppm				MADE GROUND: Loose grey slightly silty fine to medium sand with occasional angular fine gravel of brick.			
4.70- 4.90	D									
5.00- 5.45	D	4.00 (DRY)			S1	MADE GROUND: Very loose to loose orangish brown slightly silty very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of sandstone, brick and clinker. Ash present.				
5.00- 5.60	ES									
5.00- 5.60			PID=0.5ppm							
5.60- 5.90	D									
6.00- 6.45	D	4.00 (DRY)			S10					
End of Borehole							6.45		11.93	

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	PB/JG	G.I.			05/10/15	08:00						None encountered.
6.45	0.10	Dynamic Sampler	PB/JG	6.45	4.00	DRY	05/10/15	18:00						

Remarks Inspection pit hand excavated to 1.20m depth. ABS sample = 1 x vial, 1 x plastic jar and 1 amber jar
 A 50mm standpipe was installed to 5.00m with a geowrapped slotted section from 3.00m to 5.00m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 5.00m, gravel filter up to 3.00m, bentonite seal up to 0.30m, concrete up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by JG
 Figure 1 of 1
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BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No **WS06**
PN153396

Client **ATKINS LIMITED**

National Grid Coordinates 332865.53 E
398516.30 N

Ground Level 13.99 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.00- 0.40	B					Grass over TOPSOIL: Dark brown sandy silt with some fragments of brick	G.L.		13.99	
0.20	ES									
0.40- 1.20	B		PID=0.5ppm			MADE GROUND: Dark greyish brown sandy silt with some to many fragments of plastic, metal, brick and concrete.	0.40		13.59	
0.50	D									
0.50	ES		PID=0.4ppm			MADE GROUND: Dark greyish brown silty sandy cobbles of brick and concrete	0.70		13.29	
1.00	D									
1.00	ES		PID=0.4ppm							
1.20- 1.65	D	(DRY)			S11		1.40		12.59	
1.40- 1.90	ES		PID=0.2ppm			MADE GROUND: Dark brownish grey locally black sandy silt with some to many fragments of ash, clinker, brick, concrete and slate up to cobble size	1.90		12.09	
2.00- 2.45	D	2.00			S4	MADE GROUND: Black ash with fibres up to 7mm long	2.50		11.49	
2.00- 2.50	ES	(DRY)	PID=0.8ppm							
1.90- 2.50										
2.50- 2.80	D					MADE GROUND: Firm brown slightly sandy slightly gravelly clay with a low cobble content and some fragments of brick, concrete, and ash.	3.00		10.99	
3.00- 3.45	D	3.00			S15					
3.00- 3.70	ES	(DRY)	PID=0.5ppm			MADE GROUND: Black ash with some fragments of brick, glass and concrete, grading from medium gravel to silt.	4.20		9.79	
3.00- 3.70							4.30		9.69	
4.00- 4.45	D	3.00			S1		4.50		9.49	
4.00- 4.50	ES	(DRY)	PID=0.5ppm			MADE GROUND: Firm orangish brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to medium of various lithologies.				
4.60- 5.00	D					MADE GROUND: Pre 1971 newspaper (pre decimal money references)	5.00		8.99	
5.00- 5.70	ES	3.00			S3	MADE GROUND: Brown sand with some fragments of brick, concrete and ash.				
5.00- 5.45		(DRY)	PID=0.6ppm							
5.00- 5.70						MADE GROUND: Black ash with some fragments of brick, glass and concrete, grading from medium gravel to silt.				
5.70- 6.00	D									
6.00- 6.45	D	3.00			S4					
		(DRY)				End of Borehole	6.45		7.54	


Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	PB/JG	G.I.			06/10/15	08:00	5.00					Medium inflow, no rise after 20 minutes.
6.45	0.10	Dynamic Sampler	PB/JG	6.45	3.00	DRY	06/10/15	18:00						

Remarks Inspection pit hand excavated to 1.20m depth.
 ABS sample = 1 x vial, 1 x plastic jar and 1 amber jar
 A 50mm standpipe was installed to 5.70m with a slotted section from 2.70m to 5.70m with flush lockable protective cover. Backfill details from base of hole: collapsed material up to 5.70m, gravel filter up to 2.70m, bentonite seal up to 0.20m, concrete up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by JG
 Figure 1 of 1
 21/01/2016



BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No WS07 PN153396

Client ATKINS LIMITED

National Grid Coordinates 333150.41 E 398491.61 N

Ground Level 17.58 m OD


Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.20	ES					Grass over TOPSOIL: Soft dark brown slightly gravelly sandy silt. Gravel is angular to subrounded fine to coarse of various lithologies.	G.L.		17.58	
0.30	B		PID=0.2ppm				0.30		17.28	
0.30- 0.50	B					MADE GROUND: Dark brown slightly gravelly sandy silt with many fragments of brick and concrete up to cobble size. Gravel is angular fine to coarse of various lithologies.				
0.50- 0.80	B						0.80		16.78	
0.50	D									
0.50	ES		PID=0.7ppm							
0.50	D									
1.00	D									
1.00	ES		PID=17.0ppm			MADE GROUND: Very loose black domestic refuse including ash, paper, plastic, glass, ceramic, fabric and timber with occasional sand and gravel.				
1.20- 1.65	D	-		S5						
1.50- 1.70	ES	(DRY)	PID=8.4ppm							
1.50- 1.70	D									
1.70- 1.90	D									
2.00- 2.45	D	2.00 (DRY)			S2					
2.50- 2.70	ES		PID=7.1ppm							
2.50- 2.70	D									
2.70- 2.90	D									
3.00- 3.45	D	3.00 (DRY)			S5					
3.50- 3.70	ES		PID=2.4ppm							
3.50- 3.70	D									
3.70- 3.90	D									
4.00- 4.45	D	4.00 (DRY)			S24	At 4.10m cobble size brick fragment.				
4.00- 4.50	ES		PID=16.4ppm							
4.00- 4.50	D									
4.60- 4.90	D									
5.00- 5.45	D	5.00 (DRY)			S2					
5.30- 5.65	ES		PID=1.6ppm			MADE GROUND: Very loose dark greyish brown silty fine to medium sand, initially with some fragments of timber. At 5.45m becomes greyish brown	5.30		12.28	
5.30- 5.65	D						5.65		11.93	
5.65- 6.00	ES		PID=1.4ppm				5.80		11.78	
5.65- 6.00	D	6.00 (DRY)		16	S21	Grey slightly gravelly silty fine to coarse SAND. Gravel is angular fine to medium predominantly of sandstone.	6.40		11.18	
6.00- 6.45	D					Firm to stiff orangish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of various lithologies.	6.45		11.13	
						Greyish brown silty fine to medium SAND.				
						End of Borehole				

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.50	Inspection Pit	PB/JG	G.I.			05/10/15	08:00						None encountered.
6.45	0.10	Dynamic Sampler	PB/JG	6.45	4.00	DRY	05/10/15	18:00						

Remarks: Inspection pit hand excavated to 1.20m depth. ABS sample = 1 x vial, 1 x plastic jar and 1 amber jar. Backfill details from base of hole: bentonite seal up to 0.30m, arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet. All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by JG Figure 1 of 1 21/01/2016



BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No WS08 PN153396

Client ATKINS LIMITED

National Grid Coordinates 333075.63 E 398936.10 N

Ground Level 12.28 m OD

Sampling			Properties			Strata	Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
0.00- 0.90	B ES					Grass over TOPSOIL: Dark brown slightly gravelly very silty fine to medium sand with some fragments of brick. Gravel is angular to subrounded fine to coarse of various lithologies.	G.L.		12.28
0.20	D		PID=0.0ppm						
0.50	ES					MADE GROUND: Yellowish brown slightly silty fine sand.	0.90		11.38
0.50			PID=0.0ppm						
0.90- 1.20	B D ES					MADE GROUND: Firm dark greyish brown slightly gravelly sandy silt with much ash and clinker, some organic layers and occasional fragments of brick and pottery. Gravel is angular fine to medium of various lithologies.	1.70		10.58
1.00			PID=0.0ppm						
1.20- 1.70	B	1.20 (DRY)			S12	MADE GROUND: Very loose black ash and clinker grading from fine sand to medium gravel with some fragments of brick, glass and pottery.	3.00		9.28
1.20- 1.65	D		PID=0.0ppm						
1.70- 1.80	D					Soft dark brown sandy SILT.	4.10		8.18
1.80- 2.00	ES		PID=0.0ppm						
1.80- 2.00	B					Dark brown peaty silty fine to medium SAND.	4.40		7.88
2.00- 2.60	D	2.00 (DRY)			S10				
2.60- 2.80	D					Below 5.00m: Becomes medium dense brown and yellowish brown slightly peaty silty fine to coarse sand.	6.00		6.28
2.80- 3.00	ES		PID=0.0ppm						
2.80- 3.00	B					End of Borehole			
3.00- 3.60	D	3.00 (3.25)			S1				
3.60- 3.80	D								
3.80- 4.00	ES								
3.80- 4.00	D	4.00 (3.80)							
4.00- 4.45	D								
4.10- 4.70	D								
4.50- 4.70	D								
4.70- 5.00	ES								
4.70- 5.00	D	4.00 (3.70)							
5.00- 5.45	D								
5.00- 5.50	D								
5.50- 6.00	ES								
5.50- 6.00			PID=0.0ppm						


Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	SM/JB	G.I.			02/10/15	08:00						
6.00	0.10	Dynamic Sampler	SM/JB	6.00	4.00	3.25	02/10/15	18:00	3.25	3.00				Slow inflow, no rise after 20 minutes.

Remarks: Inspection pit hand excavated to 1.20m depth. ABS sample = 1 x vial, 1 x plastic jar and 1 amber jar. Backfill details from base of hole: bentonite seal up to 0.30m, arisings up to ground level.

Logged by JG
Figure 1 of 1
21/01/2016

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010



BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No WS09 PN153396

Client ATKINS LIMITED

National Grid Coordinates 333261.85 E 398770.25 N

Ground Level 16.37 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.00- 0.30	B					Grass over TOPSOIL: Soft dark brown sandy silt.	G.L.		16.37	
0.20	ES									
0.30- 0.80	B		PID=0.0ppm			MADE GROUND: Dark greyish brown slightly gravelly sandy silt with fragment of brick, concrete, sandstone masonry. Gravel is angular to subrounded fine to coarse of various lithologies.	0.30		16.07	
0.50	D									
0.50	ES		PID=0.0ppm							
0.80- 1.20	B									
1.00	D									
1.00	ES		PID=0.0ppm			MADE GROUND: Loose domestic refuse including timber, glass, metal, paper, plastic, ceramic, ash and brick fragments with occasional sand and gravel. Pockets of a soft white paste-like substance.	1.30		15.07	
1.20- 1.65	D	1.20 (DRY)		S8						
1.40- 1.70	ES		PID=5.0ppm				1.80		14.57	
1.40- 1.70	D									
1.80- 1.90	B					MADE GROUND: Firm slightly gravelly sandy silt with occasional fragments of brick. Gravel is angular fine to coarse predominantly sandstone.				
1.90- 3.30	D									
2.00- 2.45	D	2.00 (DRY)		S4						
2.40- 2.70	ES		PID=0.0ppm							
2.40- 2.70	D									
2.70- 2.90	D									
3.00- 3.45	D	3.00 (DAMP)		S4						
3.40- 3.70	ES		PID=0.0ppm			MADE GROUND: Loose domestic refuse including timber, glass, metal, paper, plastic, ceramic, ash and brick fragments with occasional sand and gravel.	3.30		13.07	
3.40- 3.70	D									
3.70- 3.90	D									
4.00- 4.45	D	4.00 (MOIST)		S4						
4.30- 4.70	ES		PID=0.0ppm							
4.30- 4.70	D									
4.70- 5.00	D									
5.00- 5.45	D	4.00 (5.25)		S34						
5.30- 5.70	ES		PID=0.0ppm			Dense dark brown slightly silty fine to medium SAND.	5.25		11.12	
5.30- 5.70	D									
5.70- 6.00	D			20						
End of Borehole							6.00		10.37	

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.50	Inspection Pit	SM/JB	G.I.			02/10/15	08:00						
6.00	0.10	Dynamic Sampler	SM/JB	6.00	4.00	DRY	02/10/15	18:00	5.25	4.00	5.20	20		Slow inflow.

Remarks Inspection pit hand excavated to 1.20m depth.
 ABS sample = 1 x vial, 1 x plastic jar and 1 amber jar
 A 50mm standpipe was installed to 3.50m with a geowrapped slotted section from 1.00m to 3.50m with flush lockable protective cover; 19/11/2015: Unable to monitor, borehole location flooded.. Backfill details from base of hole: bentonite seal up to 3.80m, gravel filter up to 0.80m, bentonite seal up to 0.30m, concrete up to ground level.

Logged by JG
 Figure 1 of 1
 21/01/2016

geotechnics

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No **WS10**
PN153396

Client **ATKINS LIMITED**

National Grid Coordinates 333254.66 E
399188.64 N

Ground Level 10.80 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.20	ES					Grass over TOPSOIL: Dark brown silty fine to medium sand.	G.L.		10.80	
0.20										
0.30- 0.60	B		PID=0.0ppm			MADE GROUND: Dark brown silty fine to medium sand with fragments of brick up to cobble size.	0.30		10.50	
0.50	D						0.60		10.20	
0.50	ES									
0.50			PID=0.0ppm			MADE GROUND: Dark brownish grey silty fine to medium sand with many fragments of brick, concrete and occasionally plastic.				
0.60- 1.20	B					At 1.20m, becomes yellowish brown.				
1.00	D									
1.00	ES		PID=0.0ppm				1.40		9.40	
1.20- 1.65	D	1.20 (DRY)			S4	MADE GROUND: Firm dark grey sandy silt with some fragments of plastic and paper.				
1.70- 1.80	D									
1.80- 1.95	ES		PID=2.5ppm				2.00		8.80	
1.80- 1.95			19							
2.00- 3.00	B					Loose dark greyish brown locally yellowish brown organic slightly silty fine to coarse SAND.				
2.00- 2.45	D	2.00 (MOIST)			S9					
2.00- 2.20	ES		PID=0.0ppm							
2.00- 2.20										
2.50- 2.70	D									
3.00- 3.45	D	2.00 (2.30)			S5					
						End of Borehole	4.00		6.80	

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	SM/JB	G.L.			01/10/15	08:00	2.10	2.00	2.05	20		Slow inflow.
4.00	0.10	Dynamic Sampler	SM/JB	4.00	2.00	2.05	01/10/15	15:30						

Remarks **1** Inspection pit hand excavated to 1.20m depth.
ABS The Window Sample Borehole was terminated at a depth of 4.00m due to instability.
 Symbols and abbreviations are explained on the accompanying key sheet.
 ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
 A 50mm standpipe was installed to 2.20m with a geowrapped slotted section from 1.00m to 2.20m with flush lockable protective cover. Backfill details from base of hole: collapsed material up to 3.30m, bentonite seal up to 2.20m, gravel filter up to 0.90m, bentonite seal up to 0.30m, concrete up to ground level.

Logged by JG
 Figure 1 of 1
 21/01/2016
 geotechnics

All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No **WS11**
PN153396

Client **ATKINS LIMITED**

National Grid Coordinates 333588.26 E
399109.22 N

Ground Level 14.49 m OD

Sampling			Properties			Strata			Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD		
0.00- 0.30	B					Grass over TOPSOIL: Soft dark brown sandy silt.	G.L.		14.49		
0.20	ES										
0.30- 0.80	B		PID=0.0ppm			MADE GROUND: Greyish brown slightly gravelly very silty fine to medium sand. Gravel is angular to subrounded fine to medium of ash, brick and various lithologies.	0.30		14.19		
0.50	D										
0.50	ES		PID=0.0ppm				0.80		13.69		
0.90- 1.20	B		13			Firm reddish brown slightly sandy CLAY.	0.90		13.59		
1.00	D										
1.00	ES		PID=0.0ppm				1.20		13.29		
1.00	D						1.35		13.14		
1.20- 1.65	D	1.20 (DRY)			S15	Reddish brown gravelly very clayey SAND. Gravel is angular to subrounded fine to medium of various lithologies.					
1.20- 1.35	D										
1.30- 1.50	B										
1.50- 1.60	D				17	Firm reddish brown slightly gravelly sandy to very sandy CLAY. Gravel is angular fine to coarse predominantly of sandstone.					
1.60- 1.80	ES		PID=0.0ppm								
1.60- 1.80	D										
1.85- 1.90	D										
2.00- 2.50	B					Firm reddish brown slightly sandy slightly gravelly CLAY. Gravel is angular fine to medium of various lithologies.					
2.00- 2.45	D	2.00 (DRY)			S22						
2.60- 2.80	ES		PID=0.0ppm			At 1.85m: 50mm layer of reddish brown slightly silty fine to coarse sand and gravel.	2.60		11.89		
2.60- 2.80	D										
2.80- 3.40	B										
2.85- 3.30	D	2.00 (DRY)			S30	Stiff reddish brown slightly sandy gravelly CLAY. Gravel is very angular fine to coarse predominantly of mudstone (possibly weathered mudstone).					
3.40- 3.50	D					End of Borehole	3.50		10.99		

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.50	Inspection Pit	SM/JB	G.I.			02/10/15	08:00	1.85	1.85			1.90	Wet material Slow inflow, no rise after 20 minutes.
3.50	0.10	Dynamic Sampler	SM/JB	3.50	2.00	DRY	02/10/15	18:00	3.30					

Remarks Inspection pit hand excavated to 1.20m depth.
 ABS sample = 1 x vial, 1 x plastic jar and 1 amber jar
 Unable to drive sample barrel past 3.50m
 Backfill details from base of hole: bentonite seal up to 0.30m, arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by JG
 Figure 1 of 1
 21/01/2016

BOREHOLE RECORD - Dynamic Sample

Project A5036 PORT OF LIVERPOOL ACCESS STUDY Engineer ATKINS

Borehole Project No **WS12**
PN153396

Client **ATKINS LIMITED**

National Grid Coordinates 333478.84 E
399448.83 N

Ground Level 11.41 m OD

Sampling			Properties			Strata		Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD	
0.00- 0.40	B					Grass over TOPSOIL: Soft dark greyish brown slightly gravelly sandy silt with some fragments of timber. Gravel is angular to subrounded fine to medium predominantly of sandstone.	G.L.		11.41	
0.20	ES		PID=0.0ppm				0.40		11.01	
0.40- 0.90	B					Orangish brown silty fine to medium SAND.				
0.50	D		PID=0.0ppm				0.90		10.51	
0.50	ES					Medium dense yellowish brown silty fine to medium SAND locally becoming dark brown and organic. Below 1.20m: Slightly gravelly silty sand. Gravel is angular fine of various lithologies.				
0.90- 1.20	B		10							
1.00	D					End of Borehole				
1.00	ES		PID=0.0ppm				4.00		7.41	
1.20- 1.65	D	(DRY)			S20					
1.40	B									
1.70- 1.80	D				19					
1.80- 2.00	ES									
1.80- 2.00			PID=0.0ppm							
2.00- 2.45		2.00 (DAMP)			S17					
2.80- 3.00	ES									
2.80- 3.00			PID=0.0ppm							
3.00- 3.45		3.00 (2.30)			S12					
3.80- 4.00	ES									
3.80- 4.00			PID=0.0ppm							
4.00- 4.45		3.00 (2.30)			S16					

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	SM/JB	G.L.			01/10/15	08:00	2.00					Slow inflow, no rise after 20 minutes.
4.45	0.10	Dynamic Sampler	SM/JB	4.45	3.00	2.00	01/10/15	16:00						

Remarks Inspection pit hand excavated to 1.20m depth.
 ABS sample = 1 x vial, 1 x plastic jar and 1 amber jar
 The Window Sample Borehole was terminated at a depth of 4.45m due to instability
 Backfill details from base of hole: bentonite seal up to 0.30m, arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres. Logged in accordance with BS5930:1999 + A2:2010

Logged by JG
 Figure 1 of 1
 21/01/2016

Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'																					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50																	
WS01A	1.20	5.78	S	-	2	6	11	12	10	10	43				*																		
<table border="1"> <tr> <td>Driller</td> <td colspan="2">Paul Bridges</td> <td rowspan="5">Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005</td> </tr> <tr> <td>Hammer No.</td> <td colspan="2">MGWS5</td> </tr> <tr> <td>Energy Ratio, Er (%)</td> <td colspan="2">82.00</td> </tr> <tr> <td>Calibration Date</td> <td colspan="2">17/04/2015</td> </tr> <tr> <td colspan="3"> </td> </tr> </table>													Driller	Paul Bridges		Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005	Hammer No.	MGWS5		Energy Ratio, Er (%)	82.00		Calibration Date	17/04/2015									
Driller	Paul Bridges		Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005																														
Hammer No.	MGWS5																																
Energy Ratio, Er (%)	82.00																																
Calibration Date	17/04/2015																																

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS02	1.20	9.97	S	-	1	-	-	-	-	-	1/450	*					
WS02	2.00	9.17	S	-	2	2	2	1	2	-	5	*					
WS02	3.00	8.17	S	-	1	1	2	2	3	3	10	*					
WS02	4.00	7.17	S	-	1	-	1	-	1	1	3	*					
Driller			Steve Jones				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS03	1.20	14.43	S	-	1	2	2	2	2	2	8	*					
WS03	2.00	13.63	S	-	1	-	2	1	2	3	8	*					
WS03	3.00	12.63	S	-	-	-	-	-	-	-	0/450	*					
WS03	4.00	11.63	S	-	-	-	1	2	2	3	8	*					
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS04	1.20	12.84	S	-	3	3	2	3	3	3	11	*					
WS04	2.00	12.04	S	-	1	-	1	2	1	-	4	*					
WS04	3.00	11.04	S	-	1	3	3	4	4	4	15		*				
WS04	4.00	10.04	S	-	1	-	-	1	-	-	1	*					
WS04	5.00	9.04	S	-	1	-	-	1	1	1	3	*					
WS04	6.00	8.04	S	-	1	1	1	1	1	1	4	*					
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS05	1.20	17.18	S	-	-	-	1	-	-	-	1	*					
WS05	2.00	16.38	S	-	1	-	-	-	-	-	1/450	*					
WS05	3.00	15.38	S	-	1	2	1	1	1	-	3	*					
WS05	4.00	14.38	S	-	1	1	2	2	1	1	6	*					
WS05	5.00	13.38	S	-	1	-	-	-	1	-	1	*					
WS05	6.00	12.38	S	-	3	6	3	3	2	2	10	*					
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS06	1.20	12.79	S	0	3	3	2	3	3	3	11	*					
WS06	2.00	11.99	S	0	1	-	1	2	1	-	4	*					
WS06	3.00	10.99	S	0	1	3	3	4	4	4	15		*				
WS06	4.00	9.99	S	0	1	-	-	1	-	-	1	*					
WS06	5.00	8.99	S	0	1	-	-	1	1	1	3	*					
WS06	6.00	7.99	S	0	1	1	1	1	1	1	4	*					
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS07	1.20	16.38	S	-	1	-	1	2	1	1	5	*					
WS07	2.00	15.58	S	-	1	1	-	1	-	1	2	*					
WS07	3.00	14.58	S	-	1	-	1	-	1	3	5	*					
WS07	4.00	13.58	S	-	2	2	4	11	7	2	24			*			
WS07	5.00	12.58	S	-	1	-	-	1	-	1	2	*					
WS07	6.00	11.58	S	-	1	3	4	4	6	7	21			*			
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'				
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50
WS08	1.20	11.08	S	-	1	2	2	3	3	4	12	*				
WS08	2.00	10.28	S	-	1	1	1	2	3	4	10	*				
WS08	3.00	9.28	S	-	1	-	1	-	-	-	1	*				
WS08	4.00	8.28	S	-	-	1	1	2	1	2	6	*				
WS08	5.00	7.28	S	-	2	3	4	6	6	6	22		*			
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005									
Hammer No.			MGWS5													
Energy Ratio, Er (%)			82.00													
Calibration Date			17/04/2015													

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS09	1.20	15.17	S	-	2	3	4	1	2	1	8	*					
WS09	2.00	14.37	S	-	1	1	1	1	1	1	4	*					
WS09	3.00	13.37	S	-	2	1	1	1	1	1	4	*					
WS09	4.00	12.37	S	-	1	1	-	1	1	2	4	*					
WS09	5.00	11.37	S	-	6	5	5	8	9	12	34			*			
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'																
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50												
WS10	1.20	9.60	S	-	1	2	1	1	1	1	4	*																
WS10	2.00	8.80	S	-	1	2	1	2	2	4	9	*																
WS10	3.00	7.80	S	-	-	-	2	1	1	1	5	*																
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:20%;">Driller</td> <td>Paul Bridges</td> <td rowspan="5" style="vertical-align: top;">Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005</td> </tr> <tr> <td>Hammer No.</td> <td>MGWS5</td> </tr> <tr> <td>Energy Ratio, Er (%)</td> <td>82.00</td> </tr> <tr> <td>Calibration Date</td> <td>17/04/2015</td> </tr> <tr> <td> </td> <td> </td> </tr> </table>													Driller	Paul Bridges	Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005	Hammer No.	MGWS5	Energy Ratio, Er (%)	82.00	Calibration Date	17/04/2015							
Driller	Paul Bridges	Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005																										
Hammer No.	MGWS5																											
Energy Ratio, Er (%)	82.00																											
Calibration Date	17/04/2015																											

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS11	1.20	13.29	S	-	2	2	3	4	4	4	15	*					
WS11	2.00	12.49	S	-	2	2	4	5	6	7	22		*				
WS11	2.85	11.64	S	-	7	8	8	7	7	8	30			*			
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



Fieldwork Results - SPT Results Summary

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'					
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10	20	30	40	50	
WS12	1.20	10.21	S	-	2	3	4	5	5	6	20		*				
WS12	2.00	9.41	S	-	2	2	3	4	5	5	17		*				
WS12	3.00	8.41	S	-	1	2	2	3	3	4	12	*					
WS12	4.00	7.41	S	-	1	2	3	3	5	5	16		*				
Driller			Paul Bridges				Remarks Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005										
Hammer No.			MGWS5														
Energy Ratio, Er (%)			82.00														
Calibration Date			17/04/2015														

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

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



APPENDIX 4

Monitoring Results

FIELDWORK - Water Level Monitoring

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Sheet No 1

Borehole		CP1		CP2		CP4		CP5		CP6		CP7	
Instrument (dia. mm)		S (50mm)		S (50mm)		S (50mm)		S (50mm)		S (50mm)		S (50mm)	
Depth to Base (m)		9.50 (Note 1)		8.00		8.20		8.90		2.80		7.00	
Filter Zone (m)		5.40-10.15		5.85-8.00		6.10-8.30		6.75-8.90		1.00-2.80		4.90-7.20	
Level		7.54 m OD		16.91 m OD		16.98 m OD		15.60 m OD		12.28 m OD		12.42 m OD	
Date	Time	Depth (m)	Level	Depth (m)	Level	Depth (m)	Level	Depth (m)	Level	Depth (m)	Level	Depth (m)	Level
20 Oct 2015		0.17	7.37	8.00	8.91	6.51	10.47	6.47	9.13	1.80	10.48	1.26	11.16
3 Nov 2015		0.00	7.54	DRY		6.48	10.50	6.42	9.18	1.73	10.55	1.08	11.34
19 Nov 2015		0.00	7.54	8.00	8.91	6.54	10.44	6.51	9.09	1.28	11.00	0.98	11.44

Remarks Note 1 - Artesian flow from CP1 on 03/11/2015 and 19/11/2015.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.



FIELDWORK - Water Level Monitoring

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No PN153396

Client ATKINS LIMITED

Sheet No 2

Borehole		WS02		WS05		WS06		WS09		WS10			
Instrument (dia. mm)		S (50mm)		S (50mm)		S (50mm)		S (50mm)		S (50mm)			
Depth to Base (m)		3.00		5.00		5.70		3.50 (Note 2)		2.20			
Filter Zone (m)		1.00-3.00		3.00-5.00		2.70-5.70		0.80-3.80		0.90-2.20			
Level		11.17 m OD		18.38 m OD		13.99 m OD		16.37 m OD		10.80 m OD			
Date	Time	Depth (m)	Level	Depth (m)	Level	Depth (m)	Level	Depth (m)	Level	Depth (m)	Level	Depth (m)	Level
20 Oct 2015		3.00	8.17	5.00	13.38	5.26	8.73	3.50	12.87	1.78	9.02		
3 Nov 2015		3.00	8.17	5.00	13.38	5.30	8.69	DRY		1.70	9.10		
19 Nov 2015		3.00	8.17	4.99	13.39	5.28	8.71	Flooded		1.51	9.29		

Remarks Note 2 - 19/11/2015: Unable to monitor, borehole location flooded.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.



FIELDWORK - Insitu Gas Monitoring - Daily Record

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No

PN153396

Date

20/10/2015

Client ATKINS LIMITED

Sheet No.

1 (1 of 2)

Equipment Used

GI Infra Red Gas Analyser

MK1

MK2

GA2000

Other Gas Data LMSxi gas analyser;

Weather / Site Conditions

Wind

Still

Light

Moderate

Strong

Cloud Cover

None

Slight

Cloudy

Overcast

Precipitation

Dry

Slight

Moderate

Heavy

Borehole	Depth to Base (m)	Depth to Water (m bgl)	Current Hole Depth (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
CP1	9.50	0.17	9.37	-	-	-	-	-	Water over valve / maybe artesian
CP2	8.00	8.00	8.02	0.0	0.0	0.4	20.8	78.7	
CP4	8.20	6.51	8.00	26.0	MAX	25.0	7.3	41.6	
CP5	8.90	6.47	8.84	5.5	MAX	5.9	17.9	70.6	
CP6	2.80	1.80	2.69	0.0	0.0	0.0	20.9	79.2	
CP7	7.00	1.26	6.92	0.0	0.0	0.0	21.4	78.5	
WS02	3.00	3.00	3.05	0.0	0.0	0.0	21.0	78.9	
WS05	5.00	5.00	4.99	0.0	0.0	1.9	19.9	78.1	
WS06	5.70	5.26	5.58	0.4	2.8	21.0	2.7	75.8	
WS09	3.50	3.50	3.62	1.0	20.9	1.6	20.1	77.2	
WS10	2.20	1.78	2.27	3.9	31.9	18	3.3	74.7	

Remarks

geotechnics

FIELDWORK - Insitu Gas Monitoring - Daily Record

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No

PN153396

Date

20/10/2015

Client ATKINS LIMITED


Sheet No.

1 (2 of 2)

Equipment Used			
GI Infra Red Gas Analyser	MK1 <input type="checkbox"/>	MK2 <input type="checkbox"/>	GA2000 <input type="checkbox"/>
Other Gas Data LMSxi gas analyser;			

Weather / Site Conditions				
Wind	Still <input type="checkbox"/>	Light <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Strong <input type="checkbox"/>
Cloud Cover	None <input type="checkbox"/>	Slight <input checked="" type="checkbox"/>	Cloudy <input type="checkbox"/>	Overcast <input type="checkbox"/>
Precipitation	Dry <input checked="" type="checkbox"/>	Slight <input type="checkbox"/>	Moderate <input type="checkbox"/>	Heavy <input type="checkbox"/>

Borehole	Depth to Base (m)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Barometric Pressure (mBars)	Flow Rate (l/hr)	Flow Rate (Steady) (l/hr)	Remarks
CP1	9.50	-	-	1018	-	-	Water over valve / maybe artesian
CP2	8.00	0.0	0.0	1018	0.6	0.2	
CP4	8.20	0.0	1.5	1018	0.8	0.6	
CP5	8.90	0.0	0.0	1018	0.3	0.1	
CP6	2.80	0.0	0.0	1018	0.0	0.0	
CP7	7.00	0.0	0.0	1018	0.0	0.0	
WS02	3.00	0.0	0.0	1018	0.0	0.0	
WS05	5.00	0.0	0.0	1018	0.0	0.0	
WS06	5.70	0.0	0.0	1018	-0.1	0.0	
WS09	3.50	0.0	0.0	1018	-0.1	0.0	
WS10	2.20	0.0	1.1	1018	-0.4	0.0	

Remarks	 Form 002/3
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FIELDWORK - Insitu Gas Monitoring - Daily Record

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No

PN153396

Date

03/11/2015

Client ATKINS LIMITED

Sheet No.

1 (1 of 2)

Equipment Used

GI Infra Red Gas Analyser

MK1

MK2

GA2000

Other Gas Data LMSxi gas analyser;

Weather / Site Conditions

Wind

Still

Light

Moderate

Strong

Cloud Cover

None

Slight

Cloudy

Overcast

Precipitation

Dry

Slight

Moderate

Heavy

Borehole	Depth to Base (m)	Depth to Water (m bgl)	Current Hole Depth (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
CP1	9.50	0.00	9.37	-	-	-	-	-	Artesian
CP2	8.00	DRY	8.02	0.0	0.0	0.3	21.2	78.4	
CP4	8.20	6.48	8.00	37.0	MAX	35.0	0.9	27.0	
CP5	8.90	6.42	8.84	4.7	88.4	9.4	18.1	67.7	
CP6	2.80	1.73	2.69	0.0	0.0	0.0	21.4	78.5	
CP7	7.00	1.08	6.92	0.0	0.0	0.0	21.5	78.4	
WS02	3.00	3.00	3.05	0.0	0.0	3.5	19.3	77.1	
WS05	5.00	5.00	4.99	0.0	0.0	8.3	12.2	79.4	
WS06	5.70	5.30	5.58	0.4	3.0	25.0	1.9	72.6	
WS09	3.50	DRY	3.62	34.5	MAX	30.0	0.8	34.6	
WS10	2.20	1.70	2.27	1.8	24.7	13.0	10.0	75.1	

Remarks



FIELDWORK - Insitu Gas Monitoring - Daily Record

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No

PN153396

Date

03/11/2015

Client ATKINS LIMITED

Sheet No.

1 (2 of 2)

Equipment Used

GI Infra Red Gas Analyser

MK1

MK2

GA2000

Other Gas Data LMSxi gas analyser;

Weather / Site Conditions

Wind

Still

Light

Moderate

Strong

Cloud Cover

None

Slight

Cloudy

Overcast

Precipitation

Dry

Slight

Moderate

Heavy

Borehole	Depth to Base (m)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Barometric Pressure (mBars)	Flow Rate (l/hr)	Flow Rate (Steady) (l/hr)	Remarks
CP1	9.50	-	-	1004	-	-	Artesian
CP2	8.00	0.0	0.0	1004	-0.1	0.0	
CP4	8.20	0.0	1.80	1004	1.4	1.3	
CP5	8.90	0.0	0.0	1004	1.1	0.0	
CP6	2.80	0.0	0.0	1004	0.0	0.0	
CP7	7.00	0.0	0.0	1004	0.0	0.0	
WS02	3.00	0.0	0.0	1004	0.0	0.0	
WS05	5.00	0.0	0.0	1004	0.0	0.0	
WS06	5.70	0.0	0.0	1004	0.3	0.2	
WS09	3.50	0.0	0.0	1004	1.4	1.2	
WS10	2.20	0.0	0.0	1004	0.3	0.2	

Remarks



FIELDWORK - Insitu Gas Monitoring - Daily Record

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No

PN153396

Date

19/11/2015

Client ATKINS LIMITED

Sheet No.

1 (1 of 2)

Equipment Used

GI Infra Red Gas Analyser

MK1

MK2

GA2000

Other Gas Data LMSxi gas analyser;

Weather / Site Conditions

Wind

Still

Light

Moderate

Strong

Cloud Cover

None

Slight

Cloudy

Overcast

Precipitation

Dry

Slight

Moderate

Heavy

Borehole	Depth to Base (m)	Depth to Water (m bgl)	Current Hole Depth (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
CP1	9.50	0.00	9.37	-	-	-	-	-	Artesian
CP2	8.00	8.00	8.02	0.0	0.0	0.0	21.0	78.9	
CP4	8.20	6.54	8.00	38.0	MAX	32.0	1.1	28.8	
CP5	8.90	6.51	8.84	0.0	0.0	0.0	21.3	78.6	
CP6	2.80	1.28	2.64	0.0	0.0	0.0	21.4	78.5	
CP7	7.00	0.98	6.92	0.0	0.0	0.0	21.4	78.5	
WS02	3.00	3.00	3.05	0.0	0.0	3.0	18.3	78.6	
WS05	5.00	4.99	4.99	0.0	0.0	0.0	21.0	78.9	
WS06	5.70	5.28	5.58	0.0	0.0	8.1	12.6	79.2	
WS09	3.50	Flooded		-	-	-	-	-	
WS10	2.20	1.51	2.27	4.3	39.5	17.0	4.8	73.8	

Remarks



FIELDWORK - Insitu Gas Monitoring - Daily Record

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No

PN153396

Date

19/11/2015

Client ATKINS LIMITED

Sheet No.

1 (2 of 2)

Equipment Used									
GI Infra Red Gas Analyser		MK1	<input type="checkbox"/>	MK2	<input type="checkbox"/>	GA2000	<input type="checkbox"/>		
Other Gas Data LMSxi gas analyser;									
Weather / Site Conditions									
Wind		Still	<input type="checkbox"/>	Light	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Strong	<input type="checkbox"/>
Cloud Cover		None	<input type="checkbox"/>	Slight	<input type="checkbox"/>	Cloudy	<input checked="" type="checkbox"/>	Overcast	<input type="checkbox"/>
Precipitation		Dry	<input type="checkbox"/>	Slight	<input checked="" type="checkbox"/>	Moderate	<input type="checkbox"/>	Heavy	<input type="checkbox"/>
Borehole	Depth to Base (m)	Hydrogen Sulphide H2S (ppm)	Carbon Monoxide CO (ppm)	Barometric Pressure (mBars)	Flow Rate (l/hr)	Flow Rate (Steady) (l/hr)	Remarks		
CP1	9.50	-	-	1001	-	-	Artesian		
CP2	8.00	0.0	0.0	1001	1.0	0.9			
CP4	8.20	0.0	2.0	1001	0.0	0.0			
CP5	8.90	0.0	0.0	1001	-0.3	0.0			
CP6	2.80	0.0	0.0	1001	0.0	0.0			
CP7	7.00	0.0	0.0	1001	-0.9	-0.6			
WS02	3.00	0.0	0.0	1001	0.6	0.5			
WS05	5.00	0.0	0.0	1001	-1.5	-0.3			
WS06	5.70	0.0	0.0	1001	-0.6	-0.2			
WS09	3.50	-	-	1001	-	-			
WS10	2.20	0.0	0.0	1001	0.0	0.0			

Remarks



APPENDIX 5

Laboratory Test Results - Geotechnical

Classification and Strength

Symbol	C - Clay (0 - containing organic matter) Plasticity	M - Silt L - Low I - Intermediate H - High V - Very High E - Extremely High
Ip	Plasticity Index	
%	% Retained on 425 µm sieve, shown under Ip value	
w _L	Liquid Limit	
w _p	Plastic Limit	
NP	Non-Plastic	
NAT	Sample tested in natural state	
w	Water Content	
p _d	Particle Density	
Test	Quick undrained triaxial tests	
	SS	Single stage - 102mm diameter.
	S3	Single stage - set of 3 38mm diameter.
	MS	Multistage - 102mm diameter.
	D	Drained Test
	HV	Hand Vane
	PP	Pocket Penetrometer (kg/cm ²)
	NST	Not suitable for test
γ _b	Bulk Density	
σ ₃	Triaxial Cell Pressure	
σ ₁ - σ ₃	Deviator Stress	
###	Excessive Strain	
c _u	Undrained Cohesion	
c	Cohesion Intercept	
φ	Angle of Shearing Resistance	
Linear Shrink	Linear Shrinkage	

Consolidation

m _v	Coefficient of Volume Compressibility
c _{v50}	Coefficient of Consolidation - Log t
c _{v90}	Coefficient of Consolidation - √t

Rock

UF	Unacceptable Failure
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Chemical Analysis

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

MCV, Compaction, CBR

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

Compaction

Type	2.5 = BS 2.5 kg Rammer
	4.5 = BS 4.5 kg Rammer
	V = BS Vibrating Hammer

γ_b Bulk Density

γ_d Dry Density

CBR California Bearing Ratio

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

Top CBR at top of mould

Bottom CBR at bottom of mould

ND None Detected


Tests performed in accordance with BS 1377: Parts 1-9:1990 incorporating amendments where appropriate and BS EN ISO 17892: Parts 1-2:2014.

LABORATORY RESULTS - Classification and Strength

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No: PN153396

Sample					Classification					Strength					
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Symbol	I_p (>425) %	w_L %	w_p %	w (p_d) %	Test	γ_b (γ_d) Mg/m ³	σ_3 kN/m ²	$\sigma_1 - \sigma_3$ kN/m ²	c_u kN/m ²	c_{Avg} kN/m ²
CP1	4.70 (4.70)	D	N60640	Very soft dark brown PEAT.					555						
CP1	5.80- 6.45 (5.80)	B	N60647	Grey slightly silty slightly gravelly fine to coarse SAND.					37.0 (2.63)						
CP1	7.95- 8.50 (7.75)	B	N60648	Brown silty fine to medium SAND with pockets of clay.					23.8 (2.65)						
CP2	2.25- 2.70 (2.25)	B	N60637	MADE GROUND: Black and brown silty very sandy fine to coarse gravel.					40.6 (2.45)						
CP2	4.20- 4.65 (4.20)	B	N60634	MADE GROUND: Brown clayey very sandy fine to coarse gravel with a high cobble content.					16.1 (2.57)						
CP2	8.20- 8.65 (8.20)	B	N60635	MADE GROUND: Dark brown and black clayey very sandy fine to coarse gravel with a medium cobble content.					51.8 (2.50)						
CP2	9.20- 9.65 (9.20)	B	N60636	Greyish brown clayey gravelly fine to coarse SAND.					18.9 (2.60)						
CP2	11.30- 11.75 (11.30)	B	N60639	Greyish brown clayey very sandy fine to coarse GRAVEL.					9.5 (2.69)						
CP3	1.20 (1.20)	D	N60641	MADE GROUND: Grey and black sandy fine to coarse gravel with clinker and ash.					15.9						
CP3	3.00- 3.45 (3.00)	B	N60644	MADE GROUND: Black silty very sandy fine to coarse gravel.					27.2 (2.62)						
CP3	4.80 (4.80)	D	N60643	MADE GROUND: Black sandy fine to coarse gravel with clinker, glass, metal, plastic and timber.					22.3 (2.56)						
CP3	6.00- 6.45 (6.00)	B	N60645	MADE GROUND: Black silty very sandy fine to coarse gravel.					40.8						
CP3	8.70 (8.70)	D	N60642	Soft dark grey and black organic CLAY with pockets of peat.					63.5						
CP3	10.00- 10.45 (10.00)	B	N60646	Greyish brown silty very sandy fine to coarse GRAVEL with a low cobble content.					9.0 (2.67)						
CP4	1.20- 1.65 (1.20)	B	N60631	MADE GROUND: Grey and black silty sand and gravel with a high cobble content.					14.7 (2.61)						

Remarks  NST - Not suitable for Test
 Water Content Test performed in accordance with BS EN ISO 17892 - 1: 2014
 All other Tests performed in accordance with BS1377: 1990




LABORATORY RESULTS - Classification and Strength

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No: PN153396

Sample					Classification				Strength						
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Symbol	I_p (>425) %	w_L %	w_p %	w (p_d) %	Test	γ_b (γ_d) Mg/m ³	σ_3 kN/m ²	$\sigma_1 - \sigma_3$ kN/m ²	c_u kN/m ²	c_{Avg} kN/m ²
CP4	5.00- 5.45 (5.00)	B	N60632	MADE GROUND: Black clayey very sandy fine to coarse gravel.					20.9 (2.60)						
CP4	9.00- 9.45 (9.00)	B	N60633	Grey clayey fine to coarse SAND.					27.3 (2.64)						
CP4	10.30 (10.30)	D	N60630	Greyish brown SAND and GRAVEL.					32.8						
CP5	1.20- 1.65 (1.20)	B	N60653	MADE GROUND: Black silty very sandy fine to coarse gravel with a low cobble content.					14.1 (2.53)						
CP5	3.20- 3.65 (3.20)	B	N60800	MADE GROUND: Dark brown/black silty sand and gravel with a medium cobble content.					43.1 (2.60)						
CP5	5.65- 6.00 (5.65)	B	N60652	Firm to stiff brown slightly gravelly sandy CLAY.	CL	13 (40%)	29	16	22.3 (2.67)						
CP5	7.15- 7.60 (7.15)	UT	N60649	Stiff very high strength brown slightly sandy slightly gravelly CLAY. PP = 2.25, 3.25	CL	13 (17%)	26	13	11.8 11.8 11.8	MS	2.31 2.31 2.31	75 150 300	365	182	182
CP5	7.85- 8.25 (7.85)	B	N60654	Firm to stiff brown slightly gravelly sandy CLAY.	CL	15 (12%)	28	13	14.6		2.22 (2.22)				
CP5	9.25- 9.70 (9.25)	UT	N60650	Extremely weak reddish grey fine to coarse grained SANDSTONE. PP = 0.25, 1.50		(11%)	20	NP	13.9 13.9 13.9	MS	2.21 2.21 2.21	100 200 400	574 814 1264	287 407 632	442
CP6	0.55- 0.95 (0.55)	B	N60655	Dark brown very clayey gravelly fine to coarse SAND.					14.9 (2.62)						
CP6	1.50 (1.60)	D	N60656	Firm reddish brown mottled grey slightly gravelly CLAY.	CL	15 (23%)	33	18	21.0						
CP6	2.00- 2.45 (2.00)	UT	N60658	Soft to firm very low strength reddish brown mottled bluish grey gravelly CLAY. PP = 1.25, 0.25	CL	16 (39%)	32	16	15.5 15.5 15.5	MS	2.19 2.19 2.19	40 80 160	67	34 ##	17
CP6	2.50 (2.50)	D	N60657	Soft to firm reddish brown mottled bluish grey gravelly CLAY.	CL	14 (42%)	33	19	19.2						
CP7	1.20- 1.65 (1.20)	B	N60659	Brown slightly silty gravelly fine to medium SAND.					16.6 (2.63)						

Remarks  NST - Not suitable for Test
Water Content Test performed in accordance with BS EN ISO 17892 - 1: 2014
All other Tests performed in accordance with BS1377: 1990




LABORATORY RESULTS - Classification and Strength

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No: PN153396

Sample					Classification					Strength					
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Symbol	I_p (>425) %	w_L %	w_p %	w (p_d) %	Test	γ_b (γ_d) Mg/m ³	σ_3 kN/m ²	$\sigma_1 - \sigma_3$ kN/m ²	c_u kN/m ²	c_{Avg} kN/m ²
CP7	3.70- 4.25 (3.70)	B	N60660	Brown slightly silty slightly gravelly fine to coarse SAND.					14.6 (2.64)						
WS2	3.50- 3.70 (3.50)	D	N60784	Yellowish brown slightly silty fine to medium SAND.					32.6						
WS2	4.50- 4.70 (4.50)	D	N60785	Dark brown PEAT.					344						
WS03	1.20- 2.15 (1.20)	B	N60788	Orangish brown slightly silty fine to medium SAND.					13.0						
WS03	2.15- 3.00 (2.15)	B	N60789	Soft to firm yellowish brown slightly sandy slightly gravelly CLAY.	CL	17 (5%)	34	17	21.7						
WS03	3.70- 4.00 (3.70)	D	N60786	Reddish brown very clayey gravelly fine to coarse SAND.					22.9						
WS03	4.70- 5.00 (4.70)	D	N60787	Stiff reddish brown slightly sandy slightly gravelly CLAY.	CI	19 (15%)	36	17	14.6						
WS07	6.00- 6.45 (6.00)	D	N60791	Firm to stiff orangish brown slightly sandy slightly gravelly CLAY.					16.0						
WS08	4.50- 4.70 (4.50)	D	N60792	Dark brown peaty silty fine to medium SAND.					30.0						
WS08	5.00- 5.45 (5.00)	D	N60793	Dark brown slightly peaty silty fine to coarse SAND.					19.6						
WS09	5.70- 6.00 (5.70)	D	N60794	Dark brown slightly silty fine to medium SAND.					19.9						
WS10	2.00- 3.00 (2.00)	B	N60795	Dark greyish brown slightly silty fine to coarse SAND.					19.5						
WS11	0.90- 1.20 (0.90)	B	N60796	Reddish brown very clayey gravelly fine to coarse SAND.					12.9						
WS11	1.50- 1.60 (1.50)	D	N60797	Firm reddish brown slightly sandy slightly gravelly CLAY.	CI	22 (10%)	39	17	17.5						

Remarks  NST - Not suitable for Test
 Water Content Test performed in accordance with BS EN ISO 17892 - 1: 2014
 All other Tests performed in accordance with BS1377: 1990




LABORATORY RESULTS - Classification and Strength

Project A5036 PORT OF LIVERPOOL ACCESS STUDY

Project No: PN153396

Sample					Classification					Strength					
Hole	Depth (Specimen Depth) m	Type	Sample Ref	Description	Symbol	I_p (>425) %	w_L %	w_p %	w (p_d) %	Test	γ_b (γ_d) Mg/m ³	σ_3 kN/m ²	$\sigma_1 - \sigma_3$ kN/m ²	c_u kN/m ²	c_{Avg} kN/m ²
WS12	0.90- 1.20 (0.90)	B	N60799	Yellowish brown and dark brown slightly silty slightly gravelly fine to medium SAND.					10.5						
WS12	1.70- 1.80 (1.70)	D	N60798	Yellowish brown silty fine to medium SAND.					19.1						

Remarks  NST - Not suitable for Test
 Water Content Test performed in accordance with BS EN ISO 17892 - 1: 2014
 All other Tests performed in accordance with BS1377: 1990



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP1

Sample Depth: 5.80-6.45m

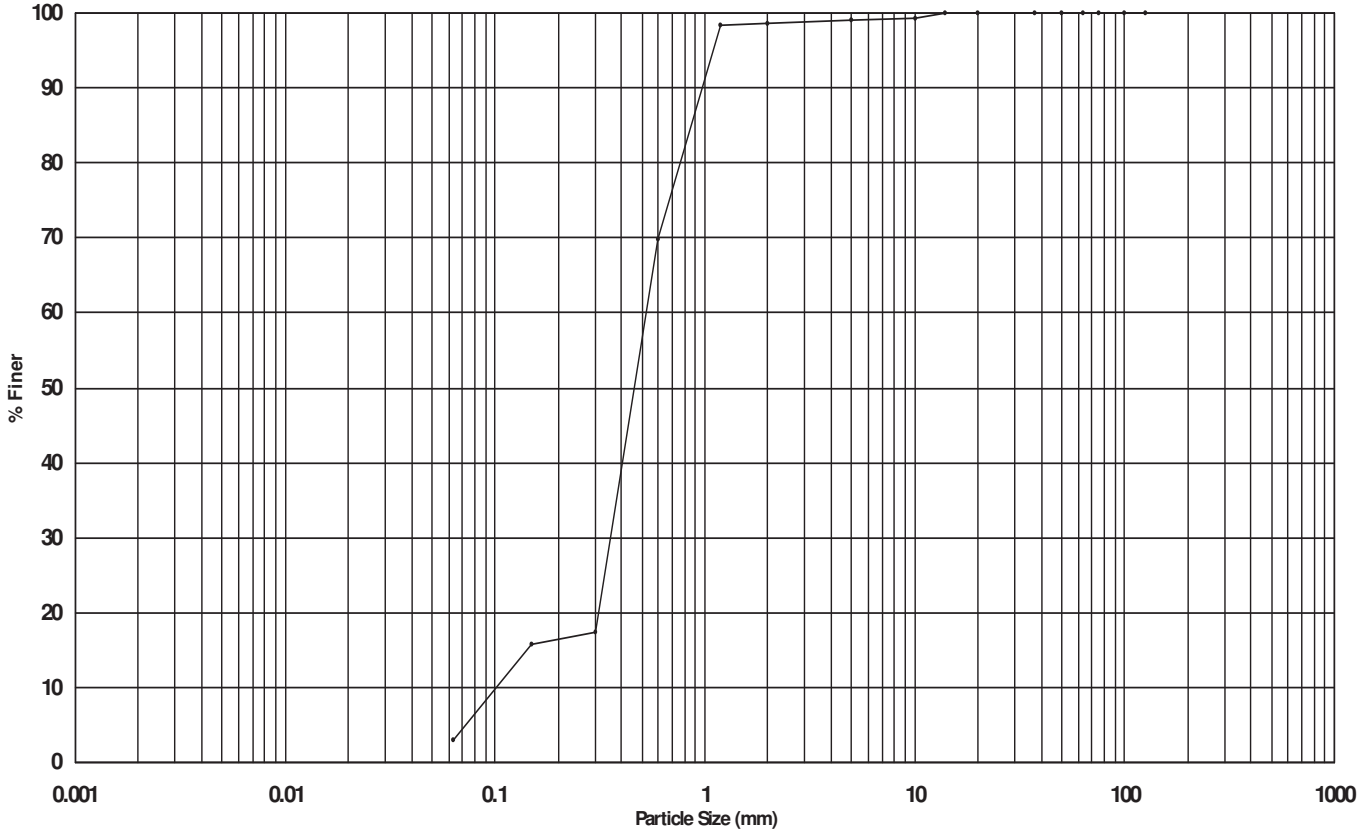
Project No: PN153396

Sample Type: B

Sample Ref: N60647

Sample Description

Grey slightly silty slightly gravelly fine to coarse SAND.



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

Classification	% of each
SILT (including CLAY)	3
SAND	96
GRAVEL	1
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	100
10 mm	99
5 mm	99
2 mm	99
1.18 mm	98
600 μm	70
300 μm	17
150 μm	16
63 μm	3

Size	% Finer

Uniformity Coefficient	
5.19	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks: AGS Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP1

Project No: PN153396

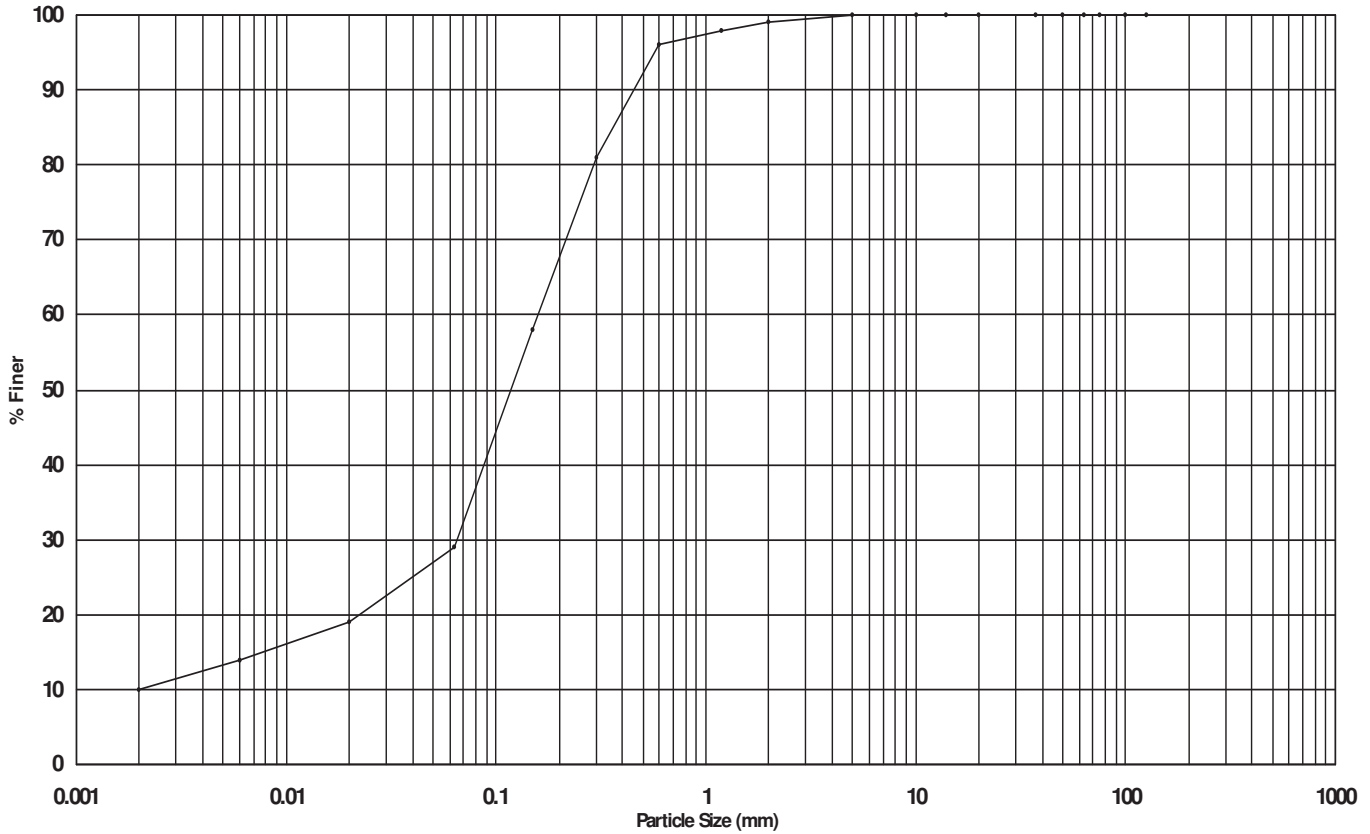
Sample Depth: 7.95-8.50m

Sample Type: B

Sample Ref: N60648

Sample Description

Brown silty fine to medium SAND with pockets of clay.



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

Classification	% of each
CLAY	10
SILT	19
SAND	70
GRAVEL	1
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2 mm	99
1.18 mm	98
600 µm	96
300 µm	81
150 µm	58
63 µm	29

Size	% Finer
20 µm	19
6 µm	14
2 µm	10

Uniformity Coefficient	
Not Available	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP2

Sample Depth: 2.25-2.70m

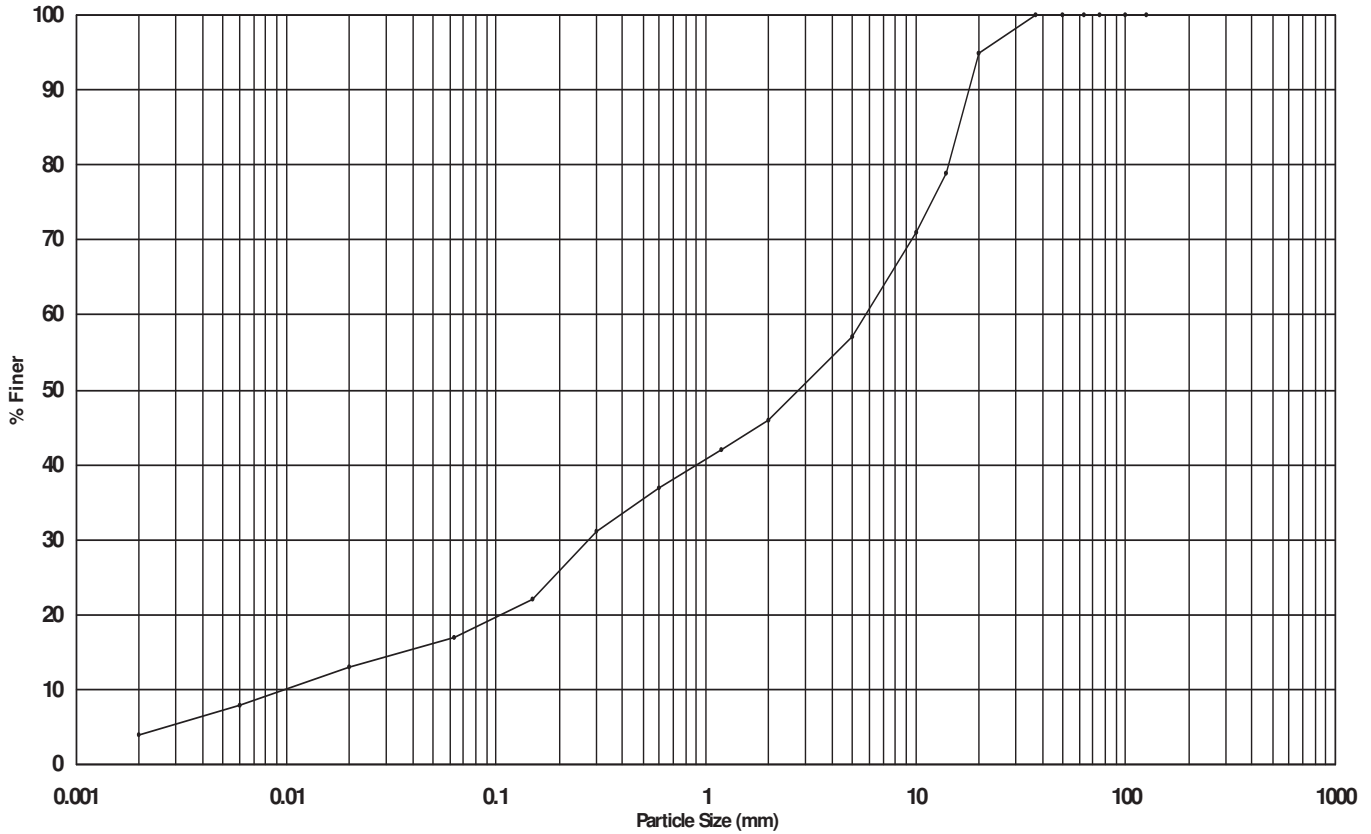
Project No: PN153396

Sample Type: B

Sample Ref: N60637

Sample Description

MADE GROUND: Black and brown silty very sandy fine to coarse gravel.



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

Classification	% of each
CLAY	4
SILT	13
SAND	29
GRAVEL	54
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	95
14 mm	79
10 mm	71
5 mm	57
2 mm	46
1.18 mm	42
600 µm	37
300 µm	31
150 µm	22
63 µm	17

Size	% Finer
20 µm	13
6 µm	8
2 µm	4

Uniformity Coefficient	
589.26	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP2

Sample Depth: 4.20-4.65m

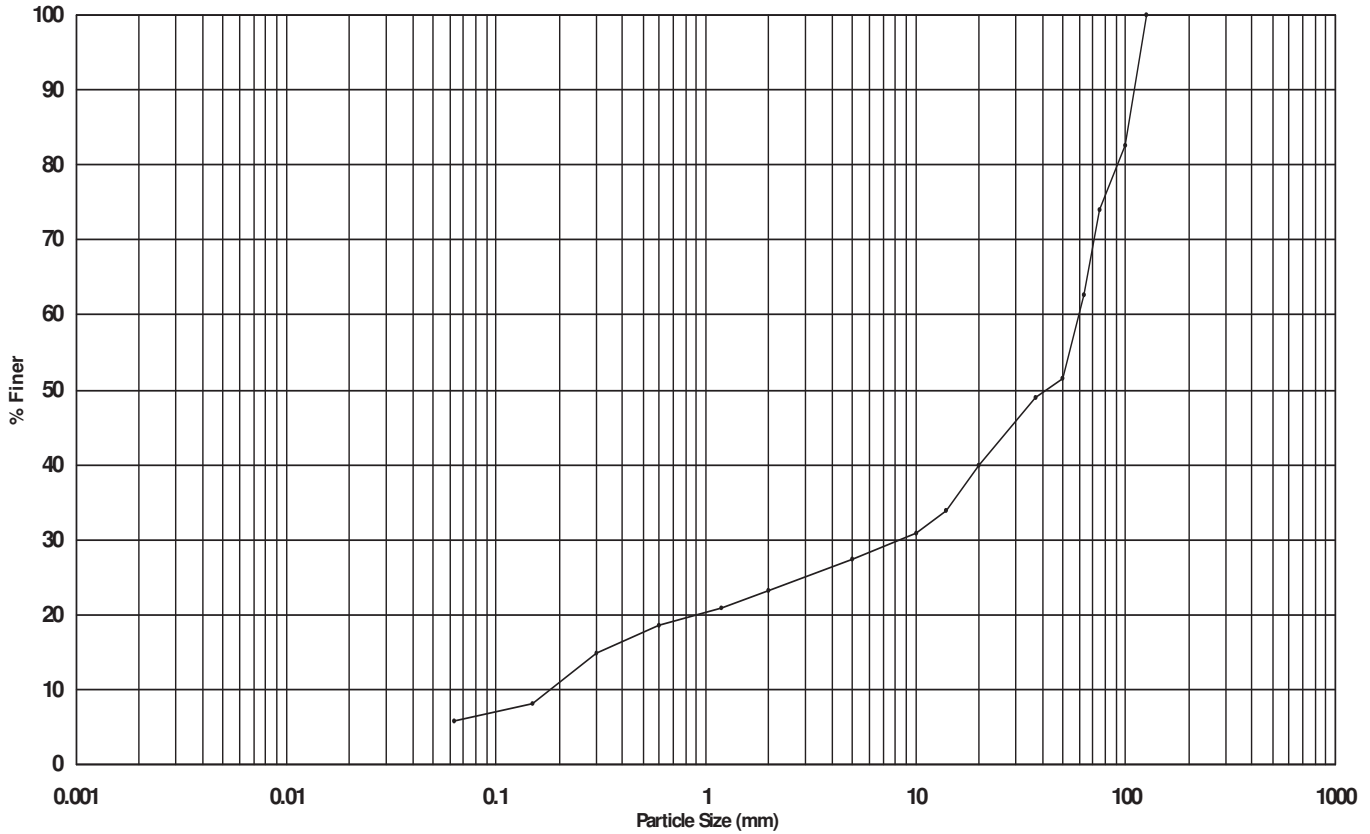
Project No: PN153396

Sample Type: B

Sample Ref: N60634

Sample Description

MADE GROUND: Brown clayey very sandy fine to coarse gravel with a high cobble content.



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

Classification	% of each
SILT (including CLAY)	6
SAND	17
GRAVEL	40
COBBLES	37
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	83
75 mm	74
63 mm	63
50 mm	51
37.5 mm	49
20 mm	40
14 mm	34
10 mm	31
5 mm	27
2 mm	23
1.18 mm	21
600 μm	19
300 μm	15
150 μm	8
63 μm	6

Size	% Finer

Uniformity Coefficient	
326.36	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks: Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP2

Sample Depth: 8.20-8.65m

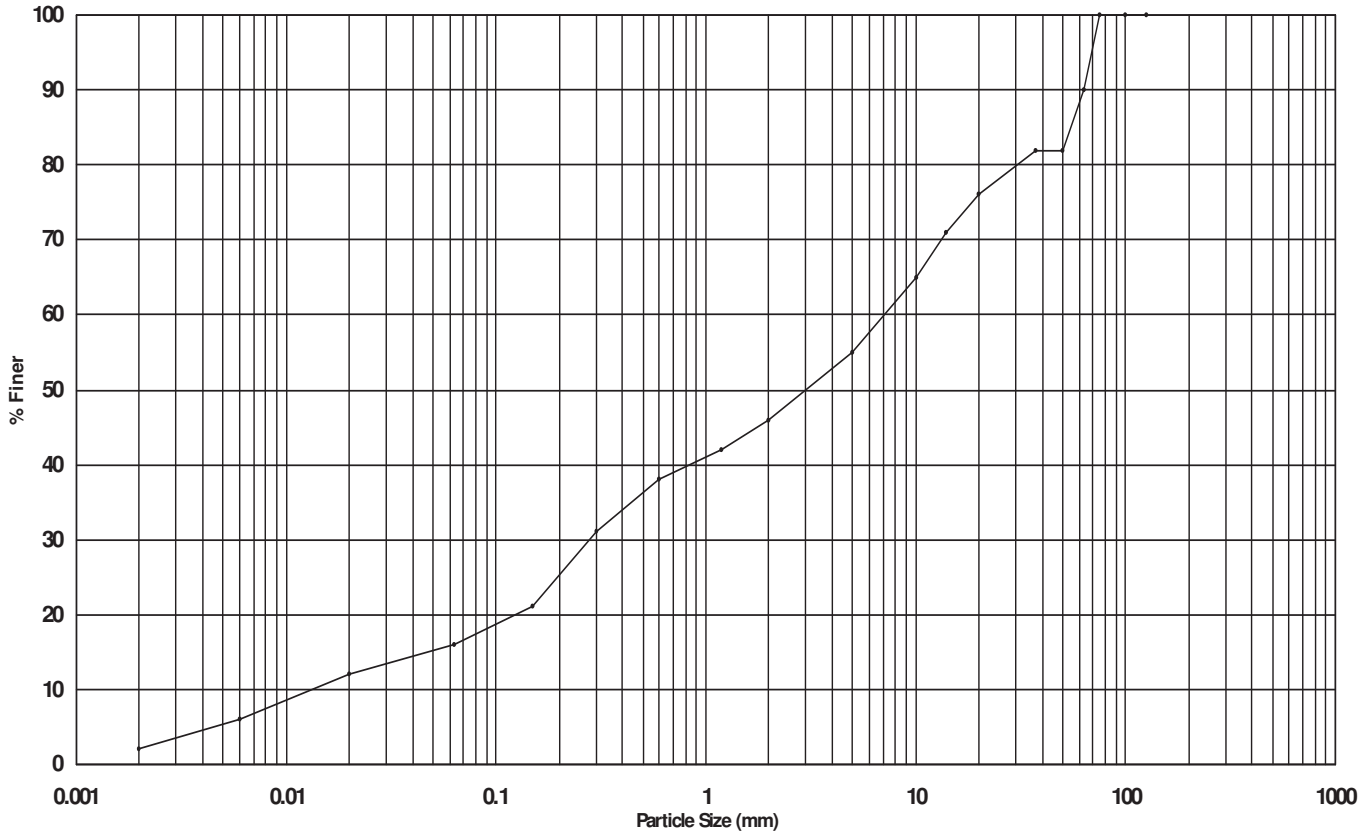
Project No: PN153396

Sample Type: B

Sample Ref: N60635

Sample Description

MADE GROUND: Dark brown and black clayey very sandy fine to coarse gravel with a medium cobble content.



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

Classification	% of each
CLAY	2
SILT	14
SAND	30
GRAVEL	44
COBBLES	10
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	90
50 mm	82
37.5 mm	82
20 mm	76
14 mm	71
10 mm	65
5 mm	55
2 mm	46
1.18 mm	42
600 µm	38
300 µm	31
150 µm	21
63 µm	16

Size	% Finer
20 µm	12
6 µm	6
2 µm	2

Uniformity Coefficient	
546.80	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP2

Project No: PN153396

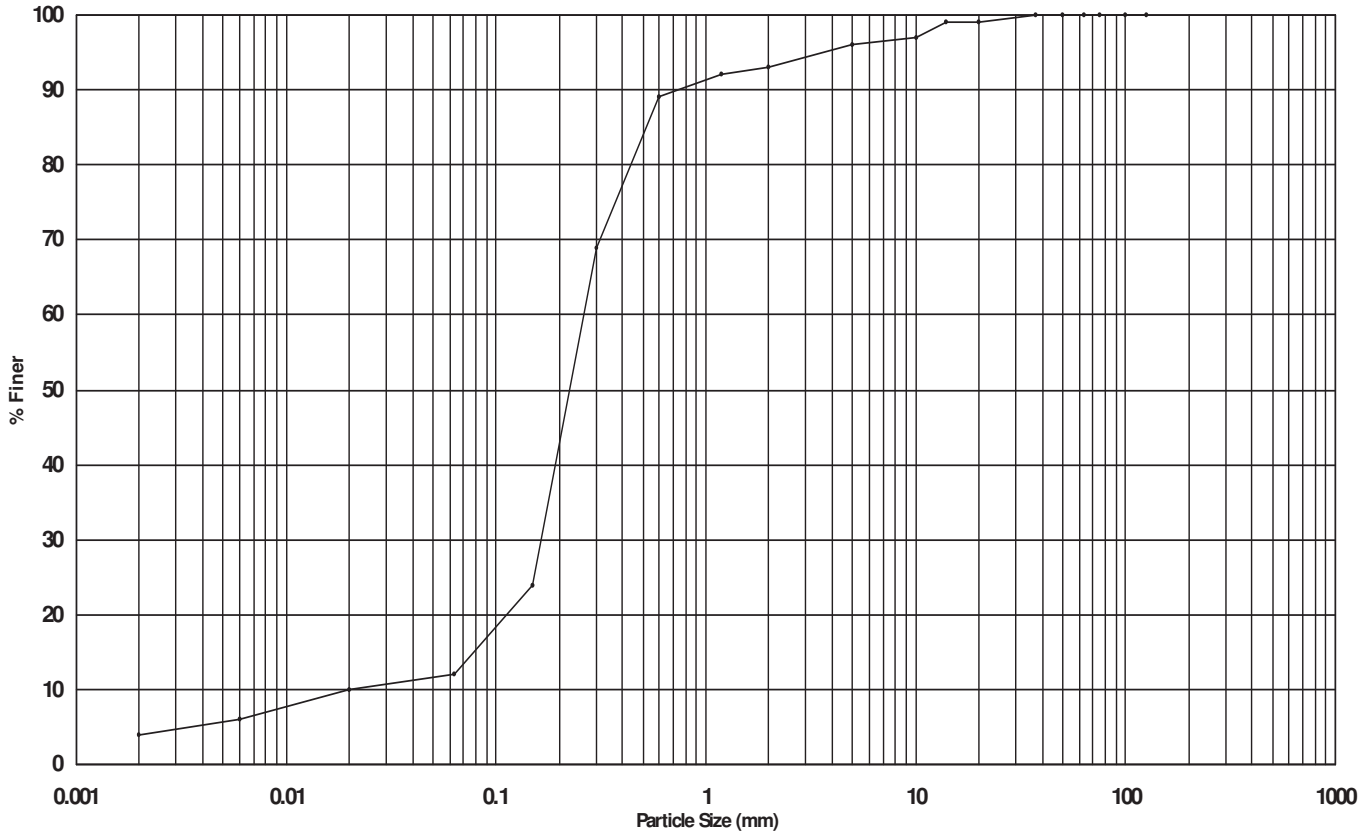
Sample Depth: 9.20-9.65m

Sample Type: B

Sample Ref: N60636

Sample Description

Greyish brown clayey gravelly fine to coarse SAND.



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

Classification	% of each
CLAY	4
SILT	8
SAND	81
GRAVEL	7
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	99
14 mm	99
10 mm	97
5 mm	96
2 mm	93
1.18 mm	92
600 µm	89
300 µm	69
150 µm	24
63 µm	12

Size	% Finer
20 µm	10
6 µm	6
2 µm	4

Uniformity Coefficient	
12.59	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole CP2

Sample Depth 11.30-11.75m

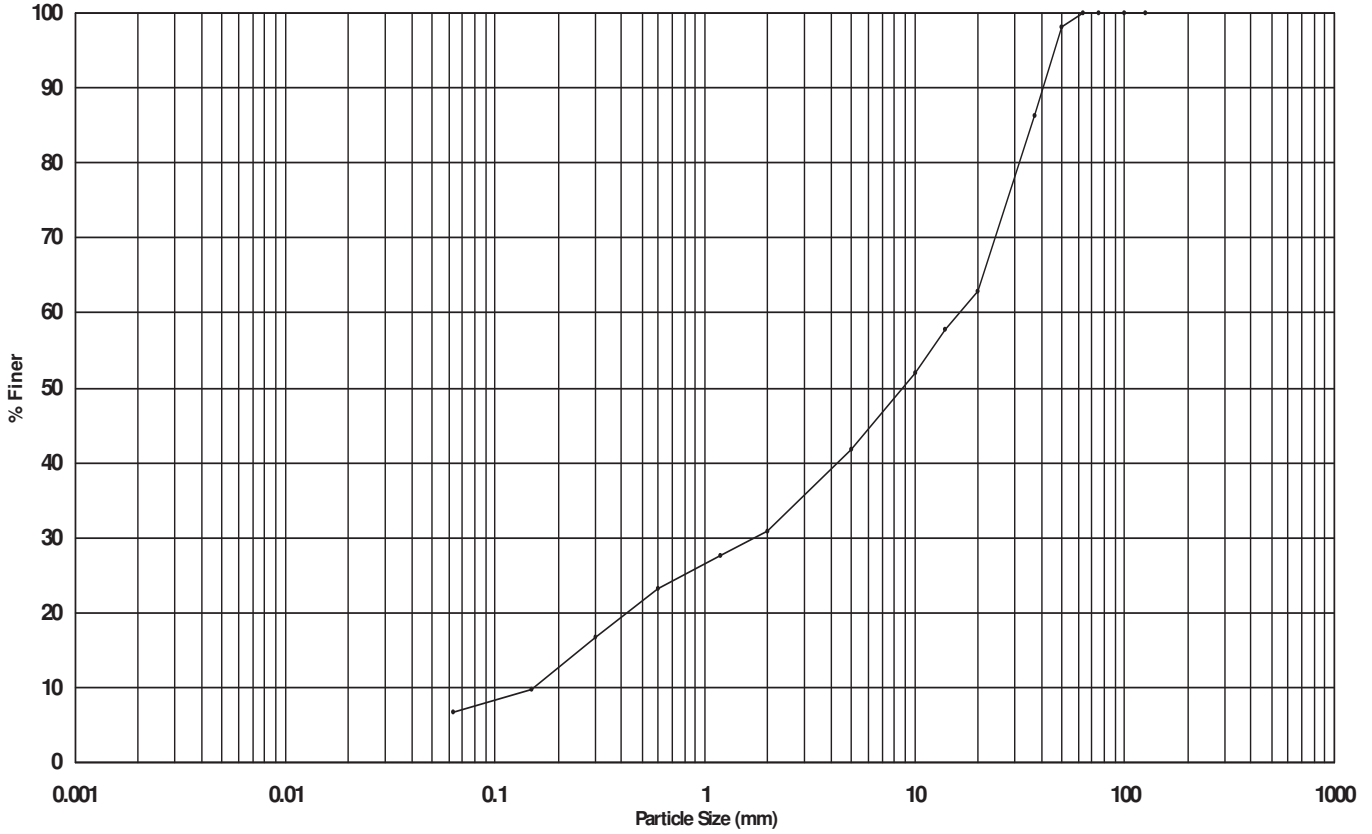
Project No: PN153396

Sample Type B

Sample Ref N60639

Sample Description

Greyish brown clayey very sandy fine to coarse GRAVEL.



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

Classification	% of each
SILT (including CLAY)	7
SAND	24
GRAVEL	69
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	98
37.5 mm	86
20 mm	63
14 mm	58
10 mm	52
5 mm	42
2 mm	31
1.18 mm	28
600 μm	23
300 μm	17
150 μm	10
63 μm	7

Size	% Finer

Uniformity Coefficient	
105.99	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP3

Project No: PN153396

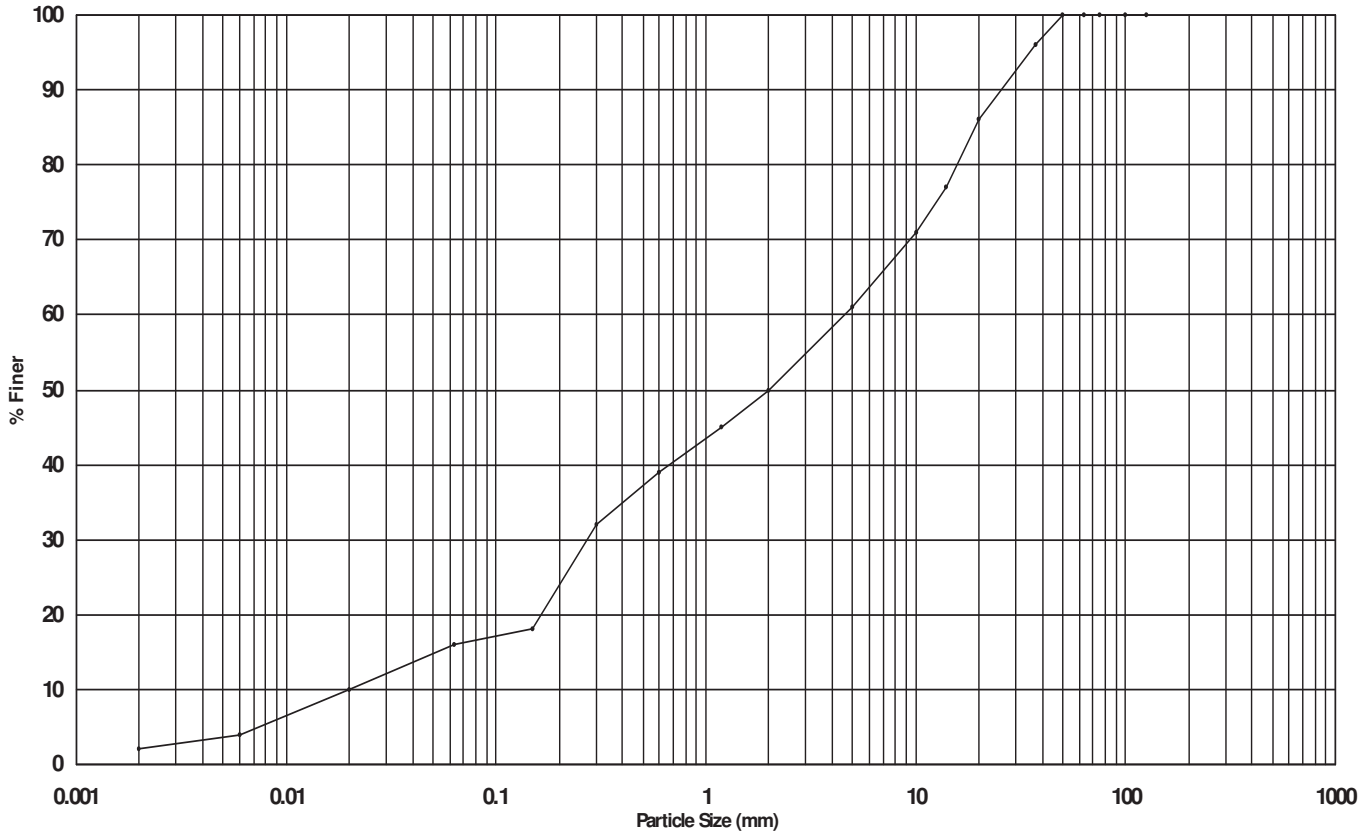
Sample Depth: 3.00-3.45m

Sample Type: B

Sample Ref: N60644

Sample Description

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



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

Classification	% of each
CLAY	2
SILT	14
SAND	34
GRAVEL	50
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	96
20 mm	86
14 mm	77
10 mm	71
5 mm	61
2 mm	50
1.18 mm	45
600 µm	39
300 µm	32
150 µm	18
63 µm	16

Size	% Finer
20 µm	10
6 µm	4
2 µm	2

Uniformity Coefficient	
212.47	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP3

Project No: PN153396

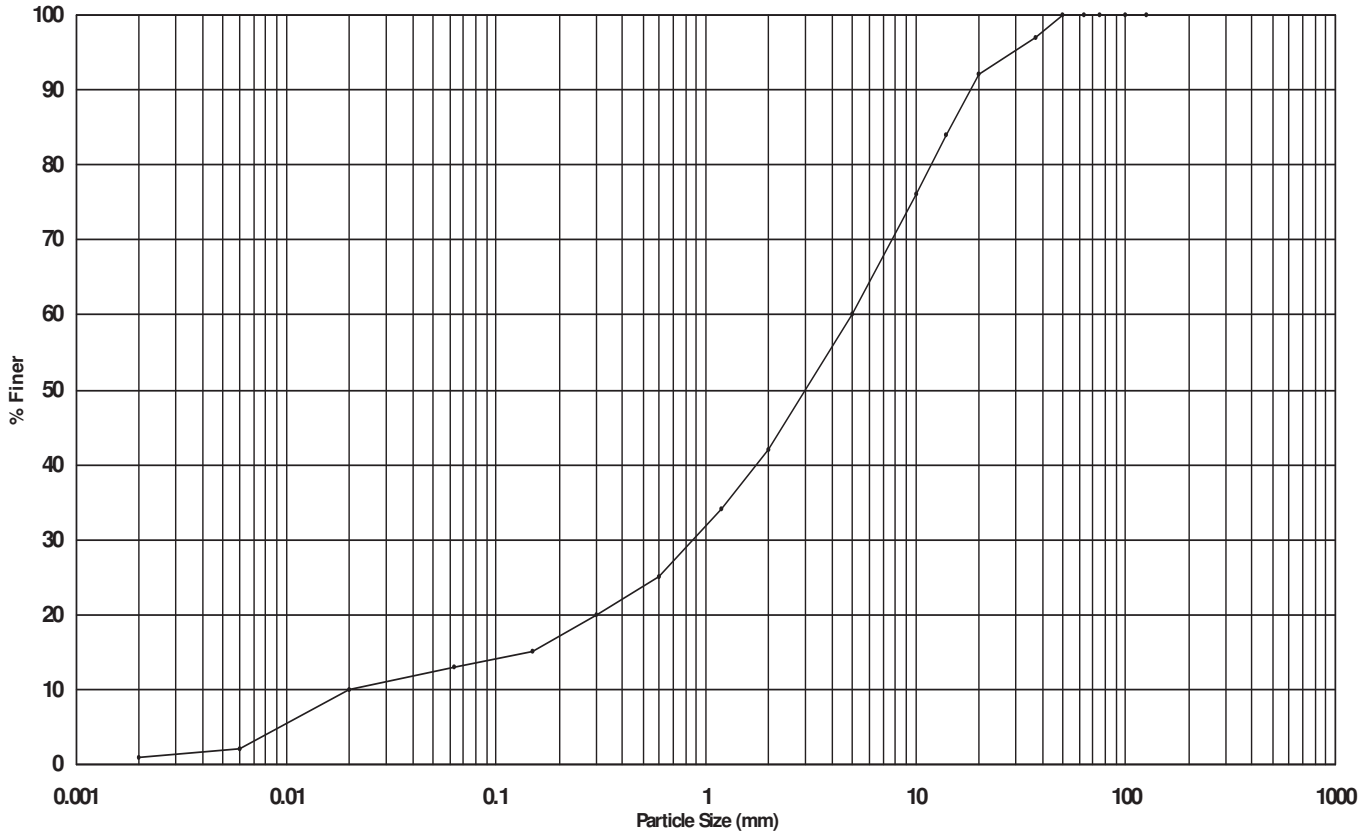
Sample Depth: 6.00-6.45m

Sample Type: B

Sample Ref: N60645

Sample Description

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



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

Classification	% of each
CLAY	1
SILT	12
SAND	29
GRAVEL	58
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	97
20 mm	92
14 mm	84
10 mm	76
5 mm	60
2 mm	42
1.18 mm	34
600 µm	25
300 µm	20
150 µm	15
63 µm	13

Size	% Finer
20 µm	10
6 µm	2
2 µm	1

Uniformity Coefficient	
233.91	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole CP3

Sample Depth 10.00-10.45m

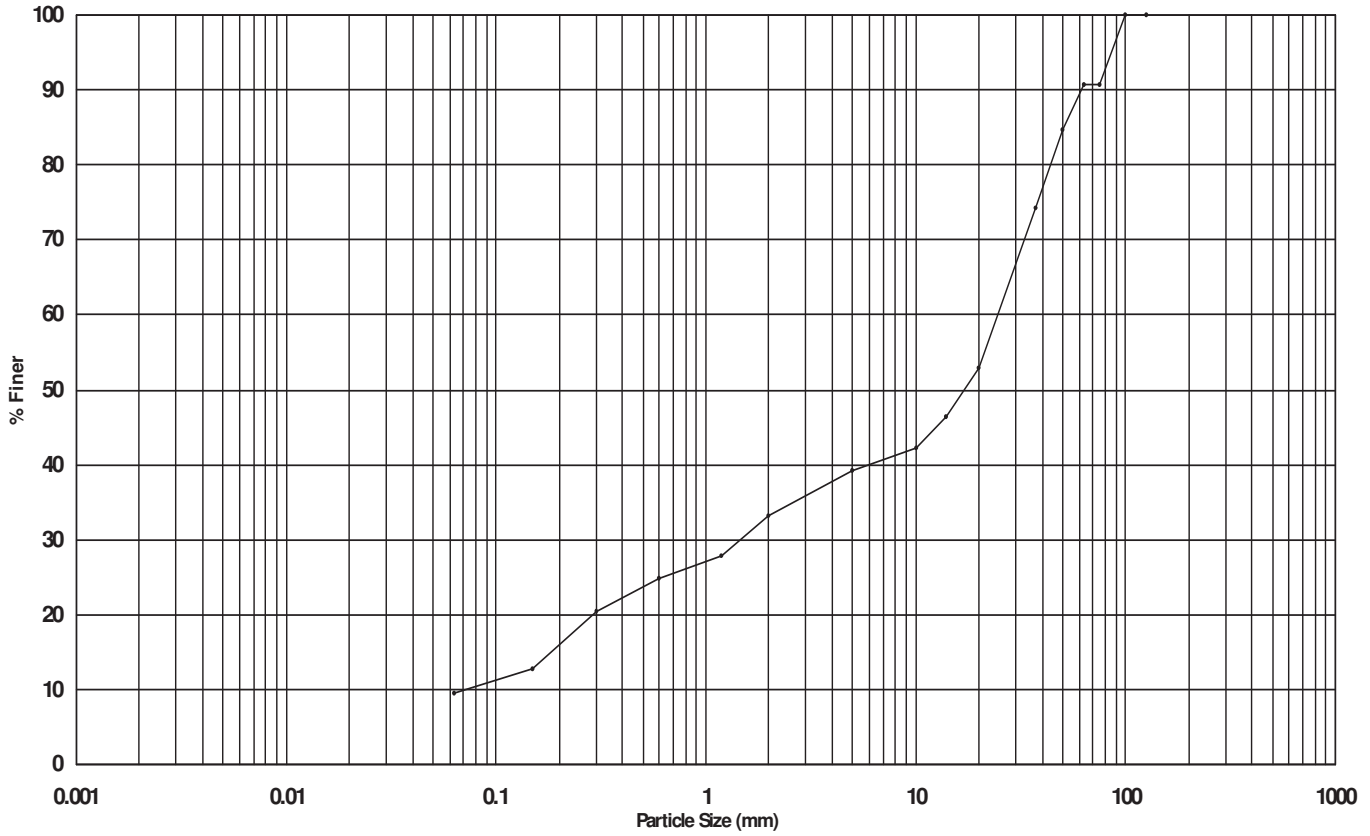
Project No: PN153396

Sample Type B

Sample Ref N60646

Sample Description

Greyish brown silty very sandy fine to coarse GRAVEL with a low cobble content.



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

Classification	% of each
SILT (including CLAY)	9
SAND	24
GRAVEL	58
COBBLES	9
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	91
63 mm	91
50 mm	85
37.5 mm	74
20 mm	53
14 mm	46
10 mm	42
5 mm	39
2 mm	33
1.18 mm	28
600 μm	25
300 μm	20
150 μm	13
63 μm	9

Size	% Finer

Uniformity Coefficient	
338.51	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole CP4

Sample Depth 1.20-1.65m

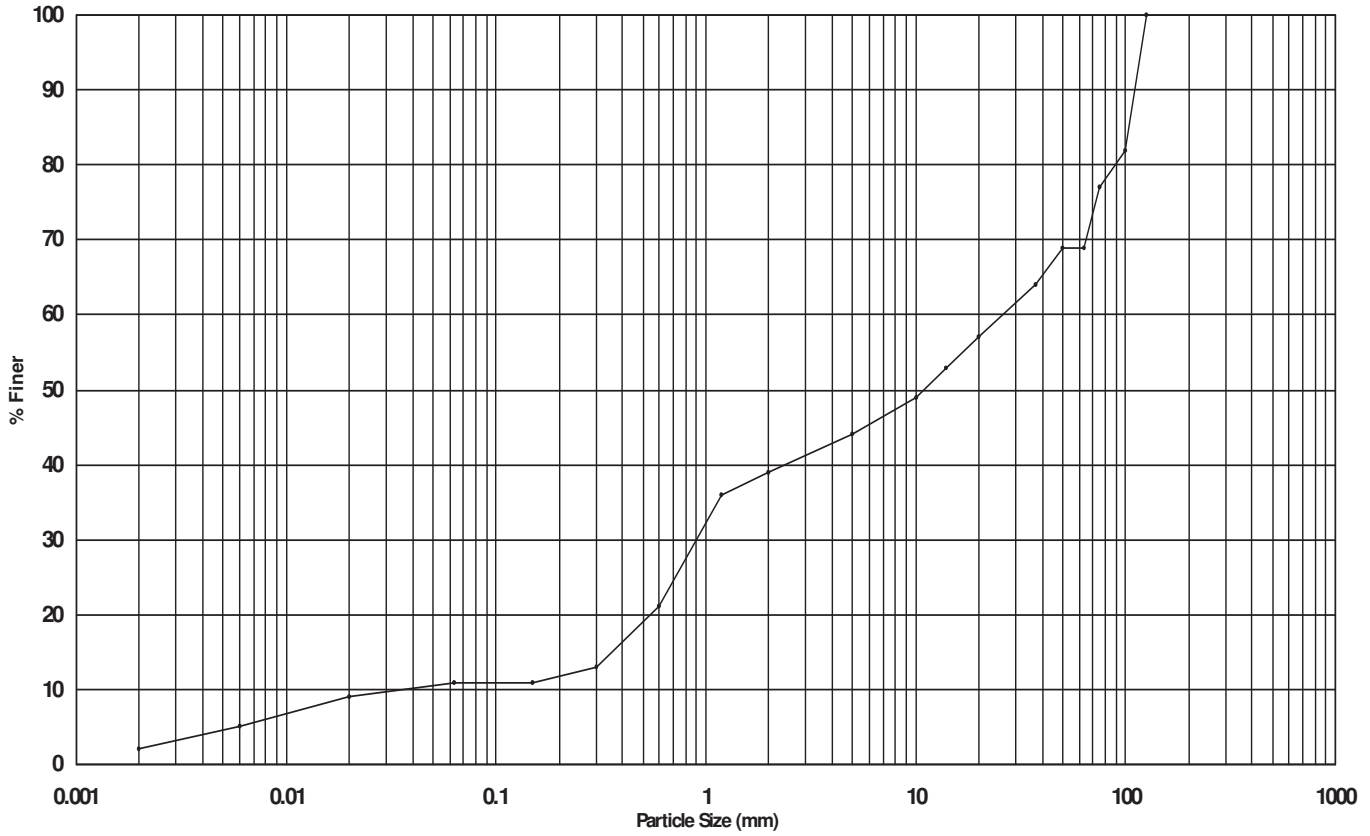
Project No: PN153396

Sample Type B

Sample Ref N60631

Sample Description

MADE GROUND: Grey and black silty sand and gravel with a high cobble content.




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

Classification	% of each
CLAY	2
SILT	9
SAND	28
GRAVEL	30
COBBLES	31
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	82
75 mm	77
63 mm	69
50 mm	69
37.5 mm	64
20 mm	57
14 mm	53
10 mm	49
5 mm	44
2 mm	39
1.18 mm	36
600 µm	21
300 µm	13
150 µm	11
63 µm	11

Size	% Finer
20 µm	9
6 µm	5
2 µm	2

Uniformity Coefficient	
684.96	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks  Test performed as NON BS due to sample mass not in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP4

Sample Depth: 5.00-5.45m

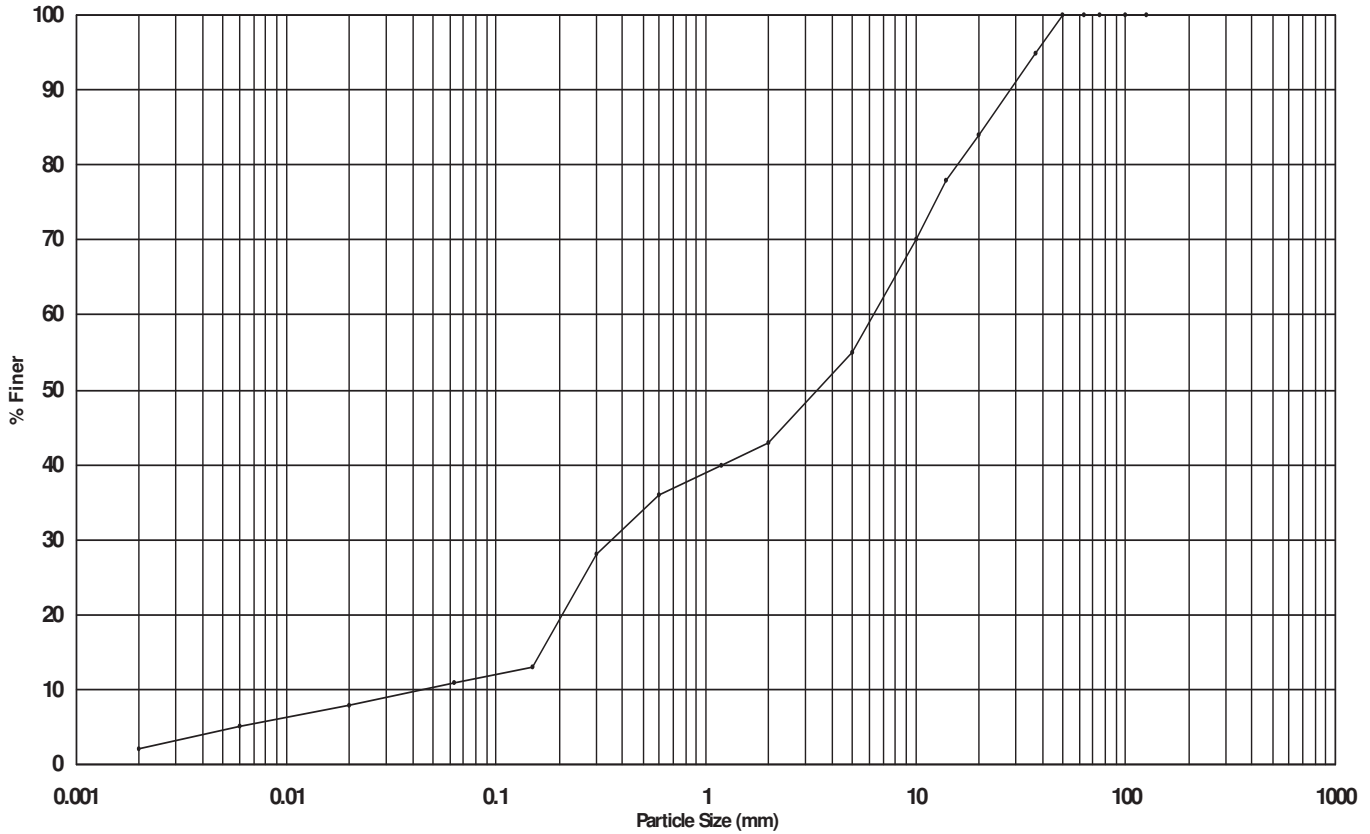
Project No: PN153396

Sample Type: B

Sample Ref: N60632

Sample Description

MADE GROUND: Black clayey very sandy fine to coarse gravel.



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

Classification	% of each
CLAY	2
SILT	9
SAND	32
GRAVEL	57
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	95
20 mm	84
14 mm	78
10 mm	70
5 mm	55
2 mm	43
1.18 mm	40
600 µm	36
300 µm	28
150 µm	13
63 µm	11

Size	% Finer
20 µm	8
6 µm	5
2 µm	2

Uniformity Coefficient	
131.82	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP4

Project No: PN153396

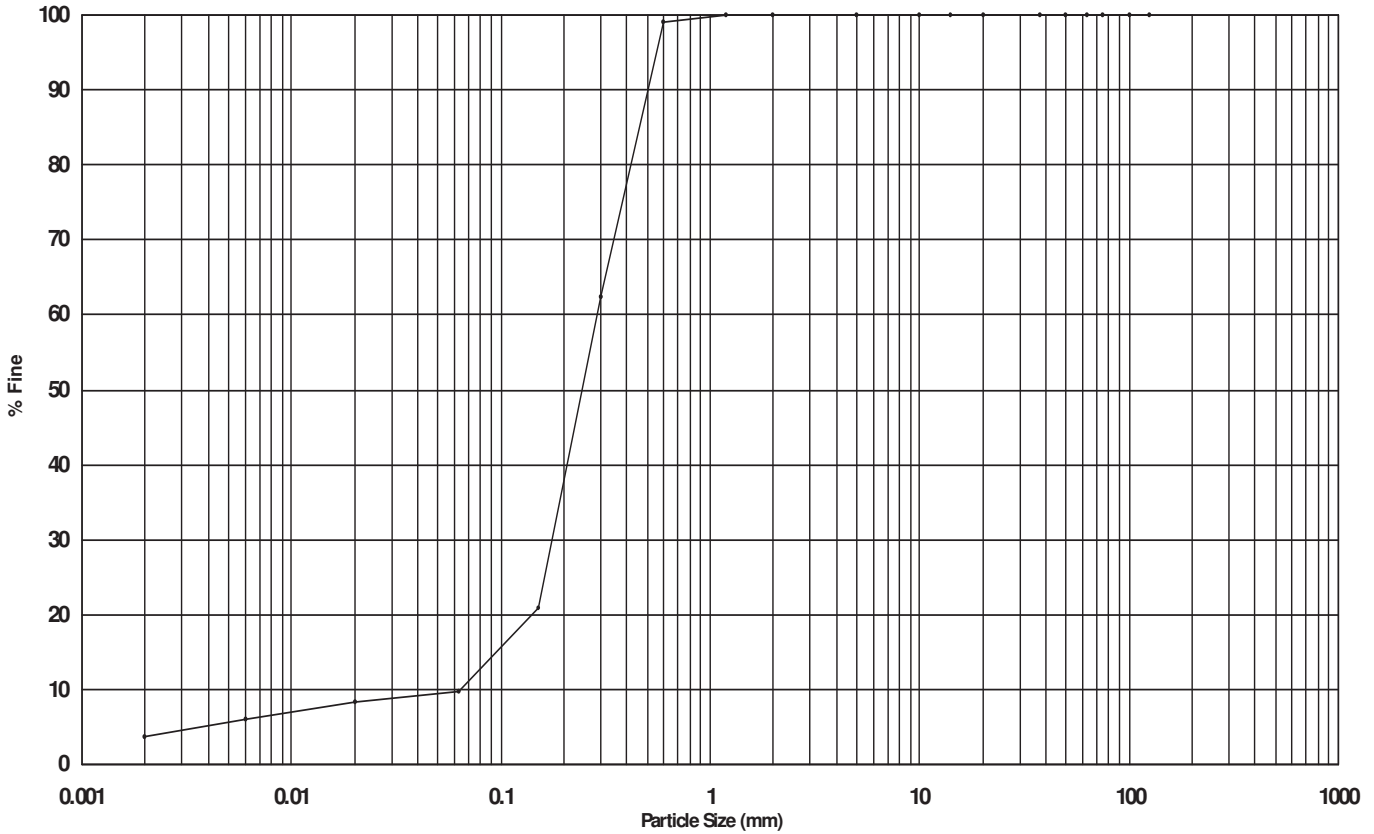
Sample Depth: 9.00-9.45m

Sample Type: B

Sample Ref: N60633

Sample Description

Grey clayey fine to coarse SAND.



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

Classification	% of each
CLAY	4
SILT	6
SAND	90
GRAVEL	0
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2 mm	100
1.18 mm	100
600 µm	99
300 µm	62
150 µm	21
63 µm	10

Size	% Finer
20 µm	8
6 µm	6
2 µm	4

Uniformity Coefficient	
4.50	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole CP5

Sample Depth 1.20-1.65m

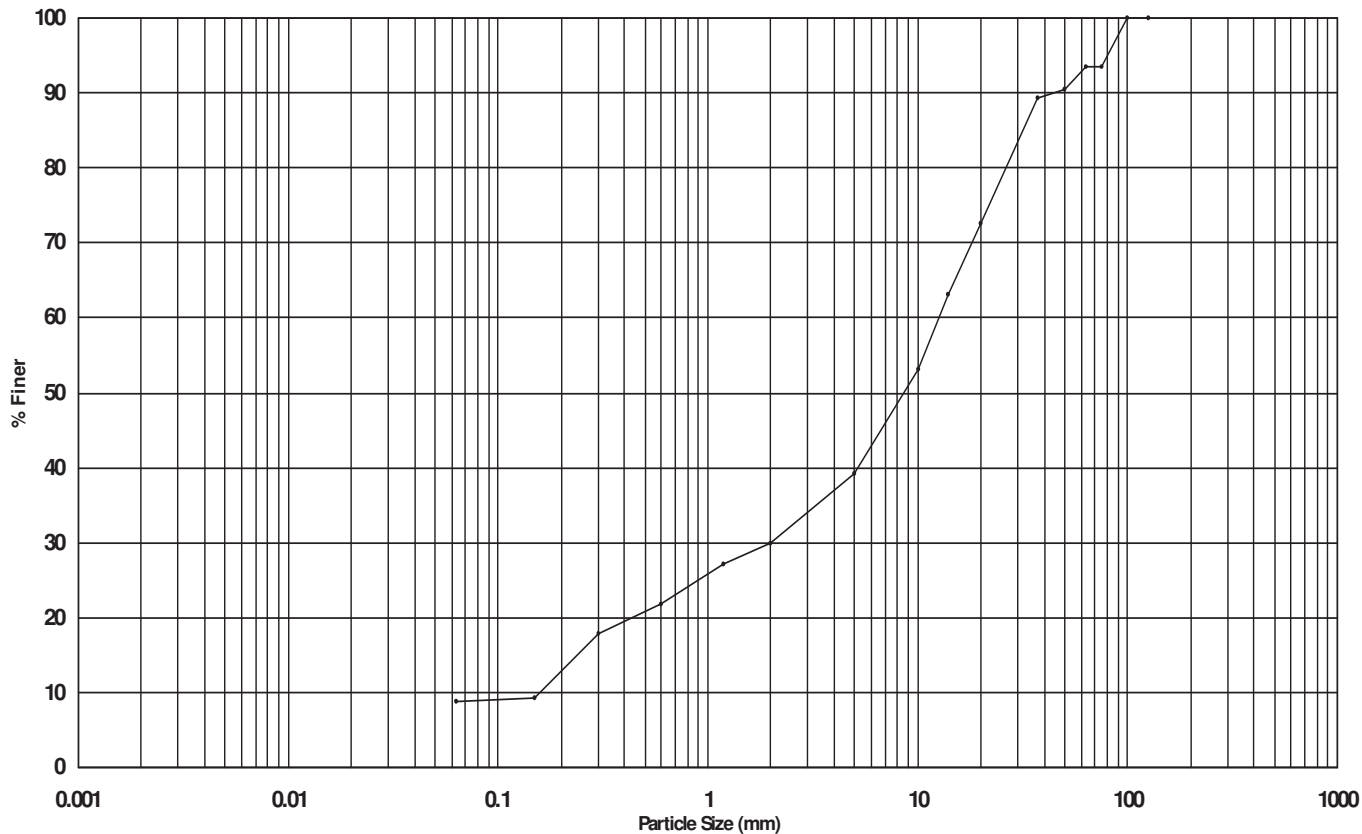
Project No: PN153396

Sample Type B

Sample Ref N60653

Sample Description

MADE GROUND: Black silty very sandy fine to coarse gravel with a low cobble content.



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

Classification	% of each
CLAY	0
SILT (including CLAY)	9
SAND	21
GRAVEL	63
COBBLES	7
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	93
63 mm	93
50 mm	91
37.5 mm	89
20 mm	73
14 mm	63
10 mm	53
5 mm	39
2 mm	30
1.18 mm	27
600 µm	22
300 µm	18
150 µm	9
63 µm	9

Size	% Finer

Uniformity Coefficient	
79.67	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP5

Project No: PN153396

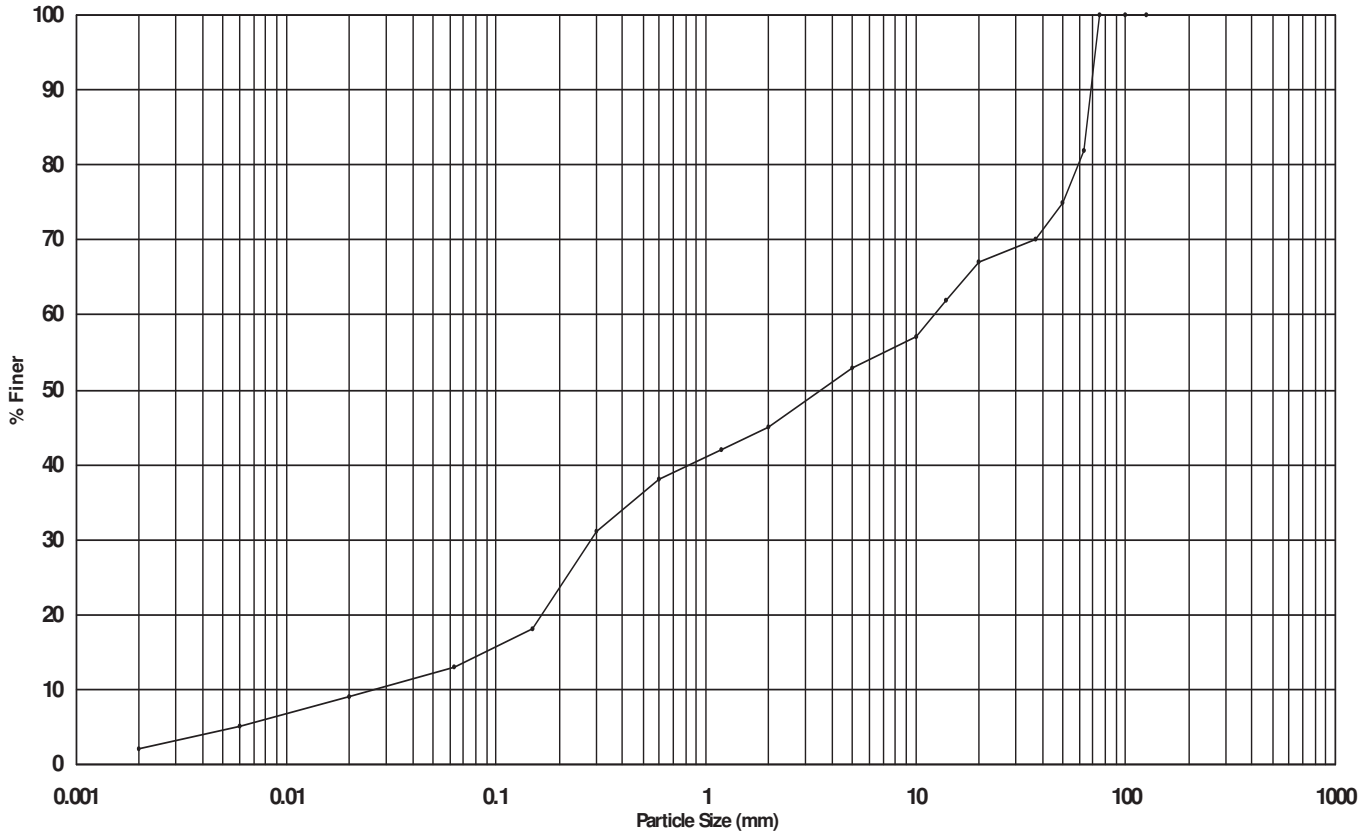
Sample Depth: 3.20-3.65m

Sample Type: B

Sample Ref: N60800

Sample Description

MADE GROUND: Dark brown/black silty sand and gravel with a medium cobble content.



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

Classification	% of each
CLAY	2
SILT	11
SAND	32
GRAVEL	37
COBBLES	18
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	82
50 mm	75
37.5 mm	70
20 mm	67
14 mm	62
10 mm	57
5 mm	53
2 mm	45
1.18 mm	42
600 µm	38
300 µm	31
150 µm	18
63 µm	13

Size	% Finer
20 µm	9
6 µm	5
2 µm	2

Uniformity Coefficient	
535.66	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP5

Sample Depth: 5.65-6.00m

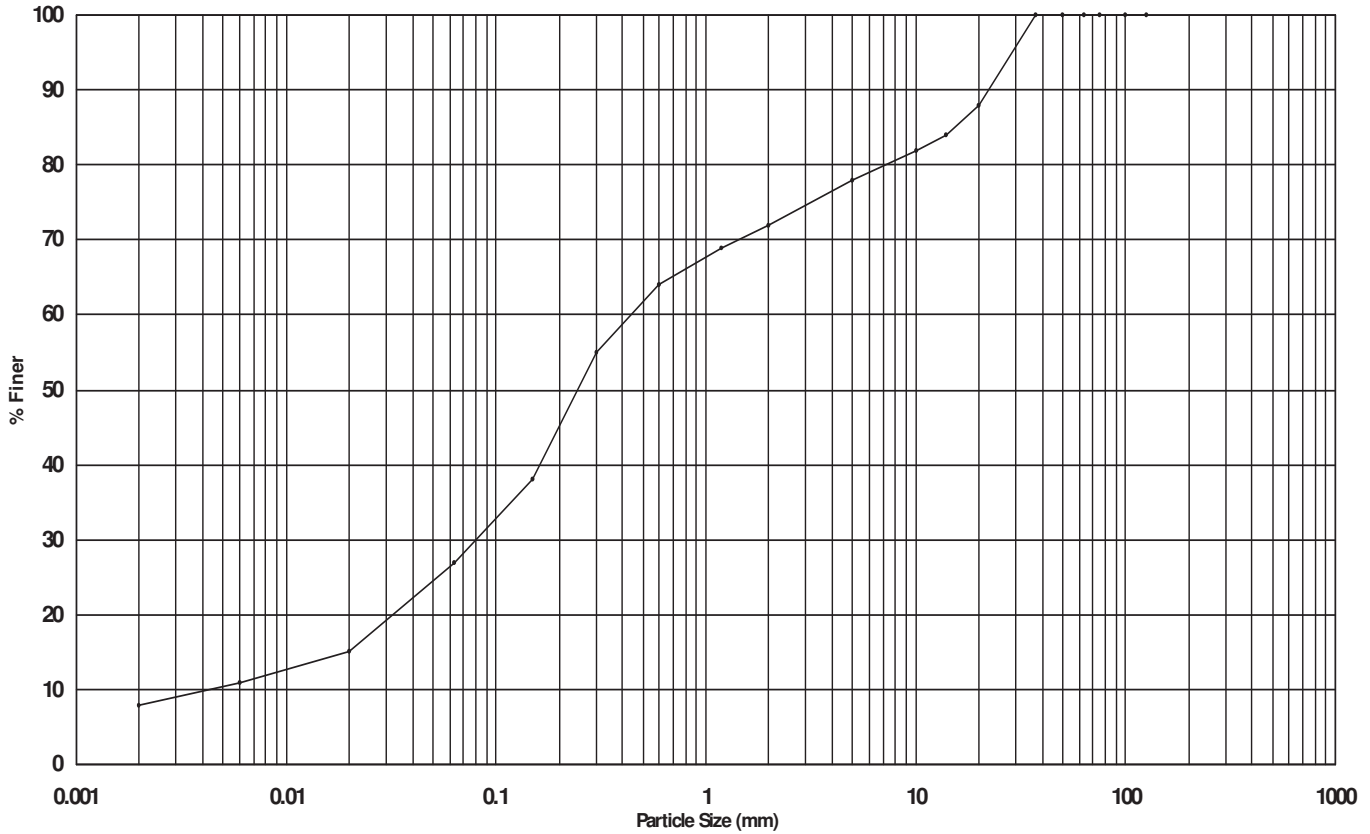
Project No: PN153396

Sample Type: B

Sample Ref: N60652

Sample Description

Firm to stiff brown slightly gravelly sandy CLAY.



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

Classification	% of each
CLAY	8
SILT	19
SAND	45
GRAVEL	28
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	88
14 mm	84
10 mm	82
5 mm	78
2 mm	72
1.18 mm	69
600 µm	64
300 µm	55
150 µm	38
63 µm	27

Size	% Finer
20 µm	15
6 µm	11
2 µm	8

Uniformity Coefficient	
102.34	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP5

Sample Depth: 7.85-8.25m

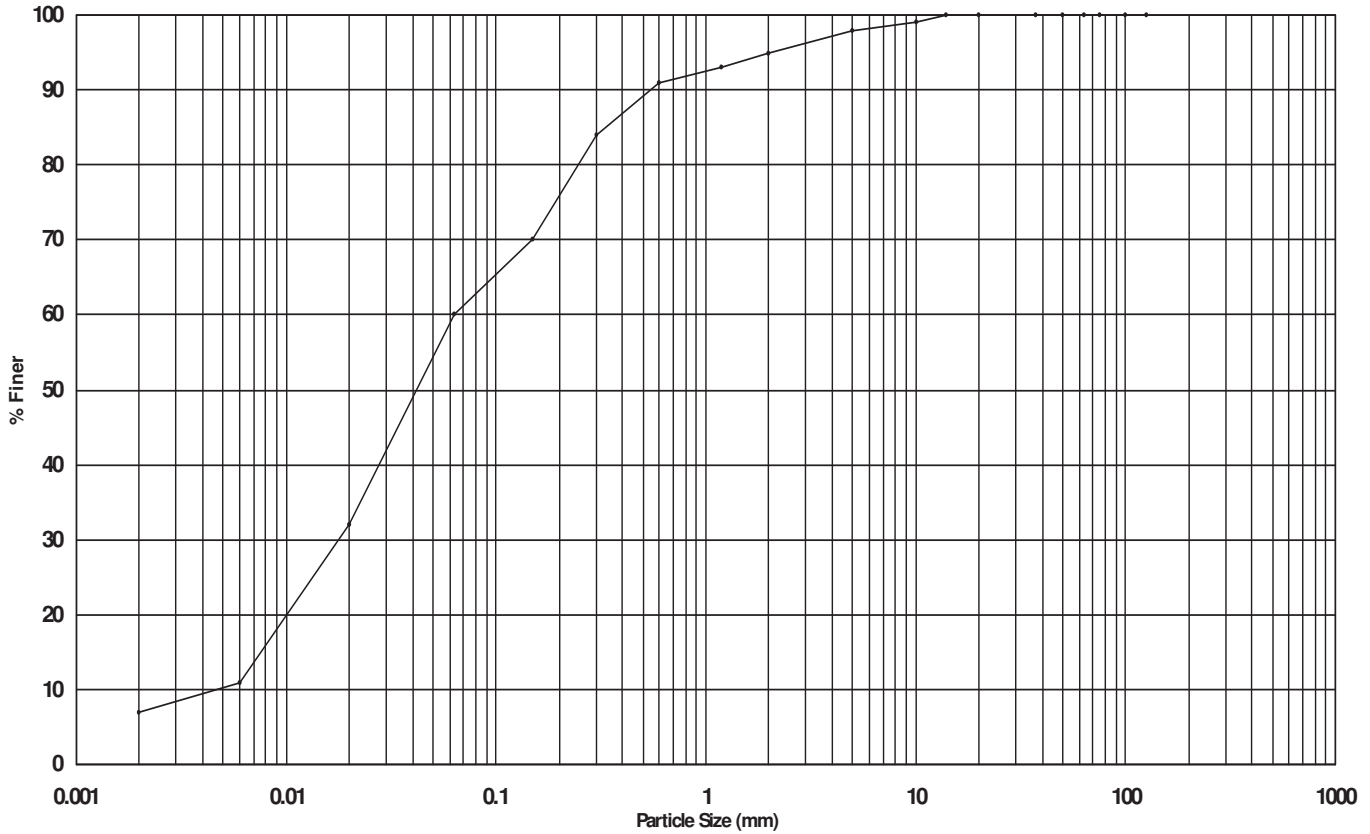
Project No: PN153396

Sample Type: B

Sample Ref: N60654

Sample Description

Firm to stiff brown slightly gravelly sandy CLAY.



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

Classification	% of each
CLAY	7
SILT	53
SAND	35
GRAVEL	5
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	100
10 mm	99
5 mm	98
2 mm	95
1.18 mm	93
600 μm	91
300 μm	84
150 μm	70
63 μm	60

Size	% Finer
20 μm	32
6 μm	11
2 μm	7

Uniformity Coefficient	
14.62	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: CP6

Project No: PN153396

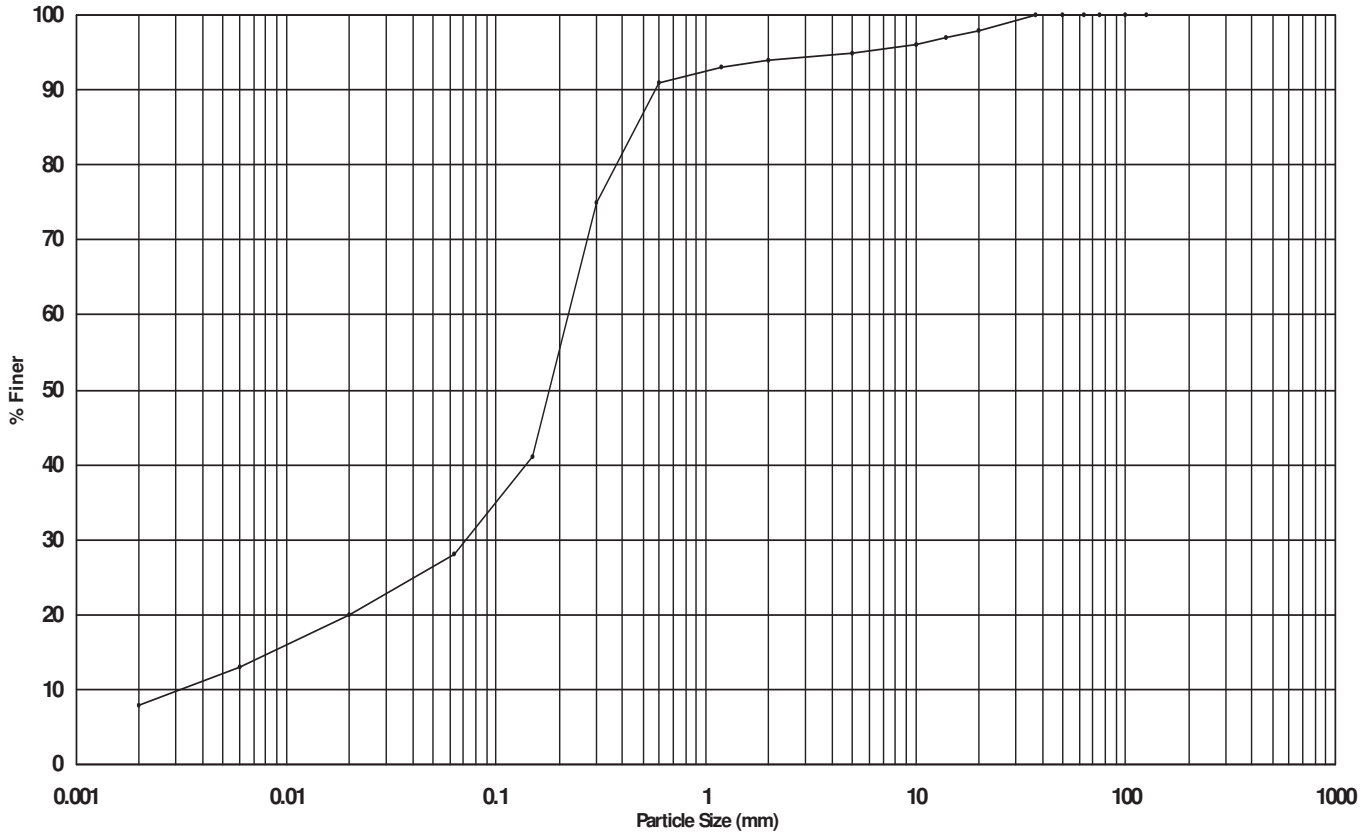
Sample Depth: 0.55-0.95m

Sample Type: B

Sample Ref: N60655

Sample Description

Dark brown very clayey gravelly fine to coarse SAND.



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

Classification	% of each
CLAY	8
SILT	20
SAND	66
GRAVEL	6
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	98
14 mm	97
10 mm	96
5 mm	95
2 mm	94
1.18 mm	93
600 µm	91
300 µm	75
150 µm	41
63 µm	28

Size	% Finer
20 µm	20
6 µm	13
2 µm	8

Uniformity Coefficient	
65.41	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



LABORATORY RESULTS - Particle Size Distribution

Project: A5036 PORT OF LIVERPOOL ACCESS STUDY

Hole: WS11

Project No: PN153396

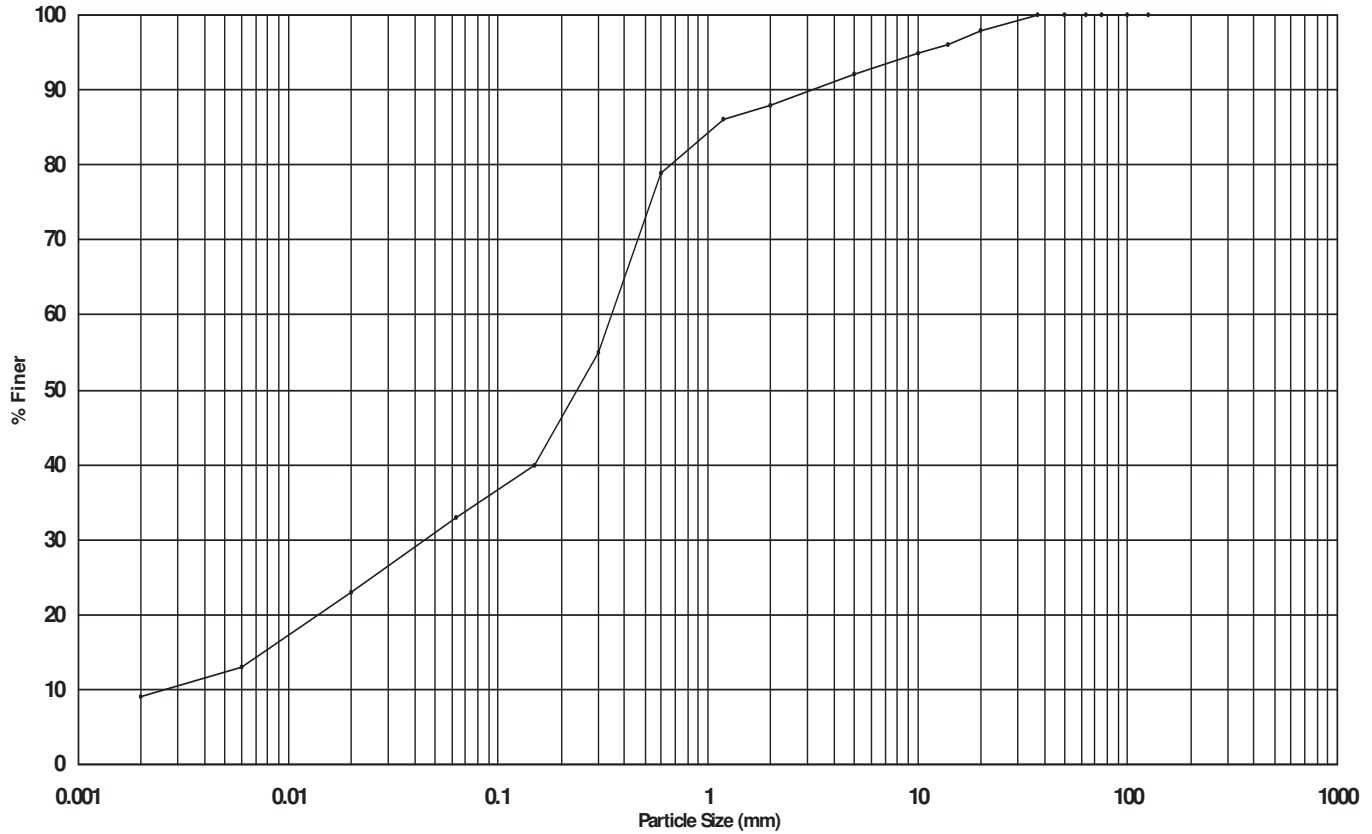
Sample Depth: 0.90-1.20m

Sample Type: B

Sample Ref: N60796

Sample Description

Reddish brown very clayey gravelly fine to coarse SAND.



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

Classification	% of each
CLAY	9
SILT	24
SAND	55
GRAVEL	12
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	98
14 mm	96
10 mm	95
5 mm	92
2 mm	88
1.18 mm	86
600 µm	79
300 µm	55
150 µm	40
63 µm	33

Size	% Finer
20 µm	23
6 µm	13
2 µm	9

Uniformity Coefficient	
137.19	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	0.00
Particle Density	2.65 (Assumed)

Remarks:  Test performed in accordance with BS 1377:Part 2:1990

08/01/2016



APPENDIX 6

Laboratory Test Results - Contamination



Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Geotechnics
Unit 1B
Borders Industrial Park
River Lane
Chester
Cheshire
CH4 8RJ

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Paul Hayes
Date : 12th November, 2015
Your reference : PN153396
Our reference : Test Report 15/15750 Batch 1
Location : A5036
Date samples received : 4th November, 2015
Status : Final report
Issue : 1

Ten samples were received for analysis on 4th November, 2015 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Paul Lee-Boden BSc
Project Manager

Jones Environmental Laboratory

Client Name: Geotechnics
Reference: PN153396
Location: A5036
Contact: Paul Hayes
JE Job No.: 15/15750

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No.	1-5	6-10	11-15	16-19	20-24	25-28	29-36	37-44	45-52	53-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	CP1	CP4	CP5	CP6	CP7	WS10	SW1	SW3	SW4	SW5			
Depth													
COC No / misc				Grab Sample		Grab Sample							
Containers	V P G	V P G	V P G	V P G	V P G	V P G	V H H N N P G	V H H N N P G	V H H N N P G	V H H N N P G			
Sample Date	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	LOD/LOR	Units	Method No.
Dissolved Arsenic [#]	<2.5	18.5	14.5	9.9	5.0	7.7	<2.5	<2.5	2.6	3.9	<2.5	ug/l	TM30/PM14
Dissolved Boron	32	2532	605	64	53	225	130	358	78	78	<12	ug/l	TM30/PM14
Dissolved Cadmium [#]	0.7	0.7	0.9	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM30/PM14
Total Dissolved Chromium [#]	<1.5	2.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	ug/l	TM30/PM14
Dissolved Copper [#]	<7	<7	<7	<7	<7	13	<7	<7	<7	<7	<7	ug/l	TM30/PM14
Total Dissolved Iron [#]	948	9811	22	446	<20	41840 ^{AA}	274	63	65	109	<20	ug/l	TM30/PM14
Dissolved Lead [#]	<5	<5	<5	<5	<5	6	<5	<5	<5	<5	<5	ug/l	TM30/PM14
Dissolved Mercury [#]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM30/PM14
Dissolved Nickel [#]	4	6	29	3	5	3	<2	<2	2	<2	<2	ug/l	TM30/PM14
Dissolved Selenium [#]	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM30/PM14
Dissolved Vanadium [#]	<1.5	2.6	1.7	<1.5	<1.5	2.5	<1.5	<1.5	<1.5	<1.5	<1.5	ug/l	TM30/PM14
Dissolved Zinc [#]	13	<3	17	<3	5	4	19	7	<3	6	<3	ug/l	TM30/PM14
PAH MS													
Naphthalene	<0.1	0.4	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.1	<0.1	<0.1	ug/l	TM4/PM30
Acenaphthylene	<0.01	0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Acenaphthene	0.01	1.09	0.02	0.01	<0.01	0.04	<0.01	0.01	0.01	<0.01	<0.01	ug/l	TM4/PM30
Fluorene	0.01	0.62	0.02	0.01	<0.01	0.04	<0.01	<0.01	0.01	<0.01	<0.01	ug/l	TM4/PM30
Phenanthrene	0.02	2.19	0.09	0.02	0.01	0.07	<0.01	0.01	0.01	0.01	<0.01	ug/l	TM4/PM30
Anthracene	<0.01	0.39	0.02	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Fluoranthene	<0.01	0.76	0.09	0.01	<0.01	0.08	<0.01	<0.01	<0.01	0.01	<0.01	ug/l	TM4/PM30
Pyrene	0.01	0.50	0.08	0.01	0.01	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Benzo(a)anthracene	<0.01	0.06	0.03	0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Chrysene	<0.01	0.07	0.04	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Benzo(bk)fluoranthene	<0.01	0.03	0.04	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Benzo(a)pyrene	<0.01	0.02	0.03	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
PAH 16 Total	<0.1	6.2	0.5	<0.1	<0.1	0.6	<0.1	<0.1	0.1	<0.1	<0.1	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01	0.02	0.03	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01	<0.01	0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	86	85	80	88	85	89	83	91	91	84	<0	%	TM4/PM30
Methyl Tertiary Butyl Ether[#]													
Methyl Tertiary Butyl Ether [#]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Benzene [#]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
Toluene [#]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
Ethylbenzene [#]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
p/m-Xylene [#]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
o-Xylene [#]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	98	100	100	100	98	100	98	98	100	99	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	104	103	103	105	103	106	104	103	105	104	<0	%	TM15/PM10

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036
 Contact: Paul Hayes
 JE Job No.: 15/15750

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No.	1-5	6-10	11-15	16-19	20-24	25-28	29-36	37-44	45-52	53-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	CP1	CP4	CP5	CP6	CP7	WS10	SW1	SW3	SW4	SW5			
Depth													
COC No / misc				Grab Sample		Grab Sample							
Containers	V P G	V P G	V P G	V P G	V P G	V P G	V H H N P G	V H H N P G	V H H N P G	V H H N P G			
Sample Date	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
>C6-C8 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
>C8-C10 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
>C10-C12 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM5/PM30
>C12-C16 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
>C16-C21 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
>C21-C35 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
Total aliphatics C5-35 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/TM36/PM30
Aromatics													
>C5-EC7 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
>EC7-EC8 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
>EC8-EC10 #	<5	<5	<5	6	<5	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
>EC10-EC12 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM5/PM30
>EC12-EC16 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
>EC16-EC21 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
>EC21-EC35 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
Total aromatics C5-35 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM30
Total aliphatics and aromatics(C5-35) #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM5/TM36/PM30
Sulphate #	503.45	<0.05	11.66	44.82	88.57	<0.05	148.15	155.90	86.97	87.60	<0.05	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	-	-	-	-	-	-	<0.06	0.25	<0.06	<0.06	<0.06	mg/l	TM38/PM0
Free Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM89/PM0
Total Cyanide #	0.01	<0.01	0.02	0.02	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N #	0.54	240.07	2.41	0.03	0.04	44.66	0.04	0.03	0.04	0.04	<0.03	mg/l	TM38/PM0
Hexavalent Chromium #	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	mg/l	TM38/PM0
Total Alkalinity as CaCO3 #	-	-	-	-	-	-	170	282	150	166	<1	mg/l	TM75/PM0
Dissolved Iron II	1.01	0.10	<0.02	<0.02	<0.02	0.06	0.02	0.02	<0.02	0.02	<0.02	mg/l	TM48/PM0
Dissolved Iron III	<0.02	9.71	0.02	0.45	<0.02	41.78	0.25	0.04	0.07	0.09	<0.02	mg/l	TM30/TM48/PM0
pH #	6.55	6.96	6.90	7.41	7.16	6.98	6.97	7.68	7.79	7.13	<0.01	pH units	TM73/PM0
Total Suspended Solids #	-	-	-	-	-	-	<10	16	12	13	<10	mg/l	TM37/PM0

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036
 Contact: Paul Hayes
 JE Job No.: 15/15750

SVOC Report : Liquid

J E Sample No.	1-5	6-10	11-15	16-19	20-24	25-28	29-36	37-44	45-52	53-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	CP1	CP4	CP5	CP6	CP7	WS10	SW1	SW3	SW4	SW5	LOD/LOR	Units	Method No.
Depth													
COC No / misc				Grab Sample		Grab Sample							
Containers	V P G	V P G	V P G	V P G	V P G	V P G	V H H N P G	V H H N P G	V H H N P G	V H H N P G			
Sample Date	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015			
SVOC MS													
Phenols													
2-Chlorophenol #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1	<1	2	<1	88 ⁺⁺	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Phenol	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Other SVOCs													
1,2-Dichlorobenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
2-Nitroaniline	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
3-Nitroaniline	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Chloroaniline	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Carbazole #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Hexachloroethane #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Isophorone #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Nitrobenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	83	73	83	82	82	76	82	82	82	81	<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	84	84	91	89	88	85	90	91	91	89	<0	%	TM16/PM30

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036
 Contact: Paul Hayes
 JE Job No.: 15/15750

VOC Report : Liquid

J E Sample No.	1-5	6-10	11-15	16-19	20-24	25-28	29-36	37-44	45-52	53-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	CP1	CP4	CP5	CP6	CP7	WS10	SW1	SW3	SW4	SW5			
Depth													
COC No / misc Containers	VP G	VP G	VP G	Grab Sample VP G	VP G	Grab Sample VP G	VHHN N P G	VHHN N P G	VHHN N P G	VHHN N P G			
Sample Date	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015	03/11/2015			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	04/11/2015	LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
cis-1-2-Dichloroethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Toluene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	<2	<2	3	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Ethylbenzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
p/m-Xylene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
o-Xylene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Bromofom #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	98	100	100	100	98	100	98	98	100	99	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	104	103	103	105	103	106	104	103	105	104	<0	%	TM15/PM10

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/15750

SOILS

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It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

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Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

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As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

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ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

JE Job No: 15/15750

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM30/TM48	Calculation of Fe (III) based on Iron and Fe(II)	PM0	No preparation is required.				

JE Job No: 15/15750

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified USEPA 160.2. Gravimetric determination of Total Suspended Solids. Sample is filtered and the resulting residue is dried and weighed.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using the Thermo Aquamem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes			
TM48	Determination of Ferrous Iron by reaction with Sodium Carbonate and Morfamquat Sulphate which is analysed spectrophotometrically.	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM75	Modified US EPA method 310.1. Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM0	No preparation is required.	Yes			



Jones Environmental Laboratory

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River Lane
Chester
Cheshire
CH4 8RJ

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Paul Hayes
Date : 9th December, 2015
Your reference : PN153396
Our reference : Test Report 15/15750 Batch 1 Schedule D
Location : A5036
Date samples received : 4th November, 2015
Status : Final report
Issue : 1

Ten samples were received for analysis on 4th November, 2015 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/15750

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+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
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ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/15750

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.				
TM38	Soluble Ion analysis using the Thermo Aquagem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes			
Subcontracted	Subcontracted analysis, sent to an ISO 17025 accredited laboratory where possible.						



Jones Environmental Laboratory

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Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Jon Hutchinson
Date : 8th October, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 1
Location : A5036 Liverpool
Date samples received : 24th September, 2015
Status : Final report
Issue : 1

Seventeen samples were received for analysis on 24th September, 2015 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Paul Lee-Boden BSc
Project Manager

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	7-9	16-18	22-24	25-27																	
Sample ID	CP4	CP4	CP4	CP4																	
Depth	1.00	4.00	6.00	8.30																	
COC No / misc																					
Containers	V J T	V J T	V J T	V J T																	
Sample Date	<>	<>	<>	<>																	
Sample Type	Soil	Soil	Soil	Soil																	
Batch Number	1	1	1	1																	
Date of Receipt	24/09/2015	24/09/2015	24/09/2015	24/09/2015																	
											LOD/LOR	Units	Method No.								
Please see attached notes for all abbreviations and acronyms																					
Arsenic ^{#M}	12.1	10.8	13.9	2.6							<0.5	mg/kg	TM30/PM15								
Cadmium ^{#M}	0.4	<0.1	0.5	<0.1							<0.1	mg/kg	TM30/PM15								
Chromium ^{#M}	82.0	73.2	112.4	139.5							<0.5	mg/kg	TM30/PM15								
Copper ^{#M}	100	30	145	9							<1	mg/kg	TM30/PM15								
Iron	23310	31780	32590	5244							<20	mg/kg	TM30/PM15								
Lead ^{#M}	175	41	100	19							<5	mg/kg	TM30/PM15								
Mercury ^{#M}	<0.1	<0.1	3.3	<0.1							<0.1	mg/kg	TM30/PM15								
Nickel ^{#M}	39.5	28.5	26.9	11.3							<0.7	mg/kg	TM30/PM15								
Selenium ^{#M}	<1	<1	1	<1							<1	mg/kg	TM30/PM15								
Vanadium	32	30	24	7							<1	mg/kg	TM30/PM15								
Zinc ^{#M}	232	62	478	35							<5	mg/kg	TM30/PM15								
PAH MS																					
Naphthalene ^{#M}	17.85 _{AB}	0.17	<0.40 _{AB}	<0.04							<0.04	mg/kg	TM4/PM8								
Acenaphthylene	1.19 _{AB}	0.19	0.42 _{AB}	<0.03							<0.03	mg/kg	TM4/PM8								
Acenaphthene ^{#M}	25.37 _{AB}	1.58	<0.50 _{AB}	<0.05							<0.05	mg/kg	TM4/PM8								
Fluorene ^{#M}	14.51 _{AB}	1.63	0.56 _{AB}	<0.04							<0.04	mg/kg	TM4/PM8								
Phenanthrene ^{#M}	81.96 _{AB}	14.63	4.84 _{AB}	0.15							<0.03	mg/kg	TM4/PM8								
Anthracene #	25.51 _{AB}	4.50	2.00 _{AB}	<0.04							<0.04	mg/kg	TM4/PM8								
Fluoranthene ^{#M}	86.37 _{AB}	17.92	12.31 _{AB}	0.24							<0.03	mg/kg	TM4/PM8								
Pyrene #	63.86 _{AB}	14.06	9.95 _{AB}	0.23							<0.03	mg/kg	TM4/PM8								
Benzo(a)anthracene #	33.38 _{AB}	5.81	8.26 _{AB}	0.15							<0.06	mg/kg	TM4/PM8								
Chrysene ^{#M}	41.72 _{AB}	6.04	9.31 _{AB}	0.13							<0.02	mg/kg	TM4/PM8								
Benzo(bk)fluoranthene ^{#M}	56.67 _{AB}	9.08	13.27 _{AB}	0.24							<0.07	mg/kg	TM4/PM8								
Benzo(a)pyrene #	40.83 _{AB}	6.30	8.54 _{AB}	0.18							<0.04	mg/kg	TM4/PM8								
Indeno(123cd)pyrene ^{#M}	21.89 _{AB}	3.49	4.92 _{AB}	0.11							<0.04	mg/kg	TM4/PM8								
Dibenzo(ah)anthracene #	4.46 _{AB}	0.58	0.61 _{AB}	<0.04							<0.04	mg/kg	TM4/PM8								
Benzo(ghi)perylene #	14.98 _{AB}	3.32	3.52 _{AB}	0.11							<0.04	mg/kg	TM4/PM8								
PAH 16 Total	530.6 _{AB}	89.3	78.5 _{AB}	1.5							<0.6	mg/kg	TM4/PM8								
Benzo(b)fluoranthene	40.80 _{AB}	6.54	9.55 _{AB}	0.17							<0.05	mg/kg	TM4/PM8								
Benzo(k)fluoranthene	15.87 _{AB}	2.54	3.72 _{AB}	0.07							<0.02	mg/kg	TM4/PM8								
PAH Surrogate % Recovery	101 _{AB}	109	103 _{AB}	83							<0	%	TM4/PM8								
Methyl Tertiary Butyl Ether ^{#M}																					
	-	<6	<6	<6							<6	ug/kg	TM15/PM10								
Benzene ^{#M}																					
	-	<5	19	<5							<5	ug/kg	TM15/PM10								
Toluene ^{#M}																					
	-	9	35	<3							<3	ug/kg	TM15/PM10								
Ethylbenzene ^{#M}																					
	-	<3	8	<3							<3	ug/kg	TM15/PM10								
p/m-Xylene ^{#M}																					
	-	<4	18	<4							<4	ug/kg	TM15/PM10								
o-Xylene ^{#M}																					
	-	<4	14	<4							<4	ug/kg	TM15/PM10								
Surrogate Recovery Toluene D8																					
	-	113	99	114							<0	%	TM15/PM10								
Surrogate Recovery 4-Bromofluorobenzene																					
	-	120	97	134							<0	%	TM15/PM10								

Jones Environmental Laboratory

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	7-9	16-18	22-24	25-27							Please see attached notes for all abbreviations and acronyms		
Sample ID	CP4	CP4	CP4	CP4							LOD/LOR	Units	Method No.
Depth	1.00	4.00	6.00	8.30									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	<>	<>	<>	<>									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	24/09/2015	24/09/2015	24/09/2015	24/09/2015									
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C8-C10	0.4	<0.1	1.7	<0.1							<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	<0.2	<0.2	<0.8 ^{AA}	<0.2							<0.2	mg/kg	TM5/PM16
>C12-C16 ^{#M}	<4	<4	<16 ^{AA}	<4							<4	mg/kg	TM5/PM16
>C16-C21 ^{#M}	11	10	<28 ^{AA}	<7							<7	mg/kg	TM5/PM16
>C21-C35 ^{#M}	166	32	202 ^{AA}	<7							<7	mg/kg	TM5/PM16
Total aliphatics C5-35	177	42	204 ^{AA}	<19							<19	mg/kg	TM5/PM16/PM12
Aromatics													
>C5-EC7	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC8-EC10 ^{#M}	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2	<0.2	<0.8 ^{AA}	<0.2							<0.2	mg/kg	TM5/PM16
>EC12-EC16	16	7	<16 ^{AA}	<4							<4	mg/kg	TM5/PM16
>EC16-EC21	99	89	255 ^{AA}	<7							<7	mg/kg	TM5/PM16
>EC21-EC35	404	272	704 ^{AA}	<7							<7	mg/kg	TM5/PM16
Total aromatics C5-35	519	368	959 ^{AA}	<19							<19	mg/kg	TM5/PM16/PM12
Total aliphatics and aromatics(C5-35)	696	410	1163 ^{AA}	<38							<38	mg/kg	TM5/PM16/PM12
MTBE #	<5	-	-	-							<5	ug/kg	TM31/PM12
Benzene #	<5	-	-	-							<5	ug/kg	TM31/PM12
Toluene #	19	-	-	-							<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	-	-	-							<5	ug/kg	TM31/PM12
m/p-Xylene #	12	-	-	-							<5	ug/kg	TM31/PM12
o-Xylene #	<5	-	-	-							<5	ug/kg	TM31/PM12
Natural Moisture Content	18.1	15.0	34.8	18.4							<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	1.0	10.4	<0.6	11.8							<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	<0.3	<0.3	1.4	<0.3							<0.3	mg/kg	TM38/PM20
Free Cyanide	<0.5	<0.5	<0.5	<0.5							<0.5	mg/kg	TM89/PM45
Total Cyanide ^{#M}	<0.5	<0.5	6.7	<0.5							<0.5	mg/kg	TM89/PM45
Organic Matter	13.6	6.8	34.1	0.7							<0.2	%	TM21/PM24
pH ^{#M}	7.73	9.95	7.87	8.13							<0.01	pH units	TM73/PM11
Sample Type	Sandy Loam	Loamy Sand	Sandy Loam	Sand								None	PM13/PM0
Sample Colour	Dark Brown	Dark Brown	Dark Brown	Dark Grey								None	PM13/PM0
Other Items	stones	stones	stones, bark, plastic	NA								None	PM13/PM0

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	7-9	16-18	22-24	25-27						Please see attached notes for all abbreviations and acronyms		
	Sample ID	CP4	CP4	CP4	CP4							
Depth	1.00	4.00	6.00	8.30								
COC No / misc												
Containers	V J T	V J T	V J T	V J T								
Sample Date	<>	<>	<>	<>								
Sample Type	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1								
Date of Receipt	24/09/2015	24/09/2015	24/09/2015	24/09/2015						LOD/LOR	Units	Method No.
Dissolved Arsenic #	3.6	17.4	9.0	10.9						<0.9	ug/l	TM30/PM14
Dissolved Cadmium #	0.25	<0.03	0.24	<0.03						<0.03	ug/l	TM30/PM14
Dissolved Chromium #	<0.2	0.5	0.6	0.3						<0.2	ug/l	TM30/PM14
Dissolved Copper #	4	7	<3	<3						<3	ug/l	TM30/PM14
Dissolved Iron #	26.4	4.8	34.7	105.4						<4.7	ug/l	TM30/PM14
Dissolved Lead #	2.6	8.8	4.2	2.3						<0.4	ug/l	TM30/PM14
Dissolved Nickel #	6.3	1.6	9.6	1.4						<0.2	ug/l	TM30/PM14
Dissolved Selenium #	<1.2	<1.2	<1.2	<1.2						<1.2	ug/l	TM30/PM14
Dissolved Vanadium #	2.2	86.3	2.8	6.3						<0.6	ug/l	TM30/PM14
Dissolved Zinc #	19.8	2.9	10.9	4.9						<1.5	ug/l	TM30/PM14
Mercury Dissolved by CVA#	0.08	0.09	0.71	0.80						<0.01	ug/l	TM61/PM38
PAH MS												
Naphthalene	<0.1	<2.0 _{AC}	0.2	<0.1						<0.1	ug/l	TM4/PM30
Acenaphthylene	0.06	0.23 _{AC}	0.05	<0.01						<0.01	ug/l	TM4/PM30
Acenaphthene	0.49	4.49 _{AC}	0.95	0.05						<0.01	ug/l	TM4/PM30
Fluorene	0.32	2.67 _{AC}	0.57	0.03						<0.01	ug/l	TM4/PM30
Phenanthrene	2.04	18.74 _{AC}	2.58	0.18						<0.01	ug/l	TM4/PM30
Anthracene	0.66	4.57 _{AC}	0.63	0.04						<0.01	ug/l	TM4/PM30
Fluoranthene	4.30	26.80 _{AC}	2.92	0.23						<0.01	ug/l	TM4/PM30
Pyrene	3.36	21.37 _{AC}	2.33	0.19						<0.01	ug/l	TM4/PM30
Benzo(a)anthracene	2.06	9.63 _{AC}	1.10	0.09						<0.01	ug/l	TM4/PM30
Chrysene	1.93	12.40 _{AC}	1.15	0.11						<0.01	ug/l	TM4/PM30
Benzo(bk)fluoranthene	3.35	15.71 _{AC}	1.88	0.15						<0.01	ug/l	TM4/PM30
Benzo(a)pyrene	2.45	11.23 _{AC}	1.25	0.08						<0.01	ug/l	TM4/PM30
Indeno(123cd)pyrene	1.02	5.07 _{AC}	0.48	0.02						<0.01	ug/l	TM4/PM30
Dibenzo(ah)anthracene	0.20	0.44 _{AC}	0.10	<0.01						<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene	0.97	3.95 _{AC}	0.53	0.03						<0.01	ug/l	TM4/PM30
PAH 16 Total	23.2	137.3 _{AC}	16.7	1.2						<0.1	ug/l	TM4/PM30
Benzo(b)fluoranthene	2.41	11.31 _{AC}	1.35	0.11						<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	0.94	4.40 _{AC}	0.53	0.04						<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	79	77 _{AC}	90	84						<0	%	TM4/PM30
Methyl Tertiary Butyl Ether	-	<1	<1	<1						<1	ug/l	TM15/PM69
Benzene	-	<1	<1	<1						<1	ug/l	TM15/PM69
Toluene	-	<2	<2	<2						<2	ug/l	TM15/PM69
Ethylbenzene	-	<2	<2	<2						<2	ug/l	TM15/PM69
p/m-Xylene	-	<3	<3	<3						<3	ug/l	TM15/PM69
o-Xylene	-	<2	<2	<2						<2	ug/l	TM15/PM69
Surrogate Recovery Toluene D8	-	102	102	101						<0	%	TM15/PM69
Surrogate Recovery 4-Bromofluorobenzene	-	113	115	113						<0	%	TM15/PM69

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

VOC Report : CEN 10:1 1 Batch

J E Sample No.	16-18	22-24	25-27								LOD/LOR	Units	Method No.
Sample ID	CP4	CP4	CP4										
Depth	4.00	6.00	8.30										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	<>	<>	<>										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	24/09/2015	24/09/2015	24/09/2015										
VOC MS													
Dichlorodifluoromethane	<2	<2	<2								<2	ug/l	TM15/PM69
Methyl Tertiary Butyl Ether	<1	<1	<1								<1	ug/l	TM15/PM69
Chloromethane	<3	<3	<3								<3	ug/l	TM15/PM69
Vinyl Chloride	<0.1	<0.1	<0.1								<0.1	ug/l	TM15/PM69
Bromomethane	<1	<1	<1								<1	ug/l	TM15/PM69
Chloroethane	<3	<3	<3								<3	ug/l	TM15/PM69
Trichlorofluoromethane	<3	<3	<3								<3	ug/l	TM15/PM69
1,1-Dichloroethene (1,1 DCE)	<3	<3	<3								<3	ug/l	TM15/PM69
Dichloromethane (DCM)	<3	<3	<3								<3	ug/l	TM15/PM69
trans-1-2-Dichloroethene	<3	<3	<3								<3	ug/l	TM15/PM69
1,1-Dichloroethane	<3	<3	<3								<3	ug/l	TM15/PM69
cis-1-2-Dichloroethene	<3	<3	<3								<3	ug/l	TM15/PM69
2,2-Dichloropropane	<1	<1	<1								<1	ug/l	TM15/PM69
Bromochloromethane	<2	<2	<2								<2	ug/l	TM15/PM69
Chloroform	<2	<2	<2								<2	ug/l	TM15/PM69
1,1,1-Trichloroethane	<2	<2	<2								<2	ug/l	TM15/PM69
1,1-Dichloropropene	<3	<3	<3								<3	ug/l	TM15/PM69
Carbon tetrachloride	<2	<2	<2								<2	ug/l	TM15/PM69
1,2-Dichloroethane	<2	<2	<2								<2	ug/l	TM15/PM69
Benzene	<1	<1	<1								<1	ug/l	TM15/PM69
Trichloroethene (TCE)	<3	<3	<3								<3	ug/l	TM15/PM69
1,2-Dichloropropane	<2	<2	<2								<2	ug/l	TM15/PM69
Dibromomethane	<3	<3	<3								<3	ug/l	TM15/PM69
Bromodichloromethane	<2	<2	<2								<2	ug/l	TM15/PM69
cis-1-3-Dichloropropene	<2	<2	<2								<2	ug/l	TM15/PM69
Toluene	<2	<2	<2								<2	ug/l	TM15/PM69
trans-1-3-Dichloropropene	<2	<2	<2								<2	ug/l	TM15/PM69
1,1,2-Trichloroethane	<2	<2	<2								<2	ug/l	TM15/PM69
Tetrachloroethene (PCE)	<3	<3	<3								<3	ug/l	TM15/PM69
1,3-Dichloropropane	<2	<2	<2								<2	ug/l	TM15/PM69
Dibromochloromethane	<2	<2	<2								<2	ug/l	TM15/PM69
1,2-Dibromoethane	<2	<2	<2								<2	ug/l	TM15/PM69
Chlorobenzene	<2	<2	<2								<2	ug/l	TM15/PM69
1,1,1,2-Tetrachloroethane	<2	<2	<2								<2	ug/l	TM15/PM69
Ethylbenzene	<2	<2	<2								<2	ug/l	TM15/PM69
p/m-Xylene	<3	<3	<3								<3	ug/l	TM15/PM69
o-Xylene	<2	<2	<2								<2	ug/l	TM15/PM69
Styrene	<2	<2	<2								<2	ug/l	TM15/PM69
Bromoform	<2	<2	<2								<2	ug/l	TM15/PM69
Isopropylbenzene	<3	<3	<3								<3	ug/l	TM15/PM69
1,1,2,2-Tetrachloroethane	<4	<4	<4								<4	ug/l	TM15/PM69
Bromobenzene	<2	<2	<2								<2	ug/l	TM15/PM69
1,2,3-Trichloropropane	<3	<3	<3								<3	ug/l	TM15/PM69
Propylbenzene	<3	<3	<3								<3	ug/l	TM15/PM69
2-Chlorotoluene	<3	<3	<3								<3	ug/l	TM15/PM69
1,3,5-Trimethylbenzene	<3	<3	<3								<3	ug/l	TM15/PM69
4-Chlorotoluene	<3	<3	<3								<3	ug/l	TM15/PM69
tert-Butylbenzene	<3	<3	<3								<3	ug/l	TM15/PM69
1,2,4-Trimethylbenzene	<3	<3	<3								<3	ug/l	TM15/PM69
sec-Butylbenzene	<3	<3	<3								<3	ug/l	TM15/PM69
4-Isopropyltoluene	<3	<3	<3								<3	ug/l	TM15/PM69
1,3-Dichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM69
1,4-Dichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM69
n-Butylbenzene	<3	<3	<3								<3	ug/l	TM15/PM69
1,2-Dichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM69
1,2-Dibromo-3-chloropropane	<2	<2	<2								<2	ug/l	TM15/PM69
1,2,4-Trichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM69
Hexachlorobutadiene	<3	<3	<3								<3	ug/l	TM15/PM69
Naphthalene	<2	<2	<2								<2	ug/l	TM15/PM69
1,2,3-Trichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM69
Surrogate Recovery Toluene D8	102	102	101								<0	%	TM15/PM69
Surrogate Recovery 4-Bromofluorobenzene	113	115	113								<0	%	TM15/PM69

Please see attached notes for all abbreviations and acronyms

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

If asbestos fibres are reported at trace levels there will not be enough fibres to quantify and will be less than 0.001%.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	1	CP4	1.00	8	29/09/2015	Mass of Dry Sample	49.2 (g)
					30/09/2015	General Description (Bulk Analysis)	soil-stones-roots
					30/09/2015	Asbestos Containing Material	None
					30/09/2015	Asbestos Containing Material (2)	None
					30/09/2015	Asbestos Screen	NAD
					30/09/2015	Asbestos Screen (2)	NAD
					30/09/2015	Asbestos Level	NAD
15/13759	1	CP4	4.00	17	01/10/2015	Mass of Dry Sample	46.9 (g)
					01/10/2015	General Description (Bulk Analysis)	Soil/Stone
					01/10/2015	Asbestos Containing Material	None
					01/10/2015	Asbestos Containing Material (2)	None
					01/10/2015	Asbestos Screen	NAD
					01/10/2015	Asbestos Screen (2)	NAD
					01/10/2015	Asbestos Level	NAD
15/13759	1	CP4	6.00	23	29/09/2015	Mass of Dry Sample	42.9 (g)
					30/09/2015	General Description (Bulk Analysis)	soil-roots-vegetation
					30/09/2015	Asbestos Containing Material	None
					30/09/2015	Asbestos Containing Material (2)	None
					30/09/2015	Asbestos Screen	NAD
					30/09/2015	Asbestos Screen (2)	NAD
					30/09/2015	Asbestos Level	NAD
15/13759	1	CP4	8.30	26	01/10/2015	Mass of Dry Sample	45.0 (g)
					01/10/2015	General Description (Bulk Analysis)	Sand/Stone
					01/10/2015	Asbestos Containing Material	None
					01/10/2015	Asbestos Containing Material (2)	None
					01/10/2015	Asbestos Screen	NAD
					01/10/2015	Asbestos Screen (2)	NAD
					01/10/2015	Asbestos Level	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x4 Dilution
AB	x10 Dilution
AC	x20 Dilution

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM12/PM16	CWG GC-FID			AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM30/PM69	PM030: Eluate samples are extracted with solvent using a magnetic stirrer to create a vortex. PM069: One part soil is mixed with 10 parts water in a vial leaving no headspace. The mixture is shaken and then left to leach for 24 hours before VOC analysis.			AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM69	Modified BS EN 12457 method. One part soil is mixed with 10 parts water in a vial leaving no headspace. The mixture is shaken and then left to leach for 24 hours before VOC analysis.			AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM69	Modified BS EN 12457 method. One part soil is mixed with 10 parts water in a vial leaving no headspace. The mixture is shaken and then left to leach for 24 hours before VOC analysis.			AR	
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.	Yes		AR	Yes

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM69	Modified BS EN 12457 method. One part soil is mixed with 10 parts water in a vial leaving no headspace. The mixture is shaken and then left to leach for 24 hours before VOC analysis.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.			AR	Yes

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM38	Samples are brominated to reduce all mercury compounds to Mercury (II) which is analysed using method TM061.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM0	No preparation is required.	Yes		AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes	Yes	AR	Yes
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Jones Environmental Laboratory

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Attention : Jon Hutchinson
Date : 20th November, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 1 Schedule B
Location : A5036 Liverpool
Date samples received : 24th September, 2015
Status : Final report
Issue : 1

Seventeen samples were received for analysis on 24th September, 2015 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Paul Lee-Boden BSc
Project Manager

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No



Jones Environmental Laboratory

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Unit 1B
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River Lane
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Cheshire
CH4 8RJ

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Jon Hutchinson
Date : 13th October, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 2
Location : A5036 Liverpool
Date samples received : 25th September, 2015
Status : Final report
Issue : 1

Twenty one samples were received for analysis on 25th September, 2015 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

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*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM12/PM16	CWG GC-FID			AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No



Jones Environmental Laboratory

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Attention : Jon Hutchinson
Date : 5th November, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 2 Schedule D
Location : A5036 Liverpool
Date samples received : 25th September, 2015
Status : Final report
Issue : 1

Twenty one samples were received for analysis on 25th September, 2015 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Any questionable sample will automatically be assumed to have breached the Waste Limit and further testing may be required.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	2	CP2	1.0	57	02/11/2015	Mass of Dry Sample	44.0 (g)
					04/11/2015	General Description (Bulk Analysis)	Soil-Silt/Clay/Brick/Stone
					04/11/2015	Asbestos Containing Material	Asbestos Insulating Board Debris
					04/11/2015	Asbestos Screen	Chrysotile
					04/11/2015	Asbestos Level	Quantifiable
					04/11/2015	Waste Limit	Asbestos waste limit cannot be determined from the analysis scheduled
15/13759	2	CP2	2.0	60	02/11/2015	Mass of Dry Sample	41.2 (g)
					04/11/2015	General Description (Bulk Analysis)	Soil-Silt/Clay/Brick/Stone
					04/11/2015	Asbestos Containing Material	Fibre Bundles
					04/11/2015	Asbestos Screen	Chrysotile
					04/11/2015	Asbestos Level	Quantifiable
					04/11/2015	Waste Limit	<0.1%
15/13759	2	CP2	3.0	63	02/11/2015	Mass of Dry Sample	38.9 (g)
					04/11/2015	General Description (Bulk Analysis)	Soil-Silt/Clay/Brick/Stone
					04/11/2015	Asbestos Containing Material	Fibre Bundles
					04/11/2015	Asbestos Screen	Chrysotile
					04/11/2015	Asbestos Level	Quantifiable
					04/11/2015	Waste Limit	<0.1%
15/13759	2	CP2	10.0	75	02/11/2015	Mass of Dry Sample	47.2 (g)
					04/11/2015	General Description (Bulk Analysis)	Soil/Stone
					04/11/2015	Asbestos Containing Material	Fibre Bundles
					04/11/2015	Asbestos Screen	Chrysotile
					04/11/2015	Asbestos Level	Quantifiable
					04/11/2015	Waste Limit	<0.1%
15/13759	2	CP3	2.8	92	02/11/2015	Mass of Dry Sample	40.2 (g)
					04/11/2015	General Description (Bulk Analysis)	Soil/Stone
					04/11/2015	Asbestos Containing Material	Fibre Bundles
					04/11/2015	Asbestos Screen	Chrysotile
					04/11/2015	Asbestos Level	Quantifiable
					04/11/2015	Waste Limit	<0.1%
15/13759	2	CP3	8.7	104	02/11/2015	Mass of Dry Sample	35.1 (g)
					04/11/2015	General Description (Bulk Analysis)	Soil/Stone/Silt
					04/11/2015	Asbestos Containing Material	Fibre Bundles
					04/11/2015	Asbestos Screen	Chrysotile

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 15/13759						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	



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Attention : Jon Hutchinson
Date : 15th October, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 3
Location : A5036 Liverpool
Date samples received : 1st October, 2015
Status : Final report
Issue : 1

Fourteen samples were received for analysis on 1st October, 2015 of which fourteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

Jones Environmental Laboratory

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	112-114	115-117	118-120	121-123	124-126	127-129	130-132	133-135	136-138	139-141	Please see attached notes for all abbreviations and acronyms		
Sample ID	CP1	CP1	CP1	CP1	CP1	CP3	CP6	CP6	CP6	CP6			
Depth	0.20	0.50	1.00	2.00	3.00	10.70	0.20	0.50	1.00	1.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	3	3	3	3	3	3	3	3	3	3			
Date of Receipt	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	LOD/LOR	Units	Method No.
Arsenic ^{#M}	190.0	79.8	53.0	48.4	18.1	4.5	47.0	8.3	5.0	5.2	<0.5	mg/kg	TM30/PM15
Barium ^{#M}	422	572	284	197	477	104	317	82	50	94	<1	mg/kg	TM30/PM15
Beryllium	6.4	7.3	3.9	3.2	<0.5	1.0	2.3	0.6	<0.5	1.2	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	0.2	0.3	0.4	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	50.9	69.8	72.8	43.7	55.6	105.3	62.7	68.0	64.4	76.1	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	167	219	242	128	14	39	202	31	16	30	<1	mg/kg	TM30/PM15
Lead ^{#M}	515	1172	1215	3055 ^{AA}	18	8	609	78	44	10	<5	mg/kg	TM30/PM15
Mercury ^{#M}	0.7	0.8	0.7	0.5	<0.1	<0.1	3.8	0.3	0.2	<0.1	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	97.6	103.0	52.4	35.2	8.2	39.3	41.0	15.9	9.2	35.4	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	3	2	2	1	2	<1	1	1	<1	<1	<1	mg/kg	TM30/PM15
Total Sulphate ^{#M}	2943	1213	1636	1883	2555	147	633	213	128	52	<50	mg/kg	TM50/PM29
Vanadium	79	107	38	30	17	38	46	20	12	45	<1	mg/kg	TM30/PM15
Water Soluble Boron ^{#M}	2.3	3.8	4.5	6.1	11.7	2.1	0.8	0.6	0.3	0.5	<0.1	mg/kg	TM74/PM32
Zinc ^{#M}	380	440	352	195	24	70	258	48	26	57	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.17	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.35	0.32	0.21	0.69	<0.03	<0.03	1.33	0.11	0.07	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	0.08	<0.04	<0.04	0.10	<0.04	<0.04	0.24	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.72	0.53	0.33	0.95	<0.03	<0.03	2.27	0.18	0.07	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	0.74	0.53	0.33	0.79	<0.03	<0.03	2.23	0.19	0.07	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.39	0.34	0.24	0.38	<0.06	<0.06	1.21	0.12	0.07	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.57	0.45	0.35	0.62	<0.02	<0.02	1.67	0.17	0.09	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.69	0.70	0.47	0.67	<0.07	<0.07	2.32	0.22	0.11	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.32	0.45	0.28	0.41	<0.04	<0.04	1.48	0.12	0.05	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	0.22	0.28	0.14	0.23	<0.04	<0.04	0.83	0.06	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.18	<0.04	0.05	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.22	0.27	0.17	0.23	<0.04	<0.04	0.86	0.08	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	4.3	3.9	2.5	5.1	<0.6	<0.6	15.1	1.3	<0.6	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.50	0.50	0.34	0.48	<0.05	<0.05	1.67	0.16	0.08	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.19	0.20	0.13	0.19	<0.02	<0.02	0.65	0.06	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	94	94	94	98	82	97	84	80	97	91	<0	%	TM4/PM8
Methyl Tertiary Butyl Ether ^{#M}	<6	-	<6	-	-	-	-	-	-	-	<6	ug/kg	TM15/PM10
Benzene ^{#M}	<5	-	<5	-	-	-	-	-	-	-	<5	ug/kg	TM15/PM10
Toluene ^{#M}	10	-	9	-	-	-	-	-	-	-	<3	ug/kg	TM15/PM10
Ethylbenzene ^{#M}	5	-	<3	-	-	-	-	-	-	-	<3	ug/kg	TM15/PM10
p/m-Xylene ^{#M}	13	-	9	-	-	-	-	-	-	-	<4	ug/kg	TM15/PM10
o-Xylene ^{#M}	7	-	<4	-	-	-	-	-	-	-	<4	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	116	-	116	-	-	-	-	-	-	-	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	88	-	94	-	-	-	-	-	-	-	<0	%	TM15/PM10

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	112-114	115-117	118-120	121-123	124-126	127-129	130-132	133-135	136-138	139-141	Please see attached notes for all abbreviations and acronyms		
Sample ID	CP1	CP1	CP1	CP1	CP1	CP3	CP6	CP6	CP6	CP6			
Depth	0.20	0.50	1.00	2.00	3.00	10.70	0.20	0.50	1.00	1.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015	28/09/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	3	3	3	3	3	3	3	3	3	3			
Date of Receipt	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM16
>C12-C16 ^{#M}	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM16
>C16-C21 ^{#M}	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM16
>C21-C35 ^{#M}	<7	<7	<7	<7	52	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM16
Total aliphatics C5-35	<19	<19	<19	<19	52	<19	<19	<19	<19	<19	<19	mg/kg	TM5/TM36/PM12/PM16
Aromatics													
>C5-EC7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 ^{#M}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM16
>EC12-EC16	<4	<4	<4	<4	<4	<4	6	<4	<4	<4	<4	mg/kg	TM5/PM16
>EC16-EC21	<7	19	<7	<7	<7	<7	36	<7	<7	<7	<7	mg/kg	TM5/PM16
>EC21-EC35	75	15	<7	<7	625	<7	109	<7	<7	<7	<7	mg/kg	TM5/PM16
Total aromatics C5-35	75	34	<19	<19	625	<19	151	<19	<19	<19	<19	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-35)	75	<38	<38	<38	677	<38	151	<38	<38	<38	<38	mg/kg	TM5/TM36/PM12/PM16
MTBE [#]	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene [#]	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene [#]	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene [#]	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene [#]	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene [#]	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Natural Moisture Content	74.8	69.6	74.8	60.6	629.0	26.1	17.9	12.9	13.2	17.3	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as N	1.7	<0.6	<0.6	<0.6	15.5	29.1	<0.6	33.5	<0.6	<0.6	<0.6	mg/kg	TM38/PM20
PID Reading	-	-	-	-	-	-	-	-	-	-	<0.1	ppm	TM120/PM0
pH ^{#M}	6.77	7.11	7.31	7.84	6.81	8.50	6.36	7.12	8.02	7.86	<0.01	pH units	TM73/PM11
Sample Type	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loam	Clayey Sand	Sandy Loam	Clayey Sand	Sand	Clay		None	PM13/PM0
Sample Colour	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Light Brown	Dark Brown	Medium Brown	Medium Brown	Medium Brown		None	PM13/PM0
Other Items	stones and roots	stones	stones	stones and brick fragments and dust	roots and peat	stones	stones and roots	loam	none	stones		None	PM13/PM0

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Any questionable sample will automatically be assumed to have breached the Waste Limit and further testing may be required.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	3	CP1	0.20	113	08/10/2015	Mass of Dry Sample	34.3 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone/Veg
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP1	0.50	116	08/10/2015	Mass of Dry Sample	30.6 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP1	1.00	119	08/10/2015	Mass of Dry Sample	32.7 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP1	2.00	122	08/10/2015	Mass of Dry Sample	34.8 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP1	3.00	125	08/10/2015	Mass of Dry Sample	20.4 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	3	CP6	0.20	131	08/10/2015	Mass of Dry Sample	52.7 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP6	0.50	134	08/10/2015	Mass of Dry Sample	53.7 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP6	1.00	137	08/10/2015	Mass of Dry Sample	50.4 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP6	1.50	140	08/10/2015	Mass of Dry Sample	52.8 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Stone
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP6	2.50	143	08/10/2015	Mass of Dry Sample	47.4 (g)
					09/10/2015	General Description (Bulk Analysis)	Soil/Clay
					09/10/2015	Asbestos Containing Material	None
					09/10/2015	Asbestos Containing Material (2)	None
					09/10/2015	Asbestos Screen	NAD
					09/10/2015	Asbestos Screen (2)	NAD
					09/10/2015	Asbestos Level	NAD
15/13759	3	CP7	0.20	146	08/10/2015	Mass of Dry Sample	49.5 (g)
					08/10/2015	General Description (Bulk Analysis)	Soil/Stone
					08/10/2015	Asbestos Containing Material	None
					08/10/2015	Asbestos Containing Material (2)	None
					08/10/2015	Asbestos Screen	NAD
					08/10/2015	Asbestos Screen (2)	NAD
					08/10/2015	Asbestos Level	NAD
15/13759	3	CP7	0.50	149	08/10/2015	Mass of Dry Sample	49.8 (g)
					08/10/2015	General Description (Bulk Analysis)	Soil/Stone
					08/10/2015	Asbestos Containing Material	None
					08/10/2015	Asbestos Containing Material (2)	None
					08/10/2015	Asbestos Screen	NAD

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	3	CP7	0.50	149	08/10/2015	Asbestos Screen (2)	NAD
					08/10/2015	Asbestos Level	NAD
15/13759	3	CP7	1.00	152	08/10/2015	Mass of Dry Sample	47.6 (g)
					08/10/2015	General Description (Bulk Analysis)	Soil/Stone
					08/10/2015	Asbestos Containing Material	None
					08/10/2015	Asbestos Containing Material (2)	None
					08/10/2015	Asbestos Screen	NAD
					08/10/2015	Asbestos Screen (2)	NAD
					08/10/2015	Asbestos Level	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM12/PM16	CWG GC-FID			AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.			AR	Yes
TM50	Acid soluble sulphate analysed by ICP-OES	PM29	Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.	Yes	Yes	AD	Yes

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes	Yes	AD	Yes
TM120	Hand-held broadband VOC gas monitor with Photoionisation Detection .	PM0	No preparation is required.			AR	No



Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

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Attention : Jon Hutchinson
Date : 23rd November, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 3 Schedule D
Location : A5036 Liverpool
Date samples received : 1st October, 2015
Status : Final report
Issue : 1

Fourteen samples were received for analysis on 1st October, 2015 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

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A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes



Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
Zone 3
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Geotechnics
Unit 1B
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River Lane
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Cheshire
CH4 8RJ

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Jon Hutchinson
Date : 28th October, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 4
Location : A5036 Liverpool
Date samples received : 7th October, 2015
Status : Final report
Issue : 1

Thirty four samples were received for analysis on 7th October, 2015 of which nine were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	163-165	172-174	176-177	184-186	187-189	196-198	208-210	214-216	235-237		Please see attached notes for all abbreviations and acronyms		
Sample ID	WS08	WS08	WS08	WS09	WS09	WS09	WS10	WS10	WS12		LOD/LOR	Units	Method No.
Depth	1.80-2.00	4.70-5.00	5.50-6.00	1.00	1.40-1.70	4.30-4.70	1.00	2.00-2.20	0.20				
COC No / misc													
Containers	V J T	V J T	V J	V J T	V J T	V J T	V J T	V J T	V J T				
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	4	4	4	4	4	4	4	4	4				
Date of Receipt	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015				
Arsenic ^{#M}	62.1	1.2	30.5	NDP	17.4	22.4	12.8	0.7	4.2		<0.5	mg/kg	TM30/PM15
Arsenic	-	-	-	13.4	-	-	-	-	-		<0.5	mg/kg	TM30/PM62
Cadmium ^{#M}	4.2	<0.1	6.1	NDP	0.3	1.2	0.2	<0.1	0.2		<0.1	mg/kg	TM30/PM15
Cadmium	-	-	-	0.5	-	-	-	-	-		<0.1	mg/kg	TM30/PM62
Chromium ^{#M}	101.4	115.3	114.3	NDP	76.0	93.3	78.5	111.3	63.1		<0.5	mg/kg	TM30/PM15
Chromium	-	-	-	17.5	-	-	-	-	-		<0.5	mg/kg	TM30/PM62
Copper ^{#M}	327AA	4	12	NDP	96	111	50	3	14		<1	mg/kg	TM30/PM15
Copper	-	-	-	48	-	-	-	-	-		<1	mg/kg	TM30/PM62
Iron	43720	2040	28160	NDP	38750	45040	21950	1977	10520		<20	mg/kg	TM30/PM15
Iron	-	-	-	15437	-	-	-	-	-		<20	mg/kg	TM30/PM62
Lead ^{#M}	770	<5	116	NDP	167	183	92	<5	25		<5	mg/kg	TM30/PM15
Lead	-	-	-	155	-	-	-	-	-		<5	mg/kg	TM30/PM62
Mercury ^{#M}	0.9	<0.1	0.2	NDP	0.1	0.3	0.2	<0.1	<0.1		<0.1	mg/kg	TM30/PM15
Mercury	-	-	-	0.4	-	-	-	-	-		<0.1	mg/kg	TM30/PM62
Nickel ^{#M}	56.1	4.2	19.8	NDP	35.6	49.1	27.2	3.2	26.4		<0.7	mg/kg	TM30/PM15
Nickel	-	-	-	18.9	-	-	-	-	-		<0.7	mg/kg	TM30/PM62
Selenium ^{#M}	1	<1	<1	NDP	1	<1	<1	<1	<1		<1	mg/kg	TM30/PM15
Selenium	-	-	-	<1	-	-	-	-	-		<1	mg/kg	TM30/PM62
Vanadium	67	3	6	NDP	46	46	36	7	16		<1	mg/kg	TM30/PM15
Vanadium	-	-	-	24	-	-	-	-	-		<1	mg/kg	TM30/PM62
Zinc ^{#M}	2366	<5	3213AB	NDP	370	394	113	<5	93		<5	mg/kg	TM30/PM15
Zinc	-	-	-	161	-	-	-	-	-		<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene ^{#M}	0.19	<0.04	<0.04	0.11	0.69	<0.04	0.57	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.09	<0.03	<0.03	0.05	0.09	<0.03	0.14	<0.03	<0.03		<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	0.59	<0.05	<0.05	0.18	0.57	0.11	1.12	<0.05	<0.05		<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	0.44	<0.04	<0.04	0.15	0.47	0.11	0.80	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	5.27	<0.03	<0.03	1.11	3.54	1.01	10.10	<0.03	0.08		<0.03	mg/kg	TM4/PM8
Anthracene #	1.36	<0.04	<0.04	0.25	0.91	0.20	2.40	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	9.77	<0.03	<0.03	1.57	5.42	1.38	12.36	<0.03	0.18		<0.03	mg/kg	TM4/PM8
Pyrene #	8.88	<0.03	<0.03	1.49	4.80	1.22	10.72	<0.03	0.18		<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	5.04	<0.06	<0.06	0.69	2.54	0.53	4.63	<0.06	0.10		<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	4.76	<0.02	<0.02	0.82	2.46	0.63	5.72	<0.02	0.11		<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene ^{#M}	6.69	<0.07	<0.07	1.22	3.50	0.93	8.08	<0.07	0.19		<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	4.69	<0.04	<0.04	0.83	2.09	0.62	5.41	<0.04	0.12		<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	2.87	<0.04	<0.04	0.52	1.47	0.38	3.52	<0.04	0.09		<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.59	<0.04	<0.04	0.11	0.28	0.08	0.63	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	2.80	<0.04	<0.04	0.52	1.40	0.38	3.35	<0.04	0.09		<0.04	mg/kg	TM4/PM8
PAH 16 Total	54.0	<0.6	<0.6	9.6	30.2	7.6	69.6	<0.6	1.1		<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	4.82	<0.05	<0.05	0.88	2.52	0.67	5.82	<0.05	0.14		<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	1.87	<0.02	<0.02	0.34	0.98	0.26	2.26	<0.02	0.05		<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	103	105	105	108	100	119	106	109		<0	%	TM4/PM8

Jones Environmental Laboratory

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	163-165	172-174	176-177	184-186	187-189	196-198	208-210	214-216	235-237	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS08	WS08	WS08	WS09	WS09	WS09	WS10	WS10	WS12			
Depth	1.80-2.00	4.70-5.00	5.50-6.00	1.00	1.40-1.70	4.30-4.70	1.00	2.00-2.20	0.20			
COC No / misc												
Containers	V J T	V J T	V J	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	4	4	4	4	4	4	4	4	4			
Date of Receipt	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015	07/10/2015			
Natural Moisture Content	37.0	22.9	24.7	NDP	17.1	36.4	13.4	19.0	7.5	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	<0.6	9.0	2.3	<0.6	46.6	60.9	<0.6	4.4	<0.6	<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Free Cyanide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Total Cyanide #M	<0.5	<0.5	0.8	<0.5	1.2	2.0	<0.5	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Organic Matter	10.2	0.9	3.5	NDP	3.4	36.1	9.1	0.3	1.4	<0.2	%	TM21/PM24
pH #M	7.96	7.55	7.17	7.88	7.80	7.48	8.22	7.81	7.49	<0.01	pH units	TM73/PM11

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Any questionable sample will automatically be assumed to have breached the Waste Limit and further testing may be required.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	4	WS08	1.80-2.00	164	21/10/2015	Mass of Dry Sample	44.0 (g)
					21/10/2015	General Description (Bulk Analysis)	Soil/Stone/Silt
					21/10/2015	Asbestos Containing Material	None
					21/10/2015	Asbestos Containing Material (2)	None
					21/10/2015	Asbestos Screen	NAD
					21/10/2015	Asbestos Screen (2)	NAD
					21/10/2015	Asbestos Level	NAD
					21/10/2015	Waste Limit	<0.1%
15/13759	4	WS08	4.70-5.00	173	21/10/2015	Mass of Dry Sample	45.6 (g)
					21/10/2015	General Description (Bulk Analysis)	Soil/Stone
					21/10/2015	Asbestos Containing Material	None
					21/10/2015	Asbestos Containing Material (2)	None
					21/10/2015	Asbestos Screen	NAD
					21/10/2015	Asbestos Screen (2)	NAD
					21/10/2015	Asbestos Level	NAD
					21/10/2015	Waste Limit	<0.1%
15/13759	4	WS08	5.50-6.00	177	21/10/2015	Mass of Dry Sample	47.9 (g)
					21/10/2015	General Description (Bulk Analysis)	Soil/Stone
					21/10/2015	Asbestos Containing Material	None
					21/10/2015	Asbestos Containing Material (2)	None
					21/10/2015	Asbestos Screen	NAD
					21/10/2015	Asbestos Screen (2)	NAD
					21/10/2015	Asbestos Level	NAD
					21/10/2015	Waste Limit	<0.1%
15/13759	4	WS09	1.00	185	21/10/2015	Mass of Dry Sample	50.3 (g)
					21/10/2015	General Description (Bulk Analysis)	soil/stones
					21/10/2015	Asbestos Containing Material	Fibre Bundles
					21/10/2015	Asbestos Screen	Chrysotile
					21/10/2015	Asbestos Level	Quantifiable
					21/10/2015	Waste Limit	<0.1%
15/13759	4	WS09	1.40-1.70	188	21/10/2015	Mass of Dry Sample	44.9 (g)
					21/10/2015	General Description (Bulk Analysis)	soil/stones
					21/10/2015	Asbestos Containing Material	None
					21/10/2015	Asbestos Containing Material (2)	None
					21/10/2015	Asbestos Screen	NAD

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	4	WS09	1.40-1.70	188	21/10/2015	Asbestos Screen (2)	NAD
					21/10/2015	Asbestos Level	NAD
					21/10/2015	Waste Limit	<0.1%
15/13759	4	WS09	4.30-4.70	197	21/10/2015	Mass of Dry Sample	39.1 (g)
					22/10/2015	General Description (Bulk Analysis)	Soil/Stone
					22/10/2015	Asbestos Containing Material	None
					22/10/2015	Asbestos Containing Material (2)	None
					22/10/2015	Asbestos Screen	NAD
					22/10/2015	Asbestos Screen (2)	NAD
					22/10/2015	Asbestos Level	NAD
					22/10/2015	Waste Limit	<0.1%
15/13759	4	WS10	1.00	209	21/10/2015	Mass of Dry Sample	48.0 (g)
					22/10/2015	General Description (Bulk Analysis)	Soil/Stone
					22/10/2015	Asbestos Containing Material	None
					22/10/2015	Asbestos Containing Material (2)	None
					22/10/2015	Asbestos Screen	NAD
					22/10/2015	Asbestos Screen (2)	NAD
					22/10/2015	Asbestos Level	NAD
					22/10/2015	Waste Limit	<0.1%
15/13759	4	WS10	2.00-2.20	215	21/10/2015	Mass of Dry Sample	49.3 (g)
					22/10/2015	General Description (Bulk Analysis)	Sand/Stone
					22/10/2015	Asbestos Containing Material	None
					22/10/2015	Asbestos Containing Material (2)	None
					22/10/2015	Asbestos Screen	NAD
					22/10/2015	Asbestos Screen (2)	NAD
					22/10/2015	Asbestos Level	NAD
					22/10/2015	Waste Limit	<0.1%
15/13759	4	WS12	0.20	236	21/10/2015	Mass of Dry Sample	52.7 (g)
					22/10/2015	General Description (Bulk Analysis)	Sand/Soil/Stone
					22/10/2015	Asbestos Containing Material	None
					22/10/2015	Asbestos Containing Material (2)	None
					22/10/2015	Asbestos Screen	NAD
					22/10/2015	Asbestos Screen (2)	NAD
					22/10/2015	Asbestos Level	NAD
					22/10/2015	Waste Limit	<0.1%

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.			AR	Yes

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes	Yes	AR	Yes



Jones Environmental Laboratory

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Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781

Attention : Jon Hutchinson
Date : 9th November, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 4 Schedule C
Location : A5036 Liverpool
Date samples received : 7th October, 2015
Status : Final report
Issue : 1

Thirty four samples were received for analysis on 7th October, 2015 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

A handwritten signature in black ink, appearing to read 'Boden'.

Paul Lee-Boden BSc
Project Manager

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Any questionable sample will automatically be assumed to have breached the Waste Limit and further testing may be required.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
Asbestos Team Leader

Table with 7 columns: J E Job No., Batch, Sample ID, Depth, J E Sample No., Date Of Analysis, Analysis, Result. Contains two rows of analysis data for Asbestos PCOM Quantification and Asbestos Gravimetric & PCOM Total.

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 15/13759						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	



Jones Environmental Laboratory

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Tel: +44 (0) 1244 833780
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Attention : Jon Hutchinson
Date : 27th November, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 4 Schedule D
Location : A5036 Liverpool
Date samples received : 7th October, 2015
Status : Final report
Issue : 1

Thirty four samples were received for analysis on 7th October, 2015 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Paul Lee-Boden BSc
Project Manager

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

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Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

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Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

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SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
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ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No



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Attention : Jon Hutchinson
Date : 26th October, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 5 Schedule A 15/13759 Batch 5 Schedule B 15/13759 Ba
Location : A5036 Liverpool
Date samples received : 8th October, 2015
Status : Final report
Issue : 1

Fifty four samples were received for analysis on 8th October, 2015 of which fifty three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	253-255	256-258	259-261	262-264	265-267	268-270	271-273	274-276	277-279	280-282	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS01B	WS01B	WS01B	WS02	WS02	WS02	WS02	WS02	WS02	WS02			
Depth	0.20	0.50	1.00	0.20	0.50	1.00	1.70-2.00	2.70-3.00	3.70-4.00	4.70-5.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	NDP	NDP	-	-	27.8	-	-	2.8	3.7	<0.5	mg/kg	TM30/PM15
Arsenic	-	11.8	8.9	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Cadmium ^{#M}	-	NDP	NDP	-	-	<0.1	-	-	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Cadmium	-	0.3	12.2	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium ^{#M}	-	NDP	NDP	-	-	81.0	-	-	126.5	31.1	<0.5	mg/kg	TM30/PM15
Chromium	-	12.9	96.5	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper ^{#M}	-	NDP	NDP	-	-	301 _{AA}	-	-	3	3	<1	mg/kg	TM30/PM15
Copper	-	31	503 _{AA}	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Iron	-	NDP	NDP	-	-	94380 _{AA}	-	-	5101	3584	<20	mg/kg	TM30/PM15
Iron	-	14185	80006 _{AA}	-	-	-	-	-	-	-	<20	mg/kg	TM30/PM62
Lead ^{#M}	-	NDP	NDP	-	-	709	-	-	<5	6	<5	mg/kg	TM30/PM15
Lead	-	99	1010	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury ^{#M}	-	NDP	NDP	-	-	<0.1	-	-	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Mercury	-	0.6	0.5	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel ^{#M}	-	NDP	NDP	-	-	65.2	-	-	7.5	5.1	<0.7	mg/kg	TM30/PM15
Nickel	-	10.5	29.0	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium ^{#M}	-	NDP	NDP	-	-	1	-	-	<1	1	<1	mg/kg	TM30/PM15
Selenium	-	<1	1	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Vanadium	-	NDP	NDP	-	-	77	-	-	8	5	<1	mg/kg	TM30/PM15
Vanadium	-	18	22	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc ^{#M}	-	NDP	NDP	-	-	325	-	-	24	<5	<5	mg/kg	TM30/PM15
Zinc	-	113	886	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene ^{#M}	-	<0.04	10.62	-	-	0.26	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	0.57	-	-	0.09	-	-	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	-	<0.05	0.48	-	-	0.74	-	-	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	-	<0.04	1.05	-	-	0.58	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	-	0.31	3.04	-	-	7.75	-	-	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	-	0.08	0.56	-	-	1.73	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	-	0.59	2.15	-	-	11.52	-	-	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	-	0.56	2.29	-	-	10.03	-	-	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	-	0.34	0.68	-	-	4.13	-	-	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	-	0.33	0.84	-	-	4.89	-	-	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	-	0.51	1.08	-	-	7.80	-	-	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	-	0.34	0.67	-	-	5.16	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	-	0.22	0.43	-	-	3.04	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	-	0.06	0.09	-	-	0.75	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	-	0.22	0.46	-	-	3.12	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	3.6	25.0	-	-	61.6	-	-	<0.6	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	0.37	0.78	-	-	5.62	-	-	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	0.14	0.30	-	-	2.18	-	-	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	105	99	-	-	99	-	-	97	111	<0	%	TM4/PM8

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	253-255	256-258	259-261	262-264	265-267	268-270	271-273	274-276	277-279	280-282	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS01B	WS01B	WS01B	WS02	WS02	WS02	WS02	WS02	WS02	WS02			
Depth	0.20	0.50	1.00	0.20	0.50	1.00	1.70-2.00	2.70-3.00	3.70-4.00	4.70-5.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	LOD/LOR	Units	Method No.
Natural Moisture Content	-	NDP	NDP	-	-	21.8	-	-	20.2	154.5	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	-	<0.6	<0.6	-	-	0.8	-	-	<0.6	19.3	<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	-	<0.3	<0.3	-	-	<0.3	-	-	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Free Cyanide	-	<0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Total Cyanide #M	-	<0.5	0.6	-	-	6.0	-	-	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Organic Matter	-	NDP	NDP	-	-	19.3	-	-	0.2	33.7	<0.2	%	TM21/PM24
PID Reading	3.1	47.2	205.0	1.5	2.5	2.7	1.0	0.7	0.9	1.1	<0.1	ppm	TM120/PM0
pH #M	-	7.81	7.93	-	-	7.54	-	-	7.45	6.61	<0.01	pH units	TM73/PM11
Sample Type	-	Loamy Sand	Sandy Loam	-	-	Sandy Loam	-	-	Sand	Loam		None	PM13/PM0
Sample Colour	-	Dark Brown	Dark Brown	-	-	Dark Brown	-	-	Light Grey	Dark Brown		None	PM13/PM0
Other Items	-	roots	stones, bricks, roots	-	-	stones	-	-	NA	stones, roots		None	PM13/PM0

Jones Environmental Laboratory

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	283-285	286-288	289-291	292-294	295-297	298-300	301-303	304-306	307-309	310-312	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS05	WS05	WS05	WS05	WS05	WS05	WS05	WS05	WS01A	WS01A			
Depth	0.20	0.50	1.00	1.30-1.50	2.30-2.50	3.30-3.50	4.00-4.30	5.00-5.60	0.20	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	14.7	-	-	38.0	-	-	6.4	-	-	<0.5	mg/kg	TM30/PM15
Arsenic	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Cadmium ^{#M}	-	<0.1	-	-	<0.1	-	-	<0.1	-	-	<0.1	mg/kg	TM30/PM15
Cadmium	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium ^{#M}	-	105.1	-	-	70.7	-	-	101.5	-	-	<0.5	mg/kg	TM30/PM15
Chromium	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper ^{#M}	-	64	-	-	111	-	-	14	-	-	<1	mg/kg	TM30/PM15
Copper	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Iron	-	43290	-	-	45070	-	-	15110	-	-	<20	mg/kg	TM30/PM15
Iron	-	-	-	-	-	-	-	-	-	-	<20	mg/kg	TM30/PM62
Lead ^{#M}	-	21	-	-	139	-	-	35	-	-	<5	mg/kg	TM30/PM15
Lead	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury ^{#M}	-	<0.1	-	-	1.2	-	-	<0.1	-	-	<0.1	mg/kg	TM30/PM15
Mercury	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel ^{#M}	-	68.5	-	-	67.4	-	-	16.1	-	-	<0.7	mg/kg	TM30/PM15
Nickel	-	-	-	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium ^{#M}	-	2	-	-	2	-	-	<1	-	-	<1	mg/kg	TM30/PM15
Selenium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Vanadium	-	83	-	-	54	-	-	163	-	-	<1	mg/kg	TM30/PM15
Vanadium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc ^{#M}	-	49	-	-	75	-	-	77	-	-	<5	mg/kg	TM30/PM15
Zinc	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene ^{#M}	-	0.13	-	-	9.38 _{AC}	-	-	<0.04	-	-	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	-	-	61.37 _{AC}	-	-	<0.03	-	-	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	-	<0.05	-	-	2.57 _{AC}	-	-	<0.05	-	-	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	-	<0.04	-	-	13.11 _{AC}	-	-	<0.04	-	-	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	-	0.16	-	-	59.46 _{AC}	-	-	0.46	-	-	<0.03	mg/kg	TM4/PM8
Anthracene #	-	<0.04	-	-	47.31 _{AC}	-	-	0.09	-	-	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	-	0.19	-	-	60.78 _{AC}	-	-	0.59	-	-	<0.03	mg/kg	TM4/PM8
Pyrene #	-	0.17	-	-	87.38 _{AC}	-	-	0.57	-	-	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	0.13	-	-	44.68 _{AC}	-	-	0.30	-	-	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	-	0.15	-	-	46.03 _{AC}	-	-	0.29	-	-	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	-	0.22	-	-	77.12 _{AC}	-	-	0.40	-	-	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	0.14	-	-	26.69 _{AC}	-	-	0.30	-	-	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	-	0.09	-	-	30.00 _{AC}	-	-	0.17	-	-	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	<0.04	-	-	7.83 _{AC}	-	-	<0.04	-	-	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	0.12	-	-	30.91 _{AC}	-	-	0.20	-	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	1.5	-	-	604.6 _{AC}	-	-	3.4	-	-	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	0.16	-	-	55.53 _{AC}	-	-	0.29	-	-	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	0.06	-	-	21.59 _{AC}	-	-	0.11	-	-	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	116	-	-	112 _{AC}	-	-	100	-	-	<0	%	TM4/PM8

Please include all sections of this report if it is reproduced

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	283-285	286-288	289-291	292-294	295-297	298-300	301-303	304-306	307-309	310-312	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS05	WS05	WS05	WS05	WS05	WS05	WS05	WS05	WS01A	WS01A			
Depth	0.20	0.50	1.00	1.30-1.50	2.30-2.50	3.30-3.50	4.00-4.30	5.00-5.60	0.20	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	LOD/LOR	Units	Method No.
Natural Moisture Content	-	10.1	-	-	22.5	-	-	14.0	-	-	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	-	<0.6	-	-	<0.6	-	-	<0.6	-	-	<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	-	<0.3	-	-	<0.3	-	-	<0.3	-	-	<0.3	mg/kg	TM38/PM20
Free Cyanide	-	<0.5	-	-	1.3	-	-	<0.5	-	-	<0.5	mg/kg	TM89/PM45
Total Cyanide #M	-	<0.5	-	-	384.6	-	-	<0.5	-	-	<0.5	mg/kg	TM89/PM45
Organic Matter	-	15.1	-	-	68.4	-	-	0.9	-	-	<0.2	%	TM21/PM24
PID Reading	1.7	0.5	0.1	0.5	0.6	1.6	0.6	0.5	0.7	0.3	<0.1	ppm	TM120/PM0
pH #M	-	7.52	-	-	6.85	-	-	8.08	-	-	<0.01	pH units	TM73/PM11
Sample Type	-	Sandy Loam	-	-	Sand	-	-	Clayey Sand	-	-		None	PM13/PM0
Sample Colour	-	Dark Brown	-	-	Black	-	-	Medium Brown	-	-		None	PM13/PM0
Other Items	-	stones, clinker	-	-	stones	-	-	stones	-	-		None	PM13/PM0

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	313-315	317-319	320-322	323-325	326-328	329-331	332-334	335-337	338-340	341-343	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS01A	WS07	WS07	WS07	WS07	WS07	WS07	WS07	WS07	WS07			
Depth	1.00	0.20	0.50	1.00	1.50-1.70	2.50-2.70	3.50-3.70	4.00-4.50	5.30-5.65	5.80-6.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	-	-	34.0	-	-	80.1	-	44.7	-	<0.5	mg/kg	TM30/PM15
Arsenic	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Cadmium ^{#M}	-	-	-	22.4	-	-	0.6	-	0.2	-	<0.1	mg/kg	TM30/PM15
Cadmium	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium ^{#M}	-	-	-	138.0	-	-	62.0	-	85.1	-	<0.5	mg/kg	TM30/PM15
Chromium	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper ^{#M}	-	-	-	372 _{AB}	-	-	819 _{AB}	-	134	-	<1	mg/kg	TM30/PM15
Copper	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Iron	-	-	-	92480 _{AB}	-	-	68210 _{AB}	-	38350	-	<20	mg/kg	TM30/PM15
Iron	-	-	-	-	-	-	-	-	-	-	<20	mg/kg	TM30/PM62
Lead ^{#M}	-	-	-	550	-	-	218	-	353	-	<5	mg/kg	TM30/PM15
Lead	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury ^{#M}	-	-	-	1.3	-	-	<0.1	-	1.5	-	<0.1	mg/kg	TM30/PM15
Mercury	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel ^{#M}	-	-	-	144.6	-	-	71.8	-	33.8	-	<0.7	mg/kg	TM30/PM15
Nickel	-	-	-	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium ^{#M}	-	-	-	2	-	-	3	-	1	-	<1	mg/kg	TM30/PM15
Selenium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Vanadium	-	-	-	46	-	-	96	-	43	-	<1	mg/kg	TM30/PM15
Vanadium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc ^{#M}	-	-	-	17670 _{AB}	-	-	968	-	172	-	<5	mg/kg	TM30/PM15
Zinc	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene ^{#M}	-	-	-	0.12	-	-	0.27	-	<0.04	-	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	-	-	0.14	-	-	0.06	-	<0.03	-	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	-	-	-	0.26	-	-	0.30	-	0.11	-	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	-	-	-	0.24	-	-	0.44	-	0.09	-	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	-	-	-	3.56	-	-	1.06	-	0.86	-	<0.03	mg/kg	TM4/PM8
Anthracene #	-	-	-	1.08	-	-	0.48	-	0.19	-	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	-	-	-	7.01	-	-	0.91	-	1.47	-	<0.03	mg/kg	TM4/PM8
Pyrene #	-	-	-	5.36	-	-	0.64	-	1.43	-	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	-	-	3.18	-	-	0.34	-	0.76	-	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	-	-	-	2.81	-	-	0.34	-	0.89	-	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	-	-	-	4.48	-	-	0.61	-	1.45	-	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	-	-	2.55	-	-	0.34	-	0.94	-	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	-	-	-	1.68	-	-	0.26	-	0.57	-	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	-	-	0.30	-	-	0.07	-	0.16	-	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	-	-	1.55	-	-	0.21	-	0.61	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	-	-	34.3	-	-	6.3	-	9.5	-	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	-	-	3.23	-	-	0.44	-	1.04	-	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	-	-	1.25	-	-	0.17	-	0.41	-	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	-	-	96	-	-	104	-	99	-	<0	%	TM4/PM8

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	313-315	317-319	320-322	323-325	326-328	329-331	332-334	335-337	338-340	341-343	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS01A	WS07	WS07	WS07	WS07	WS07	WS07	WS07	WS07	WS07			
Depth	1.00	0.20	0.50	1.00	1.50-1.70	2.50-2.70	3.50-3.70	4.00-4.50	5.30-5.65	5.80-6.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	LOD/LOR	Units	Method No.
Natural Moisture Content	-	-	-	59.2	-	-	40.7	-	22.1	-	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	-	-	-	130.7	-	-	489.1	-	101.6	-	<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	-	-	-	<0.3	-	-	1.0	-	<0.3	-	<0.3	mg/kg	TM38/PM20
Free Cyanide	-	-	-	<0.5	-	-	<0.5	-	<0.5	-	<0.5	mg/kg	TM89/PM45
Total Cyanide #M	-	-	-	2.4	-	-	<0.5	-	<0.5	-	<0.5	mg/kg	TM89/PM45
Organic Matter	-	-	-	26.3	-	-	50.7	-	13.0	-	<0.2	%	TM21/PM24
PID Reading	11.1	0.2	0.7	17.0	8.4	7.1	2.4	16.4	1.6	1.4	<0.1	ppm	TM120/PM0
pH #M	-	-	-	7.24	-	-	6.95	-	8.13	-	<0.01	pH units	TM73/PM11
Sample Type	-	-	-	Loam	-	-	Sandy Loam	-	Sand	-		None	PM13/PM0
Sample Colour	-	-	-	Medium Brown	-	-	Dark Brown	-	Dark Brown	-		None	PM13/PM0
Other Items	-	-	-	plastic, paper, glass	-	-	stones	-	NA	-		None	PM13/PM0

Jones Environmental Laboratory

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	344-346	347-349	350-352	353-355	356-358	359-361	362-364	365-367	368-370	371-373	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS06	WS06	WS06	WS06	WS06	WS06	WS06	WS06	WS03	WS03	LOD/LOR	Units	Method No.
Depth	0.20	0.50	1.00	1.40-1.90	1.90-2.50	3.00-3.70	4.00-4.50	5.00-5.70	0.20	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015			
Arsenic ^{#M}	-	-	16.0	-	52.5	-	26.9	-	-	-	<0.5	mg/kg	TM30/PM15
Arsenic	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Cadmium ^{#M}	-	-	0.2	-	<0.1	-	<0.1	-	-	-	<0.1	mg/kg	TM30/PM15
Cadmium	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium ^{#M}	-	-	196.7	-	436.9 ^{AB}	-	142.5	-	-	-	<0.5	mg/kg	TM30/PM15
Chromium	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper ^{#M}	-	-	72	-	<1	-	300 ^{AA}	-	-	-	<1	mg/kg	TM30/PM15
Copper	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Iron	-	-	104000 ^{AA}	-	198500 ^{AB}	-	113400 ^{AA}	-	-	-	<20	mg/kg	TM30/PM15
Iron	-	-	-	-	-	-	-	-	-	-	<20	mg/kg	TM30/PM62
Lead ^{#M}	-	-	95	-	<5	-	48	-	-	-	<5	mg/kg	TM30/PM15
Lead	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury ^{#M}	-	-	<0.1	-	<0.1	-	<0.1	-	-	-	<0.1	mg/kg	TM30/PM15
Mercury	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel ^{#M}	-	-	21.1	-	1.7	-	34.6	-	-	-	<0.7	mg/kg	TM30/PM15
Nickel	-	-	-	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium ^{#M}	-	-	15	-	21	-	20	-	-	-	<1	mg/kg	TM30/PM15
Selenium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Vanadium	-	-	97	-	196	-	82	-	-	-	<1	mg/kg	TM30/PM15
Vanadium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc ^{#M}	-	-	741	-	1329	-	770	-	-	-	<5	mg/kg	TM30/PM15
Zinc	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene ^{#M}	-	-	<0.80 ^{AC}	-	<0.04	-	<0.04	-	-	-	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	-	<0.60 ^{AC}	-	<0.03	-	<0.03	-	-	-	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	-	-	<1.00 ^{AC}	-	<0.05	-	<0.05	-	-	-	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	-	-	<0.80 ^{AC}	-	<0.04	-	<0.04	-	-	-	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	-	-	2.59 ^{AC}	-	<0.03	-	0.36	-	-	-	<0.03	mg/kg	TM4/PM8
Anthracene [#]	-	-	<0.80 ^{AC}	-	<0.04	-	0.06	-	-	-	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	-	-	3.52 ^{AC}	-	<0.03	-	1.42	-	-	-	<0.03	mg/kg	TM4/PM8
Pyrene [#]	-	-	2.91 ^{AC}	-	<0.03	-	1.76	-	-	-	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	-	-	1.99 ^{AC}	-	<0.06	-	0.69	-	-	-	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	-	-	1.69 ^{AC}	-	<0.02	-	0.92	-	-	-	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	-	-	2.85 ^{AC}	-	<0.07	-	0.77	-	-	-	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	-	-	1.67 ^{AC}	-	<0.04	-	0.38	-	-	-	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	-	-	1.34 ^{AC}	-	<0.04	-	0.17	-	-	-	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	-	-	<0.80 ^{AC}	-	<0.04	-	0.07	-	-	-	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	-	-	1.38 ^{AC}	-	<0.04	-	0.17	-	-	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	-	19.9 ^{AC}	-	<0.6	-	6.8	-	-	-	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	-	2.05 ^{AC}	-	<0.05	-	0.55	-	-	-	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	-	0.80 ^{AC}	-	<0.02	-	0.22	-	-	-	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	-	108 ^{AC}	-	114	-	99	-	-	-	<0	%	TM4/PM8

Please include all sections of this report if it is reproduced

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	344-346	347-349	350-352	353-355	356-358	359-361	362-364	365-367	368-370	371-373	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS06	WS06	WS06	WS06	WS06	WS06	WS06	WS06	WS03	WS03			
Depth	0.20	0.50	1.00	1.40-1.90	1.90-2.50	3.00-3.70	4.00-4.50	5.00-5.70	0.20	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	LOD/LOR	Units	Method No.
Natural Moisture Content	-	-	11.0	-	1.5	-	9.2	-	-	-	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	-	-	<0.6	-	<0.6	-	13.6	-	-	-	<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	-	-	<0.3	-	<0.3	-	<0.3	-	-	-	<0.3	mg/kg	TM38/PM20
Free Cyanide	-	-	<0.5	-	<0.5	-	<0.5	-	-	-	<0.5	mg/kg	TM89/PM45
Total Cyanide #M	-	-	<0.5	-	<0.5	-	<0.5	-	-	-	<0.5	mg/kg	TM89/PM45
Organic Matter	-	-	4.9	-	<0.2	-	10.5	-	-	-	<0.2	%	TM21/PM24
PID Reading	0.5	0.4	0.4	0.2	0.8	0.5	0.5	0.6	0.3	0.1	<0.1	ppm	TM120/PM0
pH #M	-	-	8.20	-	8.71	-	7.95	-	-	-	<0.01	pH units	TM73/PM11
Sample Type	-	-	Sandy Loam	-	Other	-	Sandy Loam	-	-	-		None	PM13/PM0
Sample Colour	-	-	Dark Brown	-	Black	-	Dark Brown	-	-	-		None	PM13/PM0
Other Items	-	-	stones	-	NA	-	paper, bricks, stone	-	-	-		None	PM13/PM0

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	374-376	377-379	380-382	383-385	386-388	389-391	392-394	395-397	398-400	401-403	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS03	WS03	WS03	WS03	WS03	WS04	WS04	WS04	WS04	WS04			
Depth	1.00	1.40-1.70	2.40-2.70	3.40-3.70	4.20-4.70	0.20	0.50	1.00	1.50-1.80	2.40-2.70			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	-	-	-	-	-	-	10.6	-	-	<0.5	mg/kg	TM30/PM15
Arsenic	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Cadmium ^{#M}	-	-	-	-	-	-	-	0.3	-	-	<0.1	mg/kg	TM30/PM15
Cadmium	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium ^{#M}	-	-	-	-	-	-	-	81.5	-	-	<0.5	mg/kg	TM30/PM15
Chromium	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper ^{#M}	-	-	-	-	-	-	-	49	-	-	<1	mg/kg	TM30/PM15
Copper	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Iron	-	-	-	-	-	-	-	16930	-	-	<20	mg/kg	TM30/PM15
Iron	-	-	-	-	-	-	-	-	-	-	<20	mg/kg	TM30/PM62
Lead ^{#M}	-	-	-	-	-	-	-	195	-	-	<5	mg/kg	TM30/PM15
Lead	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury ^{#M}	-	-	-	-	-	-	-	0.1	-	-	<0.1	mg/kg	TM30/PM15
Mercury	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel ^{#M}	-	-	-	-	-	-	-	17.2	-	-	<0.7	mg/kg	TM30/PM15
Nickel	-	-	-	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium ^{#M}	-	-	-	-	-	-	-	<1	-	-	<1	mg/kg	TM30/PM15
Selenium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Vanadium	-	-	-	-	-	-	-	19	-	-	<1	mg/kg	TM30/PM15
Vanadium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc ^{#M}	-	-	-	-	-	-	-	178	-	-	<5	mg/kg	TM30/PM15
Zinc	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene ^{#M}	-	-	-	-	-	-	-	0.18	-	-	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	-	-	-	-	-	-	0.03	-	-	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	-	-	-	-	-	-	-	0.26	-	-	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	-	-	-	-	-	-	-	0.19	-	-	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	-	-	-	-	-	-	-	2.20	-	-	<0.03	mg/kg	TM4/PM8
Anthracene #	-	-	-	-	-	-	-	0.41	-	-	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	-	-	-	-	-	-	-	3.00	-	-	<0.03	mg/kg	TM4/PM8
Pyrene #	-	-	-	-	-	-	-	2.74	-	-	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	-	-	-	-	-	-	1.34	-	-	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	-	-	-	-	-	-	-	1.37	-	-	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	-	-	-	-	-	-	-	1.94	-	-	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	-	-	-	-	-	-	1.18	-	-	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	-	-	-	-	-	-	-	0.73	-	-	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	-	-	-	-	-	-	0.20	-	-	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	-	-	-	-	-	-	0.72	-	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	-	-	-	-	-	-	16.5	-	-	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	-	-	-	-	-	-	1.40	-	-	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	-	-	-	-	-	-	0.54	-	-	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	-	-	-	-	-	-	109	-	-	<0	%	TM4/PM8

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	374-376	377-379	380-382	383-385	386-388	389-391	392-394	395-397	398-400	401-403	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS03	WS03	WS03	WS03	WS03	WS04	WS04	WS04	WS04	WS04	LOD/LOR	Units	Method No.
Depth	1.00	1.40-1.70	2.40-2.70	3.40-3.70	4.20-4.70	0.20	0.50	1.00	1.50-1.80	2.40-2.70			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	5	5	5	5	5	5	5	5	5	5			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015			
Natural Moisture Content	-	-	-	-	-	-	-	11.7	-	-	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	-	-	-	-	-	-	-	<0.6	-	-	<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	-	-	-	-	-	-	-	<0.3	-	-	<0.3	mg/kg	TM38/PM20
Free Cyanide	-	-	-	-	-	-	-	<0.5	-	-	<0.5	mg/kg	TM89/PM45
Total Cyanide #M	-	-	-	-	-	-	-	<0.5	-	-	<0.5	mg/kg	TM89/PM45
Organic Matter	-	-	-	-	-	-	-	3.8	-	-	<0.2	%	TM21/PM24
PID Reading	0.3	0.3	0.1	<0.1	0.9	<0.1	0.1	0.3	0.4	1.6	<0.1	ppm	TM120/PM0
pH #M	-	-	-	-	-	-	-	8.33	-	-	<0.01	pH units	TM73/PM11
Sample Type	-	-	-	-	-	-	-	Sandy Loam	-	-		None	PM13/PM0
Sample Colour	-	-	-	-	-	-	-	Medium Brown	-	-		None	PM13/PM0
Other Items	-	-	-	-	-	-	-	stones	-	-		None	PM13/PM0

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	404-406	407-409	410-412							Please see attached notes for all abbreviations and acronyms		
Sample ID	WS04	WS04	WS04							LOD/LOR	Units	Method No.
Depth	3.30-3.70	4.00-4.70	5.00-5.70									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	<>	<>	<>									
Sample Type	Soil	Soil	Soil									
Batch Number	5	5	5									
Date of Receipt	08/10/2015	08/10/2015	08/10/2015									
Natural Moisture Content	19.1	23.3	-							<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	<0.6	<0.6	-							<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	<0.3	<0.3	-							<0.3	mg/kg	TM38/PM20
Free Cyanide	<0.5	<0.5	-							<0.5	mg/kg	TM89/PM45
Total Cyanide #M	3.9	<0.5	-							<0.5	mg/kg	TM89/PM45
Organic Matter	24.5	21.6	-							<0.2	%	TM21/PM24
PID Reading	0.1	0.4	0.3							<0.1	ppm	TM120/PM0
pH #M	7.38	7.73	-							<0.01	pH units	TM73/PM11
Sample Type	Sandy Loam	Sandy Loam	-								None	PM13/PM0
Sample Colour	Dark Brown	Dark Brown	-								None	PM13/PM0
Other Items	stones	stones, clinker	-								None	PM13/PM0

Jones Environmental Laboratory

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	323-325	350-352	362-364	404-406	407-409																			
Sample ID	WS07	WS06	WS06	WS04	WS04																			
Depth	1.00	1.00	4.00-4.50	3.30-3.70	4.00-4.70																			
COC No / misc																								
Containers	V J T	V J T	V J T	V J T	V J T																			
Sample Date	<>	<>	<>	<>	<>																			
Sample Type	Soil	Soil	Soil	Soil	Soil																			
Batch Number	5	5	5	5	5																			
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015	08/10/2015																			
																						LOD/LOR	Units	Method No.
Dissolved Arsenic #	10.1	<0.9	<0.9	<0.9	<0.9																	<0.9	ug/l	TM30/PM14
Dissolved Cadmium #	0.78	0.29	0.37	0.29	0.41																	<0.03	ug/l	TM30/PM14
Dissolved Chromium #	1.2	2.2	<0.2	0.3	<0.2																	<0.2	ug/l	TM30/PM14
Dissolved Copper #	9	9	<3	<3	<3																	<3	ug/l	TM30/PM14
Dissolved Iron #	149.8	123.0	33.7	<4.7	8.7																	<4.7	ug/l	TM30/PM14
Dissolved Lead #	8.7	1.5	1.1	<0.4	4.6																	<0.4	ug/l	TM30/PM14
Dissolved Nickel #	50.5	0.7	1.7	12.1	3.9																	<0.2	ug/l	TM30/PM14
Dissolved Selenium #	<1.2	<1.2	<1.2	<1.2	<1.2																	<1.2	ug/l	TM30/PM14
Dissolved Vanadium #	<0.6	2.1	<0.6	<0.6	<0.6																	<0.6	ug/l	TM30/PM14
Dissolved Zinc #	514.4	7.0	3.3	38.0	9.9																	<1.5	ug/l	TM30/PM14
Mercury Dissolved by CVA#	0.75	1.36	<0.01	0.06	0.04																	<0.01	ug/l	TM61/PM38
PAH MS																								
Naphthalene	<0.1	<0.1	<0.1	<0.1	<0.1																	<0.1	ug/l	TM4/PM30
Acenaphthylene	0.01	0.01	<0.01	0.01	0.02																	<0.01	ug/l	TM4/PM30
Acenaphthene	0.05	0.01	<0.01	<0.01	<0.01																	<0.01	ug/l	TM4/PM30
Fluorene	0.08	0.01	0.01	<0.01	0.01																	<0.01	ug/l	TM4/PM30
Phenanthrene	0.38	0.03	0.02	<0.01	0.02																	<0.01	ug/l	TM4/PM30
Anthracene	0.07	0.01	<0.01	<0.01	0.03																	<0.01	ug/l	TM4/PM30
Fluoranthene	0.68	0.07	0.01	0.02	0.02																	<0.01	ug/l	TM4/PM30
Pyrene	0.50	0.06	0.01	0.02	0.04																	<0.01	ug/l	TM4/PM30
Benzo(a)anthracene	0.19	0.05	<0.01	0.03	0.02																	<0.01	ug/l	TM4/PM30
Chrysene	0.35	0.07	<0.01	0.03	0.03																	<0.01	ug/l	TM4/PM30
Benzo(b)fluoranthene	0.23	0.13	<0.01	0.06	0.05																	<0.01	ug/l	TM4/PM30
Benzo(a)pyrene	0.18	0.24	<0.01	0.15	0.17																	<0.01	ug/l	TM4/PM30
Indeno(123cd)pyrene	0.03	0.05	<0.01	0.02	0.01																	<0.01	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.01	<0.01	<0.01	<0.01	<0.01																	<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene	0.03	0.04	<0.01	0.02	0.01																	<0.01	ug/l	TM4/PM30
PAH 16 Total	2.8	0.8	<0.1	0.4	0.4																	<0.1	ug/l	TM4/PM30
Benzo(b)fluoranthene	0.17	0.09	<0.01	0.04	0.04																	<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	0.06	0.04	<0.01	0.02	0.01																	<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	80	95	95	97	100																	<0	%	TM4/PM30
Sulphate #	83.55	17.83	13.45	308.78	215.29																	<0.05	mg/l	TM38/PM0
Free Cyanide #	10	<10	<10	<10	<10																	<10	ug/l	TM89/PM0
Total Cyanide #	15	<5	15	<5	<5																	<5	ug/l	TM89/PM0
Hexavalent Chromium	<2	<2	<2	<2	<2																	<2	ug/l	TM38/PM0
pH	7.92	8.11	8.11	7.74	7.65																	<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Any questionable sample will automatically be assumed to have breached the Waste Limit and further testing may be required.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	5	WS01B	0.50	257	19/10/2015	Mass of Dry Sample	51.9 (g)
					20/10/2015	General Description (Bulk Analysis)	soil/stones
					20/10/2015	Asbestos Containing Material	Fibre Bundles
					20/10/2015	Asbestos Screen	Chrysotile
					20/10/2015	Asbestos Level	Quantifiable
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS01B	1.00	260	19/10/2015	Mass of Dry Sample	49.3 (g)
					20/10/2015	General Description (Bulk Analysis)	soil/stones
					20/10/2015	Asbestos Containing Material	Asbestos Cement Debris
					20/10/2015	Asbestos Screen	Chrysotile
					20/10/2015	Asbestos Level	Quantifiable
					20/10/2015	Waste Limit	Asbestos waste limit cannot be determined from the analysis scheduled
15/13759	5	WS02	1.00	269	19/10/2015	Mass of Dry Sample	43.0 (g)
					20/10/2015	General Description (Bulk Analysis)	soil/stones
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS02	3.70-4.00	278	19/10/2015	Mass of Dry Sample	47.7 (g)
					20/10/2015	General Description (Bulk Analysis)	Sand
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS02	4.70-5.00	281	19/10/2015	Mass of Dry Sample	23.2 (g)
					20/10/2015	General Description (Bulk Analysis)	Soil/Veg
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Level	NAD

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	5	WS02	4.70-5.00	281	20/10/2015	Waste Limit	<0.1%
15/13759	5	WS05	0.50	287	19/10/2015	Mass of Dry Sample	45.6 (g)
					20/10/2015	General Description (Bulk Analysis)	Soil/Stone
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS05	2.30-2.50	296	19/10/2015	Mass of Dry Sample	46.1 (g)
					20/10/2015	General Description (Bulk Analysis)	soil/stones
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS05	5.00-5.60	305	19/10/2015	Mass of Dry Sample	53.7 (g)
					20/10/2015	General Description (Bulk Analysis)	soil/stones
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS07	1.00	324	19/10/2015	Mass of Dry Sample	33.7 (g)
					20/10/2015	General Description (Bulk Analysis)	soil/stones
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS07	3.50-3.70	333	19/10/2015	Mass of Dry Sample	41.1 (g)
					20/10/2015	General Description (Bulk Analysis)	Soil/Stone
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS07	5.30-5.65	339	19/10/2015	Mass of Dry Sample	49.8 (g)
					20/10/2015	General Description (Bulk Analysis)	Soil/Stone
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/13759	5	WS07	5.30-5.65	339	20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS06	1.00	351	19/10/2015	Mass of Dry Sample	54.8 (g)
					20/10/2015	General Description (Bulk Analysis)	Soil/Stone
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS06	1.90-2.50	357	19/10/2015	Mass of Dry Sample	60.2 (g)
					20/10/2015	General Description (Bulk Analysis)	silt-soil
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS06	4.00-4.50	363	19/10/2015	Mass of Dry Sample	53.1 (g)
					20/10/2015	General Description (Bulk Analysis)	soil-stones-roots
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS04	1.00	396	19/10/2015	Mass of Dry Sample	51.4 (g)
					20/10/2015	General Description (Bulk Analysis)	soil-stones
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS04	3.30-3.70	405	19/10/2015	Mass of Dry Sample	45.5 (g)
					20/10/2015	General Description (Bulk Analysis)	Soil-Silt/Clay/Brick/Stone/MMMF
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Containing Material (2)	None
					20/10/2015	Asbestos Screen	NAD
					20/10/2015	Asbestos Screen (2)	NAD
					20/10/2015	Asbestos Level	NAD
					20/10/2015	Waste Limit	<0.1%
15/13759	5	WS04	4.00-4.70	408	19/10/2015	Mass of Dry Sample	48.8 (g)
					20/10/2015	General Description (Bulk Analysis)	Soil-Silt/Clay/Brick/Stone
					20/10/2015	Asbestos Containing Material	None
					20/10/2015	Asbestos Screen	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution
AC	x20 Dilution

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.	Yes		AR	Yes

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM38	Samples are brominated to reduce all mercury compounds to Mercury (II) which is analysed using method TM061.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM0	No preparation is required.	Yes		AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes	Yes	AR	Yes
TM120	Hand-held broadband VOC gas monitor with Photoionisation Detection .	PM0	No preparation is required.			AR	No
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Jones Environmental Laboratory

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Attention : Jon Hutchinson
Date : 30th October, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 5 Schedule C
Location : A5036 Liverpool
Date samples received : 8th October, 2015
Status : Final report
Issue : 1

Fifty four samples were received for analysis on 8th October, 2015 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	265-267	268-270	274-276	280-282															
Sample ID	WS02	WS02	WS02	WS02															
Depth	0.50	1.00	2.70-3.00	4.70-5.00															
COC No / misc																			
Containers	V J T	V J T	V J T	V J T															
Sample Date	08/10/2015	08/10/2015	08/10/2015	08/10/2015															
Sample Type	Soil	Soil	Soil	Soil															
Batch Number	5	5	5	5															
Date of Receipt	08/10/2015	08/10/2015	08/10/2015	08/10/2015															
Please see attached notes for all abbreviations and acronyms																			
TPH CWG																			
Aliphatics																			
>C5-C6 ^{#M}	<0.1	<0.1	<0.1	<0.2 _{AA}													<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	<0.1	<0.1	<0.1	<0.2 _{AA}													<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.2 _{AA}													<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	<0.2	<0.2	<0.2	<0.2													<0.2	mg/kg	TM5/PM16
>C12-C16 ^{#M}	<4	<4	<4	<4													<4	mg/kg	TM5/PM16
>C16-C21 ^{#M}	<7	<7	306	278													<7	mg/kg	TM5/PM16
>C21-C35 ^{#M}	15	19	<7	<7													<7	mg/kg	TM5/PM16
Total aliphatics C5-35	<19	19	306	278													<19	mg/kg	TM5/TM36/PM12/PM16
Aromatics																			
>C5-EC7	<0.1	<0.1	<0.1	<0.2 _{AA}													<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1	<0.1	<0.1	<0.2 _{AA}													<0.1	mg/kg	TM36/PM12
>EC8-EC10 ^{#M}	<0.1	<0.1	<0.1	<0.2 _{AA}													<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2	<0.2	<0.2	<0.2													<0.2	mg/kg	TM5/PM16
>EC12-EC16	<4	<4	<4	<4													<4	mg/kg	TM5/PM16
>EC16-EC21	46	34	26	34													<7	mg/kg	TM5/PM16
>EC21-EC35	225	179	594	355													<7	mg/kg	TM5/PM16
Total aromatics C5-35	271	213	620	389													<19	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-35)	271	232	926	667													<38	mg/kg	TM5/TM36/PM12/PM16
MTBE [#]	<5	<5	<5	<10 _{AA}													<5	ug/kg	TM31/PM12
Benzene [#]	<5	<5	<5	<10 _{AA}													<5	ug/kg	TM31/PM12
Toluene [#]	<5	<5	<5	<10 _{AA}													<5	ug/kg	TM31/PM12
Ethylbenzene [#]	<5	<5	<5	<10 _{AA}													<5	ug/kg	TM31/PM12
m/p-Xylene [#]	<5	<5	<5	<10 _{AA}													<5	ug/kg	TM31/PM12
o-Xylene [#]	<5	<5	<5	<10 _{AA}													<5	ug/kg	TM31/PM12
Natural Moisture Content	27.4	-	71.2	-													<0.1	%	PM4/PM0

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

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It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

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Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

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DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

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Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

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ABBREVIATIONS and ACRONYMS USED

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M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
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++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x2 Dilution

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM12/PM16	CWG GC-FID			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes



Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
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Deeside
CH5 2UA

Geotechnics
Unit 1B
Borders Industrial Park
River Lane
Chester
Cheshire
CH4 8RJ

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Jon Hutchinson
Date : 20th November, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 6
Location : A5036 Liverpool
Date samples received : 12th November, 2015
Status : Final report
Issue : 1

Nineteen samples were received for analysis on 12th November, 2015 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Paul Lee-Boden BSc
Project Manager

Client Name: Geotechnics
 Reference: PN153396
 Location: A5036 Liverpool
 Contact: Jon Hutchinson
 JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	413	414	419	422	424	425	427	428	430	431	Please see attached notes for all abbreviations and acronyms		
Sample ID	CP1	CP1	CP2	CP3	CP4	CP4	CP5	CP5	CP7	CP7			
Depth	1.20-1.65	3.60	9.20	9.70	7.00	9.30	6.10	8.25-8.70	2.00	4.25-4.70			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	6	6	6	6	6	6	6	6	6	6			
Date of Receipt	12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015	LOD/LOR	Units	Method No.
Sulphate as SO ₄ (2:1 Ext) ^{#M}	0.7275	0.6870	0.1506	<0.0015	0.2439	0.0738	0.0987	0.0279	<0.0015	0.0120	<0.0015	g/l	TM38/PM20
pH ^{#M}	7.57	7.44	7.48	8.69	7.87	8.94	8.30	8.91	7.30	7.55	<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Sand	Silt	Clay	Sand	Clay	Clay	Sand	Sand		None	PM13/PM0
Sample Colour	Dark Brown	Dark Brown	Dark Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Dark Brown	Dark Brown		None	PM13/PM0
Other Items	rocks, stones, vegetation, glass	vegetation, stones	stones, wet	stones, wet	stones, wet, vegetation, tiles	stones, wet	stones, sand	stones	wet, stones	stones		None	PM13/PM0

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

SOILS

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Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

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SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

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Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

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ABBREVIATIONS and ACRONYMS USED

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B	Indicates analyte found in associated method blank.
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M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No



Jones Environmental Laboratory

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Unit 1B
Borders Industrial Park
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Cheshire
CH4 8RJ

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Jon Hutchinson
Date : 30th November, 2015
Your reference : PN153396
Our reference : Test Report 15/13759 Batch 7
Location : A5036 Liverpool
Date samples received : 19th November, 2015
Status : Final report
Issue : 1

Eleven samples were received for analysis on 19th November, 2015 of which eleven were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Simon Gomery BSc
Project Manager

Client Name: Geotechnics
Reference: PN153396
Location: A5036 Liverpool
Contact: Jon Hutchinson
JE Job No.: 15/13759

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	432	433	434	435	436	437	438	439	440	441			
Sample ID	WS04	WS03	WS05	WS05	WS06	WS06	WS07	WS08	WS09	WS10			
Depth	4.00-4.45	1.20-1.65	1.50-2.70	5.00-5.45	0.40-1.20	4.00-4.45	3.00-3.45	1.20-1.70	1.90-3.30	0.60-1.20	Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	7	7	7	7	7	7	7	7	7	7			
Date of Receipt	19/11/2015	19/11/2015	19/11/2015	19/11/2015	19/11/2015	19/11/2015	19/11/2015	19/11/2015	19/11/2015	19/11/2015	LOD/LOR	Units	Method No.
Sulphate as SO ₄ (2:1 Ext) ^{#M}	1.1307	0.0169	1.0206	0.0801	0.1047	0.6664	2.4546	0.0964	0.2610	0.0295	<0.0015	g/l	TM38/PM20
pH ^{#M}	7.66	8.11	7.07	8.55	8.16	7.89	7.09	8.26	8.05	8.09	<0.01	pH units	TM73/PM11
Sample Type	Sandy Loam	Sand	Sandy Loam	Sand	Sandy Loam	Sandy Loam	Sandy Loam	Clay	Clay	Sandy Loam		None	PM13/PM0
Sample Colour	Dark Brown	Medium Brown	Dark Brown	Medium Brown	Dark Brown	Dark Brown	Dark Brown	Medium Brown	Medium Brown	Dark Brown		None	PM13/PM0
Other Items	stones, vegetation and clinker	NA	stones and clinker	stones	stones, brick fragments, vegetation and glass	stones, brick fragments, clay and paper	stones, brick fragments, glass, rubble and paper	stones	stones	stones, brick fragments and roots		None	PM13/PM0

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/13759

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ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
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+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
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TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/13759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No



Certificate of Analysis

Certificate Number 15-51224

26-Nov-15

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

Our Reference 15-51224

Client Reference PN153396

Order No OC14293

Contract Title A5036 PORT OF LIVERPOOL

Description 6 Soil samples.

Date Received 23-Nov-15

Date Started 23-Nov-15

Date Completed 26-Nov-15

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

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

Approved By

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

Rob Brown
Business Manager



Summary of Asbestos Analysis

Soil Samples

Our Ref 15-51224

Client Ref PN153396

Contract Title A5036 PORT OF LIVERPOOL

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
904059	CP3 3.00-3.45	SOIL	NAD	none	D Wilkinson
904060	CP3 6.00-6.45	SOIL	NAD	none	D Wilkinson
904061	CP2 2.25-2.70	SOIL	NAD	none	D Wilkinson
904062	CP2 4.20-4.65	SOIL	NAD	none	D Wilkinson
904063	CP2 6.20-6.65	SOIL	Chrysotile	Chrysotile present as fibre bundle and small cement fragment	D Wilkinson
904064	CP2 8.20-8.65	SOIL	NAD	none	D Wilkinson

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

Information in Support of the Analytical Results

Our Ref 15-51224
 Client Ref PN153396
 Contract A5036 PORT OF LIVERPOOL

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
904059	CP3 3.00-3.45 SOIL	20/11/15	PT 1L		
904060	CP3 6.00-6.45 SOIL	20/11/15	PT 1L		
904061	CP2 2.25-2.70 SOIL	20/11/15	PT 1L		
904062	CP2 4.20-4.65 SOIL	20/11/15	PT 1L		
904063	CP2 6.20-6.65 SOIL	20/11/15	PT 1L		
904064	CP2 8.20-8.65 SOIL	20/11/15	PT 1L		

Key: P-Plastic T-Tub

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

Disposal

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

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

APPENDIX 7

Laboratory Test Results - Bacteriological

For the attention of Paul Hayes
 Geotechnics Ltd
 The Geotechnical Centre
 Unit 1B, Borders Ind Prk
 Chester
 CH4 8RJ
 Date Sampled: 03/11/2015
 Num Samples: 4

Our Ref: 108437
 Your Ref: AUTH-ON13782 PN153396 A5036 Port Of
 Liverpool Access Study
 Date Received: Wednesday 04 November 2015
 Time Received: 08:30
 Sample Type: Water
 Date Started: 04 Nov 2015
 Date Reported: 07 November 2015

Certificate of Analysis

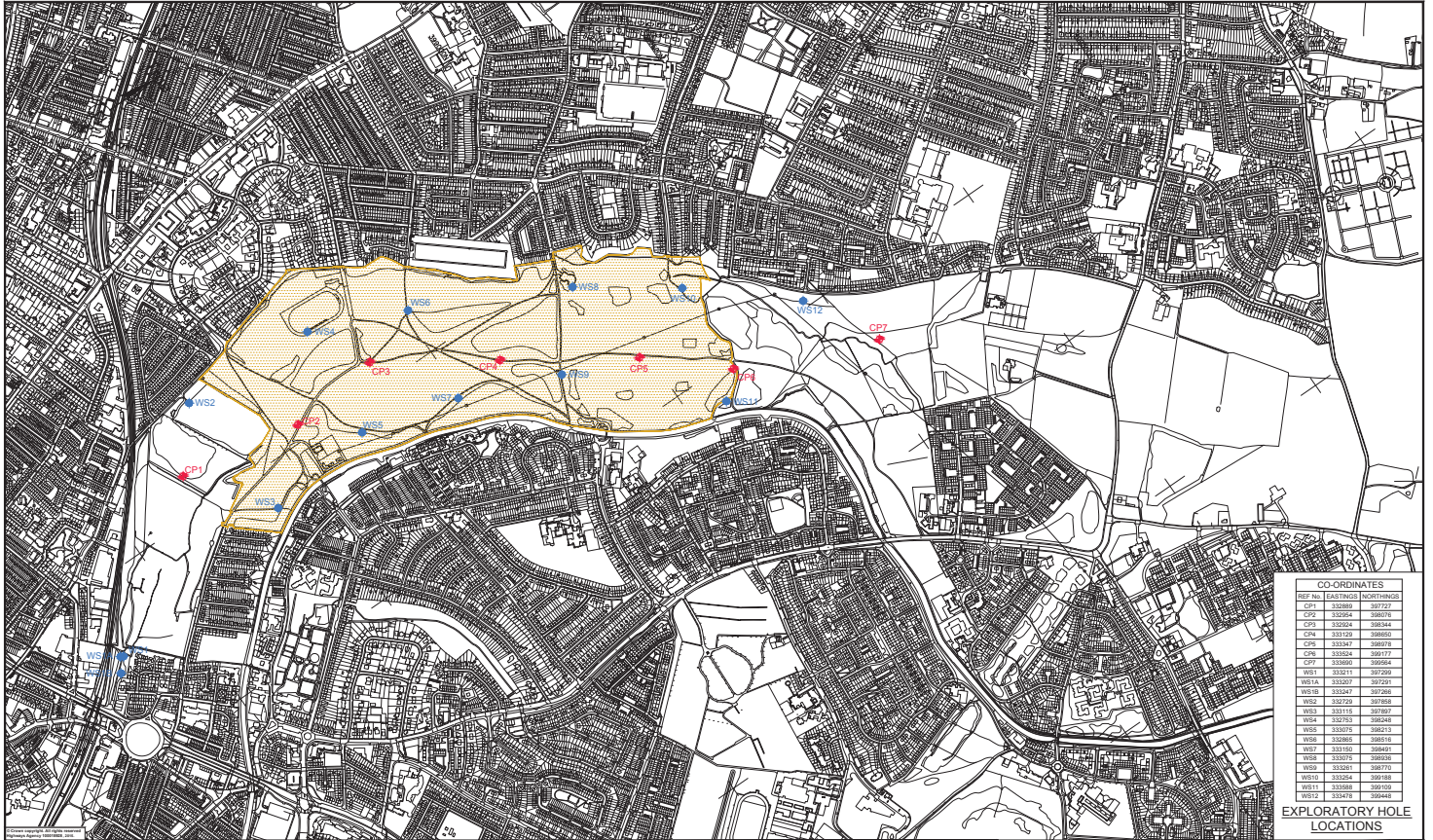
Sample Ref	Lab Ref	E coli -Enumeration cfu/100ml	Faecal Streptococci cfu/100ml
SW1 A5306	335263	15	51
SW3 A5306	335264	49	30
SW4 A5306	335265	32	40
SW5 A5306	335266	25	37

N.D. = Not Detected, cfu = Colony Forming Unit, n/a = Test Not Applicable, ~ = Estimated, Results relate only to samples analysed

This Certificate has been generated electronically (Digital Signature Code:=77747) and is authorised by Anthony Griffiths BSc. Authorised Signatory

APPENDIX 8
Exploratory Hole Location Plan

DO NOT SCALE



CO-ORDINATES	
CP1	332388 332752
CP2	332364 332876
CP3	332324 332934
CP4	332129 332852
CP5	332347 332973
CP6	332324 332977
CP7	332360 332924
WS1	332111 332729
WS1A	332327 332721
WS1B	332247 332726
WS2	332729 332768
WS3	332115 332827
WS4	332152 332828
WS5	332375 332823
WS6	332365 332815
WS7	332152 332821
WS8	332375 332826
WS9	332327 332873
WS10	332324 332816
WS11	332328 332959
WS12	332478 332945

EXPLORATORY HOLE LOCATIONS

NOTE:
 1. AS BUILT COORDINATES PROVIDED BY GEOTECHNICS LIMITED.

KEY:
 [Yellow outline] OUTLINE AREA OF HISTORICAL LANDFILL SITE
 [Red dot] CABLE PERCUSSION EXPLORATORY HOLE
 [Blue dot] WINDOW SAMPLE EXPLORATORY HOLE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design focused top).

CONSIDERATIONS:
 1. LOCATION OF EXISTING SERVICES AND OVERHEAD CABLES TO THE PROXIMITY OF EXPLORATORY HOLES TO BE CONFIRMED.
 2. INVASIVE SPECIES PRESENT IN PARK.

ENVIRONMENTAL ISSUES:
 (Enter Name if applicable)

Date: _____
 (Enter Name if applicable)

Authorising / Approval: _____
 (Enter Name if applicable)

Rev	Description	Date	By	Check
001	Issue for Design	20/11/15	AS	AS
002	Issue for Construction	20/11/15	AS	AS
003	Issue for Construction	20/11/15	AS	AS
004	Issue for Construction	20/11/15	AS	AS

AS BUILT **AB** **A5036 PORT OF LIVERPOOL ACCESS**

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highways
england

PRELIMINARY GROUND INVESTIGATION EXPLORATORY HOLE LOCATIONS

Scale	1:5000	1:1000	1:500	1:250	1:100
Sheet	A1	A2	A3	A4	A5
Project	HA549387 - ATK - HGT - ZZ - SK - GE - 0001				
Drawn By	PK2				

APPENDIX 9

Investigation Techniques and General Notes

INTRODUCTION

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

TRIAL PITS

The trial pit is amongst the most simple yet effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a back-acting excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the trial pits will not have been provided with temporary side support during their construction. Under such circumstances ground conditions to some 1.20 metres can be closely inspected, subject to stability assessment, but below this depth, entrance into the pit is not permitted in the absence of shoring and hence observations will have been made from ground surface and samples taken from the excavator bucket.

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

CABLE PERCUSSION BORING

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

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

The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.

ROTARY DRILLING

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

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

Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.

WINDOW SAMPLING

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

Driving devices can be hand-held or machine mounted and the drive tubes are typically in 1m lengths. The hole formed is not cased, however, and hence the success of this technique is limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 8m can be achieved in suitable circumstances but depths of 4m to 6m are more common.

EXPLORATORY HOLE RECORDS

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

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

DYNAMIC PROBING

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

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

The hand-driven DCP probing device has been calibrated by the TRL to provide a profile of CBR values over a range of depths of up to 1.50m.

INSTRUMENTATION

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

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

1. The report is prepared for the exclusive use of the Client named in the document and copyright subsists with Geotechnics Limited. Prior written permission must be obtained to reproduce all or part of the report. It is prepared on the understanding that its contents are only disclosed to parties directly involved in the current investigation, preparation and development of the site.
2. Further copies may be obtained with the Client's written permission, from Geotechnics Limited with whom the master copy of the document will be retained.
3. The report and/or opinion is prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to Geotechnics Limited at that time. Re-consideration will be necessary should those details change. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Geotechnics Limited.
4. The assessment of the significance of the factual data, where called for, is provided to assist the Client and his Engineer and/or Advisers in the preparation of their designs.
5. The report is based on the ground conditions encountered in the exploratory holes together with the results of field and laboratory testing in the context of the proposed development. The data from any commissioned desk study and site reconnaissance are also drawn upon. There may be special conditions appertaining to the site, however, which are not revealed by the investigation and which may not be taken into account in the report.
6. Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical and any geoenvironmental data would be required to provide discussion and evaluations appropriate to these methods.
7. The accuracy of results reported depends upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristics of the strata as a whole (see accompanying notes on Investigation Techniques). Where such measurements are critical, the technique of investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the Company where necessary.
8. The samples selected for laboratory test are prepared and tested in accordance with the relevant Clauses of BS 1377 Parts 1 to 8, where appropriate, in Geotechnics Limited's UKAS accredited Laboratory, where possible. A list of tests is given.
9. Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.
10. Any unavoidable variations from specified procedures are identified in the report.
11. Specimens are cut vertically, where this is relevant and can be identified, unless otherwise stated.
12. All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.
13. Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.
14. Classification of materials as Made Ground is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for fill materials that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.
15. The classification of materials as Topsoil is generally based on visual description and should not be interpreted to mean that the material so described complies with the criteria for Topsoil used in BS 3882 (2007). Specific testing would be necessary where such definition is a requirement.
16. Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.
17. Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.
18. Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. The foundations should be designed in accordance with the good practice embodied in BS 8004:1986 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.
19. Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.
20. The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.

Appendix D. Ground Gas Results

All Gas Monitoring Results

BH Number	Carbon dioxide concentration (%)	Methane concentration (%)	Flow Rate
CP1	0	0	0
CP2	0.4	0.1	1
CP4	35	38	1.4
CP5	9.4	5.5	1.1
CP6	0.1	0.1	0.1
CP7	0.1	0.1	0.1
WS02	3.5	0	0.6
WS05	8.3	0	0.1
WS06	25	0.4	0.3
WS09	30	34.5	1.4
WS10	18	4.3	0.3
BH12	0	0	0
WS1	0	0	0
WS2	0	0	0
WS3	0	0	0
WS4	0	0	0
WS5	0	0	0
WS6	0	0	0
WS7	0	0	0
WS8	0	0	0
WS9	0	0	0

How many rounds of gas monitoring undertaken?	3
Over what time period?	6 weeks
How many boreholes were assessed?	8

Determining the Gas Screening Value

Maximum Carbon dioxide concentration	Maximum methane concentration	Maximum Flow rate
35	38	1.4

Gas Screening Value (l/hr) = Max. borehole flow rate (l/hr) x Max. gas concentration (%)

Gas Screening Value = 0.532

Appendix E. CAT Waste Results

Site Name	A5036 - Port of Liverpool
Location	Rimrose Valley Park
Site ID	
Job Number	5136024
Date	11/12/2015
User Name	lucy.rutland@atkinsglobal.com
Company Name	Atkins

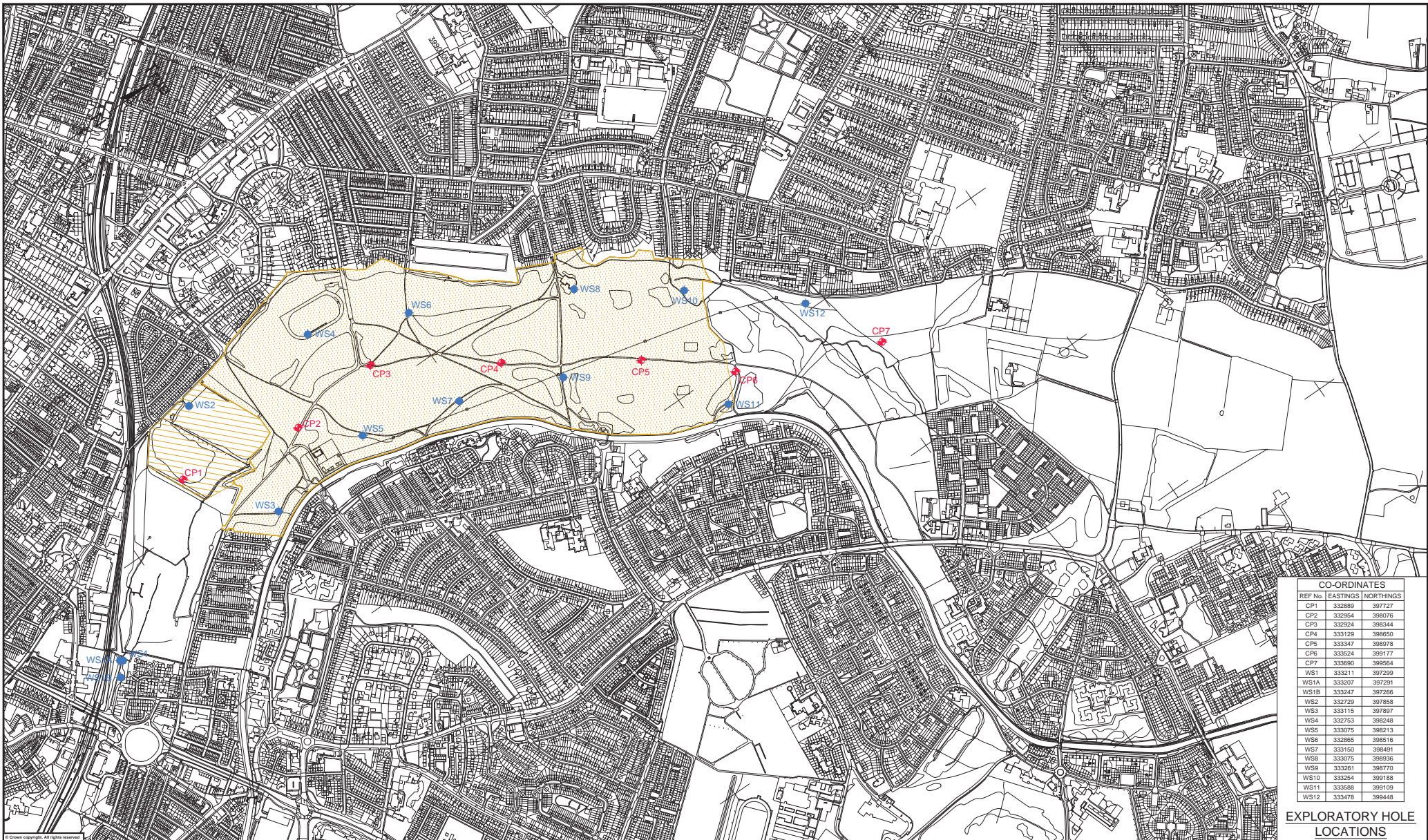
Hole ID	Sample Depth	Hazardous Waste Y/N	HP1	HP2	HP3	HP4	HP5	HP6	HP7	HP8	HP9	HP10	HP11	HP12	HP13	HP14	HP15	HP16
WS01B	0.5	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS01B	1	Y	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
WS02	0.5	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS02	1	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS02	2.70-3.00	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS02	3.70-4.00	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS02	4.70-5.00	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS04	1	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS04	3.30-3.70	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS04	4.00-4.70	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS05	0.5	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS05	2.30-2.50	Y	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
WS05	5.00-5.60	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS06	1	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS06	1.90-2.50	Y	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
WS06	4.00-4.50	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS07	1	Y	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
WS07	3.50-3.70	Y	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
WS07	5.30-5.65	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS08	1.80-2.00	Y	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
WS08	4.70-5.00	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS08	5.50-6.00	Y	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
WS09	1	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS09	1.40-1.70	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS09	4.30-4.70	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS10	1	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS10	2.00-2.20	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
WS12	0.2	N	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Appendix F. Revised Landfill Boundary

DO NOT SCALE

Millimetres

0 10



CO-ORDINATES		
REF No.	EASTINGS	NORTHINGS
CP1	332889	397727
CP2	332954	398078
CP3	332924	398344
CP4	333129	398650
CP5	333347	398978
CP6	333524	399177
CP7	333690	399564
WS1	333211	397299
WS1A	333207	397291
WS1B	333247	397268
WS2	332729	397858
WS3	333115	397897
WS4	332753	398248
WS5	333075	398213
WS6	332865	398516
WS7	333150	398491
WS8	333075	398636
WS9	333261	398770
WS10	333254	399188
WS11	333588	399109
WS12	333478	399448

EXPLORATORY HOLE LOCATIONS

NOTE:

- AS BUILT COORDINATES PROVIDED BY GEOTECHNICS LIMITED
- INDICATIVE WHABBS TIP LANDFILL BOUNDARY BASED ON GI

KEY:

- EXTENT OF HISTORICAL LANDFILL SITE CONFIRMED BY SITE INVESTIGATION.
- CABLE PERCUSSION EXPLORATORY HOLE
- WINDOW SAMPLE EXPLORATORY HOLE
- ADDITIONAL AREA OF LANDFILL INDICATED FROM INITIAL SITE INVESTIGATION

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

- Construction
- LOCATION OF EXISTING SERVICES AND OVERHEAD CABLES TO THE PROXIMITY OF EXPLORATORY HOLES TO BE CONFIRMED.
 - INVASIVE SPECIES PRESENT IN PARK MAINTENANCE/CLEANING (Enter "None" if applicable)

Use	(Enter "None" if applicable)
Decommissioning / Demolition	(Enter "None" if applicable)

Rev.	Date	Description	By	Check	App'd
P01	16/03/16	Final Issue		TRM	MP
P02	20/11/16	As Built Information		SH	MS
P03.1	---	As Built Information	---	---	---

WORK IN PROGRESS

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Project Title		Drawing Title	
A5036 PORT OF LIVERPOOL ACCESS		PRELIMINARY GROUND INVESTIGATION EXPLORATORY HOLE LOCATIONS	
Scale	1:5000	Designed / Drawn	Checked
Original Size	A1	SH	NA
Date	18/03/16	Approved	MP
Date	18/03/16	Author	MP
Project	HA549387 - ATK - HGT - ZZ - SK - GE - 0001	Volume	
Location		Revision	P03

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