Phase II Geo-Environmental Assessment Report

C2415 - Water Orton Primary School

September 2017

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WATER ORTON PRIMARY SCHOOL
PLANK LANE
WATER ORTON

Phase II Geo-Environmental Assessment Report

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Executive Summary

HSP Consulting has been commissioned by Wilmott Dixon Construction Ltd to provide a Phase II Geoenvironmental Assessment report providing information on likely constraints to the development of the site, parameters for design and recommendations for any mitigation measures should they be required.

The site is an open field located off Plank Lane, Water Orton approximately 0.35km south of Water Orton village centre. The approximate National Grid Reference for the centre of the site is (NGR) 417521,290868. A single storey primary school is proposed in the centre of the site with car parking in the east, hard play area in the west and sports pitches and soft play areas across the remainder of the site.

The ground investigation comprised 10No window sample boreholes to a maximum depth of 5.00m begl, 3No trial pits with soakaway testing to a maximum depth of 1.10m begl and 6No cable percussive boreholes to a maximum depth of 8.00m begl to provide information for foundation design and obtain representative disturbed soil samples to forward for geotechnical and geo-environmental analysis. In addition, six shallow pits were excavated to a maximum depth of 0.90m begl to take samples for waste acceptance criteria testing.

The geology of the site comprises topsoil overlying superficial River Terrace deposits comprising sandy gravelly CLAY to a maximum depth of 2.10m begl overlying SAND and GRAVEL. This was underlain by bedrock deposits of the Mercia Mudstone Formation comprising weathered MUDSTONE and CLAY from a minimum depth of 0.15m begl. Made ground comprising clayey gravelly SAND was encountered in the south of the site to a maximum proven depth of 0.80m begl.

The loadings for the proposed development, based on a column load of 350kN, are likely to be in the range of 150-180kN/m^2. Four mature oak trees are to be removed from within and adjacent to the building footprint. In accordance with NHBC Standards Chapter 4.2, due to the presence of medium volume change potential fine soils the foundations should be deepened to over 2.50m depth within 6.00m from the centre of the trees, decreasing in steps in line with table 14 in NHBC Standards Chapter 4.2, subject to the ABP being suitable for the development. Heave precautions will be required on any foundations over 1.50m depth.

Due to the variability of the soils there is potential for differential settlement and reinforcement will be required within strip foundations. If pad foundations are chosen then these will need to vary in size across the building footprint.

Should reinforced foundations be considered inappropriate a mini piled foundation may be utilised, founding in the weathered Mercia Mudstone Formation deposits from a minimum depth of 4.00m begl. The design of the pile should be carried out by and warranted by a specialist piling contractor.

It is considered appropriate to adopt a basic Design Sulphate Class of DS-1 together with an Aggressive Chemical Environment for Concrete (ACEC) of AC-1.

The chemical analysis and risk assessment undertaken to date indicate that the soils on site should be considered suitable for the proposed end use and mitigation is not required during redevelopment.

Analysis of the ground gas monitoring undertaken indicates the site falls into a Characteristic Situation 1 / Green. Therefore, gas protection measures are not necessary within any new development.

Soakaway testing was undertaken in three of the trial pits. The water level did not drop below 75% of the starting level in any of the pits within a 24 hour period. Comparison of this data with table 7.1 Permeability and Drainage Characteristics of Soils Terzaghi and Peck indicates the ground to be of poor drainage potential. It is therefore considered that the natural fine soils at the site would not be suitable for soakaway drainage.

The executive summary contains an overview of key findings and conclusions. However no reliance should be placed on the executive summary until the whole of the report has been read. Other sections of the report may contain information which puts into context the findings noted within the executive summary.

1. Introduction

1.1 Background

Wilmott Dixon Construction Ltd propose to construct a single storey primary school with associated hard and soft play areas and car parking at Plank Lane, Water Orton. A Proposed Site Development Plan is included in Appendix I. Our Client requires an overview of the contamination and ground conditions at the site in order to inform the design of the buildings.

1.2 Client Brief & Scope

HSP Consulting has been commissioned by Wilmott Dixon Construction Ltd to undertake an intrusive ground investigation at the site to investigate the existing ground conditions and provide information on likely constraints to the development, parameters for design and recommendations for any mitigation measures should they be required.

The report presents the following information:

- a summary of the previous Geo-environmental Reports (Section 1.4 below),
- details of the ground investigation undertaken and the ground conditions encountered,
- details and results of the geotechnical testing and contamination analysis,
- recommendations for mitigating constraints to the proposed development where appropriate and providing parameters for foundation design.

Where applicable, the fieldwork was undertaken in accordance with BS5930:2015 Code of Practice for Site Investigations and BS10175:2011+A1:2013 Investigation of Potentially Contaminated Sites.

1.3 Report Objectives

The objectives of this report are to:

- establish the geological and hydrogeological conditions using existing available/published information;
- summarise available information and identify site specific geotechnical and environmental hazards which may place a constraint upon the proposed site use;
- produce an updated Conceptual Site Model identifying potential pollution linkages between sources of contamination, pathways and receptors;

1.4 Limitations

The recommendations made in this report are based on the findings of the intrusive ground investigation undertaken by HSP Consulting Ltd between 7th to 11th August 2017.

1.5 Previous Reports

No previous reports have been made available to HSP Consulting Engineers Ltd by the Client.

2. Review of Existing Information & Geoenvironmental Setting

2.1 The Site

2.1.1 Location

The site is located off Plank Lane, Water Orton approximately 0.35km south of Water Orton village centre. The approximate National Grid Reference for the centre of the site is (NGR) 417521,290868.

2.1.2 Description

The site is broadly irregular in shape and is approximately 2.65Ha in area.

The site is an open field with an enclosure marked by wooden fencing in the south. A public footpath runs north to south through the east of the site.

A number of trees are present across the site. Four mature oak trees are present in the centre of the site and a mix of beech, apple, holly and oaks are present around the site boundaries.

The site is bound by wooden panel fencing and wooden post and rail fencing to the east and south. The western and northern boundaries are defined by hedgerows and shrubs.

The site slopes down to the west by approximately three metres, from approximately 83.80m in the east and 80.80m in the west. There is a step in elevations running north to south in the centre of the site of approximately 0.50m.

2.1.3 Surrounding Land Use

The main features of interest identified from the site walkover are:

North:	Fields with housing beyond.
East:	Residential properties.
South:	Fields and park with housing and school beyond.
West:	Agricultural land.

2.1.4 Site Access

The main vehicle entrance for the site is in the south through a gate off Plank Lane.

2.1.5 Proposed End Use

A single storey primary school is proposed in the centre of the site with car parking in the east, hard play area in the west and sports pitches and soft play areas across the remainder of the site. A proposed development plan is included in Appendix I.

2.2 Geology

2.2.1 Made Ground

The BGS mapping does not indicate any Made Ground on the site.

2.2.2 Superficial Deposits

The BGS mapping indicates that the site is underlain by superficial River Terrace deposits described by the BGS as *Sand and gravel, locally with lenses of silt, clay or peat.*

2.2.3 Bedrock Geology

BGS bedrock mapping indicates the site is underlain by bedrock deposits of the Mercia Mudstone Group described by the BGS as *Dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite widespread; sandstones are also present.*

2.2.4 Structural Geology

No faults are shown within the site vicinity on the BGS mapping.

2.3 Pertinent Site Sensitivity Information

Based on information available freely from BGS, Ordnance Survey and Environment Agency, the geo-environmental setting of the site is summarised as follows:

- Historic mapping for the site indicates that the site has been an open field in the west with trees in the east since at least 1880. The trees were cleared by 1982. The surrounding area has been predominantly residential with a railway line present 0.25km to the north.
- The site is underlain by River Terrace superficial deposits.
- The site is underlain by Mercia Mudstone Group bedrock deposits.
- Made Ground is not indicated within the site boundary on the published geological mapping.
- The underlying superficial geology is designated as a Secondary A Aquifer.
- The underlying bedrock geology is designated as Secondary B Aquifer.
- Minworth Landfill and Water Orton M42 Landfill are located within 250m of the site.

3. Fieldwork & Factual Information

Site work was carried out between 7th to 11th August 2017. Where applicable, the fieldwork was undertaken in accordance with BS5930:2015 Code of Practice for Site Investigations (Ref. 7) and BS10175:2011+A1:2013 Investigation of Potentially Contaminated Sites (Ref. 9).

The boreholes were positioned as close to the proposed building footprints as possible to provide information for foundation design and obtain representative soil samples for geotechnical and geo-environmental analysis.

3.1 Exploratory Methods

The physical methods of investigation employed were 10No window sample boreholes to a maximum depth of 5.00m begl, 3No trial pits with soakaway testing to a maximum depth of 1.10m begl and 6No cable percussive boreholes to a maximum depth of 8.00m begl. In addition, six shallow pits were excavated to a maximum depth of 0.90m begl to take samples for waste acceptance criteria testing. The exploratory holes were logged and sampled by an Engineer from HSP Consulting Ltd and the logs are presented in Appendix II. The exploratory hole locations are shown on the Ground Investigation Layout Plan presented in Appendix III.

Fragmentary bulk, disturbed and undisturbed samples were recovered from materials revealed within all of the exploratory holes. Geo-environmental samples, placed in plastic tubs and glass jars supplied by the laboratory, were also obtained specifically for chemical analysis. The samples were taken to UKAS accredited laboratories for further examination and testing.

3.2 In-situ Testing

3.2.1 Standard Penetration Tests

Standard Penetration Tests (SPTs) were carried out at 1.00m intervals to 5.00m begl then at 1.50m intervals to the terminal depth within all the boreholes. The SPTs were undertaken in accordance with BS 1377:1990 and the results are included on the appended borehole logs (Appendix II).

3.3 Laboratory Testing

The laboratory testing schedules were prepared by HSP Consulting Ltd.

3.3.1 Geotechnical Testing

Geotechnical testing has been scheduled to be undertaken by a UKAS accredited laboratory as part of the works at the site:

- Particle Size Distribution
- Triaxial Shear Strength Test
- Plasticity Indexes
- Natural Moisture Content
- Sulphate Analysis

The laboratory testing is currently being carried out by Professional Soils Laboratory Limited (UKAS accredited, laboratory No.4043) in accordance with BS1377:1990 using calibrated equipment specifically for the British Standard.

3.3.2 Chemical Analysis

The geo-environmental samples retained specifically for chemical analysis were stored in cooled containers until delivery to the laboratory by courier.

Chemical analysis was scheduled on twelve soil samples for the presence of a selected suite of potential contaminants as outlined in the tables below:

Exploratory Hole Location & Depth	Sample Description
WAC1 0.30m	CLAY[1,3,4]
WAC2 0.50m	CLAY[1,3,4]
WAC3 0.80m	CLAY[1,3,4]
WAC4 0.40m	SAND[1,3,4]
WAC5 0.90m	CLAY[1,3,4]
WAC6 0.60m	SAND[1,3,4]
WS1 0.80m	SAND[1,2]
WS3 0.20m	Topsoil[1,2]
WS5 0.00m	Topsoil[1,2]
WS5 0.90m	CLAY[1,2]
WS7 0.20m	Made Ground[1,2,3]
WS7 0.70m	Made Ground[1,2,3]

[1] HSP Standard Suite
[2] Organic Matter
[3] Asbestos Screen
[4] Waste Acceptance Criteria
[5] BS3882 Topsoil Testing
[6] HSP Leachate Suite

Metals	Cadmium	Chromium (III & VI)	Copper
	Lead	Mercury	Nickel
	Zinc		
Semi Metals and Non-metals	Arsenic	Boron	Selenium
Others	pH	Asbestos	
Inorganic Chemicals	Cyanide	Sulphate	Sulphide
Organic Chemicals	PAH (US EPA 16)	TPH (CWG)	Phenol

The contamination analysis was carried out by Chemtest Environmental Ltd (UKAS accredited, laboratory No. 2183) during the period 11th to 22nd August 2017. The results are presented in Appendix V.

3.4 Ground Conditions

3.4.1 Published Geology

The published geology indicates the site is underlain by superficial River Terrace deposits comprising sand and gravel overlying bedrock deposits comprising the Mercia Mudstone Group as described in section 2.2.3 above.

3.4.2 Ground Conditions on site or General Geology & Revealed Strata

The exploratory hole data generally confirms with the published information, although made ground was identified in the south of the site. The strata across the site generally comprises:

Table 1 – Encountered Ground Conditions

Strata		Depth (mbegl)	Thickness (m)	Description
Anthropogenic	MADE GROUND	G.L - 0.10	0.10	MADE GROUND comprising brown sandy clay.
	MADE GROUND	0.10 – 0.50	0.40	MADE GROUND comprising black gravelly sand.
	MADE GROUND	0.10 – 0.50	0.40	MADE GROUND comprising brown clayey gravelly sand.
	MADE GROUND	0.20 – 0.80	0.30	MADE GROUND comprising brown sandy gravelly clay.
Superficial	RIVER TERRACE DEPOSITS	0.20 – 2.10	1.55	Firm orangish brown and yellowish brown sandy gravelly CLAY.
		0.35 – 3.10	2.05	Yellowish brown and brown gravelly SAND.
		1.20 – 2.80	0.70	Orangish brown and reddish brown SAND.
Bedrock	MERCIA MUDSTONE GROUP	0.15 – 5.00	2.60	Firm to stiff reddish brown and grey sandy gravelly CLAY.
		1.90 – 8.00	5.10	Extremely weak reddish brown and grey MUDSTONE.

3.5 Groundwater Levels

Groundwater was not encountered during the site investigation.

Monitoring of the groundwater has been undertaken as part of this investigation on four occasions. Water was encountered in all wells from a minimum depth of 3.61m begl.

3.6 Ground Gas Monitoring

Sources of potential ground gas have been identified in the site vicinity including Minworth Landfill and Water Orton M42 Landfill. Gas monitoring installations were constructed within three of the boreholes at the site (BH1, 2 and 5). Each well has been constructed using 50mm diameter HDPE pipe with the top one metre being plain and the remainder slotted. All of the borehole installations have a 6mm pea gravel surround to the slotted pipe with a bentonite seal above and a gas tap. The covers are cemented flush with ground level and are round lockable stopcock covers.

HSP Consulting uses a GFM 430 Gas Analyser. Prior to its use a calibration check can be performed against gas readings in air. It is recommended that this check is undertaken once on each day the analyser is used. Annual calibration is undertaken on the unit and a copy of this certificate has been included within Appendix VI.

The results of the ground gas monitoring undertaken to date are discussed in Section 5.5 below.

3.7 Visual and Olfactory Evidence of Contamination

Fragments of ash and clinker were noted in WS7 and WS8.

4. Geotechnical Assessment

4.1 Detailed Ground Model

For the purposes of this assessment the window sample and cable percussion borehole information has been utilised. The exploratory hole logs are presented in Appendix II.

4.1.1 Made Ground

Made Ground was identified in WS7, WS8 and WS10. This comprised turf over brown sandy CLAY overlying black gravelly SAND with gravel of brick, ash, clinker and mixed lithology in WS7 and WS8 to a maximum depth of 0.50m begl. This was underlain by reworked natural deposits comprising firm brown slightly gravelly very sandy CLAY with gravel of brick, ash and mixed lithology to a maximum depth of 0.80m begl.

In WS10 brown clayey gravelly SAND with gravel of mixed lithology was identified between 0.10m and 0.50m begl.

4.1.2 River Terrace Deposits

Superficial River Terrace Deposits were encountered in all locations with the exception of BH6, WS5 and WS6. This variously comprised firm orangish brown and yellowish brown sandy gravelly CLAY with gravel of mixed lithology between 0.20m and 2.10m begl in WS3, WS4, WS7 and WS9 and BH1-5.

Yellowish brown and brown fine to coarse SAND and sub-angular to rounded fine to coarse GRAVEL of mixed lithology was encountered in all locations where superficial deposits were identified with the exception of WS9 between 0.35m and 3.10m begl. In WS1, WS4 and WS7 this was interbedded with bands of reddish brown and orangish brown locally clayey fine to coarse SAND between 1.20m and 2.80m begl.

4.1.3 Mercia Mudstone Group

Bedrock deposits of the Mercia Mudstone Group were encountered across the site from a minimum depth of 0.15m begl and comprised weathered firm to stiff reddish brown and grey sandy locally gravelly CLAY with gravel of mixed lithology between 0.15m and 5.00m begl in all window sample locations with the exception of WS7 and WS10.

This was underlain by extremely weak reddish brown and light grey MUDSTONE from a minimum depth of 1.90m begl to a maximum proven depth of 8.00m begl.

4.1.4 In-situ Testing and Assessment

Soil infiltration testing was undertaken by means of soakaways in general accordance with BRE Digest 365 Soakaway Design (Ref. 3) in the three of the trial pits excavated. The results are discussed in section 4.7 below and included in Appendix VIII.

A series of Standard Penetration Tests (SPT's) undertaken within all boreholes have returned a SPT 'N' values in the range of 8 - 36 at 1.00m depth, 10 – 50 at 2.00m depth and 7 - 50 at 3.00m depth. The following table summarises the N values at depth across the site within the natural strata.

Table 2 – SPT N Values

Depth (m)	Range of 'N' Values	Mean 'N' Value	Description
1.00	8 - 36	18.5	SAND/CLAY/MUDSTONE
2.00	10 – 50	28	SAND/GRAVEL/MUDSTONE
3.00	7 – 50	27	SAND/GRAVEL/MUDSTONE
4.00	30 – 44	38	SAND/GRAVELMUDSTONE
5.00	23 – 50	44	MUDSTONE

Twenty Plasticity Index tests have been undertaken to confirm the visual description and engineering behaviour of the soils. The available results are included in Appendix IV.

The plasticity index of the fine deposits is in the range 10 to 33% indicating clays of low to high plasticity. One sample from WS102 at 1.50m was non-plastic. The modified plasticity index of the fine soils is in the range 9.2% to 33% indicating soils of Low to Medium Volume Change Potential (VCP) in accordance with the NHBC guidance on building near trees (Ref. 11). The natural moisture content of the samples was in the range 10 to 35%.

Four Particle Size Distribution analysis tests have been undertaken to confirm the visual description and engineering behaviour of the soils. The results are included in Appendix IV.

Unconsolidated undrained shear strength tests in triaxial compression were successfully carried out on three samples of clay with returned Cu values of 61 - 112kPa.

4.2 Earthworks

Significant earthwork operations are not expected at the site due to constraints presented by the existing ground levels at the boundaries. It is likely that near surface fine soil arisings generated on site will be suitable for use as engineered fill on site, subject to testing and assessment.

4.3 Excavations

Excavations to proposed formation level for new foundations should generally be readily achievable adopting standard excavation plant. However, random and potentially severe falls should be anticipated from the faces of near vertically sided unsupported excavations carried out at the site. Where personnel are required to enter near vertically sided excavations, it is considered that full support should be provided to the full depth of all excavations.

It is recommended that all support systems are continually assessed by fully trained or experienced personnel.

Groundwater was not encountered during the fieldwork however, there is a possibility that groundwater entries may be encountered at shallow depths during construction. It should be noted that groundwater levels may vary due to seasonal variations or other effects. Should shallow groundwater entries be encountered at the site during groundwork operations traditional sump and pump dewatering should be sufficient if required.

4.4 Foundations

The development proposals for the site indicate a single storey primary school at the site. The proposed development plans for the site can be seen in Appendix I. Should development plans alter a geotechnical engineer from HSP must be consulted to review the foundation options.

For the purpose of this foundation assessment the information gained from all boreholes with the exception of WS1-3 and WS5-6, which are outside the proposed building footprint, has been considered.

The table below indicates the indicative allowable bearing pressure (ABP) that could be achieved using strip or pad foundations across the building footprint. An ABP has been calculated using the mean of the corrected SPT $(N_1)_{60}$ values for the borehole group at 1m intervals from the existing ground level.

The made ground deposits encountered are not considered to be suitable as a formation layer and SPTs within these deposits are not considered within the calculations.

Table 3 – Indicative Allowable Bearing Pressures

Depth (m)	Mean SPT $(N1)_{60}$ Value	Range of 'N' Values	Eurocode 7 Soil Strength Description	Consistency (BS5930) Description	Approximate ABP (kN/m^2) – 0.60m wide strip footing	Approximate ABP (kN/m^2) – 2x2m pad footing
1.00	16	8 - 18	Medium Strength	Firm	130	140
2.00	35	16 – 50	Dense/Extremely Weak	Dense/Extremely Weak	150 – 250	150 - 250
3.00	39	17 – 50	Very Dense/Extremely Weak	Very Dense/Extremely Weak	170 - 250	170 - 250
4.00	43	31 – 44	Very Dense/Extremely Weak	Very Dense/Extremely Weak	250	250
5.00	44	23 – 50	Very Dense/Extremely Weak	Very Dense/Extremely Weak	250	250

The loadings for the proposed development, based on a column load of 350kN, are likely to be in the range of 150-180kN/m^2. Foundations should be designed in accordance with NHBC Standards Chapter 4.2 assuming soils of medium volume change potential. Four mature oak trees are to be removed from within and adjacent to the building footprint. NHBC Standards Chapter 4.2 indicates the foundations within 6.00m of the trees should be Engineer designed. Any stepping should be in accordance with table 14 in NHBC Standards Chapter 4.2, subject to the ABP being suitable for the development. Heave precautions will be required on any foundations greater than 1.50m depth due to the influence of trees.

Due to the variability of the soils there is potential for differential settlement and reinforcement will be required within strip foundations. If pad foundations are chosen then these may need to vary in size across the building footprint to cover the range of allowable bearing pressures given in Table 3.

The allowable bearing capacity value incorporates a factor of safety of 3 and total settlements are not expected to exceed approximately 25mm.

Should traditional reinforced foundations be considered inappropriate a mini piled foundation may be utilised, founding in the weathered Mercia Mudstone Formation deposits from a minimum depth of 4.00m begl. The design of the pile should be carried out by and warranted by a specialist piling contractor.

4.5 Ground Floor Slab

Due to the removal of oak trees from the building footprint and development area and the presence of soils of medium volume change potential a suspended ground floor slab will need to be utilised.

4.6 Concrete Classification

The results of sulphate and pH testing carried out on selected soil samples taken during this investigation have been compared with the recommendations outlined in BRE Special Digest 1, Part 1: 2005.

The guidelines given in BRE Special Digest 1 are based upon a site classification relating to its previous usage. It is considered appropriate to define this site as a 'greenfield site' location for the purposes of concrete classification.

On the basis of the above, it is considered appropriate to adopt a basic Design Sulphate Class of DS-1 together with and Aggressive Chemical Environment for Concrete (ACEC) of AC-1.

4.7 Drainage

Soakaway testing was undertaken in three of the trial pits. The results are reported in Appendix VII.

The water level did not drop below 75% of the starting level in any of the pits within a 24 hour period. Comparison of this data with table 7.1 Permeability and Drainage Characteristics of Soils Terzaghi and Peck indicates the ground to be of poor drainage potential. It is therefore considered that the natural fine soils at the site would not be suitable for soakaway drainage.

5. Environmental Assessment

5.1 Introduction

The approach to the human health risk assessment reported here follows the principals given in CRL 11, i.e. application of the following assessment hierarchy:

- Tier 1 risk screening by establishment of potential pollutant linkages, i.e. the preliminary conceptual site model (PCSM), or
- Tier 2 generic quantitative assessment using generic assessment criteria (GACs) that represent 'acceptably low' risk, or
- Tier 3 quantitative risk assessment using site specific assessment criteria (SSACs) that represent 'unacceptable risk', or where generic assessment criteria are not available or they are not applicable to the CSM.

The results of laboratory analysis have been screened against GACs including the Defra Category 4 Screening Levels (C4SL) and LQM and CIEH S4ULs for Human Health Risk Assessment (Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3180. All rights reserved) (Refs 11 and 12 respectively).

In the absence of a standard scenario for a school environment, the standard exposure scenario of residential without plant uptake has been used to identify potential exposure pathways for human health receptors. Controlled water, flora and fauna and property receptors have also been included within the CSM.

It should be noted that organic contamination (PAH, TPH and BTEX) have been screened against the GAC for 1%Soil Organic Matter (SOM).

The assessment of PAHs is undertaken using the surrogate marker approach; recommended by Health Protection Agency (2010) guidance, providing the PAH profile is sufficient similar to the coal tars tested by Culp et al (1998). Where PAH profile is not sufficiently coal tar like the TEF method is adopted using the LQM and CIEH S4ULs. Prior to assessment a PAH profile is generated for all samples analysed for PAH using the LQM PAH Profiling Tool v1.3, the graphical output is presented in Appendix V.

5.2 Assessment of Soil Analysis Results

Twelve samples, as detailed in section 3.3.2, were scheduled for analysis from the development area. These provide a basis for characterising the soils to outline the potential impacts on human health and any environmental receptors from any contamination found.

The screening process for on-site human health receptors show that the GACs, representative of minimal risk for a residential with plant uptake setting were not exceeded. The results for the potential contaminants of concern were all below the screening criteria for individual contaminant concentrations.

Eight of the soil samples derived of Made Ground were submitted for asbestos screen and identification. No asbestos was identified.

5.3 Human Health Mitigation

The concentrations of potential contaminants recorded at the site are not considered to pose a significant possibility of significant harm to the proposed end use of the site.

Should any obvious evidence of unexpected contamination be encountered during the redevelopment works it should be reported to HSP so that an inspection can be made and appropriate sampling and assessment work be carried out.

Appropriate health and safety precautions should be adopted during any excavation works to avoid exposure to potentially contaminated soils and dust. Consideration should be given to the HSE document HSG 66 'Protection of workers and the General Public during Redevelopment of Contaminated Land'.

The approval of the local Environmental Health Officer should be sought with respect to the soil contamination assessment and mitigation proposals.

5.4 Water Supply

The environmental testing for the site has been compared to the following document in order to assess the most appropriate pipe material that should be used upon the site for mains water supply:

'Guidance for the selection of water supply pipes to be used in Brownfield sites – UK Water Industry Research – Ref: 10/WM/03/21.'

Based on the chemical analysis report it is considered that specialist materials are not likely to be required for water supply pipes at the site. However confirmation of supply pipes should be sought from utility providers.

5.5 Ground Gas Risk Assessment

Sources of potential ground gas have been identified in the site vicinity. Ground gas concentrations have been monitored on four occasions over a four week period in order to obtain an indication of the ground gas regime at the site.

The results indicate that methane has not been recorded above the limits of detection of the machine. Carbon dioxide has been recorded at concentrations up to a maximum 3.6% by volume in air. Positive gas flows above the limits of detection have not been recorded.

The results have been assessed in line with the guidance provided in NHBC Guidance on Methane and Carbon Dioxide (Ref 15) CIRIA Document C665 'Assessing Risks Posed by Hazardous Ground Gases to Buildings' (Ref 16.). Comparison of these results with Table 8.5 of the CIRIA document indicates that the site falls into a Characteristic Situation 1.

Therefore, gas protection measures are not necessary within any new developments upon the site.

Significantly depleted oxygen levels were observed in BH5 during the monitoring. This poses a risk of asphyxiation to construction and maintenance workers in confined spaces such as excavations or manhole chambers. A confined spaces risk assessment should be carried out prior to working in any buried structures or excavations.

The certificates and summary for the gas monitoring are included as Appendix VI.

5.6 Waste Classification

The results of the chemical testing have been assessed using web-based software for classifying hazardous waste, using HazWasteOnline[tm]. The majority of the materials tested are likely to be classified as non-hazardous waste, however the levels of zinc in the sample from WAC4 have resulted in the material being classified as hazardous. The results are included in Appendix VIII.

The results of the WAC tests have been compared to Landfill Waste Acceptance Criteria Limits. Fluoride levels in sample WAC2 at 0.50m classify the material as inert hazardous waste.

It may be necessary to carry out a delineation exercise to determine the extent of the hazardous material to reduce costs for off-site removal.

5.7 Updated Conceptual Site Model

The PCSM and Summary of plausible pollutant linkages was produced by undertaking a Source-Pathway-Receptor analysis of the site. Based on the findings of this and the previous investigation the updated conceptual site model has been updated and is presented in the table below.

Table 6 - Updated Conceptual Site Model.

Source	Pathway	Receptor	Consequence	Probability	Risk	Comments
On site **S1: Made Ground in south of site** **S2: Agricultural Land**	**P1:** Human uptake pathways • direct contact, • ingestion of soils and dust, • inhalation of fugitive dust.	**R1:** End Users **R2:** Construction and maintenance workers	Mild	Unlikely	Very Low	Elevated concentrations of contaminants have not been identified within the topsoil and natural material on site, therefore mitigation measures are not required. The risk is considered to be VERY LOW.
	P2: Horizontal and vertical migration of contaminants through potentially permeable soils and rocks. **P3:** Migration of contaminants along preferential pathways (man- made). **P4:** Surface runoff.	**R3:** Controlled Water: Groundwater & Surface Water	Mild	Unlikely	Very Low	The underlying geology comprises superficial River Terrace deposits which are classified as a Secondary A Aquifer and Mercia Mudstone Group bedrock deposits which are classified as a Secondary B Aquifer. Elevated concentrations of contaminants have not been identified within the topsoil and natural material on site. Based on the information available, the risk to surface water and groundwater is considered to be VERY LOW.
Off Site (within 250m) **S3: Made Ground associated with development in the area** **S4: Landfills** **S5: Historical & Contemporary Land Use: railway land, agricultural land**	**P2:** Horizontal and vertical migration of contaminants through potentially permeable soils and rocks. **P3:** Migration of contaminants along preferential pathways (man- made). **P4:** Surface runoff. **P5:** Vertical and lateral migration of ground gases and/or vapour.	**R1:** End Users **R2:** Construction and maintenance workers	Mild	Unlikely	Very Low	Elevated concentrations of contaminants have not been identified within the topsoil and natural material on site, therefore mitigation measures are not required. The risk is considered to be VERY LOW.
	P2: Horizontal and vertical migration of contaminants through potentially permeable soils and rocks. **P3:** Migration of contaminants along preferential pathways (man- made). **P4:** Surface runoff. **P5:** Vertical and lateral migration of ground gases and/or vapour.	**R4:** Property, services and substructures **R5:** Adjacent Residential Properties	Mild	Unlikely	Very Low	The natural and made ground deposits may contain sulphates that present a risk to buried concrete. Testing indicates the soils are unlikely to be aggressive to concrete and it is considered appropriate to adopt a basic Design Sulphate Class of DS-1 together with and Aggressive Chemical Environment for Concrete (ACEC) of AC-1. The chemical analysis of the soils indicates specialist materials are unlikely to be required for water supply pipes at the site. Ground gas monitoring has been carried out on four occasions over a four week period. The results indicate that the site is characterised as CS1. Gas protection measures

						will not be required; therefore the risk is considered to be VERY LOW.
	P6: Root uptake.	**R6:** Proposed Flora and fauna	Mild	Unlikely	Very Low	The risk of uptake to proposed flora and fauna is VERY LOW.

6. References

1. BRITISH GEOLOGICAL SURVEY. 1996. Birmingham. England and Wales Sheet 168. Bedrock and Superficial Deposits. 1:50,000 (Keyworth, Nottingham: British geological Survey).
2. British Geological Survey Lexicon Search - http://www.bgs.ac.uk/lexicon/
3. Department for Environment, Food and Rural affairs and the Environment Agency (2002) Soil Guideline Value Reports for Individual Soil Contaminants. Report R&D SGV Series. Environment Agency. 2004. Model Procedures for the Management of Contaminated Land CLR 11.
4. Department of the Environment Industry Profiles.
5. Site Investigation in Construction, Volume 3, Specification for Ground Investigation 2nd Edition.
6. BS 5930:2015 Code of Practice for Site Investigations.
7. BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)
8. BS10175:2011 +A1:2013 Investigation of Potentially Contaminated Sites - Code of Practice.
9. NHBC Standards, Chapter 4.2, Building near trees.
10. Land Quality Management and Chartered Institute for Environmental Health. 2009, 2nd Edition. Generic Assessment Criteria for Human Health Risk Assessment.
11. Department for Environment, Food and Rural Affairs and Contaminated Land: Applications in Real Environments (CL:AIRE) (December 2013). SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination.
12. BRE Special Digest 1:Concrete in Aggressive Ground, 2005, Building Research Establishment.
13. CL:AIRE The definition of Waste: Development Industry Code of Practice, 2008.
14. NHBC & RSK Group Plc, March 2007. Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present. Ed 4.
15. CIRIA C665 ‘Assessing Risks Posed by Hazardous Ground Gases to Buildings’

Appendix I

ASCH017 - Parking Spaces		
Type Comments	Comments	Type
Disabled car parking bay	Disabled bay with 1200mm safety zone	2400x4800
Disabled car parking bay: 4		
Standard parking bay		2400x4800
Standard parking bay: 46		
Grand total: 50		

ASCH016 - Timber Planters		
Description	Type Comments	Type
Timber planter	To avoid collisions with open windows	450x450x1200
450x450x1200: 7		
Timber planter	To avoid collisions with open windows	450x450x2200
450x450x2200: 1		
Timber planter	To avoid collisions with open windows	450x450x3500
450x450x3500: 15		
Grand total: 23		

Fence Key:

- 1 Site boundary
- 2 Weldmesh fence - 1800mm high, inc. gates
- 3 Timber Pallisade fencing - 1200mm high
- 4 Chainlink fence - 3000mm high

Revisions

F	Layout revised to suit clients' comments	21/02/17	FB
E	Layout revised to suit highways comments	14/02/17	ABW
D	Issue for information	26/08/16	JP
C	Issue for information	25/08/16	JP
B	Site constrains added	12/08/16	FB

No. Description — Date / Issued by

Notes:

Scale 1 to 1000 — 10 0 10 20 50 Metres

ASCH015 - Site Areas			
Type	Description	BB99 Allowance	Area
Grass - Playing Field	Playing Field - 86m x 56m inc run off	8400	4108 m²
Soft Informal and Social Area	Playing field / Soft play	1925	2242 m²
Hard Informal and Social Area	Hard Play Area, informal and social	1075	1076 m²
Hardcourt - MUGA	Multi Use Games Area - 22m x 37m	814	814 m²
Habitat	Habitat area	668	1967 m²
Hardcourt - Games Court	Games court, hard surfaced	626	629 m²
School Pedestrian Area	Pedestrian circulation		906 m²
Net site area: 7			11741 m²
Building Footprint	2FEN Keynes	Non-net area	2186 m²
School Vehicular Area	Vehicular circulation	Non-net area	2157 m²
Grass	Residual Grass	Non-net area	13893 m²
Non-net site area: 3			18236 m²
Grand total: 10			29978 m²

Site General:

Cycle Storage = 20 no. (10 hoops within polycarbonate shelters)

Note:
Traffic and pedestrian Signage to be confirmed.

Use figured dimensions only. All levels and dimensions to be checked on site. This drawing is to be read in conjunction with all other relevant drawings and specifications.

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Project Name:
Water Orton Primary School

Dwg Reference:
Site Layout - OPT1

Drawn: FB	Checked: ABW	Date: July 2016

Status: For Information

Scale: 1 : 1000 @ A3

Job No:	Dwg No:	Rev:
Z0188	SK-100	F

Appendix II

Borehole Log

Borehole No. **WS101**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 30/10/2017 - 30/10/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30 - 0.60	U		0.30			TOPSOIL: Blackish brown sandy clayey TOPSOIL.
		0.60 - 0.90	U					Light grey and orangish brown clayey SAND. Sand is fine to coarse. (River Terrace Deposits)
		1.20 - 1.50	U		1.10			Firm reddish brown and grey sandy CLAY. High plasticity (field description) (Mercia Mudstone).
		1.60 - 1.90	U					
		2.30 - 2.60	U					
		2.60 - 2.90	U					
		3.30 - 3.60	U		3.00			Reddish brown and grey MUDSTONE. Recovered as clayey gravelly sand. Sand is fine to coarse. (Mercia Mudstone)
		3.60 - 3.90	U					
		4.10 - 4.40	U					
		4.60 - 4.90	U					
					5.00			End of borehole at 5.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 5.00m depth and backfilled with arisings.

Borehole Log

Borehole No. **WS102**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 30/10/2017 - 30/10/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.50 - 0.80	U		0.30			TOPSOIL: Turf overlying blackish brown clayey sandy TOPSOIL.
		1.50 - 1.80	U					Orangish brown and yellowish brown SAND. Sand is fine to coarse. (River Terrace Deposits)
					2.20			End of borehole at 2.20 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 2.20m depth and backfilled with arisings.

Borehole Log

Borehole No. **WS103**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 30/10/2017 - 30/10/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 0.50	U		0.20			TOPSOIL: Turf overlying blackish brown clayey sandy TOPSOIL.
		0.70 - 1.00	U					Firm reddish brown and grey sandy gravelly CLAY. High plasticity (field description). Gravel is fine to medium angular of mudstone. (Mercia Mudstone)
		1.00 - 1.30	U					
								...becoming gravelly from 1.30m to 1.50m depth.
					1.50			Reddish and grey MUDSTONE. Recovered as clayey gravelly sand. Sand is fine to coarse. (Mercia Mudstone)
		1.70 - 2.00	U					
		2.00 - 2.30	U					
		2.70 - 3.00	U					
		3.10 - 3.40	U					
		3.70 - 4.00	U					
					4.00			End of borehole at 4.00 m

1 2 3 4 5 6 7 8 9 10

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 4.00m depth and backfilled with arisings.

AGS

Borehole Log

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Borehole No. **BH1**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type CP
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 07/08/2017 - 07/08/2017	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.50	B		0.10			Turf over blackish brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		0.50 - 1.00	B		0.60			Loose brown sandy topsoil (Driller's description)
		1.00		N=18 (2,3/3,4,5,6)				Stiff orangish brown and grey slightly gravelly very sandy CLAY. Low plasticity (field description). Gravel is sub-rounded to rounded fine to coarse of mixed lithology.
		1.00 - 1.45	D					
		1.50 - 2.00	B		1.50			Medium dense orangish brown slightly gravelly clayey fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		2.00		N=31 (3,4/6,6,8,11)				
		2.00 - 2.45	D					
		2.00 - 2.50	B					
		3.00		N=30 (4,5/5,8,8,9)	3.10			Extremely weak reddish brown and grey MUDSTONE recovered as clayey gravelly fine to coarse sand.
		3.00 - 3.45	D					
		3.00 - 3.50	B					
		4.00		N=31 (4,6/6,7,8,10)				
		4.00 - 4.45	D					
		5.00		N=50 (7,10/50 for 265mm)	5.00			End of borehole at 5.00 m
		5.00 - 5.40	D					

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 5.00m depth due to refusal.
3. Gas and water monitoring standpipe installed to 5.00m depth.

AGS

Borehole Log

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Borehole No. **BH2**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type CP
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 08/08/2017 - 08/08/2017	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.50	B		0.10			Turf over blackish brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
					0.70			Loose brown sandy topsoil (Driller's description)
		1.00		N=10 (2,1/2,2,3,3)				Firm grey and orangish brown slightly gravelly very sandy CLAY. Low plasticity (field description). Gravel is sub-rounded to rounded fine to coarse of mixed lithology.
		1.00 - 1.45	D					
		1.50 - 2.00	B		1.50			Medium dense orangish brown and grey fine to coarse SAND and sub-angular to rounded fine to coarse GRAVEL of mixed lithology.
		2.00		N=34 (10,10/10,8,8,8)				
		2.00 - 2.45	D					
		2.00 - 2.50	B					
		3.00		N=18 (3,4/3,4,5,6)	2.90			Extremely weak reddish brown and grey MUDSTONE recovered as clayey gravelly fine to coarse sand.
		3.00 - 3.45	D					
		3.50 - 4.00	B					
		4.00		N=43 (6,6/7,11,10,15)				
		4.00 - 4.45	D					
		5.00		N=39 (6,7/8,10,9,12)				
		5.00 - 5.45	D					
		6.50		N=40 (6,9/7,7,11,15)				
		6.50 - 6.95	D					
		8.00		50 (10,14/50 for 235mm)	8.00			End of borehole at 8.00 m
		8.00 - 8.30	D					

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 8.00m depth due to refusal.
3. Gas and water monitoring standpipe installed to 5.00m depth.

AGS

Borehole Log

Borehole No. **BH3**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type CP
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.50	B		0.10			Turf over blackish brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		0.50 - 1.00	B		0.60			Loose brown sandy topsoil (Driller's description)
		1.00		N=18 (3,2/2,3,5,8)				Firm orangish brown and grey slightly gravelly very sandy CLAY. Low plasticity (field description). Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		1.00 - 1.45	D					
		1.50 - 2.00	B		1.50			Medium dense orangish brown and grey slightly gravelly clayey fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		2.00		N=25 (9,9/8,6,6,5)				
		2.00 - 2.45	D					
		2.00 - 2.50	B					
					2.70			Extremely weak reddish brown and grey MUDSTONE recovered as clayey gravelly fine to coarse sand.
		3.00		N=19 (4,4/6,5,3,5)				
		3.00 - 3.45	D					
		3.50 - 4.00	B					
		4.00		N=34 (4,7/7,8,9,10)				
		4.00 - 4.45	D					
		5.00		N=23 (6,6/6,5,6,6)				
		5.00 - 5.45	D					
		6.50		N=50 (6,6/50 for 295mm)	6.50			End of borehole at 6.50 m
		6.50 - 6.90	D					

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 6.50m depth due to refusal and backfilled with arisings.

Borehole Log

Borehole No. **BH4**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type CP
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			Turf over blackish brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		0.50 - 1.00	B		0.20			Loose brown sandy topsoil (Driller's description)
		1.00 - 1.45	U					Firm orangish brown and grey slightly gravely very sandy CLAY. Low plasticity (field description). Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		1.50 - 2.00	B					
		2.00		N=16 (6,8/6,3,3,4)	1.90			Medium dense orangish brown and grey slightly gravelly clayey fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		2.00 - 2.45	D					
		2.00 - 2.50	B					
		3.00		N=29 (3,3/5,7,8,9)	2.80			Extremely weak reddish brown and grey MUDSTONE recovered as clayey gravelly fine to coarse sand.
		3.00 - 3.45	D					
		3.50 - 4.00	B					
		4.00		N=44 (5,6/8,9,13,14)				
		4.00 - 4.45	D					
		5.00		N=50 (10,10/50 for 270mm)	5.00			End of borehole at 5.00 m
		5.00 - 5.40	D					

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 5.00m depth due to refusal and backfilled with arisings.

Borehole Log

Borehole No. **BH5**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type CP
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 10/08/2017 - 10/08/2017	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.50	B		0.10			Turf over blackish brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
					0.60			Loose brown sandy topsoil (Driller's description)
		1.00 - 1.45	U		0.90			Firm orangish brown slightly gravelly very sandy CLAY. Low plasticity (field description). Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		1.60	D		1.50			Firm reddish brown and grey sandy gravelly CLAY. Low plasticity (field description). Gravel is angular to sub- angular fine to coarse of mudstone.
		2.00		50 (9,14/18,15,17,)				Medium dense orangish brown and grey gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		2.00 - 2.45	D					
					2.70			Extremely weak reddish brown and grey MUDSTONE recovered as clayey gravelly fine to coarse sand.
		3.00		N=17 (4,4/5,4,4,4)				
		3.00 - 3.45	D					
		3.50 - 4.00	B					
		4.00		N=44 (5,5/7,10,13,14)				
		4.00 - 4.45	D					
		5.00		N=50 (8,10/50 for 275mm)	5.00			End of borehole at 5.00 m
		5.00 - 5.40	D					

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 5.0m depth due to refusal.
3. Gas and water monitoring standpipe installed to 5.00m depth.

Borehole Log

hsp consulting

Borehole No. **BH6**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type CP
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 11/08/2017 - 11/08/2017	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			Turf over blackish brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to coarse of mixed lithology.
		0.50 - 1.00	B		0.50			Loose brown sandy topsoil (Driller's description)
		1.00 - 1.45	U					Extremely weak reddish brown and grey MUDSTONE recovered as clayey gravelly fine to coarse sand.
		1.60	D					
		2.00		N=13 (3,3/3,4,3,3)				
		2.00 - 2.45	D					
		2.50 - 3.00	B					
		3.00		N=50 (9,9/50 for 290mm)				
		3.00 - 3.45	D					
		4.00		N=44 (11,11/12,10,10,12)				
		4.00 - 4.45	D					
		5.00		50 (11,13/50 for 295mm)	5.00			End of borehole at 5.00 m
		5.00 - 5.35	D					

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 5.00m depth due to refusal and backfilled with arisings.

AGS

Borehole Log

Borehole No. **WS1**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	J		0.40			Turf overlying blackish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
		0.80	J					Yellowish brown clayey gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
		1.00		N=36 (4,5/8,8,10,10)	1.20			Orange brown SAND. Sand is fine to coarse.
		2.00		N=10 (2,2/2,2,3,3)	1.70			Brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
		3.00		N=10 (1,1/2,2,3,3)	2.30			Firm reddish brown sandy CLAY. High plasticity (field description). *...becoming gravelly. Gravel is fine to coarse angular of mixed lithology from 2.70m depth.*
		4.00		N=30 (6,6/6,7,7,10)	4.10			Extremely weak reddish brown and light grey MUDSTONE. Recovered as a fine to coarse angular gravel.
		5.00		N=50 (5,7/10,15,20,5)	5.00			End of borehole at 5.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 5.00m depth due to refusal and backfilled with arisings.

Borehole Log

Borehole No. **WS2**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	J		0.35			Turf overlying blackish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
		0.60	J					Orangish brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
		1.00		N=32 (4,5/6,8,8,10)				*...becoming clayey from 0.80m to 1.10m depth.*
		2.00		N=36 (25 for 105mm/13,12,6,5)	1.90			Brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
					2.40			Firm reddish brown slightly gravelly very sandy CLAY. High plasticity (Field description). Gravel is fine to coarse sub angular to rounded of mixed lithology.
		3.00		N=14 (4,3/4,3,4,3)	3.10			*...with bands of reddish brown fine to coarse sand.*
								Firm reddish brown and light grey sandy CLAY. High plasticity (Field description).
		4.00		N=33 (6,6/7,8,8,10)				*...becoming stiff from 4.20m depth.*
		5.00		N=50 (7,7/10,13,12,15)	5.00			End of borehole at 5.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 5.00m depth due to refusal and backfilled with arisings.

Borehole Log

Borehole No. **WS3**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	J		0.40			Turf overlying blackish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
		0.80	J		0.60			Orangish brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse angular to rounded of mixed lithology.
		1.00		N=11 (1,3/2,2,4,3)				Firm orangish brown and yellowish brown slightly gravelly very sandy CLAY. High plasticity (Field description). Gravel is fine to coarse angular to rounded of mixed lithology.
		2.00		N=48 (5,2/10,13,12,13)	1.60			Reddish brown and light grey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub rounded to rounded of mixed lithology.
		3.00		N=7 (1,2/2,2,1,2)	2.70			Firm to stiff reddish brown light grey sandy CLAY. Sand is fine to coarse. High plasticity (Field description).
		4.00		N=37 (7,6/7,8,10,12)				
		5.00		N=40 (5,6/7,10,10,13)	5.00			End of borehole at 5.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 5.00m depth and backfilled with arisings.

Borehole Log

Borehole No. **WS4**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	J		0.35			Turf overlying blackish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
		0.70	J					Firm orangish brown and yellowish brown slightly gravelly very sandy CLAY. High plasticity (Field description). Gravel is fine to coarse sub angular to rounded of mixed lithology.
		1.00		N=8 (1,2/2,2,2,2)				
	▼	2.00		N=24 (2,2/1,1,2,20)	1.90			Reddish brown SAND. Sand is fine to coarse.
		2.40		N=39 (25 for 80mm/17,10,6,6)	2.40			Firm grey and brown slightly gravelly silty CLAY. High plasticity (Field description). Gravel is fine to medium sub rounded to rounded of mixed lithology.
		3.00		N=50 (5,7/50 for 295mm)	2.70 3.00			Reddish brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to rounded of mixed lithology.
								End of borehole at 3.00 m

Remarks

1. Groundwater was encountered during the drilling process at 1.90m depth.
2. Borehole was terminated at 3.00m depth due to refusal and backfilled with arisings.

Borehole Log

Borehole No. **WS5**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00	J		0.35			Turf overlying blackish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
		0.90	J					Firm reddish brown sandy CLAY. Sand is fine to coarse. High plasticity (Field description).
					2.00			End of borehole at 2.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 2.00m depth and backfilled with arisings.

Borehole Log

Borehole No. **WS6**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	J		0.15			Turf overlying blackish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
								Firm reddish brown sandy CLAY. Sand is fine to coarse. High plasticity (Field description).
					1.90			Extremely weak reddish brown and light grey MUDSTONE. Recovered as stiff gravelly clay.
					2.00			End of borehole at 2.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 2.00m depth and backfilled with arisings.

Borehole Log

Borehole No. **WS7**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	J		0.10			MADE GROUND - Turf overlying brown sandy clay. Low plasticity (Field description).
		0.70	J		0.50			MADE GROUND - Black gravelly sand. Sand is fine to coarse. Gravel is fine to coarse angular to sub rounded of brick, ash, clinker and mixed lithology.
		1.00		N=15 (2,2/2,3,5,5)	0.80			MADE GROUND - Brown slightly gravelly very sandy clay. Low plasticity (Field description). Gravel is fine to coarse angular to rounded of brick , ash and mixed lithology (Reworked material).
		2.00		N=22 (2,2/4,5,7,6)	1.40			Firm yellowish brown and grey slightly gravelly very sandy CLAY. Low plasticity (Field description). Gravel is fine to coarse sub angular to rounded of mixed lithology.
		3.00		N=50 (6,11/13,13,12,12)	2.10			Reddish brown SAND. Sand is fine to coarse.
					2.30			Grey and reddish brown very clayey SAND. Sand is fine to coarse.
					2.80			Orangish brown clayey SAND. Sand is fine to coarse.
					3.00			Grey and brown clayey sandy GRAVEL. Gravel is fine to coarse angular to rounded of mixed lithology.
								End of borehole at 3.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 3.00m depth due to refusal and backfilled with arisings.

Borehole Log

Borehole No. **WS8**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND - Turf overlying brown sandy clay. Low plasticity (Field description).
					0.20			MADE GROUND - Black gravelly sand. Sand is fine to coarse. Gravel is fine to coarse angular to sub rounded of brick, ash, clinker and mixed lithology.
					0.50			MADE GROUND - Brown slightly gravelly very sandy clay. Low plasticity (Field description). Gravel is fine to coarse angular to rounded of brick , ash and mixed lithology (Reworked material).
					0.60			Yellowish brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub angular to rounded of mixed lithology.
					1.00			Stiff reddish brown and grey slightly gravelly very sandy CLAY. Low plasticity (Field description). Gravel is fine to coarse angular to rounded of mixed lithology.
								End of borehole at 1.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 1.00m depth and backfilled with arisings.

Borehole Log

Borehole No. **WS9**

Sheet 1 of 1

Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			Turf overlying brown slightly gravelly very sandy CLAY. Low plasticity (Field description). Gravel is fine to medium sub angular to rounded of mixed lithology.
					1.00			Firm yellowish brown and grey slightly gravelly sandy CLAY. High plasticity (Field description). Gravel is fine to medium sub angular to rounded of mixed lithology.
								End of borehole at 1.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 1.00m depth and backfilled with arisings.

Borehole Log

Borehole No. **WS10**

Sheet 1 of 1

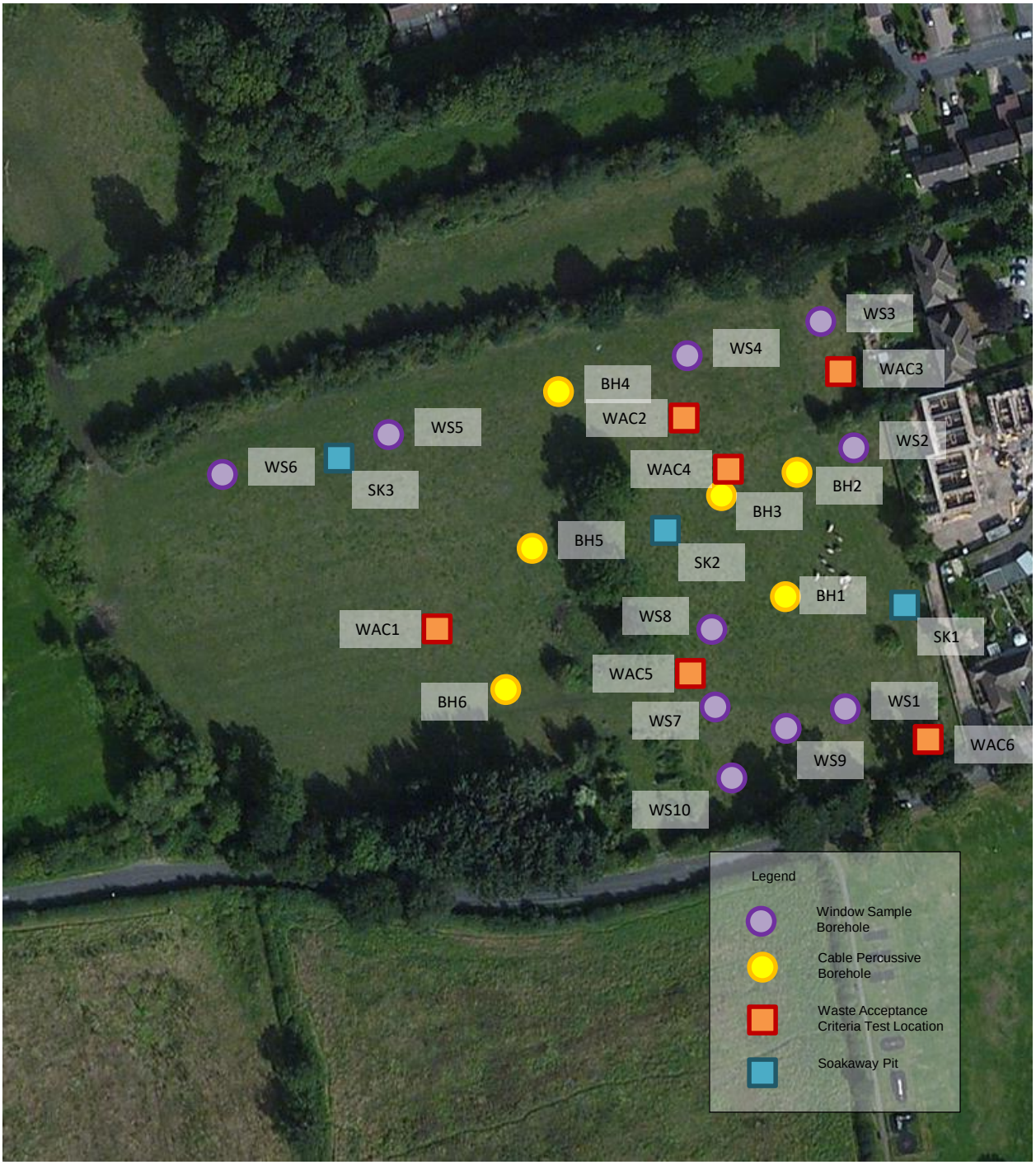
Project Name: Water Orton Primary School	Project No. C2415	Co-ords: -	Hole Type WS
Location: Birmingham		Level:	Scale 1:50
Client: Willmott Dixon Ltd		Dates: 09/08/2017 - 09/08/2017	Logged By LB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND - Turf overlying brown sandy clay. Low plasticity (Field description).
					0.50			MADE GROUND - Brown clayey gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse angular to rounded of mixed lithology.
					0.60			Yellowish brown clayey gravelly fine to coarse SAND. Gravel is fine to coarse angular to rounded of mixed lithology.
					1.00			Stiff reddish brown and grey slightly gravelly very sandy CLAY. Low plasticity (Field description). Gravel is fine to coarse angular to rounded of mixed lithology.
								End of borehole at 1.00 m

Remarks

1. No groundwater was encountered during the drilling process.
2. Borehole was terminated at 1.00m depth and backfilled with arisings.

Appendix III



Client: Wilmott Dixon	Scale: NTS	Rev.	By	Date	Details	Chkd
	Date: September 2017	Drawing Status			INFORMATION	
Project: Water Orton Primary School	Drawn By: LEB					
	Checked By: LEB					
Title: Site Investigation Layout Plan	HSP Drg. No.: C2415-502	Rev.				

hsp consulting
Lawrence House, Meadowbank Way, Eastwood, Nottingham, NG16 3SB
Tel: 0870 600 6090 www.hspconsulting.com

Appendix IV

LABORATORY REPORT

REPORT

4043

Contract Number: PSL17/5320

Report Date: 23 November 2017

Client's Reference: C2415

Client Name: HSP Consulting
Lawrence House
4 Meadowbank Way
Eastwood
Nottingham
NG16 3SB

For the attention of: Luke Bradley

Contract Title: Water Orton

Date Received: 1/11/2017
Date Commenced: 1/11/2017
Date Completed: 23/11/2017

Notes: Opinions and Interpretations are outside the UKAS Accreditation

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	A Fry (Senior Technician)

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awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH1		B	3.00	3.50	Reddish brown gravelly very sandy CLAY.
BH2		B	3.50	4.00	Reddish brown mottled grey slightly gravelly very sandy CLAY.
BH3		B	3.50	4.00	Reddish brown mottled grey slightly gravelly very sandy CLAY.
BH4		B	0.50	1.00	Brown slightly gravelly sandy CLAY.
BH4		B	3.50	4.00	Brown mottled grey gravelly very sandy CLAY.
BH5		B	3.50	4.00	Brown gravelly very sandy CLAY.
BH6		B	2.50	3.00	Brown gravelly sandy CLAY.
WS101		U	1.20	1.50	Brown mottled grey slightly gravelly sandy CLAY.
WS101		U	1.60	1.90	Brown mottled grey slightly gravelly very sandy CLAY.
WS101		U	2.30	2.60	Brown slightly sandy CLAY.
WS101		U	2.60	2.90	Reddish brown slightly gravelly sandy CLAY.
WS101		U	3.30	3.60	Reddish brown slightly gravelly sandy CLAY.
WS101		U	3.60	3.90	Reddish brown mottled grey sandy CLAY.
WS101		U	4.10	4.40	Reddish brown mottled grey sandy CLAY.
WS101		U	4.60	4.90	Reddish brown mottled grey sandy CLAY.
WS103		U	0.20	0.50	Brown slightly gravelly sandy CLAY.
WS103		U	0.70	1.00	Brown slightly gravelly sandy CLAY.
WS103		U	1.00	1.30	Brown slightly gravelly sandy CLAY.
WS103		U	1.70	2.00	Brown slightly gravelly sandy CLAY.

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Water Orton**	**Contract No:**
			PSL17/5320
			Client Ref:
			C2415

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS103		U	2.00	2.30	Reddish brown mottled grey slightly gravelly very sandy CLAY.
WS103		U	2.70	3.00	Reddish brown mottled grey very sandy CLAY.
WS103		U	3.10	3.40	Brown mottled grey sandy CLAY.
WS103		U	3.70	4.00	Reddish brown very clayey SAND.
WS102		U	1.50	1.80	Brown silty SAND.

UKAS TESTING 4043

PSL Professional Soils Laboratory

Water Orton

Contract No:

PSL17/5320

Client Ref:

C2415

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
BH1		B	3.00	3.50	25			35	20	15	82	Intermediate plasticity CI.
BH2		B	3.50	4.00	24			36	21	15	92	Intermediate plasticity CI.
BH3		B	3.50	4.00	26			36	21	15	91	Intermediate plasticity CI.
BH4		B	0.50	1.00	18			44	22	22	96	Intermediate plasticity CI.
BH4		B	3.50	4.00	23			35	21	14	86	Intermediate plasticity CI.
BH5		B	3.50	4.00	29			35	22	13	84	Intermediate plasticity CI.
BH6		B	2.50	3.00	28			46	22	24	82	Intermediate plasticity CI.
WS101		U	1.20	1.50	16			42	21	21	97	Intermediate plasticity CI.
WS101		U	1.60	1.90	15							
WS101		U	2.30	2.60	35			61	28	33	100	High plasticity CH.
WS101		U	3.30	3.60	26			48	23	25	95	Intermediate plasticity CI.
WS101		U	3.60	3.90	28							
WS101		U	4.10	4.40	25			46	23	23	100	Intermediate plasticity CI.
WS101		U	4.60	4.90	24							
WS103		U	0.20	0.50	30			47	24	23	94	Intermediate plasticity CI.
WS103		U	0.70	1.00	33							
WS103		U	1.00	1.30	34			49	24	25	97	Intermediate plasticity CI.
WS103		U	1.70	2.00	29							
WS103		U	2.00	2.30	31			36	21	15	95	Intermediate plasticity CI.

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Water Orton

Contract No:

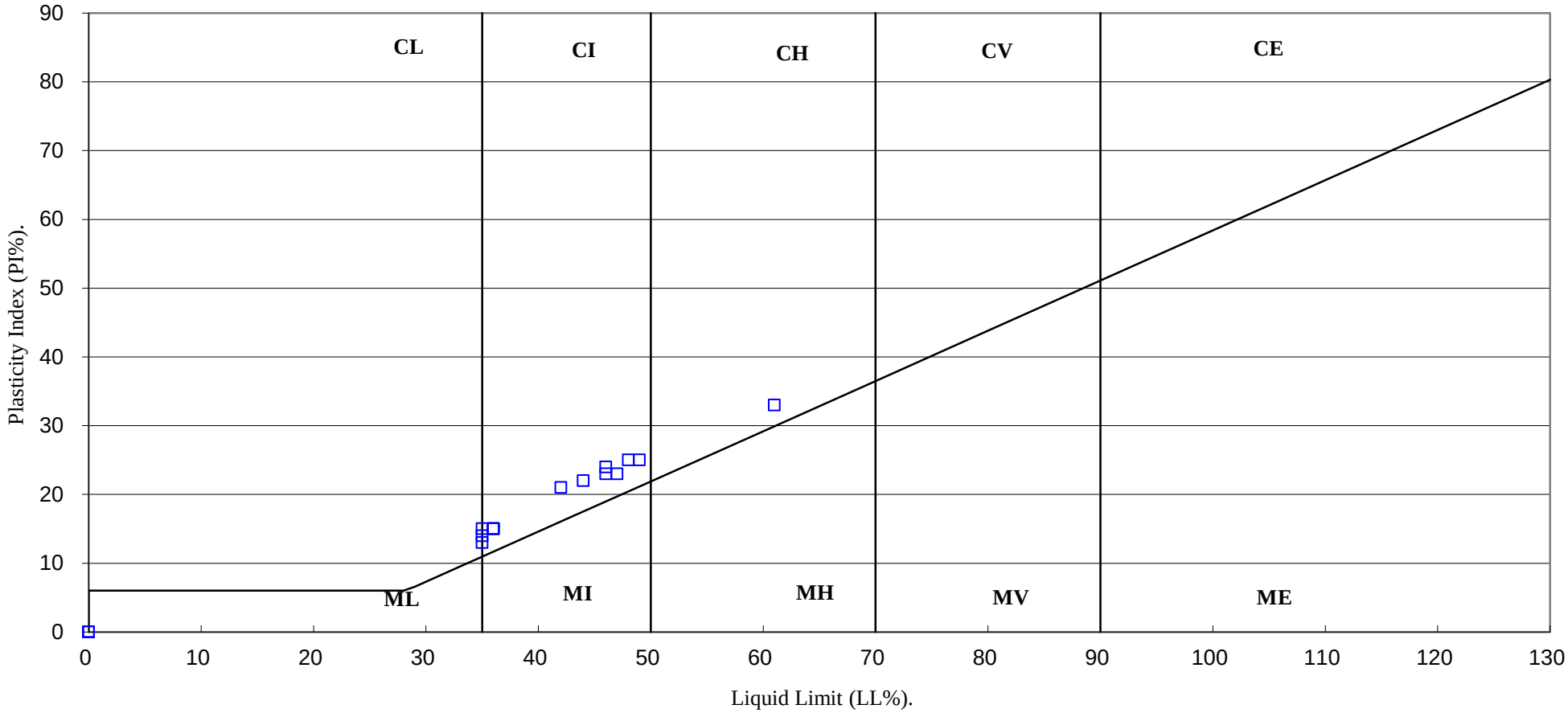
PSL17/5320

Client Ref:

C2415

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



UKAS TESTING 4043	PSL Professional Soils Laboratory	**Water Orton**	**Contract No:** PSL17/5320 **Client Ref:** C2415

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS103		U	2.70	3.00	30							
WS103		U	3.10	3.40	28			46	23	23	100	Intermediate plasticity CI.
WS103		U	3.70	4.00	19							
WS102		U	1.50	1.80	10				NP			

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Water Orton

Contract No:

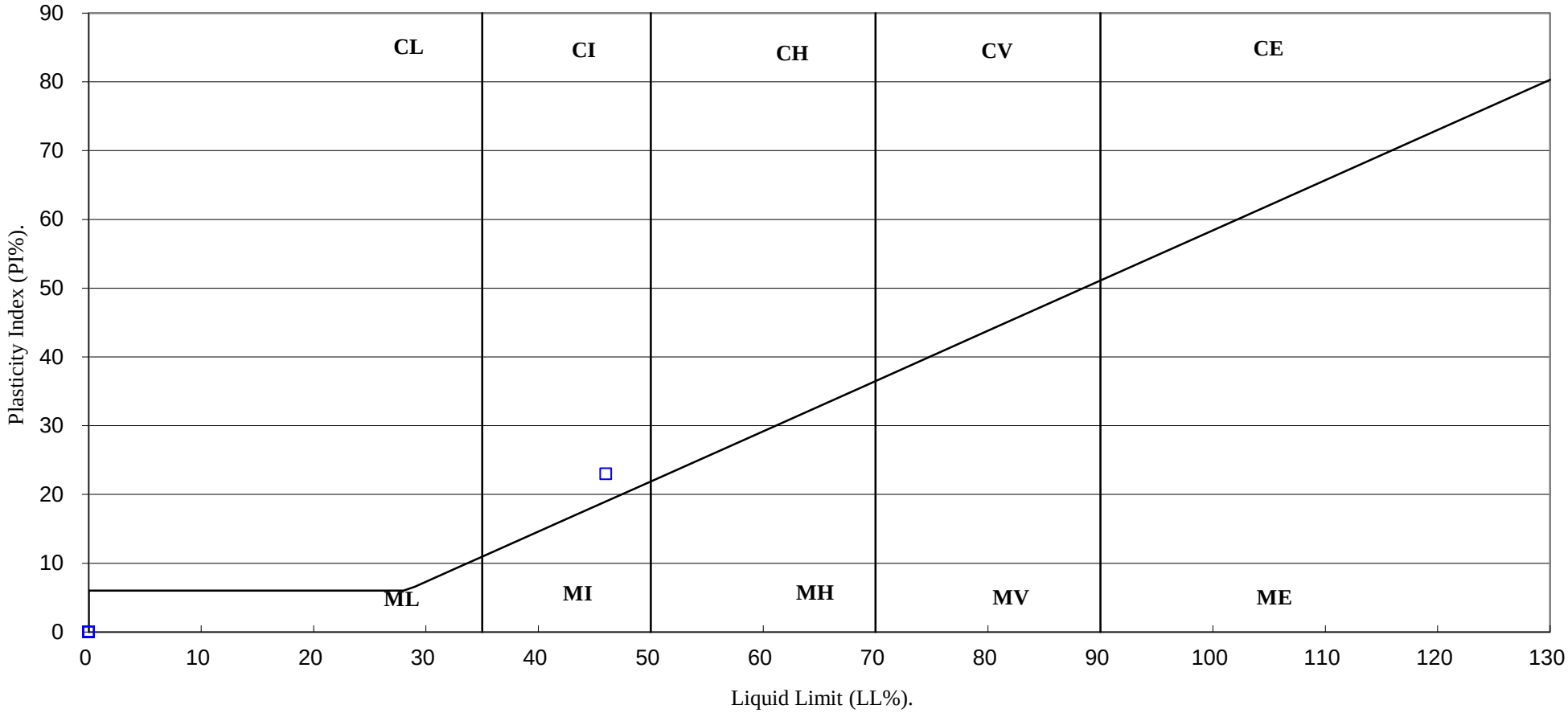
PSL17/5320

Client Ref:

C2415

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



UKAS TESTING 4043	PSL Professional Soils Laboratory	**Water Orton**	**Contract No:** PSL17/5320 **Client Ref:** C2415

Summary of results

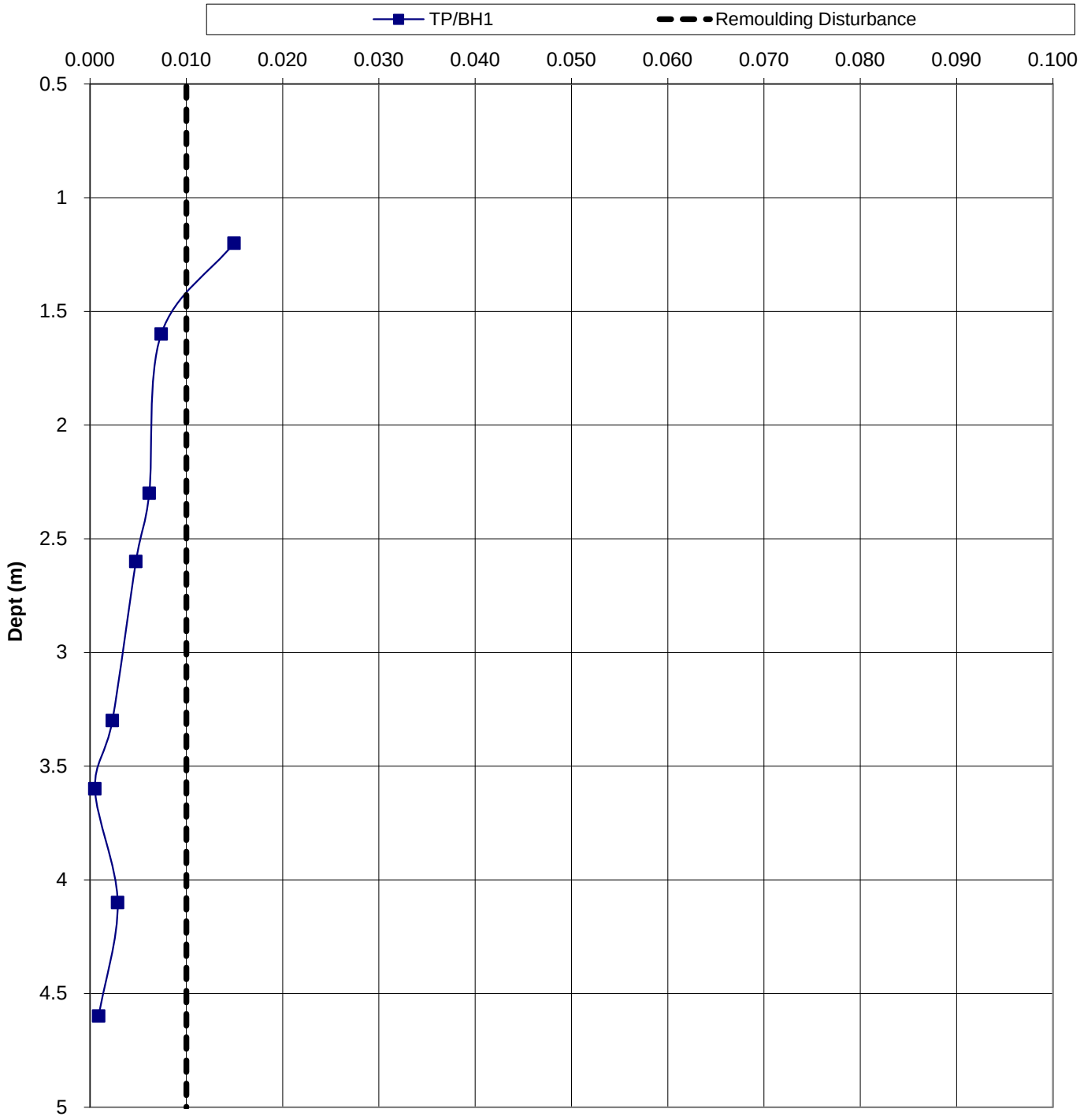
One Dimensional Swell / Strain test - In House Method

Hole Number	Sample Number	Sample Type	Depth m	Strain	Dd (mm)	Moisture Content (%)	Remarks
WS101			1.20	0.0150	9.0	16	
WS101			1.60	0.0074	1.5	13	
WS101			2.30	0.0061	2.1	35	
WS101			2.60	0.0048	0.7	27	
WS101			3.30	0.0023	0.8	26	
WS101			3.60	0.0005	0.1	28	
WS101			4.10	0.0029	0.7	25	
WS101			4.60	0.0009	0.2	24	
Total column Dd TP/BH1 =				**12.6 mm**			

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Water Orton**	**Contract No:**
			PSL17/5320
			Client Ref:
			C2415

Oedometer Strain

One Dimensional Swell / Strain test - In House Method



UKAS TESTING 4043	PSL Professional Soils Laboratory	**Water Orton**	**Contract No:** PSL17/5320 **Client Ref:** C2415

Summary of results

One Dimensional Swell / Strain test - In House Method

Hole Number	Sample Number	Sample Type	Depth m	Strain	Dd (mm)	Moisture Content (%)	Remarks
WS103			0.20	0.0022	0.2	30	
WS103			0.70	0.0039	1.0	33	
WS103			1.00	0.0018	0.3	34	
WS103			1.70	0.0008	0.3	29	
WS103			2.00	0.0009	0.1	31	
WS103			2.70	0.0009	0.3	30	
WS103			3.10	0.0001	0.0	28	
WS103			3.70	-0.0051	-1.5	19	
Total column Dd TP/BH1 =				**1.5 mm**			

4043

PSL Professional Soils Laboratory

Water Orton

Contract No:

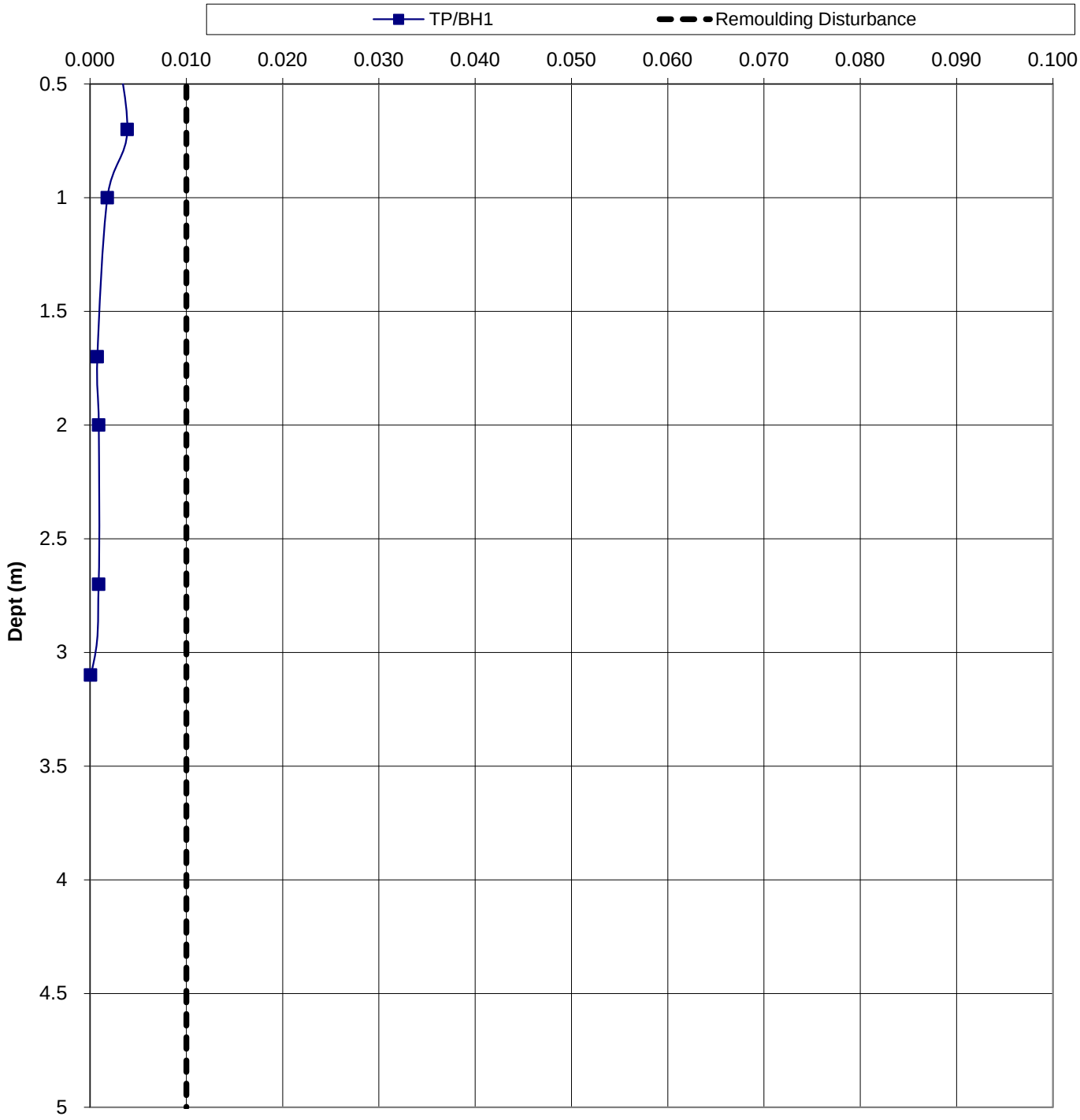
PSL17/5320

Client Ref:

C2415

Oedometer Strain

One Dimensional Swell / Strain test - In House Method



UKAS TESTING 4043	PSL Professional Soils Laboratory	**Water Orton**	**Contract No:** PSL17/5320 **Client Ref:** C2415

LABORATORY REPORT

4043

Contract Number: PSL17/3958

Report Date: 04 September 2017

Client's Reference: C2415

Client Name: HSP Consulting
Lawrence House
4 Meadowbank Way
Eastwood
Nottingham
NG16 3SB

For the attention of: Luke Bradley

Contract Title: Water Orton

Date Received: 15/8/2017
Date Commenced: 15/8/2017
Date Completed: 4/9/2017

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH1		B	0.50	1.00	Brown gravelly very sandy CLAY
BH1		B	1.50	2.00	Reddish brown slightly gravelly very silty SAND.
BH2		B	1.00	1.50	Brown mottled grey slightly gravelly very sandy CLAY.
BH3		B	0.50	1.00	Brown slightly gravelly very sandy CLAY.
BH4		U	1.00	1.45	Stiff brown sandy CLAY.
BH4		B	1.50	2.00	Brown slightly gravelly sandy CLAY.
BH4		B	2.00	2.50	Brown very clayey SAND and GRAVEL.
BH5		U	1.00	1.45	Stiff brown CLAY.
BH5		B	2.00	2.50	Brown very sandy slightly silty GRAVEL.
BH6		B	0.50	1.00	Brown slightly gravelly slightly sandy CLAY.
BH6		U	1.00	1.45	Stiff brown slightly gravelly CLAY.

UKAS TESTING 4043

PSL Professional Soils Laboratory

C2415 - Water Orton

Contract No: PSL17/3958

Client Ref:

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
BH1		B	0.50	1.00	13			29	15	14	82	Low plasticity CL.
BH3		B	0.50	1.00	14			24	14	10	92	Low plasticity CL.
BH4		B	1.50	2.00	25			42	19	23	93	Intermediate plasticity CI.
BH6		B	0.50	1.00	24			53	24	29	93	High plasticity CH.

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

C2415 - Water Orton

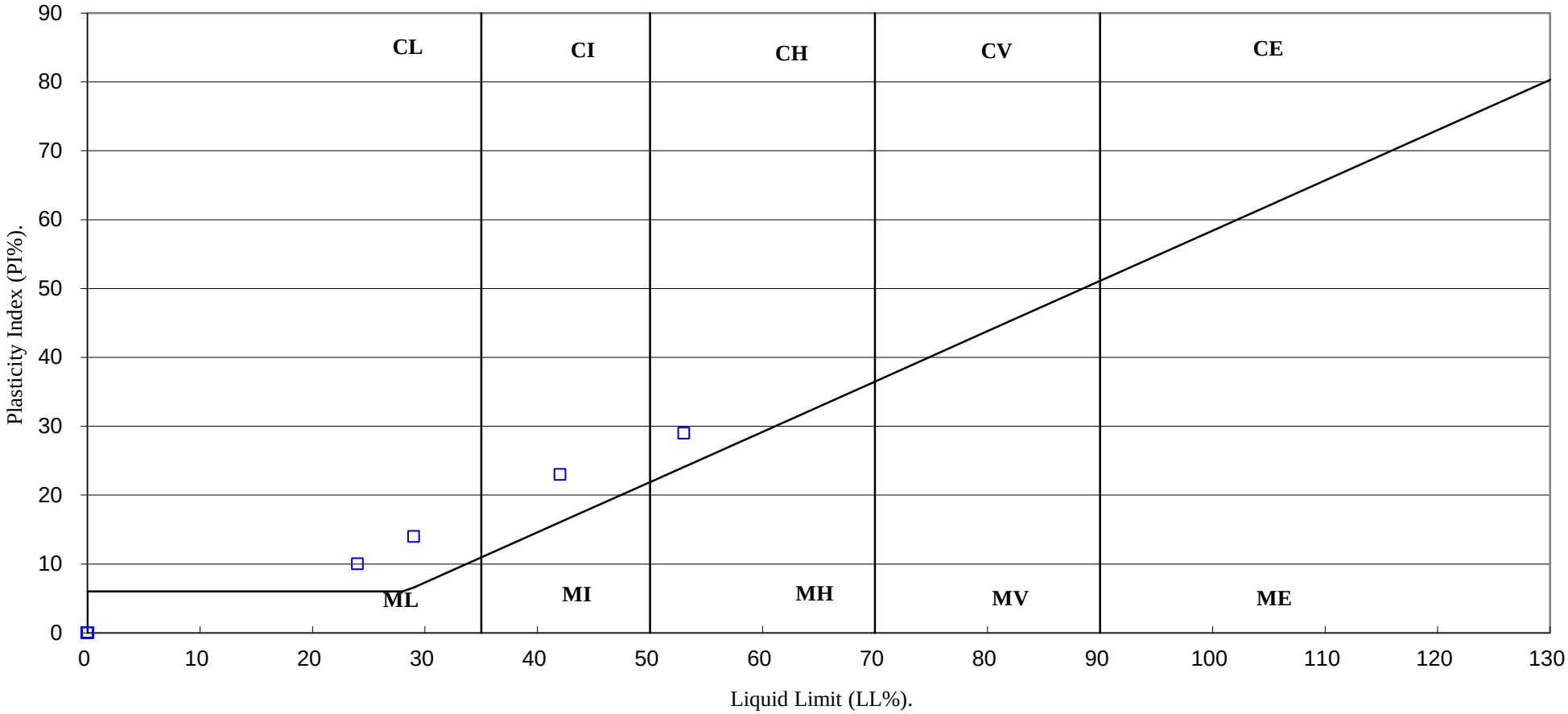
Contract No:

PSL17/3958

Client Ref:

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



UKAS TESTING 4043	PSL Professional Soils Laboratory	**C2415 - Water Orton**	**Contract No:**
			PSL17/3958
			Client Ref:

PARTICLE SIZE DISTRIBUTION TEST

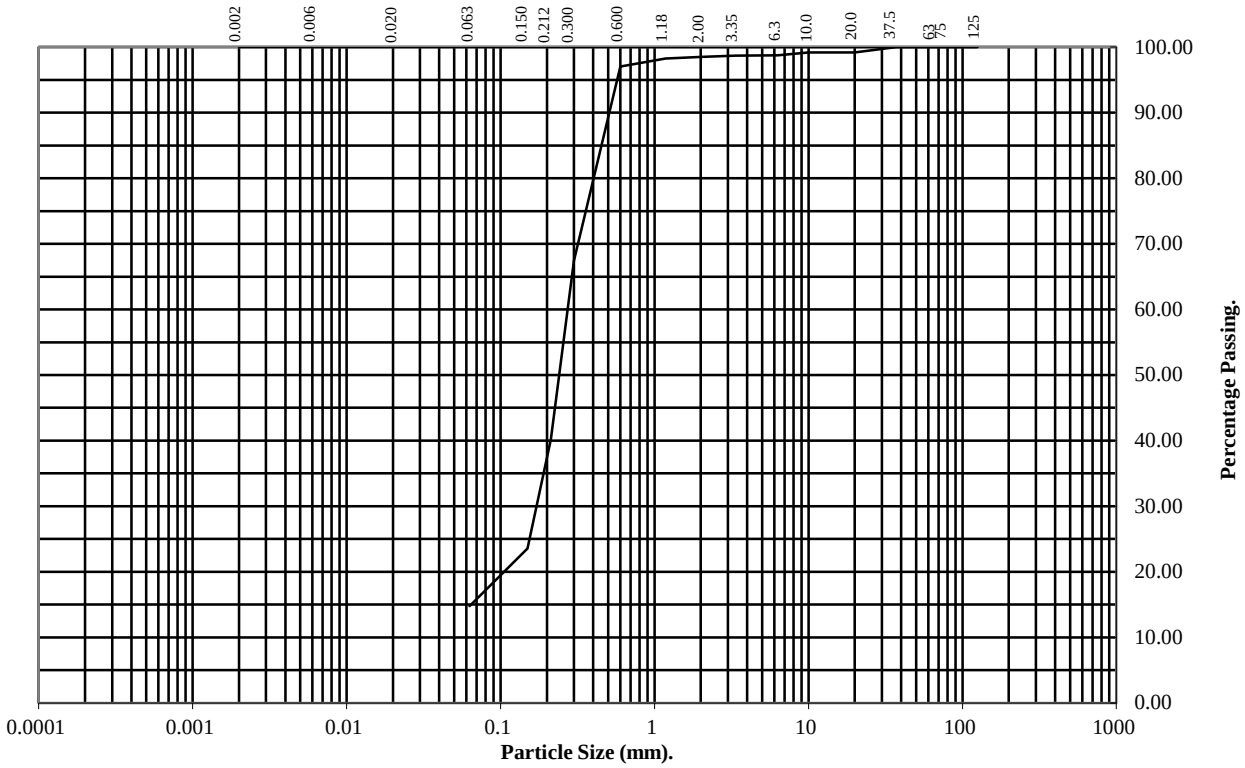
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH1** **Top Depth (m):** **1.50**

Sample Number: **Base Depth(m):** **2.50**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	99
10	99
6.3	99
3.35	99
2	98
1.18	98
0.6	97
0.3	67
0.212	40
0.15	24
0.063	15

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

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

C2415 - Water Orton

Contract No: **PSL17/3958**

Client Ref:

PARTICLE SIZE DISTRIBUTION TEST

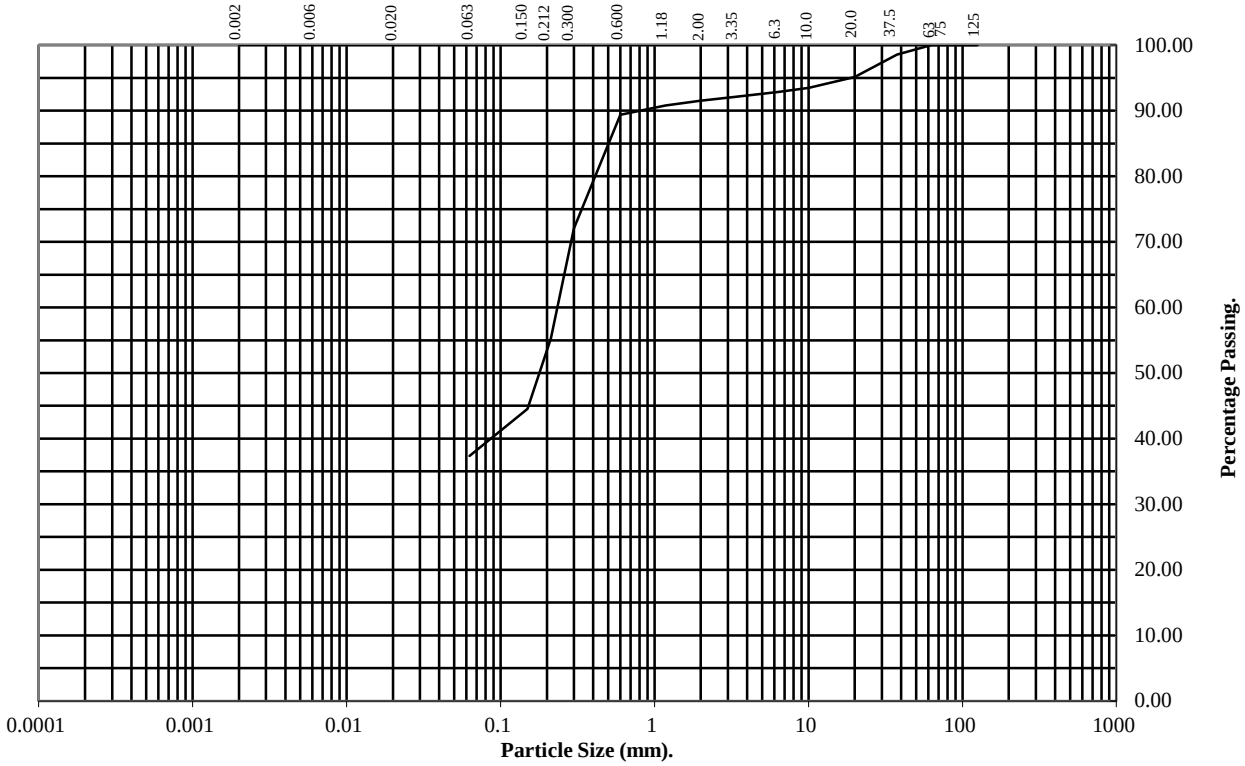
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH2** **Top Depth (m):** **1.00**

Sample Number: **Base Depth(m):** **1.50**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	99
20	95
10	93
6.3	93
3.35	92
2	92
1.18	91
0.6	89
0.3	72
0.212	55
0.15	45
0.063	37

Soil Fraction	Total Percentage
Cobbles	0
Gravel	8
Sand	55
Silt/Clay	37

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

C2415 - Water Orton

Contract No: **PSL17/3958**

Client Ref:

PARTICLE SIZE DISTRIBUTION TEST

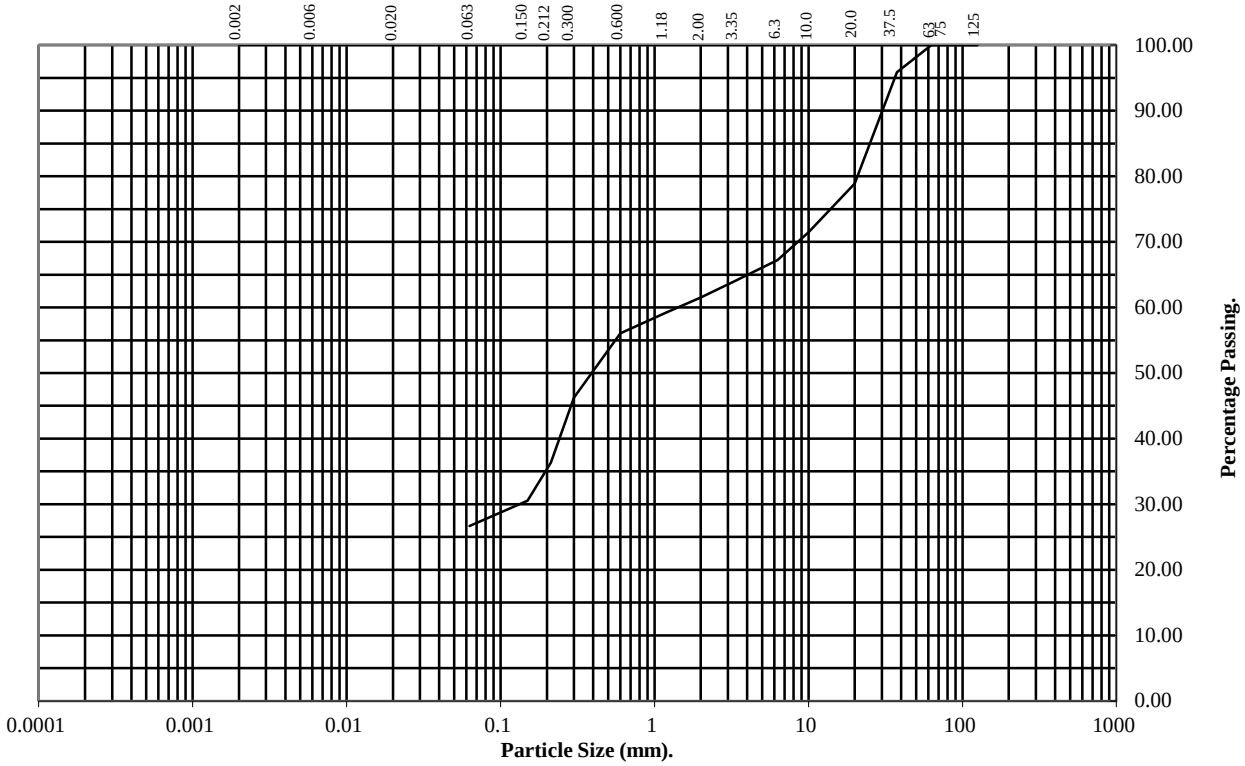
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH4** **Top Depth (m):** **2.00**

Sample Number: **Base Depth(m):** **2.50**

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	96
20	79
10	71
6.3	67
3.35	64
2	62
1.18	59
0.6	56
0.3	46
0.212	36
0.15	31
0.063	27

Soil Fraction	Total Percentage
Cobbles	0
Gravel	38
Sand	35
Silt/Clay	27

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL Professional Soils Laboratory

C2415 - Water Orton

Contract No: **PSL17/3958**

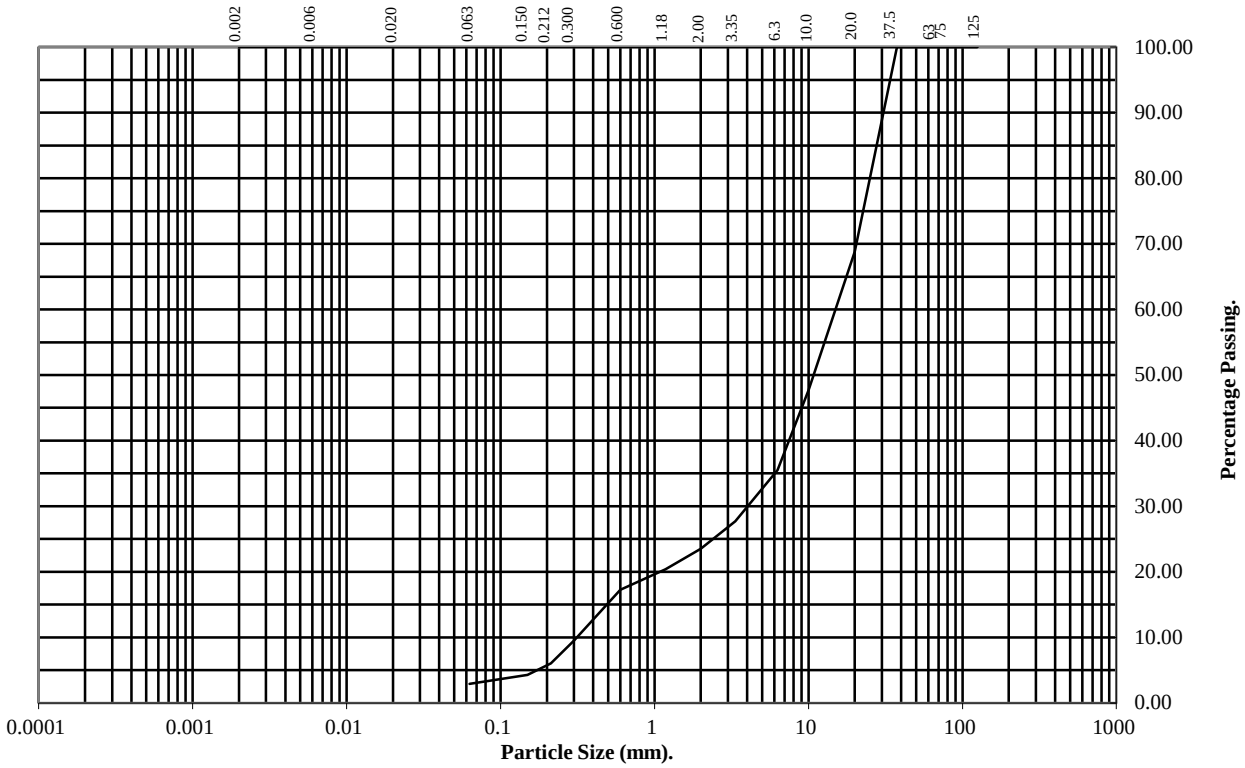
Client Ref:

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**BH5**	**Top Depth (m):**	**2.00**
Sample Number:		**Base Depth(m):**	**2.50**
Sample Type:	**B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	69
10	48
6.3	36
3.35	28
2	23
1.18	20
0.6	17
0.3	9
0.212	6
0.15	4
0.063	3

Soil Fraction	Total Percentage
Cobbles	0
Gravel	77
Sand	20
Silt/Clay	3

Remarks:

See Summary of Soil Descriptions

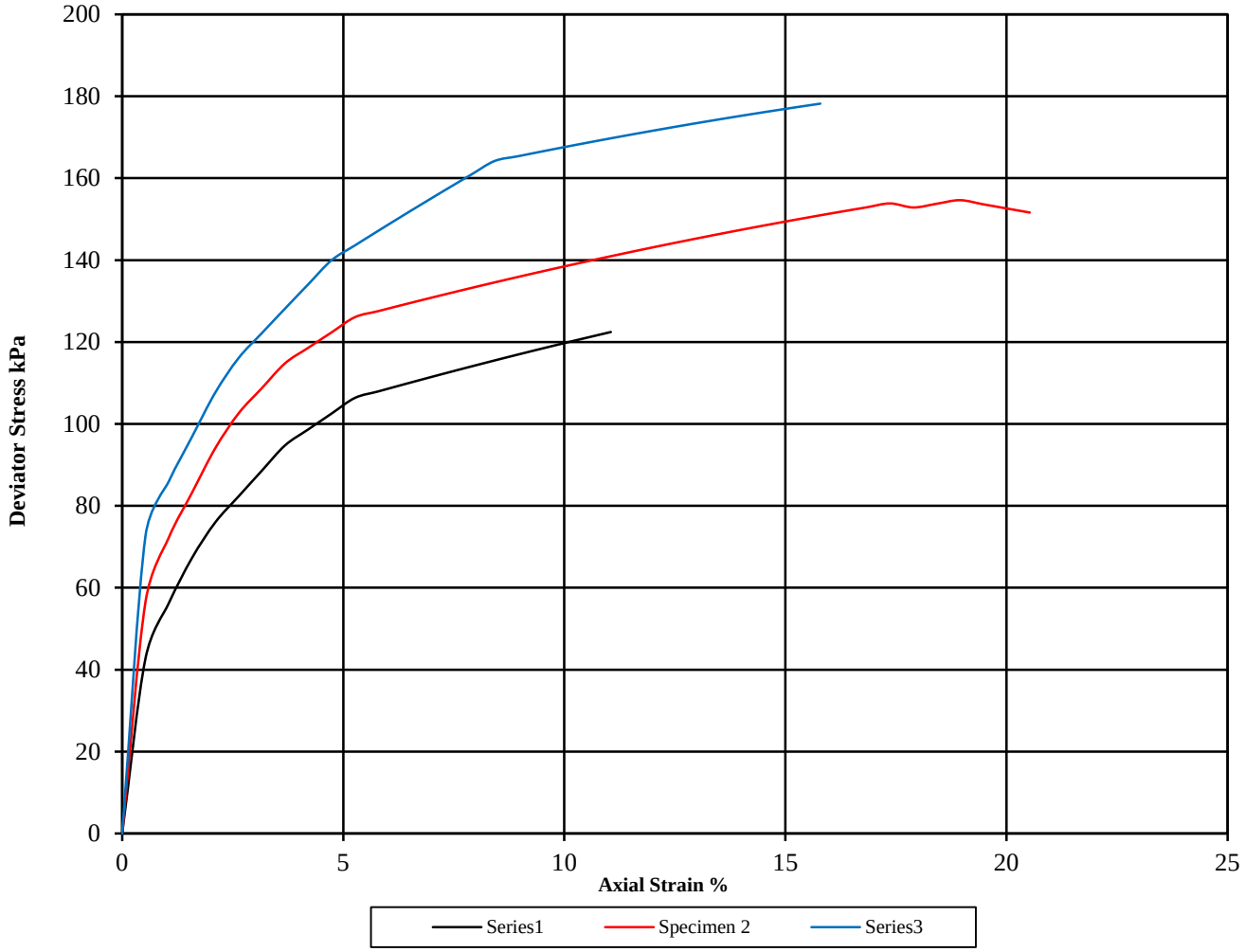
UKAS TESTING 4043	PSL Professional Soils Laboratory	**C2415 - Water Orton**	**Contract No:** PSL17/3958 **Client Ref:**

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH4**	**Top Depth (m):**	**1.00**
Sample Number:		**Base Depth (m):**	**1.45**
Sample Type:	**U**		



Diameter (mm):		38.0	Height (mm):		76.0	Test:	3x38mm Samples.			Remarks
Specimen	Specimen Depth	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Specimens obtained by use of 3x38mm cutters Rate of strain - 2%/min Latex membrane used 0.2mm See summary of soil descriptions
1	1.00	23	1.98	1.61	20	122	61	11.1	Brittle	
2	1.00	23	1.97	1.61	40	155	77	18.9	Brittle	
3	1.00	23	1.97	1.60	80	178	89	15.8	Brittle	

UKAS TESTING 4043

PSL Professional Soils Laboratory

C2415 - Water Orton

Contract No: PSL17/3958

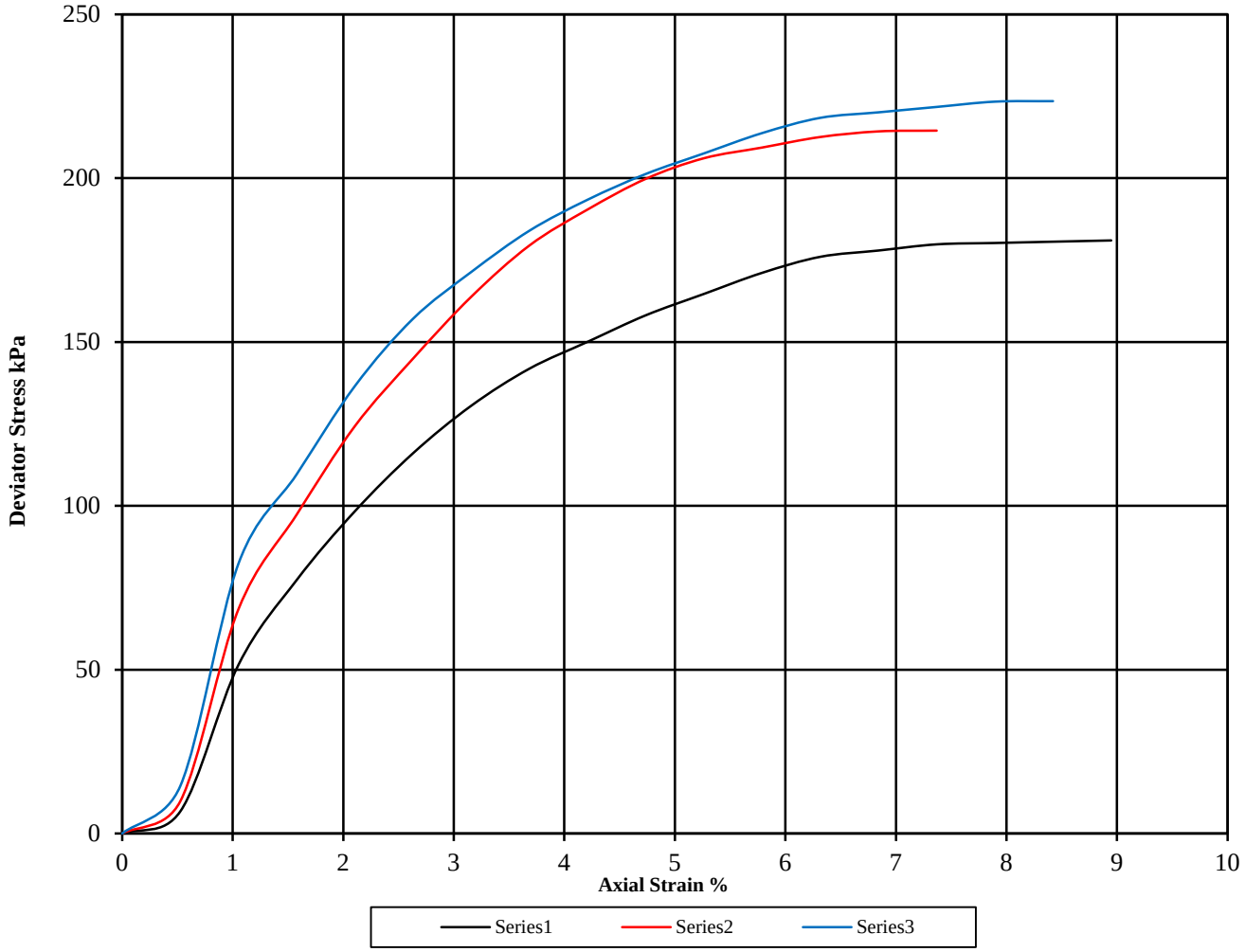
Client Ref:

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH5**	**Top Depth (m):**	**1.00**
Sample Number:		**Base Depth (m):**	**1.45**
Sample Type:	**U**		



Diameter (mm):		38.0	Height (mm):		76.0	Test:	3x38mm Samples.			Remarks
Specimen	Specimen Depth	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Specimens obtained by use of 3x38mm cutters Rate of strain - 2%/min Latex membrane used 0.2mm See summary of soil descriptions
1	1.00	32	1.82	1.37	20	181	90	8.9	Plastic	
2	1.00	33	1.82	1.37	40	215	107	7.4	Plastic	
3	1.00	32	1.82	1.37	80	224	112	8.4	Plastic	

UKAS TESTING 4043

PSL Professional Soils Laboratory

C2415 - Water Orton

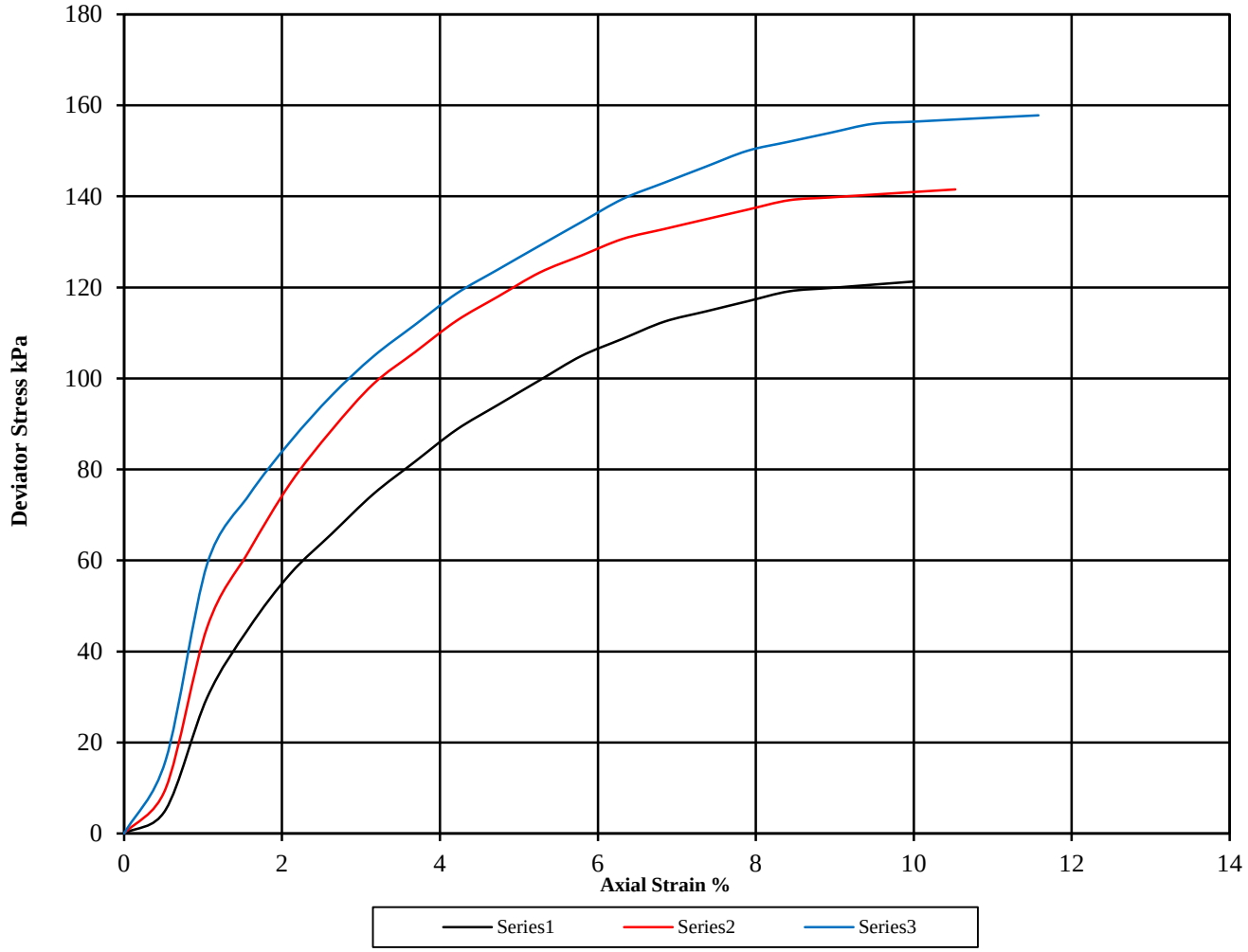
Contract No:
PSL17/3958
Client Ref:

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:	**BH6**	**Top Depth (m):**	**1.00**
Sample Number:		**Base Depth (m):**	**1.45**
Sample Type:	**U**		



Diameter (mm):		38.0	Height (mm):		76.0	Test:	3x38mm Samples.			Remarks
Specimen	Specimen Depth	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Specimens obtained by use of 3x38mm cutters Rate of strain - 2%/min Latex membrane used 0.2mm See summary of soil descriptions
1	1.00	38	1.73	1.26	20	121	61	10.0	Brittle	
2	1.00	38	1.74	1.26	40	142	71	10.5	Brittle	
3	1.00	37	1.74	1.27	80	158	79	11.6	Brittle	

UKAS TESTING 4043

PSL Professional Soils Laboratory

C2415 - Water Orton

Contract No:
PSL17/3958
Client Ref:

Certificate of Analysis

Certificate Number 17-08234

23-Aug-17

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference	17-08234
Client Reference	PSL17/3958
Order No	(not supplied)
Contract Title	C2415 - Water Orton
Description	2 Soil samples.
Date Received	19-Aug-17
Date Started	19-Aug-17
Date Completed	23-Aug-17
Test Procedures	Identified by prefix DETSn (details on request).

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

Approved By

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 17-08234
Client Ref PSL17/3958
Contract Title C2415 - Water Orton

			Lab No	1219444	1219445
			Sample ID	BH1	BH3
			Depth	1.50-2.00	0.50-1.00
			Other ID		
			Sample Type	B	B
			Sampling Date	n/s	n/s
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10
Inorganics					
pH	DETSC 2008#			7.4	7.3
Chloride Aqueous Extract	DETSC 2055	1	mg/l	4.5	5.9
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	2.9	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	< 10	12
Sulphur as S, Total	DETSC 2320	0.01	%	0.01	0.01
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.03	0.02

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 17-08234
Client Ref PSL17/3958
Contract C2415 - Water Orton

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1219444	BH1 1.50-2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1219445	BH3 0.50-1.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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

Appendix V

2531

ANALYTICAL TEST REPORT

Contract no:	66593
Contract name:	Water Orton
Client reference:	C2415
Clients name:	HSP Consulting
Clients address:	Lawrence House Meadowbank Way, Eastwood Nottingham NG16 3SB
Samples received:	11 August 2017
Analysis started:	11 August 2017
Analysis completed	18 August 2017
Report issued:	18 August 2017

Notes:

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

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

Key:

U UKAS accredited test

M MCERTS & UKAS accredited test

$ Test carried out by an approved subcontractor

I/S Insufficient sample to carry out test

N/S Sample not suitable for testing

NAD No Asbestos Detected

Approved by:

Dave Bowerbank
Customer Services Co-ordinator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
66593-1	WS1	0.80	Sandy Clay	-	-	5.3
66593-2	WS3	0.20	Loam	-	-	17.0
66593-3	WS5	0.00	Loam	-	-	22.4
66593-4	WS5	0.90	Clay	-	-	18.9
66593-5	WS7	0.20	Sand with Gravel	-	-	20.1
66593-6	WS7	0.70	Sandy Clay	-	-	11.6

Chemtech Environmental Limited

SOILS

Lab number			66593-1	66593-2	66593-3	66593-4	66593-5	66593-6
Sample id			WS1	WS3	WS5	WS5	WS7	WS7
Depth (m)			0.80	0.20	0.00	0.90	0.20	0.70
Date sampled			10/08/2017	10/08/2017	10/08/2017	10/08/2017	10/08/2017	10/08/2017
Test	Method	Units						
Arsenic (total)	CE127 M	mg/kg As	3.8	7.9	7.3	3.0	19	2.8
Boron (water soluble)	CE063 M	mg/kg B	0.8	0.6	1.0	1.1	1.1	0.6
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	0.3	0.3	<0.2	<0.2	<0.2
Chromium (total)	CE127 M	mg/kg Cr	80	89	111	76	108	68
Copper (total)	CE127 M	mg/kg Cu	8.8	34	31	17	97	10
Lead (total)	CE127 M	mg/kg Pb	11	51	79	8.6	30	10
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel (total)	CE127 M	mg/kg Ni	12	13	20	38	64	12
Selenium (total)	CE127 M	mg/kg Se	0.4	0.6	0.7	0.8	1.6	0.5
Zinc (total)	CE127 M	mg/kg Zn	21	74	100	71	74	52
pH	CE004 M	units	7.8	6.2	5.9	7.1	6.5	5.8
Sulphate (2:1 water soluble)	CE061 M	mg/l SO_4	12	15	38	<10	63	18
Sulphur (free)	CE034 M	mg/kg S	<10	<10	<10	<10	90	<10
Sulphide	CE079	mg/kg S^{2-}	<10	<10	<10	<10	<10	<10
Cyanide (free)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Organic Carbon (TOC)	CE072 M	% w/w C	<0.1	1.75	2.80	0.11	27.95	0.58
Estimate of OMC (calculated from TOC)	CE072 M	% w/w	<0.1	3.02	4.83	0.19	48.19	1.00
PAH								
Naphthalene	CE087 M	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	CE087 M	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	CE087 M	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	CE087 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	CE087 M	mg/kg	<0.02	0.03	0.04	<0.02	0.10	<0.02
Anthracene	CE087 U	mg/kg	<0.02	<0.02	<0.02	<0.02	0.11	<0.02
Fluoranthene	CE087 M	mg/kg	<0.02	<0.02	0.11	<0.02	0.18	<0.02
Pyrene	CE087 M	mg/kg	<0.02	0.03	0.09	<0.02	0.15	<0.02
Benzo(a)anthracene	CE087 U	mg/kg	<0.02	<0.02	0.05	<0.02	0.08	<0.02
Chrysene	CE087 M	mg/kg	<0.01	<0.01	<0.01	<0.01	0.09	<0.01
Benzo(b)fluoranthene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(k)fluoranthene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	CE087 U	mg/kg	<0.02	<0.02	<0.02	<0.02	0.10	<0.02
Indeno(123cd)pyrene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(ghi)perylene	CE087 M	mg/kg	<0.02	<0.02	0.04	<0.02	0.08	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	<0.27	<0.27	0.32	<0.27	0.87	<0.27
BTEX & TPH								
MTBE	CE057 U	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	CE057 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	CE057 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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SOILS

Lab number			66593-1	66593-2	66593-3	66593-4	66593-5	66593-6
Sample id			WS1	WS3	WS5	WS5	WS7	WS7
Depth (m)			0.80	0.20	0.00	0.90	0.20	0.70
Date sampled			10/08/2017	10/08/2017	10/08/2017	10/08/2017	10/08/2017	10/08/2017
Test	Method	Units						
Ethylbenzene	CE057 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m & p-Xylene	CE057 U	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	CE057 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	<4	<4	<4	<4	<4	<4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	<4	<4	<4	5	<4	<4
EPH Aliphatic (>C16-C35)	CE068	mg/kg	<10	22	55	<10	12	<10
EPH Aliphatic (>C35-C44)	CE068	mg/kg	<10	<10	10	<10	<10	<10
Subcontracted analysis								
Asbestos (qualitative)	$	-	-	-	-	-	NAD	NAD

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	M	0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	Wet	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	M	10	mg/l SO_4
CE034	Sulphur (free)	Solvent extraction, HPLC	Dry	M	10	mg/kg S
CE079	Sulphide	Extraction, Continuous Flow Colorimetry	Wet		10	mg/kg S^{2-}
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	Wet		1	mg/kg CN
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	Wet	M	1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	Wet		0.5	mg/kg PhOH
CE072	Total Organic Carbon (TOC)	Removal of IC by acidification, Carbon Analyser	Dry	M	0.1	% w/w C
CE072	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry	M	0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	Wet	U	0.01	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	Wet		0.27	mg/kg
CE057	MTBE	Headspace GC-FID	Wet	U	0.02	mg/kg
CE057	Benzene	Headspace GC-FID	Wet	U	0.01	mg/kg
CE057	Toluene	Headspace GC-FID	Wet	U	0.01	mg/kg
CE057	Ethylbenzene	Headspace GC-FID	Wet	U	0.01	mg/kg
CE057	m & p-Xylene	Headspace GC-FID	Wet	U	0.02	mg/kg
CE057	o-Xylene	Headspace GC-FID	Wet	U	0.01	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	Wet		0.01	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	Wet		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	Wet		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	Wet		10	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
IT	Sample not cooled
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
66593-1	WS1	0.80	N	
66593-2	WS3	0.20	N	
66593-3	WS5	0.00	N	
66593-4	WS5	0.90	N	
66593-5	WS7	0.20	N	
66593-6	WS7	0.70	N	

2531

ANALYTICAL TEST REPORT

Contract no: 66593

Contract name: Water Orton

Client reference: C2415

Clients name: HSP Consulting

Clients address: Lawrence House
Meadowbank Way, Eastwood
Nottingham
NG16 3SB

Samples received: 11 August 2017

Analysis started: 11 August 2017

Analysis completed 18 August 2017

Report issued: 18 August 2017

Notes:

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

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

Key:

U UKAS accredited test

M MCERTS & UKAS accredited test

$ Test carried out by an approved subcontractor

I/S Insufficient sample to carry out test

N/S Sample not suitable for testing

NAD No Asbestos Detected

Approved by:

Dave Bowerbank
Customer Services Co-ordinator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
66593-1	WS1	0.80	Sandy Clay	-	-	5.3
66593-2	WS3	0.20	Loam	-	-	17.0
66593-3	WS5	0.00	Loam	-	-	22.4
66593-4	WS5	0.90	Clay	-	-	18.9
66593-5	WS7	0.20	Sand with Gravel	-	-	20.1
66593-6	WS7	0.70	Sandy Clay	-	-	11.6

2531

ANALYTICAL TEST REPORT

Contract no:	66644
Contract name:	Water Orton
Client reference:	C2415
Clients name:	HSP Consulting
Clients address:	Lawrence House Meadowbank Way Eastwood, Nottingham NG16 3SB
Samples received:	15 August 2017
Analysis started:	15 August 2017
Analysis completed	22 August 2017
Report issued:	22 August 2017

Notes:

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

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

Key:

U UKAS accredited test

M MCERTS & UKAS accredited test

$ Test carried out by an approved subcontractor

I/S Insufficient sample to carry out test

N/S Sample not suitable for testing

NAD No Asbestos Detected

Approved by:

James Spittle
Customer Services Team Leader

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
66644-1	WAC1	0.30	Sandy Clay with Roots	-	-	15.4
66644-2	WAC2	0.50	Sandy Clay	-	-	13.5
66644-3	WAC3	0.80	Clayey Sand	-	-	13.3
66644-4	WAC4	0.40	Clayey Sand	-	-	7.0
66644-5	WAC5	0.90	Sandy Clay	-	-	11.5
66644-6	WAC6	0.60	Sandy Clay	-	-	12.7

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SOILS

Lab number			66644-1	66644-2	66644-3	66644-4	66644-5	66644-6
Sample id			WAC1	WAC2	WAC3	WAC4	WAC5	WAC6
Depth (m)			0.30	0.50	0.80	0.40	0.90	0.60
Date sampled			11/08/2017	11/08/2017	11/08/2017	11/08/2017	11/08/2017	11/08/2017
Test	Method	Units						
Antimony (total)	CE127 U	mg/kg Sb	1.3	0.6	0.3	3.2	0.3	0.3
Arsenic (total)	CE127 M	mg/kg As	11	5.4	3.3	15	3.5	5.3
Barium (total)	CE127 M	mg/kg Ba	131	61	79	2859	46	62
Boron (water soluble)	CE063 M	mg/kg B	1.1	1.4	1.0	0.5	0.4	0.5
Cadmium (total)	CE127 M	mg/kg Cd	0.4	<0.2	<0.2	1.7	<0.2	<0.2
Chromium (total)	CE127 M	mg/kg Cr	81	83	89	171	93	75
Copper (total)	CE127 M	mg/kg Cu	31	17	12	92	8.9	9.9
Lead (total)	CE127 M	mg/kg Pb	95	28	8.2	189	6.7	15
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	6.4	6.5	5.6	12	6.7	5.1
Nickel (total)	CE127 M	mg/kg Ni	18	16	19	49	12	13
Selenium (total)	CE127 M	mg/kg Se	0.7	0.5	0.6	2.0	0.4	0.5
Zinc (total)	CE127 M	mg/kg Zn	144	56	50	562	28	35
pH	CE004 M	units	6.3	8.0	6.9	7.0	6.0	6.2
Sulphate (2:1 water soluble)	CE061 M	mg/l SO_4	19	54	16	11	<10	<10
Sulphur (free)	CE034 M	mg/kg S	<10	<10	<10	<10	<10	<10
Sulphide	CE079	mg/kg S^{2-}	<10	<10	<10	<10	<10	<10
Cyanide (free)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	0.9	0.7	0.6	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	CE087 M	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	CE087 M	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	CE087 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	CE087 M	mg/kg	0.13	0.11	0.03	0.03	0.03	0.03
Anthracene	CE087 U	mg/kg	0.05	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	CE087 M	mg/kg	0.27	0.16	<0.02	<0.02	0.02	0.03
Pyrene	CE087 M	mg/kg	0.26	0.15	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	CE087 U	mg/kg	0.17	0.08	<0.02	<0.02	<0.02	<0.02
Chrysene	CE087 M	mg/kg	0.16	0.11	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	CE087 M	mg/kg	0.17	0.10	<0.02	<0.02	<0.02	<0.02
Benzo(k)fluoranthene	CE087 M	mg/kg	0.13	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	CE087 U	mg/kg	0.18	0.08	<0.02	<0.02	<0.02	<0.02
Indeno(123cd)pyrene	CE087 M	mg/kg	0.09	0.04	<0.02	<0.02	<0.02	<0.02
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(ghi)perylene	CE087 M	mg/kg	0.12	0.05	<0.02	<0.02	<0.02	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	1.74	0.87	<0.27	<0.27	<0.27	<0.27

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SOILS

Lab number			66644-1	66644-2	66644-3	66644-4	66644-5	66644-6
Sample id			WAC1	WAC2	WAC3	WAC4	WAC5	WAC6
Depth (m)			0.30	0.50	0.80	0.40	0.90	0.60
Date sampled			11/08/2017	11/08/2017	11/08/2017	11/08/2017	11/08/2017	11/08/2017
Test	Method	Units						
BTEX & TPH								
MTBE	CE057 U	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	CE057 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	CE057 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	CE057 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m & p-Xylene	CE057 U	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	CE057 U	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	<4	<4	<4	<4	<4	<4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	<4	<4	<4	<4	<4	<4
EPH Aliphatic (>C16-C35)	CE068	mg/kg	40	<10	<10	<10	<10	17
EPH Aliphatic (>C35-C44)	CE068	mg/kg	12	<10	<10	<10	<10	<10
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Antimony (total)	Aqua regia digest, ICP-MS	Dry	U	0.2	mg/kg Sb
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Barium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ba
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	M	0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Molybdenum (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Mo
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	Wet	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	M	10	mg/l SO_4
CE034	Sulphur (free)	Solvent extraction, HPLC	Dry	M	10	mg/kg S
CE079	Sulphide	Extraction, Continuous Flow Colorimetry	Wet		10	mg/kg S^{2-}
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	Wet		1	mg/kg CN
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	Wet	M	1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	Wet		0.5	mg/kg PhOH
CE087	Naphthalene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	Wet	U	0.01	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	Wet		0.27	mg/kg
CE057	MTBE	Headspace GC-FID	Wet	U	0.02	mg/kg
CE057	Benzene	Headspace GC-FID	Wet	U	0.01	mg/kg
CE057	Toluene	Headspace GC-FID	Wet	U	0.01	mg/kg
CE057	Ethylbenzene	Headspace GC-FID	Wet	U	0.01	mg/kg
CE057	m & p-Xylene	Headspace GC-FID	Wet	U	0.02	mg/kg
CE057	o-Xylene	Headspace GC-FID	Wet	U	0.01	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	Wet		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	Wet		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	Wet		10	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
IT	Sample not cooled
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
66644-1	WAC1	0.30	N	
66644-2	WAC2	0.50	N	
66644-3	WAC3	0.80	N	
66644-4	WAC4	0.40	N	
66644-5	WAC5	0.90	N	
66644-6	WAC6	0.60	N	

Waste Acceptance Criteria Testing
BS EN 12457-Part 3, 2 Stage Process

CHEMTECH environmental

Sample Details		Test Values	
Contract Name	Water Orton	Mass of Raw Test Portion (MW) kg	0.207
Lab Number	66644-1	Mass of Dried Test Portion (MD) kg	0.175
Sample ID	WAC1 0.30m	Moisture Content Ratio (MC) %	18.19
Date Sampled	11 August 2017	Dry Matter Content Ratio (DR) %	84.61
Date Received	15 August 2017	Leachant Volume (1) (L2) Litre	0.318
Particle Size (<4mm)	-	Leachant Volume (2) (L8) Litre	1.400
Method of size reduction	N/A	Eluate Volume (1) (VE1) Litre	0.240
Non-crushable matter	N/A	Eluate Volume (2) (VE2) Litre	1.285

Eluate Analysis	Conc in Eluate		Amount Leached		BS EN 12457-3 Limit Values mg/kg at L:S 10:1		
Liquid : Waste Ratio	2:1	8:1					
pH (units)	7.3	7.9			Inert	Non-reactive	Hazardous
Temperature (°C)	20	20	2:1	10:1	Waste	Hazardous	Waste
Conductivity (µS/cm)	57	43	mg/kg	mg/kg		Waste	
Antimony (µg/l Sb)	3.4	1.5	0.007	0.018	0.06	0.7	5
Arsenic (µg/l As)	10.61	7.03	0.021	0.075	0.5	2	25
Barium (µg/l Ba)	14.6	9.7	0.029	0.103	20	100	300
Cadmium (µg/l Cd)	<0.07	<0.07	<0.0002	<0.0007	0.04	1	5
Chromium (µg/l Cr)	1.0	1.3	0.002	0.012	0.5	10	70
Copper (µg/l Cu)	25.1	11.4	0.050	0.132	2	50	100
Lead (µg/l Pb)	6.6	5.8	0.0132	0.059	0.5	10	50
Mercury (µg/l Hg)	0.045	0.027	0.00009	0.00029	0.01	0.2	2
Molybdenum (µg/l Mo)	1.5	0.8	0.003	0.009	0.5	10	30
Nickel (µg/l Ni)	7.0	3.0	0.014	0.035	0.4	10	40
Selenium (µg/l Se)	0.77	0.51	0.002	0.005	0.1	0.5	7
Zinc (µg/l Zn)	34	17	0.067	0.196	4	50	200
Chloride (mg/l Cl)	<1	1.2	<2	<12	800	15000	25000
Fluoride (mg/l F)	0.5	0.5	1.0	5.0	10	150	500
Sulphate (mg/l SO_4)	<10	<10	<20	<100	1000	20000	50000
Total Dissolved Solids (mg/l TDS)	45	35	90	364	4000	60000	100000
Phenol Index (mg/l PhOH)	<0.01	<0.01	<0.02	<0.1	1		
Dissolved Organic Carbon (mg/l C	15	9.0	30	98	500	800	1000

Waste Analysis	Units	Result			
Total Organic Carbon	% w/w	2.7	3%	5%	6%
Loss on Ignition	% w/w	6.5			10%
BTEX	mg/kg	<0.06	6		
PCBs (7 congeners)	mg/kg	<0.045	1		
TPH (C10 - C40)	mg/kg	90	500		
PAH (total)	mg/kg	1.74	100		
pH	pH units	6.3		>6	
Acid Neutralisation Capacity (pH4)	mol/kg	0.09		To be evaluated	
Acid Neutralisation Capacity (pH7)	mol/kg	-		To be evaluated	

Comments

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Report date: 22 August 2017 Position: Director

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Waste Acceptance Criteria Testing
BS EN 12457-Part 3, 2 Stage Process

CHEMTECH environmental

Sample Details		Test Values	
Contract Name	Water Orton	Mass of Raw Test Portion (MW) kg	0.202
Lab Number	66644	Mass of Dried Test Portion (MD) kg	0.175
Sample ID	WAC2 0.50m	Moisture Content Ratio (MC) %	15.65
Date Sampled	11 August 2017	Dry Matter Content Ratio (DR) %	86.47
Date Received	15 August 2017	Leachant Volume (1) (L2) Litre	0.323
Particle Size (<4mm)	-	Leachant Volume (2) (L8) Litre	1.400
Method of size reduction	N/A	Eluate Volume (1) (VE1) Litre	0.235
Non-crushable matter	N/A	Eluate Volume (2) (VE2) Litre	1.280

Eluate Analysis	Conc in Eluate		Amount Leached		BS EN 12457-3 Limit Values mg/kg at L:S 10:1		
Liquid : Waste Ratio	2:1	8:1					
pH (units)	7.6	7.9			Inert	Non-reactive	Hazardous
Temperature (°C)	20	20	2:1	10:1	Waste	Hazardous	Waste
Conductivity (µS/cm)	514	176	mg/kg	mg/kg		Waste	
Antimony (µg/l Sb)	2.7	1.8	0.005	0.019	0.06	0.7	5
Arsenic (µg/l As)	3.12	2.87	0.006	0.029	0.5	2	25
Barium (µg/l Ba)	25.0	9.1	0.050	0.112	20	100	300
Cadmium (µg/l Cd)	<0.07	<0.07	<0.0002	<0.0007	0.04	1	5
Chromium (µg/l Cr)	0.9	2.2	0.002	0.021	0.5	10	70
Copper (µg/l Cu)	34.4	20.9	0.069	0.227	2	50	100
Lead (µg/l Pb)	11.4	9.3	0.0229	0.096	0.5	10	50
Mercury (µg/l Hg)	0.047	0.031	0.00009	0.00033	0.01	0.2	2
Molybdenum (µg/l Mo)	39.7	15.1	0.079	0.184	0.5	10	30
Nickel (µg/l Ni)	12.6	8.1	0.025	0.087	0.4	10	40
Selenium (µg/l Se)	1.97	1.14	0.004	0.013	0.1	0.5	7
Zinc (µg/l Zn)	2	7	0.004	0.061	4	50	200
Chloride (mg/l Cl)	18	3.7	36	56	800	15000	25000
Fluoride (mg/l F)	4.4	2.5	8.8	27.6	10	150	500
Sulphate (mg/l SO_4)	39	<10	78	<139	1000	20000	50000
Total Dissolved Solids (mg/l TDS)	390	135	780	1692	4000	60000	100000
Phenol Index (mg/l PhOH)	<0.01	<0.01	<0.02	<0.1	1		
Dissolved Organic Carbon (mg/l C	40	26	80	279	500	800	1000

Waste Analysis	Units	Result			
Total Organic Carbon	% w/w	1.2	3%	5%	6%
Loss on Ignition	% w/w	4.3			10%
BTEX	mg/kg	<0.06	6		
PCBs (7 congeners)	mg/kg	<0.045	1		
TPH (C10 - C40)	mg/kg	73	500		
PAH (total)	mg/kg	0.87	100		
pH	pH units	8.0		>6	
Acid Neutralisation Capacity (pH4)	mol/kg	0.16		To be evaluated	
Acid Neutralisation Capacity (pH7)	mol/kg	0.04		To be evaluated	

Comments

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BS EN 12457-Part 3, 2 Stage Process

CHEMTECH environmental

Sample Details		Test Values	
Contract Name	Water Orton	Mass of Raw Test Portion (MW) kg	0.202
Lab Number	6664-3	Mass of Dried Test Portion (MD) kg	0.175
Sample ID	WAC3 0.80m	Moisture Content Ratio (MC) %	15.37
Date Sampled	11 August 2017	Dry Matter Content Ratio (DR) %	86.68
Date Received	15 August 2017	Leachant Volume (1) (L2) Litre	0.323
Particle Size (<4mm)	-	Leachant Volume (2) (L8) Litre	1.400
Method of size reduction	N/A	Eluate Volume (1) (VE1) Litre	0.265
Non-crushable matter	N/A	Eluate Volume (2) (VE2) Litre	1.310

Eluate Analysis	Conc in Eluate		Amount Leached		BS EN 12457-3 Limit Values mg/kg at L:S 10:1		
Liquid : Waste Ratio	2:1	8:1					
pH (units)	7.2	7.2			Inert	Non-reactive	Hazardous
Temperature (°C)	20	20	2:1	10:1	Waste	Hazardous	Waste
Conductivity (µS/cm)	156	46	mg/kg	mg/kg		Waste	
Antimony (µg/l Sb)	0.2	0.2	0.000	0.002	0.06	0.7	5
Arsenic (µg/l As)	0.31	0.32	0.001	0.003	0.5	2	25
Barium (µg/l Ba)	9.5	6.6	0.019	0.070	20	100	300
Cadmium (µg/l Cd)	<0.07	<0.07	<0.0002	<0.0007	0.04	1	5
Chromium (µg/l Cr)	<0.2	1.8	<0.0004	<0.015	0.5	10	70
Copper (µg/l Cu)	4.5	2.7	0.009	0.030	2	50	100
Lead (µg/l Pb)	0.3	0.6	0.0006	0.006	0.5	10	50
Mercury (µg/l Hg)	<0.008	<0.008	<0.00002	<0.00008	0.01	0.2	2
Molybdenum (µg/l Mo)	1.2	<0.3	0.002	<0.004	0.5	10	30
Nickel (µg/l Ni)	3.0	2.2	0.006	0.023	0.4	10	40
Selenium (µg/l Se)	0.16	0.15	0.000	0.001	0.1	0.5	7
Zinc (µg/l Zn)	9	3	0.017	0.039	4	50	200
Chloride (mg/l Cl)	11	2.5	22	38	800	15000	25000
Fluoride (mg/l F)	0.2	0.3	0.4	2.8	10	150	500
Sulphate (mg/l SO_4)	<10	<10	<20	<100	1000	20000	50000
Total Dissolved Solids (mg/l TDS)	120	35	240	479	4000	60000	100000
Phenol Index (mg/l PhOH)	<0.01	<0.01	<0.02	<0.1	1		
Dissolved Organic Carbon (mg/l C	<5	5.6	<10	<55	500	800	1000

Waste Analysis	Units	Result			
Total Organic Carbon	% w/w	0.3	3%	5%	6%
Loss on Ignition	% w/w	3.5			10%
BTEX	mg/kg	<0.06	6		
PCBs (7 congeners)	mg/kg	<0.045	1		
TPH (C10 - C40)	mg/kg	21	500		
PAH (total)	mg/kg	<0.29	100		
pH	pH units	6.9		>6	
Acid Neutralisation Capacity (pH4)	mol/kg	0.12		To be evaluated	
Acid Neutralisation Capacity (pH7)	mol/kg	-		To be evaluated	

Comments

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Waste Acceptance Criteria Testing
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CHEMTECH environmental

Sample Details		Test Values	
Contract Name	Water Orton	Mass of Raw Test Portion (MW) kg	0.188
Lab Number	66644-4	Mass of Dried Test Portion (MD) kg	0.175
Sample ID	WAC4 0.40m	Moisture Content Ratio (MC) %	7.48
Date Sampled	11 August 2017	Dry Matter Content Ratio (DR) %	93.04
Date Received	15 August 2017	Leachant Volume (1) (L2) Litre	0.337
Particle Size (<4mm)	-	Leachant Volume (2) (L8) Litre	1.400
Method of size reduction	N/A	Eluate Volume (1) (VE1) Litre	0.280
Non-crushable matter	N/A	Eluate Volume (2) (VE2) Litre	1.325

Eluate Analysis	Conc in Eluate		Amount Leached		BS EN 12457-3 Limit Values mg/kg at L:S 10:1		
Liquid : Waste Ratio	2:1	8:1					
pH (units)	7.2	7.1			Inert	Non-reactive	Hazardous
Temperature (°C)	20	20	2:1	10:1	Waste	Hazardous	Waste
Conductivity (µS/cm)	26	21	mg/kg	mg/kg		Waste	
Antimony (µg/l Sb)	0.7	0.3	0.001	0.004	0.06	0.7	5
Arsenic (µg/l As)	1.08	1.02	0.002	0.010	0.5	2	25
Barium (µg/l Ba)	13.5	5.4	0.027	0.067	20	100	300
Cadmium (µg/l Cd)	<0.07	<0.07	<0.0002	<0.0007	0.04	1	5
Chromium (µg/l Cr)	2.8	1.4	0.006	0.017	0.5	10	70
Copper (µg/l Cu)	14.2	7.1	0.028	0.082	2	50	100
Lead (µg/l Pb)	3.7	3.7	0.0075	0.037	0.5	10	50
Mercury (µg/l Hg)	0.019	0.015	0.00004	0.00015	0.01	0.2	2
Molybdenum (µg/l Mo)	0.5	0.3	0.001	0.003	0.5	10	30
Nickel (µg/l Ni)	3.7	2.1	0.007	0.024	0.4	10	40
Selenium (µg/l Se)	0.66	0.31	0.001	0.004	0.1	0.5	7
Zinc (µg/l Zn)	<1	2	<0.002	<0.021	4	50	200
Chloride (mg/l Cl)	<1	<1	<2	<10	800	15000	25000
Fluoride (mg/l F)	0.4	0.3	0.8	3.2	10	150	500
Sulphate (mg/l SO_4)	<10	<10	<20	<100	1000	20000	50000
Total Dissolved Solids (mg/l TDS)	20	15	40	158	4000	60000	100000
Phenol Index (mg/l PhOH)	<0.01	<0.01	<0.02	<0.1	1		
Dissolved Organic Carbon (mg/l C	9.7	5.7	19	63	500	800	1000

Waste Analysis	Units	Result			
Total Organic Carbon	% w/w	0.3	3%	5%	6%
Loss on Ignition	% w/w	2.1			10%
BTEX	mg/kg	<0.06	6		
PCBs (7 congeners)	mg/kg	<0.045	1		
TPH (C10 - C40)	mg/kg	<10	500		
PAH (total)	mg/kg	<0.29	100		
pH	pH units	7.0		>6	
Acid Neutralisation Capacity (pH4)	mol/kg	0.12		To be evaluated	
Acid Neutralisation Capacity (pH7)	mol/kg	-		To be evaluated	

Comments

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Sample Details		Test Values	
Contract Name	Water Orton	Mass of Raw Test Portion (MW) kg	0.198
Lab Number	66644-5	Mass of Dried Test Portion (MD) kg	0.175
Sample ID	WAC5 0.90m	Moisture Content Ratio (MC) %	13.05
Date Sampled	11 August 2017	Dry Matter Content Ratio (DR) %	88.46
Date Received	15 August 2017	Leachant Volume (1) (L2) Litre	0.327
Particle Size (<4mm)	-	Leachant Volume (2) (L8) Litre	1.400
Method of size reduction	N/A	Eluate Volume (1) (VE1) Litre	0.235
Non-crushable matter	N/A	Eluate Volume (2) (VE2) Litre	1.280

Eluate Analysis	Conc in Eluate		Amount Leached		BS EN 12457-3 Limit Values mg/kg at L:S 10:1		
Liquid : Waste Ratio	2:1	8:1					
pH (units)	7.0	6.9			Inert	Non-reactive	Hazardous
Temperature (°C)	20	20	2:1	10:1	Waste	Hazardous	Waste
Conductivity (µS/cm)	26	17	mg/kg	mg/kg		Waste	
Antimony (µg/l Sb)	0.7	0.2	0.001	0.003	0.06	0.7	5
Arsenic (µg/l As)	0.83	0.99	0.002	0.010	0.5	2	25
Barium (µg/l Ba)	9.9	4.5	0.020	0.052	20	100	300
Cadmium (µg/l Cd)	<0.07	0.10	<0.0002	<0.001	0.04	1	5
Chromium (µg/l Cr)	2.1	1.4	0.004	0.015	0.5	10	70
Copper (µg/l Cu)	11.3	6.7	0.023	0.073	2	50	100
Lead (µg/l Pb)	1.3	2.8	0.0026	0.026	0.5	10	50
Mercury (µg/l Hg)	<0.008	0.012	<0.00002	<0.00012	0.01	0.2	2
Molybdenum (µg/l Mo)	<0.3	<0.3	<0.0006	<0.003	0.5	10	30
Nickel (µg/l Ni)	1.9	1.3	0.004	0.014	0.4	10	40
Selenium (µg/l Se)	0.29	0.19	0.001	0.002	0.1	0.5	7
Zinc (µg/l Zn)	<1	3	<0.002	<0.027	4	50	200
Chloride (mg/l Cl)	<1	<1	<2	<10	800	15000	25000
Fluoride (mg/l F)	0.1	0.1	0.2	1.0	10	150	500
Sulphate (mg/l SO_4)	<10	<10	<20	<100	1000	20000	50000
Total Dissolved Solids (mg/l TDS)	20	15	40	157	4000	60000	100000
Phenol Index (mg/l PhOH)	<0.01	<0.01	<0.02	<0.1	1		
Dissolved Organic Carbon (mg/l C	7.3	5.2	15	55	500	800	1000

Waste Analysis	Units	Result			
Total Organic Carbon	% w/w	0.1	3%	5%	6%
Loss on Ignition	% w/w	1.8			10%
BTEX	mg/kg	<0.06	6		
PCBs (7 congeners)	mg/kg	<0.045	1		
TPH (C10 - C40)	mg/kg	<10	500		
PAH (total)	mg/kg	<0.29	100		
pH	pH units	6.0		>6	
Acid Neutralisation Capacity (pH4)	mol/kg	0.08		To be evaluated	
Acid Neutralisation Capacity (pH7)	mol/kg	-		To be evaluated	

Comments

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CHEMTECH environmental

Sample Details		Test Values	
Contract Name	Water Orton	Mass of Raw Test Portion (MW) kg	0.200
Lab Number	66644-6	Mass of Dried Test Portion (MD) kg	0.175
Sample ID	WAC6 0.60m	Moisture Content Ratio (MC) %	14.53
Date Sampled	11 August 2017	Dry Matter Content Ratio (DR) %	87.32
Date Received	15 August 2017	Leachant Volume (1) (L2) Litre	0.325
Particle Size (<4mm)	-	Leachant Volume (2) (L8) Litre	1.400
Method of size reduction	N/A	Eluate Volume (1) (VE1) Litre	0.225
Non-crushable matter	N/A	Eluate Volume (2) (VE2) Litre	1.265

Eluate Analysis	Conc in Eluate		Amount Leached		BS EN 12457-3 Limit Values mg/kg at L:S 10:1		
Liquid : Waste Ratio	2:1	8:1					
pH (units)	7.0	8.0			Inert	Non-reactive	Hazardous
Temperature (°C)	20	20	2:1	10:1	Waste	Hazardous	Waste
Conductivity (µS/cm)	23	47	mg/kg	mg/kg		Waste	
Antimony (µg/l Sb)	0.8	0.4	0.002	0.004	0.06	0.7	5
Arsenic (µg/l As)	0.94	0.99	0.002	0.010	0.5	2	25
Barium (µg/l Ba)	7.6	6.1	0.015	0.063	20	100	300
Cadmium (µg/l Cd)	<0.07	0.29	<0.0002	<0.003	0.04	1	5
Chromium (µg/l Cr)	1.8	0.9	0.004	0.010	0.5	10	70
Copper (µg/l Cu)	10.4	7.8	0.021	0.081	2	50	100
Lead (µg/l Pb)	3.3	11.4	0.0066	0.103	0.5	10	50
Mercury (µg/l Hg)	<0.008	0.009	<0.00002	<0.00009	0.01	0.2	2
Molybdenum (µg/l Mo)	<0.3	0.4	<0.0006	<0.004	0.5	10	30
Nickel (µg/l Ni)	2.2	1.9	0.004	0.019	0.4	10	40
Selenium (µg/l Se)	0.30	0.32	0.001	0.003	0.1	0.5	7
Zinc (µg/l Zn)	<1	16	<0.002	<0.141	4	50	200
Chloride (mg/l Cl)	<1	1.2	<2	<12	800	15000	25000
Fluoride (mg/l F)	0.3	0.3	0.6	3.0	10	150	500
Sulphate (mg/l SO_4)	<10	<10	<20	<100	1000	20000	50000
Total Dissolved Solids (mg/l TDS)	15	35	30	324	4000	60000	100000
Phenol Index (mg/l PhOH)	<0.01	<0.01	<0.02	<0.1	1		
Dissolved Organic Carbon (mg/l C	11	9.6	22	98	500	800	1000

Waste Analysis	Units	Result			
Total Organic Carbon	% w/w	0.4	3%	5%	6%
Loss on Ignition	% w/w	3.3			10%
BTEX	mg/kg	<0.06	6		
PCBs (7 congeners)	mg/kg	<0.045	1		
TPH (C10 - C40)	mg/kg	15	500		
PAH (total)	mg/kg	<0.29	100		
pH	pH units	6.2		>6	
Acid Neutralisation Capacity (pH4)	mol/kg	0.09		To be evaluated	
Acid Neutralisation Capacity (pH7)	mol/kg	-		To be evaluated	

Comments

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Report date: 22 August 2017 Position: Director

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Appendix VI

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH1

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl
00:00	0.0	<0.1	<0.1	20.7	<0.1	<1	<1		5.62	3.89
00:15	0.0	<0.1	<0.1	18.5	2.4	1	2		5.62	3.89
00:30	0.0	<0.1	<0.1	18.2	2.5	1	<1		5.62	3.89
00:45	0.0	<0.1	<0.1	18.2	2.6	1	<1		5.62	3.89
01:00	0.0	<0.1	<0.1	18.1	2.6	<1	<1		5.62	3.89
01:15	0.0	<0.1	<0.1	18.1	2.6	<1	<1		5.62	3.89
01:30	0.0	<0.1	<0.1	18.1	2.6	1	<1		5.62	3.89
01:45	0.0	<0.1	<0.1	18.1	2.6	1	<1		5.62	3.89
02:00	0.0	<0.1	<0.1	18.0	2.6	1	<1		5.62	3.89
02:15	0.0	<0.1	<0.1	18.0	2.6	1	<1		5.62	3.89
02:30	0.0	<0.1	<0.1	18.0	2.6	1	<1		5.62	3.89
02:45	0.0	<0.1	<0.1	18.0	2.6	2	<1		5.62	3.89
03:00	0.0	<0.1	<0.1	18.0	2.6	2	<1		5.62	3.89
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**18.0**	**2.6**	**2.0**	**<1**	**#####**	**5.62**	**3.89**
Peak	**0.0**	**0.0**	**0.0**	**20.7**	**2.6**	**2.0**	**2.0**	**0.0**	**5.62**	**3.89**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH2

	Detection Limit								
	<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm)	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl)
00:00	0.0	<0.1	<0.1	20.6	<0.1	<1	<1		4.47	4.00
00:15	0.0	<0.1	<0.1	18.8	2.0	<1	<1		4.47	4.00
00:30	0.0	<0.1	<0.1	18.8	2.0	<1	<1		4.47	4.00
00:45	0.0	<0.1	<0.1	18.7	2.0	<1	<1		4.47	4.00
01:00	0.0	<0.1	<0.1	18.6	2.0	<1	<1		4.47	4.00
01:15	0.0	<0.1	<0.1	18.6	2.0	<1	<1		4.47	4.00
01:30	0.0	<0.1	<0.1	18.6	2.0	<1	<1		4.47	4.00
01:45	0.0	<0.1	<0.1	18.6	2.0	<1	<1		4.47	4.00
02:00	0.0	<0.1	<0.1	18.6	2.0	<1	<1		4.47	4.00
02:15	0.0	<0.1	<0.1	18.5	2.0	<1	<1		4.47	4.00
02:30	0.0	<0.1	<0.1	18.5	2.0	<1	<1		4.47	4.00
02:45	0.0	<0.1	<0.1	18.5	2.0	<1	<1		4.47	4.00
03:00	0.0	<0.1	<0.1	18.5	2.0	<1	<1		4.47	4.00
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**18.5**	**2.0**	**<1**	**<1**	**#####**	**4.47**	**4.00**
Peak	**0.0**	**0.0**	**0.0**	**20.6**	**2.0**	**0.0**	**0.0**	**0.0**	**4.47**	**4.00**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH5

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00	0.0	<0.1	<0.1	20.7	<0.1	<1	<1		5.45	3.67
00:15	0.0	<0.1	<0.1	17.4	2.9	<1	<1		5.45	3.67
00:30	0.0	<0.1	<0.1	17.0	2.9	<1	<1		5.45	3.67
00:45	0.0	<0.1	<0.1	16.9	3.0	<1	<1		5.45	3.67
01:00	0.0	<0.1	<0.1	16.8	3.0	<1	<1		5.45	3.67
01:15	0.0	<0.1	<0.1	16.8	3.0	<1	<1		5.45	3.67
01:30	0.0	<0.1	<0.1	16.8	3.0	<1	<1		5.45	3.67
01:45	0.0	<0.1	<0.1	16.8	3.1	<1	<1		5.45	3.67
02:00	0.0	<0.1	<0.1	16.8	3.1	<1	<1		5.45	3.67
02:15	0.0	<0.1	<0.1	16.8	3.1	<1	<1		5.45	3.67
02:30	0.0	<0.1	<0.1	16.7	3.1	<1	<1		5.45	3.67
02:45	0.0	<0.1	<0.1	16.7	3.1	<1	<1		5.45	3.67
03:00	0.0	<0.1	<0.1	16.7	3.1	<1	<1		5.45	3.67
03:15	0.0	<0.1	<0.1	16.7	3.1	<1	<1		5.45	3.67
03:30	0.0	<0.1	<0.1	16.7	3.2	<1	<1		5.45	3.67
03:45	0.0	<0.1	<0.1	16.6	3.2	<1	<1		5.45	3.67
04:00	0.0	<0.1	<0.1	16.6	3.2	<1	<1		5.45	3.67
04:15	0.0	<0.1	<0.1	16.6	3.2	<1	<1		5.45	3.67
04:30	0.0	<0.1	<0.1	16.6	3.3	<1	<1		5.45	3.67
04:45	0.0	<0.1	<0.1	16.5	3.3	<1	<1		5.45	3.67
05:00	0.0	<0.1	<0.1	16.3	3.3	<1	<1		5.45	3.67
Steady	**0.0**	**<0.1**	**<0.1**	**16.3**	**3.3**	**<1**	**<1**	**#####**	**5.45**	**3.67**
Peak	**0.0**	**0.0**	**0.0**	**20.7**	**3.3**	**0.0**	**0.0**	**0.0**	**5.45**	**3.67**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

0

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00										
00:15										
00:30										
00:45										
01:00										
01:15										
01:30										
01:45										
02:00										
02:15										
02:30										
02:45										
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	#####	#####	#####	#####	#####	#####	#####	#####	#####	######
Peak	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

0

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00										
00:15										
00:30										
00:45										
01:00										
01:15										
01:30										
01:45										
02:00										
02:15										
02:30										
02:45										
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	#####	#####	#####	#####	#####	#####	#####	#####	#####	######
Peak	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

0

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl
00:00										
00:15										
00:30										
00:45										
01:00										
01:15										
01:30										
01:45										
02:00										
02:15										
02:30										
02:45										
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	#####	#####	#####	#####	#####	#####	#####	#####	#####	######
Peak	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

0

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl
00:00										
00:15										
00:30										
00:45										
01:00										
01:15										
01:30										
01:45										
02:00										
02:15										
02:30										
02:45										
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	#####	#####	#####	#####	#####	#####	#####	#####	#####	######
Peak	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

0

	Detection Limit								
	<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00										
00:15										
00:30										
00:45										
01:00										
01:15										
01:30										
01:45										
02:00										
02:15										
02:30										
02:45										
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	#####	#####	#####	#####	#####	#####	#####	#####	#####	######
Peak	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

0

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00										
00:15										
00:30										
00:45										
01:00										
01:15										
01:30										
01:45										
02:00										
02:15										
02:30										
02:45										
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	#####	#####	#####	#####	#####	#####	#####	#####	#####	######
Peak	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

0

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00										
00:15										
00:30										
00:45										
01:00										
01:15										
01:30										
01:45										
02:00										
02:15										
02:30										
02:45										
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	#####	#####	#####	#####	#####	#####	#####	#####	#####	######
Peak	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**

Date	Notes:			
05.09.2017	Engineer	DRS	Barometric Pressure, mbar	1001
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	19

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH1

	Detection Limit								
	<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl
00:00	0.0	<0.1	<0.1	20.7	<0.1	<1	<1		5.54	3.89
00:15	0.0	<0.1	<0.1	18.2	2.4	<1	<1		5.54	3.89
00:30	0.0	<0.1	<0.1	18.0	2.4	<1	<1		5.54	3.89
00:45	0.0	<0.1	<0.1	17.9	2.4	<1	<1		5.54	3.89
01:00	0.0	<0.1	<0.1	17.9	2.4	1	<1		5.54	3.89
01:15	0.0	<0.1	<0.1	17.9	2.4	<1	<1		5.54	3.89
01:30	0.0	<0.1	<0.1	17.8	2.5	<1	<1		5.54	3.89
01:45	0.0	<0.1	<0.1	17.9	2.5	<1	<1		5.54	3.89
02:00	0.0	<0.1	<0.1	17.9	2.5	<1	<1		5.54	3.89
02:15	0.0	<0.1	<0.1	17.9	2.5	<1	<1		5.54	3.89
02:30	0.0	<0.1	<0.1	17.9	2.5	<1	<1		5.54	3.89
02:45	0.0	<0.1	<0.1	17.9	2.5	<1	<1		5.54	3.89
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**17.9**	**2.5**	**<1**	**<1**	**#####**	**5.54**	**3.89**
Peak	**0.0**	**0.0**	**0.0**	**20.7**	**2.5**	**1.0**	**0.0**	**0.0**	**5.54**	**3.89**

Date	Notes:			
12.09.2017	Engineer	DRS	Barometric Pressure, mbar	996
			Pressure Trend	Fallimg
	Equipment	GFM430	Air Temp (˚C)	17

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH2

Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm)	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl)
Detection Limit		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
00:00	0.0	<0.1	<0.1	20.5	<0.1	<1	<1		4.56	3.97
00:15	0.0	<0.1	<0.1	18.4	1.7	1	<1		4.56	3.97
00:30	0.0	<0.1	<0.1	18.2	1.7	1	<1		4.56	3.97
00:45	0.0	<0.1	<0.1	18.1	1.7	1	<1		4.56	3.97
01:00	0.0	<0.1	<0.1	18.0	1.8	1	<1		4.56	3.97
01:15	0.0	<0.1	<0.1	18.0	1.8	1	<1		4.56	3.97
01:30	0.0	<0.1	<0.1	18.0	1.8	<1	<1		4.56	3.97
01:45	0.0	<0.1	<0.1	18.0	1.8	<1	<1		4.56	3.97
02:00	0.0	<0.1	<0.1	17.9	1.8	<1	<1		4.56	3.97
02:15	0.0	<0.1	<0.1	17.9	1.8	<1	<1		4.56	3.97
02:30	0.0	<0.1	<0.1	17.9	1.8	<1	<1		4.56	3.97
02:45	0.0	<0.1	<0.1	17.9	1.8	1	<1		4.56	3.97
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**17.9**	**1.8**	**1.0**	**<1**	**#####**	**4.56**	**3.97**
Peak	**0.0**	**0.0**	**0.0**	**20.5**	**1.8**	**1.0**	**0.0**	**0.0**	**4.56**	**3.97**

Date	Notes:			
12.09.2017	Engineer	DRS	Barometric Pressure, mbar	996
			Pressure Trend	Fallimg
	Equipment	GFM430	Air Temp (˚C)	17

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH5

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00	0.0	<0.1	<0.1	26.0	<0.1	<1	<1		5.42	3.61
00:15	0.0	<0.1	<0.1	17.0	3.0	<1	2		5.42	3.61
00:30	0.0	<0.1	<0.1	17.2	3.1	1	2		5.42	3.61
00:45	0.0	<0.1	<0.1	17.1	3.1	<1	2		5.42	3.61
01:00	0.0	<0.1	<0.1	17.1	3.1	<1	2		5.42	3.61
01:15	0.0	<0.1	<0.1	17.1	3.1	1	<1		5.42	3.61
01:30	0.0	<0.1	<0.1	17.1	3.2	<1	<1		5.42	3.61
01:45	0.0	<0.1	<0.1	17.0	3.2	<1	<1		5.42	3.61
02:00	0.0	<0.1	<0.1	17.0	3.2	<1	2		5.42	3.61
02:15	0.0	<0.1	<0.1	17.0	3.2	<1	<1		5.42	3.61
02:30	0.0	<0.1	<0.1	17.0	3.2	1	<1		5.42	3.61
02:45	0.0	<0.1	<0.1	17.0	3.2	<1	2		5.42	3.61
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**17.0**	**3.2**	**<1**	**2.0**	**#####**	**5.42**	**3.61**
Peak	**0.0**	**0.0**	**0.0**	**26.0**	**3.2**	**1.0**	**2.0**	**0.0**	**5.42**	**3.61**

Date	Notes:			
12.09.2017	Engineer	DRS	Barometric Pressure, mbar	996
			Pressure Trend	Fallimg
	Equipment	GFM430	Air Temp (˚C)	17

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH1

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl
00:00	0.0	<0.1	<0.1	20.6	<0.1	<1	<1		5.60	3.92
00:15	0.0	<0.1	<0.1	18.0	2.5	<1	<1		5.60	3.92
00:30	0.0	<0.1	<0.1	17.9	2.6	1	<1		5.60	3.92
00:45	0.0	<0.1	<0.1	17.8	2.6	<1	<1		5.60	3.92
01:00	0.0	<0.1	<0.1	17.8	2.6	<1	<1		5.60	3.92
01:15	0.0	<0.1	<0.1	17.7	2.6	1	<1		5.60	3.92
01:30	0.0	<0.1	<0.1	17.7	2.6	<1	<1		5.60	3.92
01:45	0.0	<0.1	<0.1	17.7	2.6	1	<1		5.60	3.92
02:00	0.0	<0.1	<0.1	17.7	2.6	<1	<1		5.60	3.92
02:15	0.0	<0.1	<0.1	17.7	2.7	<1	<1		5.60	3.92
02:30	0.0	<0.1	<0.1	17.7	2.7	<1	<1		5.60	3.92
02:45	0.0	<0.1	<0.1	17.7	2.7	<1	<1		5.60	3.92
03:00	0.0	<0.1	<0.1	17.7	2.7	<1	<1		5.60	3.92
03:15	0.0	<0.1	<0.1	17.7	2.7	1	<1		5.60	3.92
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**17.7**	**2.7**	**1.0**	**<1**	**#####**	**5.60**	**3.92**
Peak	**0.0**	**0.0**	**0.0**	**20.6**	**2.7**	**1.0**	**0.0**	**0.0**	**5.60**	**3.92**

Date	Notes:			
19.9.2017	Engineer	DRS	Barometric Pressure, mbar	1010
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	15

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH2

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl
00:00	0.0	<0.1	<0.1	20.7	<0.1	<1	<1		4.49	4.04
00:15	0.0	<0.1	<0.1	17.6	2.2	<1	<1		4.49	4.04
00:30	0.0	<0.1	<0.1	17.2	2.3	<1	<1		4.49	4.04
00:45	0.0	<0.1	<0.1	17.1	2.3	<1	<1		4.49	4.04
01:00	0.0	<0.1	<0.1	17.1	2.3	<1	<1		4.49	4.04
01:15	0.0	<0.1	<0.1	17.1	2.3	<1	<1		4.49	4.04
01:30	0.0	<0.1	<0.1	17.0	2.3	<1	<1		4.49	4.04
01:45	0.0	<0.1	<0.1	17.0	2.3	<1	<1		4.49	4.04
02:00	0.0	<0.1	<0.1	17.0	2.3	<1	<1		4.49	4.04
02:15	0.0	<0.1	<0.1	16.9	2.3	<1	<1		4.49	4.04
02:30	0.0	<0.1	<0.1	16.9	2.4	<1	<1		4.49	4.04
02:45	0.0	<0.1	<0.1	16.9	2.4	<1	<1		4.49	4.04
03:00	0.0	<0.1	<0.1	16.8	2.4	<1	<1		4.49	4.04
03:15	0.0	<0.1	<0.1	16.8	2.4	<1	<1		4.49	4.04
03:30	0.0	<0.1	<0.1	16.8	2.4	<1	<1		4.49	4.04
03:45	0.0	<0.1	<0.1	16.7	2.4	<1	<1		4.49	4.04
04:00	0.0	<0.1	<0.1	16.7	2.4	<1	<1		4.49	4.04
04:15	0.0	<0.1	<0.1	16.7	2.5	1	<1		4.49	4.04
04:30	0.0	<0.1	<0.1	16.6	2.5	<1	<1		4.49	4.04
04:45	0.0	<0.1	<0.1	16.6	2.5	<1	<1		4.49	4.04
05:00	0.0	<0.1	<0.1	16.6	2.5	<1	<1		4.49	4.04
Steady	**0.0**	**<0.1**	**<0.1**	**16.6**	**2.5**	**<1**	**<1**	**#####**	**4.49**	**4.04**
Peak	**0.0**	**0.0**	**0.0**	**20.7**	**2.5**	**1.0**	**0.0**	**0.0**	**4.49**	**4.04**

Date	Notes:			
19.9.2017	Engineer	DRS	Barometric Pressure, mbar	1010
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	15

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH5

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00	0.0	<0.1	<0.1	20.6	<0.1	<1	<1		5.48	3.75
00:15	0.0	<0.1	<0.1	17.4	3.2	1	2		5.48	3.75
00:30	0.0	<0.1	<0.1	17.1	3.2	2	<1		5.48	3.75
00:45	0.0	<0.1	<0.1	17.0	3.3	2	<1		5.48	3.75
01:00	0.0	<0.1	<0.1	16.9	3.3	2	<1		5.48	3.75
01:15	0.0	<0.1	<0.1	16.9	3.3	3	<1		5.48	3.75
01:30	0.0	<0.1	<0.1	16.9	3.3	2	<1		5.48	3.75
01:45	0.0	<0.1	<0.1	16.9	3.3	2	<1		5.48	3.75
02:00	0.0	<0.1	<0.1	16.9	3.3	3	<1		5.48	3.75
02:15	0.0	<0.1	<0.1	1.6	3.3	2	2		5.48	3.75
02:30	0.0	<0.1	<0.1	1.6	3.3	3	2		5.48	3.75
02:45	0.0	<0.1	<0.1	1.6	3.3	2	<1		5.48	3.75
03:00	0.0	<0.1	<0.1	1.6	3.3	2	<1		5.48	3.75
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**1.6**	**3.3**	**2.0**	**<1**	**#####**	**5.48**	**3.75**
Peak	**0.0**	**0.0**	**0.0**	**20.6**	**3.3**	**3.0**	**2.0**	**0.0**	**5.48**	**3.75**

Date	Notes:			
19.9.2017	Engineer	DRS	Barometric Pressure, mbar	1010
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	15

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH1

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl
00:00	0.0	<0.1	<0.1	20.7	<0.1	<1	<1		5.60	3.92
00:15	0.0	<0.1	<0.1	17.6	3.0	1	2		5.60	3.92
00:30	0.0	<0.1	<0.1	17.2	3.0	<1	<1		5.60	3.92
00:45	0.0	<0.1	<0.1	17.1	3.0	1	<1		5.60	3.92
01:00	0.0	<0.1	<0.1	17.0	3.1	1	2		5.60	3.92
01:15	0.0	<0.1	<0.1	17.0	3.1	1	2		5.60	3.92
01:30	0.0	<0.1	<0.1	17.0	3.1	1	2		5.60	3.92
01:45	0.0	<0.1	<0.1	17.0	3.1	<1	5		5.60	3.92
02:00	0.0	<0.1	<0.1	17.0	3.1	2	5		5.60	3.92
02:15	0.0	<0.1	<0.1	17.0	3.1	2	<1		5.60	3.92
02:30	0.0	<0.1	<0.1	17.0	3.1	1	2		5.60	3.92
02:45	0.0	<0.1	<0.1	17.0	3.1	<1	2		5.60	3.92
03:00										
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**17.0**	**3.1**	**<1**	**2.0**	**#####**	**5.60**	**3.92**
Peak	**0.0**	**0.0**	**0.0**	**20.7**	**3.1**	**2.0**	**5.0**	**0.0**	**5.60**	**3.92**

Date	Notes:			
26.09.2017	Engineer	DRS	Barometric Pressure, mbar	1013
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	18

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH2

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbgl
00:00	0.0	<0.1	<0.1	20.7	<0.1	<1	<1		4.50	4.07
00:15	0.0	<0.1	<0.1	17.0	2.8	1	2		4.50	4.07
00:30	0.0	<0.1	<0.1	16.5	2.9	<1	5		4.50	4.07
00:45	0.0	<0.1	<0.1	16.4	2.9	3	7		4.50	4.07
01:00	0.0	<0.1	<0.1	16.3	3.0	2	5		4.50	4.07
01:15	0.0	<0.1	<0.1	16.3	3.0	1	5		4.50	4.07
01:30	0.0	<0.1	<0.1	16.3	3.0	1	5		4.50	4.07
01:45	0.0	<0.1	<0.1	16.2	3.0	1	7		4.50	4.07
02:00	0.0	<0.1	<0.1	16.2	3.0	1	5		4.50	4.07
02:15	0.0	<0.1	<0.1	16.1	3.0	1	7		4.50	4.07
02:30	0.0	<0.1	<0.1	16.1	3.1	<1	7		4.50	4.07
02:45	0.0	<0.1	<0.1	16.1	3.1	2	7		4.50	4.07
03:00	0.0	<0.1	<0.1	16.0	3.1	2	5		4.50	4.07
03:15	0.0	<0.1	<0.1	16.0	3.2	1	5		4.50	4.07
03:30	0.0	<0.1	<0.1	15.9	3.2	1	10		4.50	4.07
03:45	0.0	<0.1	<0.1	15.9	3.2	1	2		4.50	4.07
04:00	0.0	<0.1	<0.1	15.9	3.2	<1	5		4.50	4.07
04:15	0.0	<0.1	<0.1	15.8	3.3	1	5		4.50	4.07
04:30	0.0	<0.1	<0.1	15.8	3.3	2	5		4.50	4.07
04:45	0.0	<0.1	<0.1	15.7	3.4	1	5		4.50	4.07
05:00	0.0	<0.1	<0.1	15.7	3.4	1	5		4.50	4.07
Steady	**0.0**	**<0.1**	**<0.1**	**15.7**	**3.4**	**1.0**	**5.0**	**#####**	**4.50**	**4.07**
Peak	**0.0**	**0.0**	**0.0**	**20.7**	**3.4**	**3.0**	**10.0**	**0.0**	**4.50**	**4.07**

Date	Notes:			
26.09.2017	Engineer	DRS	Barometric Pressure, mbar	1013
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	18

Gas Monitoring Certificate

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

BH5

		Detection Limit								
		<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1		
Time	Gas Flow Rate. (l/hr)	Methane. (%LEL)	Methane. (%vol)	Oxygen. (%vol)	Carbon Dioxide. (%vol)	Hydrogen Sulphide. (ppm)	Carbon Monoxide. (ppm)	Volatile Organic Carbon (ppm	Depth of Installation. (mbgl)	Depth of Groundwater (mbg
00:00	0.0	<0.1	<0.1	20.7	<0.1	<1	<1		5.50	3.78
00:15	0.0	<0.1	<0.1	17.0	3.5	<1	2		5.50	3.78
00:30	0.0	<0.1	<0.1	16.4	3.5	<1	2		5.50	3.78
00:45	0.0	<0.1	<0.1	16.3	3.6	<1	2		5.50	3.78
01:00	0.0	<0.1	<0.1	16.3	3.6	<1	2		5.50	3.78
01:15	0.0	<0.1	<0.1	16.3	3.6	<1	2		5.50	3.78
01:30	0.0	<0.1	<0.1	16.2	3.6	1	2		5.50	3.78
01:45	0.0	<0.1	<0.1	16.2	3.6	<1	<1		5.50	3.78
02:00	0.0	<0.1	<0.1	16.1	3.6	<1	<1		5.50	3.78
02:15	0.0	<0.1	<0.1	16.1	3.6	<1	2		5.50	3.78
02:30	0.0	<0.1	<0.1	16.1	3.6	<1	2		5.50	3.78
02:45	0.0	<0.1	<0.1	16.1	3.6	1	<1		5.50	3.78
03:00	0.0	<0.1	<0.1	16.1	3.6	1	2		5.50	3.78
03:15										
03:30										
03:45										
04:00										
04:15										
04:30										
04:45										
05:00										
Steady	**0.0**	**<0.1**	**<0.1**	**16.1**	**3.6**	**1.0**	**2.0**	**#####**	**5.50**	**3.78**
Peak	**0.0**	**0.0**	**0.0**	**20.7**	**3.6**	**1.0**	**2.0**	**0.0**	**5.50**	**3.78**

Date	Notes:			
26.09.2017	Engineer	DRS	Barometric Pressure, mbar	1013
			Pressure Trend	Steady
	Equipment	GFM430	Air Temp (˚C)	18

Gas Testing Summary

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

Methane. (%LEL)						
BH1	<0.1	<0.1	<0.1	<0.1	0	0
BH2	<0.1	<0.1	<0.1	<0.1	0	0
BH5	<0.1	<0.1	<0.1	<0.1	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Methane. (%vol)						
BH1	<0.1	<0.1	<0.1	<0.1	0	0
BH2	<0.1	<0.1	<0.1	<0.1	0	0
BH5	<0.1	<0.1	<0.1	<0.1	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Oxygen. (%vol)						
BH1	18	17.9	17.7	17	0	0
BH2	18.5	17.9	16.6	15.7	0	0
BH5	16.3	17	1.6	16.1	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Gas Testing Summary

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

Carbon Dioxide. (%vol)						
BH1	2.6	2.5	2.7	3.1	0	0
BH2	2	1.8	2.5	3.4	0	0
BH5	3.3	3.2	3.3	3.6	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Hydrogen Sulphide. (ppm)						
BH1	2	<1	1	<1	0	0
BH2	<1	1	<1	1	0	0
BH5	<1	<1	2	1	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Carbon Monoxide. (ppm)						
BH1	<1	<1	<1	2	0	0
BH2	<1	<1	<1	5	0	0
BH5	<1	2	<1	2	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Gas Testing Summary

Project Number	C2415
Project Name	Water Orton, Birmingham
Client	Willmott Dixon Ltd

Gas Flow Rate (l/hr)						
BH1	0	0	0	0	0	0
BH2	0	0	0	0	0	0
BH5	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Volatile Organic Carbons (ppm)						
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Atmospheric Pressure Range						
	1001	0	0	0	0	0

Max Methane Concentration (%vol)	0
Max Carbon Dioxide Concentration (%vol)	3.6
Max Carbon Monoxide Concentration (ppm)	2
Max Hydrogen Sulphide Concentration (ppm)	5
Max Flow Rate (l/hr)	0
Max Volatile Organic Carbon Concentration (ppm)	0
Methane Gas Screening Value	0
Carbon Dioxide Gas Screening Value	0

Carbon Monoxide Gas Screening Value	0
Hydrogen Sulphide Gas Screening Value	0
Maximum Gas Screening Value	0
Characteristic Situation 1	PASS
Characteristic Situation 2	PASS
Characteristic Situation 3	PASS
Characteristic Situation 4	PASS
Characteristic Situation 5	PASS
Characteristic Situation 6	PASS
Hydrocarbon Vapour Barrier Required?	NO

TEST DATE AND CONDITIONS		
Date	04.07.17	
Atmospheric Pressure	1001	mB
Ambient Temperature	22.4	°C
Environics Serial No.	5089	

GAS DATA LTD
Pegasus House
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LB
Tel 02476303311 Fax 02476307711

GFM430 Final Inspection & Calibration Check Certificate

Temperature Checks		
Calibration Temperature Applied Temperature °C	Instrument Temperature Reading °C	
-10.0	**-10.0**	*Accept +/- 2.0*
0.0	**0.0**	*Accept +/- 1.0*
30.0	**30.0**	*Accept +/- 1.0*
60.0	**60.0**	*Accept +/- 1.0*
100.0	**100.0**	*Accept +/- 1.0*

Technician:	Date Tested:
J.Rutland	***04.07.17***

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.

Gas Data Ltd is certified to BS EN ISO9001:2015. Certificate NQA 8374. Valid until 22/03/2019

TEST DATE AND CONDITIONS		
Date	04.07.17	
Atmospheric Pressure	1001	mB
Ambient Temperature	22.4	°C
Environics Serial No.	5089	

GAS DATA LTD
Pegasus House
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LB
Tel 02476303311 Fax 02476307711

GFM430 Final Inspection & Calibration Check Certificate

Customer	HSP Consulting Engineers Ltd
Certificate Number	119411
Order Number	317508

Serial Number	10152	Recalibration DUE Date	
Software Version	G430-00.0024/0013	*04.07.18*	

Instrument Checks					
Keyboard	✓		Display Contrast	✓	
Pump Flow In	500	*Accept > 200 cc/min*	Pump Flow @ -200mB	200	*Accept > 200 cc/min*
Clock Set / Running	✓		Labels Fitted	✓	

Gas Checks						
Sensor	CH_4		CO_2		O_2	
	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value %
	60 *Accept +/- 3.0*	*60*	39.5 *Accept +/- 3.0*	*40*	20.9 *Accept +/- 0.5*	*20.9*
	4.8 *Accept +/- 0.3*	*5*	4.7 *Accept +/- 0.3*	*5*	6.0 *Accept +/- 0.3*	*6*
Zero Reading 100% N_2	0.0 *Accept +/- 0.0*	*0.0*	0.0 *Accept +/- 0.0*	*0.0*	0.0 *Accept + 0.1*	*0.0*

Optional Gas Checks						
Applied Gas & Range of GFM		Concentration Tested @ *(ppm)*	Instrument Readings *(ppm)*			
Toxic Gas	Range *(ppm)*		Zero Reading		Instrument Gas Reading	
H2S	2000	*1500*	0.0	*Accept +/-0.0*	1504	*Accept +/-5.0*
CO	2000	*1000*	0.0	*Accept +/-0.0*	1002	*Accept +/-5.0*
				Accept +/-0.0		*Accept +/-5.0*
				Accept +/-0.0		*Accept +/-5.0*

Cross Gas Effects								
Applied Gas *(ppm)*		Instrument Readings *(ppm)*						
Toxic Gas	Concentration	Toxic 1:	*H2S*	Toxic 2:	*CO*	Toxic 3:		Toxic 4:	
H2S	*1500*	1504		0				
CO	*1000*	45		1002				

Pressure Checks						
Atmospheric Pressure [AP] *(mB)*				Static Pressure [SP] *(mB)*		
Current Atmospheric Pressure *(mB)*	Instrument Atmospheric Pressure Reading *(mB)*			Applied Pressure *(mB)*	Instrument Pressure *(mB)*	
All Ports	*Open Ports*	1001	*Accept +/- 2.0*	*0.0mB*		*Accept +/- 0.0*
AP Port (Internal)	*+800 mB*	801	*Accept +/- 5.0*	*+50mB*		*Accept +/- 2.0*
AP Port (Internal)	*+1200mb*	1200	*Accept +/- 5.0*	*-100mB*		*Accept +/- 2.0*

Flow Checks)					
Borehole Flow	Instrument Flow Reading *(l/h)*		Differential Pressure		
Applied Flow Reading *(l/h)*			Instrument DP Reading *(Pa)*		Applied DP Pressure *(Pa)*
-30.0	-28.6	*Accept +/-3.0*	-268	*Accept +/-50*	*-273*
-3.0	-2.9	*Accept +/-1.0*	-11	*Accept +/-6.0*	*-12*
0.0	0.0	*Accept +/-0.0*	0.0	*Accept +/-0.5*	*0.0*
+3.0	3.0	*Accept +/-0.5*	12	*Accept +/-3.0*	*12*
+30.0	29.5	*Accept +/-3.0*	277	*Accept +/-50*	*282*
+60.0	59.1	*Accept +/-6.0*	863	*Accept +/-130*	*875*
+90.0	89.5	*Accept +/-9.0*	1755	*Accept +/-250*	*1751*

All test performed with equipment that is traceable to National Standards unless otherwise stated

TEST DATE AND CONDITIONS	
Date	4.7.17
Atmospheric Pressure	1001 mB
Ambient Temp	22.4°C
Environics Serial No.	5089

GAS DATA LTD
Pegasus House
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LB
Tel 02476303311 Fax 02476307711

GFM430 -1 OUTWARD INSPECTION & QUALITY CHECK SHEET

INSTRUMENT DETAILS			
SO Number	Instrument Type	Instrument Serial Number + SW Version	Job Number(s)
317508	GFM430	10152 G430-00.0024/0013	1015227017

Calibration Technician ..... **Date** 4.7.17

Inspection Technician ..... **Date** 5.7.17

INSTRUMENT CHECKS			Pass (P), Fail (F) or not applicable (NA)
Function Tests	Dust Caps Fitted		P
	Keyboard Test (All Keys)		P
	Backlight		P
	Clock Set / Running		P
	Comms Test		P
	Pump Flow Test (In & Out)		P
	Overall Leak Test (30mB)		N/A
	Battery Charge Test		P
	Service Date set to?		4.7.18
Channel Test	Data Logging Enabled?		P
	Verify CH4/LEL		P
	Verify CO2		P
	Verify O2		P
	Verify LEL		P
	Verify 1st Option Gas	H2S	P
	Verify 2nd Option Gas	CO	P
	Verify 3rd Option Gas		N/A
	Verify 4th Option Gas		N/A
	Verify Atmospheric pressure		P
	Verify static pressure		N/A
	Verify differential pressure		P
	Verify flow		P
	Verify temperature probe input		P
	Verify vane anemometer input		P
DataBase Checks	Jobcard(s) completed and signed		P
	Jobcard(s) booked off database		P
	Calibration certificate completed		P
	Complete & print QI record		N/A
Label Checks	No. of Calibration label fitted		GDL06138
	Warranty label fitted		N/A
	H2S Range from Sales Order		20000ppm
	H2S Range from Cal Cert		20000PPM
	Over-range value correct?		P

INSTRUMENT PACKING LIST		Tick if included
Instrument		✓
Leather Case		✓
Instrument Strap		✓
AC Battery Charger (UK)		✓
AC Battery Charger (EURO)		X
AC Battery Charger (US)		X
AC Battery Charger (AUS)		X
Gas Sample Pipe		✓
Carry Case		X
Spares Pot		X
Allen Key		X
Flow Sample Pipe		✓
Temperature Probe		X
Vane Anemometer		X
USB Cable		X
USB Memory stick		X
SiteMan Software	Ver 4.15	X
Internal Filter Pack	Qty	10
External Filter Pack	Qty	X
Field Guide		X
Operation Manual (hard copy)		X
Extra Items:		

Comments:

Appendix VII

INSITU SOAKAWAY TEST RESULTS

Trialpit No.: SK1

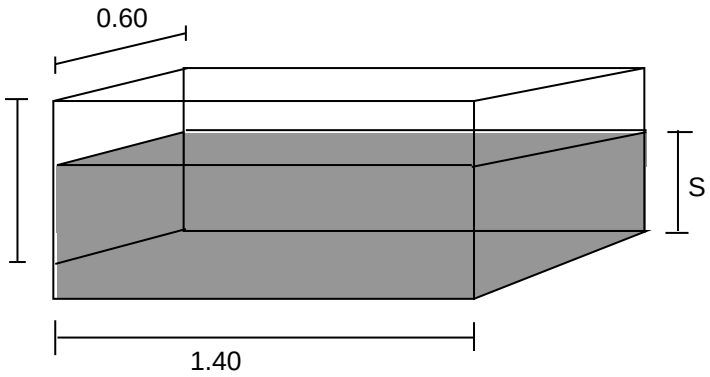
Soil Profile:

Depth (m) From:	To:	Description
0.00	0.40	TOPSOIL - Grass overlying brown sandy slightly clayey slighlty gravelly topsoil.
0.40	0.90	SAND & GRAVEL - Medium dense orangish reddish brown sand and gravel.
0.90	1.60	SAND - Medium dense reddisg brown very gravelly very clayey sand.

Sketch plan of test zone

Not to scale
All dimensions in metres.

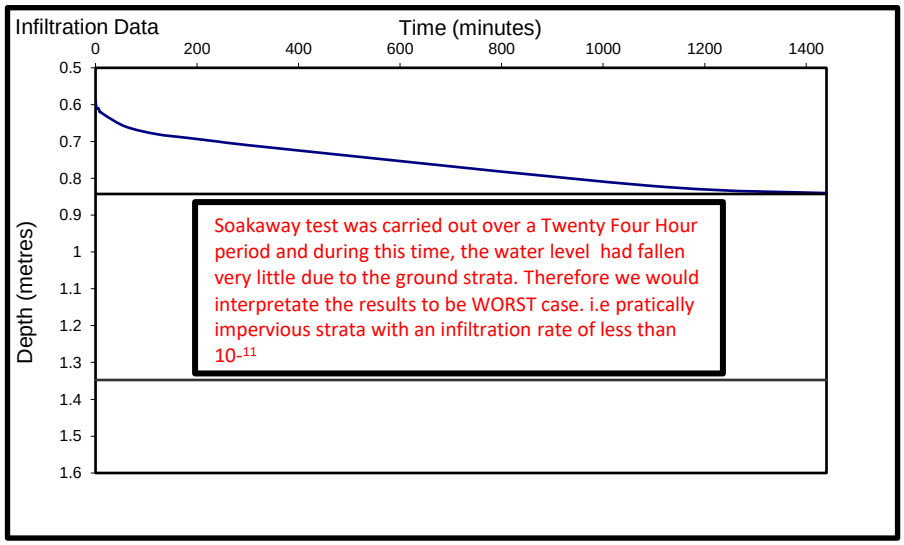
porosity (N) = 1
(measured in laboratory)
S= Storage depth (m) 1.60
Water level from 0.59 to 1.60m.
No Groundwater was encountered



Gives the Figures

S=	1.01	m
a_{p50}=	2.86	m^2
V_{p75-25}=	0.42	m^3

Soakaway Test Run 1 Test Date: 10/08/2017



Time (minutes)	Depth (m)
0	0.59
2	0.61
4	0.61
6	0.61
8	0.62
10	0.62
20	0.63
60	0.66
120	0.68
180	0.69
240	0.70
300	0.71
1090	0.82
1440	0.84

From the above graph,

t_{p25}= N/A (min) $t_{p75=}$ N/A (min)

Soil Infiltration Rate: $f = \frac{V_{p75-25} \times N}{a_{p50} \times t_{p75-25}}$ = N/A

f_{run1}= N/A m/s

Test and analysis carried out in general accordance with BRE Digest 365 : 2003

Job No.: Water Orton, Birmingham
Site: C2415
Client: Willmott Dixon Ltd

hsp consulting

INSITU SOAKAWAY TEST RESULTS

Trialpit No.: SK2

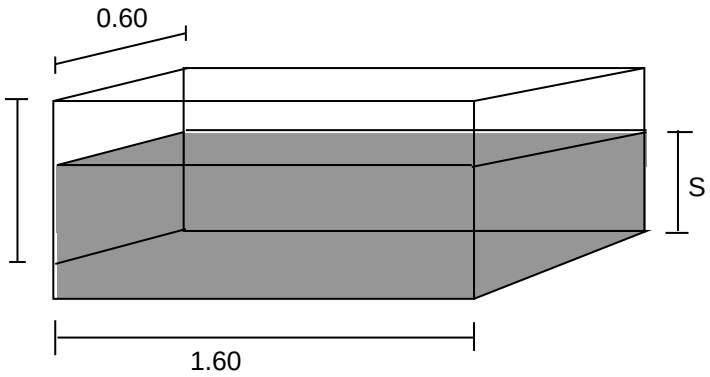
Soil Profile:

Depth (m) From:	To:	Description
0.00	0.40	TOPSOIL - Grass overlying brown sandy slightly clayey slighlty gravelly topsoil.
0.40	0.80	SAND & GRAVEL - Medium dense orangish reddish brown sand and gravel.
0.80	1.50	SAND - Medium dense reddisg brown very gravelly very clayey sand.

Sketch plan of test zone

Not to scale
All dimensions in metres.

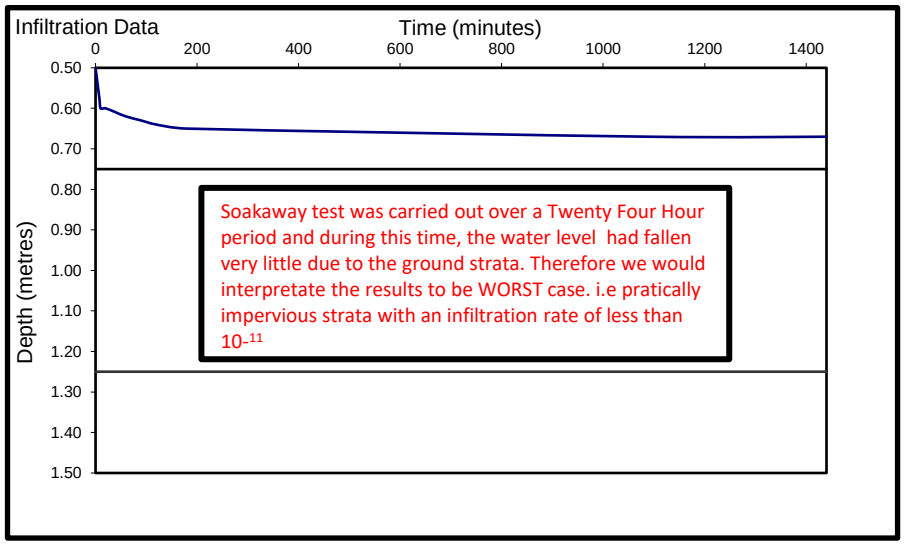
porosity (N) = 1
(measured in laboratory)
S= Storage depth (m) 1.50
Water level from 0.50 to 1.50m.
No Groundwater was encountered



Gives the Figures

S=	1.00	m
a_{p50}=	3.16	m^2
V_{p75-25}=	0.48	m^3

Soakaway Test Run 1 Test Date: 10/08/2017



Time (minutes)	Depth (m)
0	0.50
2	0.52
4	0.54
6	0.56
8	0.58
10	0.60
20	0.60
40	0.61
60	0.62
90	0.63
120	0.64
180	0.65
1090	0.67
1440	0.67

From the above graph,

t_{p25}= N/A (min) $t_{p75=}$ N/A (min)

Soil Infiltration Rate: $f = \frac{V_{p75-25} \times N}{a_{p50} \times t_{p75-25}}$ = N/A

f_{run1}= N/A m/s

Test and analysis carried out in general accordance with BRE Digest 365 : 2003

Job No.: Water Orton, Birmingham
Site: C2415
Client: Willmott Dixon Ltd

hsp consulting

INSITU SOAKAWAY TEST RESULTS

Trialpit No.: SK3

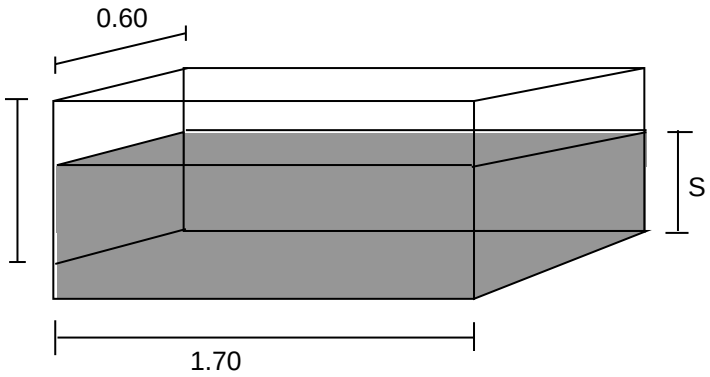
Soil Profile:

Depth (m) From:	To:	Description
0.00	0.30	TOPSOIL - Grass overlying brown sandy clayey slighlty gravelly topsoil.
0.30	0.50	CLAY - Soft reddish brown very sandy slightly gravelly clay.
0.50	1.50	CLAY - Firm to stiff reddish brown slightly sandy slightly gravelly clay.

Sketch plan of test zone

Not to scale
All dimensions in metres.

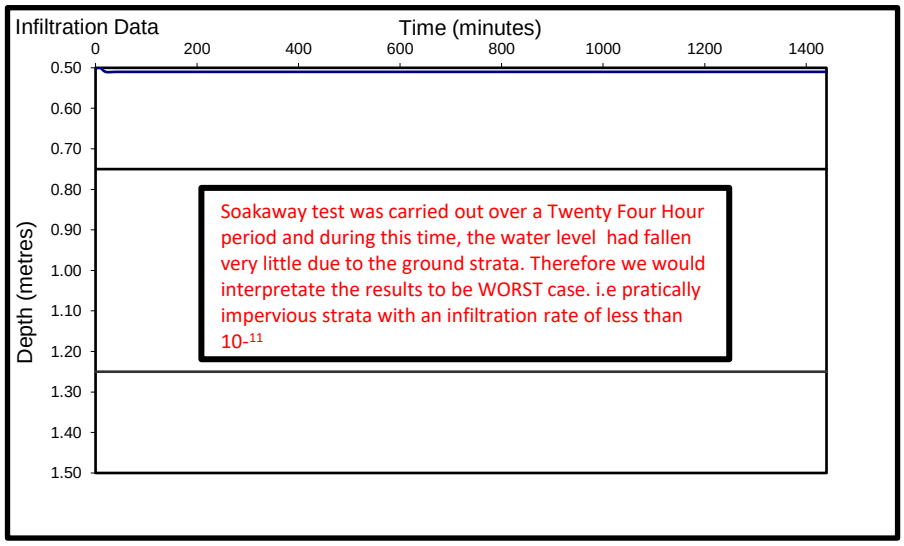
porosity (N) = 1
(measured in laboratory)
S= Storage depth (m) 1.50
Water level from 0.50 to 1.50m.
No Groundwater was encountered



Gives the Figures

S=	1.00	m
a_{p50}=	3.32	m^2
V_{p75-25}=	0.51	m^3

Soakaway Test Run 1 Test Date: 10/08/2017



Time (minutes)	Depth (m)
0	0.50
2	0.50
4	0.50
6	0.50
8	0.50
10	0.50
20	0.51
40	0.51
60	0.51
90	0.51
120	0.51
180	0.51
1007	0.51
1440	0.51

From the above graph,

t_{p25}= N/A (min) $t_{p75=}$ N/A (min)

Soil Infiltration Rate: $f = \frac{V_{p75-25} \times N}{a_{p50} \times t_{p75-25}}$ = N/A

f_{run1}= N/A m/s

Test and analysis carried out in general accordance with BRE Digest 365 : 2003

Job No.: Water Orton, Birmingham
Site: C2415
Client: Willmott Dixon Ltd

hsp consulting

Appendix VIII

HazWasteOnline™

Waste Classification Report

FAR6H-TZDZ2-9EAQQ

Job name

C2415 - Water Orton Primary School

Description/Comments

Project

Site

Waste Stream Template

Contaminated Soils Chemtest Determinand Order

Classified by

Name:
Luke Bradley
Date:
10/12/2017 10:58:20 AM UTC
Telephone:
01773 535555

Company:
HSP Consulting
Lawrence House
4 Meadowbank Way, Eastwood
Nottingham
NG16 3SB

Report

Created by: Luke Bradley
Created date: 10/12/2017 10:58 UTC

Job summary

Classification of sample: WS1 0.80

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS1 0.80
Sample Depth:
0.80 m
Moisture content:
5.3%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.3% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	confirm TPH has NOT arisen from diesel or petrol					☑					
2	pH			PH		7.8 pH		7.8 pH	7.8 pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.8 mg/kg	13.43	10.744 mg/kg	0.00107 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		3.8 mg/kg	1.32	5.017 mg/kg	0.000502 %		
5	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		80 mg/kg	1.462	116.924 mg/kg	0.0117 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		8.8 mg/kg	1.126	9.908 mg/kg	0.000991 %		
7	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		12 mg/kg	1.579	18.954 mg/kg	0.0019 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	11 mg/kg	1.56	17.158 mg/kg	0.0011 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.4 mg/kg	2.554	1.021 mg/kg	0.000102 %		
10	zinc { zinc chromate }	024-007-00-3				21 mg/kg	2.774	58.257 mg/kg	0.00583 %		
								Total:	0.0232 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS3 0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS3 0.20
Sample Depth:
0.20 m
Moisture content:
17%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	confirm TPH has NOT arisen from diesel or petrol					☑					
2	pH			PH		6.2 pH		6.2 pH	6.2 pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.6 mg/kg	13.43	8.058 mg/kg	0.000806 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7.9 mg/kg	1.32	10.431 mg/kg	0.00104 %		
5	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.3 mg/kg	1.285	0.386 mg/kg	0.00003 %		
6	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		89 mg/kg	1.462	130.078 mg/kg	0.013 %		
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		34 mg/kg	1.126	38.28 mg/kg	0.00383 %		
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		13 mg/kg	1.579	20.533 mg/kg	0.00205 %		
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	51 mg/kg	1.56	79.551 mg/kg	0.0051 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.6 mg/kg	2.554	1.532 mg/kg	0.000153 %		
11	zinc { zinc chromate }	024-007-00-3				74 mg/kg	2.774	205.287 mg/kg	0.0205 %		
12	TPH (C6 to C40) petroleum group			TPH		22 mg/kg		22 mg/kg	0.0022 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		phenanthrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			201-581-5	85-01-8									
14		pyrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			204-927-3	129-00-0									
										Total:	0.0488 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: Force this Hazardous property to non hazardous because No liquid phase

Classification of sample: WS5 0.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS5 0.00
Sample Depth:
0.00 m
Moisture content:
22.4%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22.4% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	confirm TPH has NOT arisen from diesel or petrol		☑					
2	pH PH		5.9 pH		5.9 pH	5.9 pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) } 10294-33-4, 10294-34-5, 7637-07-2		1 mg/kg	13.43	13.43 mg/kg	0.00134 %		
4	arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		7.3 mg/kg	1.32	9.638 mg/kg	0.000964 %		
5	cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	0.3 mg/kg	1.285	0.386 mg/kg	0.00003 %		
6	chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		111 mg/kg	1.462	162.233 mg/kg	0.0162 %		
7	copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		31 mg/kg	1.126	34.903 mg/kg	0.00349 %		
8	nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		20 mg/kg	1.579	31.59 mg/kg	0.00316 %		
9	lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	79 mg/kg	1.56	123.225 mg/kg	0.0079 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		0.7 mg/kg	2.554	1.788 mg/kg	0.000179 %		
11	zinc { zinc chromate } 024-007-00-3		100 mg/kg	2.774	277.415 mg/kg	0.0277 %		
12	TPH (C6 to C40) petroleum group TPH		65 mg/kg		65 mg/kg	0.0065 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		phenanthrene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			201-581-5	85-01-8									
14		fluoranthene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
			205-912-4	206-44-0									
15		pyrene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
			204-927-3	129-00-0									
16		benzo[a]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-033-00-9	200-280-6	56-55-3									
17		benzo[a]pyrene; benzo[def]chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-032-00-3	200-028-5	50-32-8									
18		benzo[ghi]perylene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			205-883-8	191-24-2									
										Total:	0.0676 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: Force this Hazardous property to non hazardous because No liquid phase

Classification of sample: WS5 0.90

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS5 0.90
Sample Depth:
0.90 m
Moisture content:
18.9%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.9% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	confirm TPH has NOT arisen from diesel or petrol					☑							
2	pH			PH		7.1	pH		7.1	pH	7.1 pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		1.1	mg/kg	13.43	14.773	mg/kg	0.00148 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		3	mg/kg	1.32	3.961	mg/kg	0.000396 %		
5	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		76	mg/kg	1.462	111.078	mg/kg	0.0111 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		17	mg/kg	1.126	19.14	mg/kg	0.00191 %		
7	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		38	mg/kg	1.579	60.021	mg/kg	0.006 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	8.6	mg/kg	1.56	13.414	mg/kg	0.00086 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.8	mg/kg	2.554	2.043	mg/kg	0.000204 %		
10	zinc { zinc chromate }	024-007-00-3				71	mg/kg	2.774	196.964	mg/kg	0.0197 %		
11	TPH (C6 to C40) petroleum group			TPH		5	mg/kg		5	mg/kg	0.0005 %		
										Total:	0.0422 %		

Key	
	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: Force this Hazardous property to non hazardous because No liquid phase

Classification of sample: WS7 0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS7 0.20
Sample Depth:
0.20 m
Moisture content:
20.1%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20.1% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	confirm TPH has NOT arisen from diesel or petrol					☑					
2	pH			PH		6.5 pH		6.5 pH	6.5 pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		1.1 mg/kg	13.43	14.773 mg/kg	0.00148 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		19 mg/kg	1.32	25.086 mg/kg	0.00251 %		
5	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		108 mg/kg	1.462	157.848 mg/kg	0.0158 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		97 mg/kg	1.126	109.211 mg/kg	0.0109 %		
7	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		64 mg/kg	1.579	101.088 mg/kg	0.0101 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	30 mg/kg	1.56	46.794 mg/kg	0.003 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.6 mg/kg	2.554	4.086 mg/kg	0.000409 %		
10	zinc { zinc chromate }	024-007-00-3				74 mg/kg	2.774	205.287 mg/kg	0.0205 %		
11	TPH (C6 to C40) petroleum group			TPH		12 mg/kg		12 mg/kg	0.0012 %		
12	phenanthrene		201-581-5	85-01-8		0.1 mg/kg		0.1 mg/kg	0.00001 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		anthracene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
			204-371-1	120-12-7									
14		fluoranthene				0.18	mg/kg		0.18	mg/kg	0.000018 %		
			205-912-4	206-44-0									
15		pyrene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
			204-927-3	129-00-0									
16		benzo[a]anthracene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
		601-033-00-9	200-280-6	56-55-3									
17		chrysene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
		601-048-00-0	205-923-4	218-01-9									
18		benzo[a]pyrene; benzo[def]chrysene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
		601-032-00-3	200-028-5	50-32-8									
19		benzo[ghi]perylene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
			205-883-8	191-24-2									
										Total:	0.066 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: Force this Hazardous property to non hazardous because No liquid phase

Classification of sample: WS7 0.70

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS7 0.70
Sample Depth:
0.70 m
Moisture content:
11.6%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.6% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		confirm TPH has NOT arisen from diesel or petrol					☑							
2		pH			PH		5.8	pH		5.8	pH	5.8 pH		
3		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.6	mg/kg	13.43	8.058	mg/kg	0.000806 %		
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		2.8	mg/kg	1.32	3.697	mg/kg	0.00037 %		
5		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		68	mg/kg	1.462	99.386	mg/kg	0.00994 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		10	mg/kg	1.126	11.259	mg/kg	0.00113 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		12	mg/kg	1.579	18.954	mg/kg	0.0019 %		
8		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	10	mg/kg	1.56	15.598	mg/kg	0.001 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.5	mg/kg	2.554	1.277	mg/kg	0.000128 %		
10		zinc { zinc chromate }	024-007-00-3				52	mg/kg	2.774	144.256	mg/kg	0.0144 %		
											Total:	0.0297 %		

Key	
	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WAC1 0.30

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WAC1 0.30
Sample Depth:
0.30 m
Moisture content:
15.4%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15.4% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	confirm TPH has NOT arisen from diesel or petrol		☑					
2	pH PH		6.3 pH		6.3 pH	6.3 pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) } 10294-33-4, 10294-34-5, 7637-07-2		1.1 mg/kg	13.43	14.773 mg/kg	0.00148 %		
4	arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		11 mg/kg	1.32	14.524 mg/kg	0.00145 %		
5	cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	0.4 mg/kg	1.285	0.514 mg/kg	0.00004 %		
6	chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		81 mg/kg	1.462	118.386 mg/kg	0.0118 %		
7	copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		31 mg/kg	1.126	34.903 mg/kg	0.00349 %		
8	nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		18 mg/kg	1.579	28.431 mg/kg	0.00284 %		
9	lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	95 mg/kg	1.56	148.182 mg/kg	0.0095 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		0.7 mg/kg	2.554	1.788 mg/kg	0.000179 %		
11	zinc { zinc chromate } 024-007-00-3		144 mg/kg	2.774	399.477 mg/kg	0.0399 %		
12	TPH (C6 to C40) petroleum group TPH		52 mg/kg		52 mg/kg	0.0052 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		phenanthrene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
			201-581-5	85-01-8									
14		anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-371-1	120-12-7									
15		fluoranthene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
			205-912-4	206-44-0									
16		pyrene				0.26	mg/kg		0.26	mg/kg	0.000026 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				0.17	mg/kg		0.17	mg/kg	0.000017 %		
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				0.16	mg/kg		0.16	mg/kg	0.000016 %		
		601-048-00-0	205-923-4	218-01-9									
19		benzo[b]fluoranthene				0.17	mg/kg		0.17	mg/kg	0.000017 %		
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				0.18	mg/kg		0.18	mg/kg	0.000018 %		
		601-032-00-3	200-028-5	50-32-8									
22		indeno[123-cd]pyrene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
			205-893-2	193-39-5									
23		benzo[ghi]perylene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
			205-883-8	191-24-2									
										Total:	0.0761 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: Force this Hazardous property to non hazardous because No liquid phase

Classification of sample: WAC2 0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WAC2 0.50
Sample Depth:
0.50 m
Moisture content:
13.5%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.5% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		confirm TPH has NOT arisen from diesel or petrol					☑							
2		pH			PH		8	pH		8	pH	8pH		
3		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		1.4	mg/kg	13.43	18.802	mg/kg	0.00188 %		
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		5.4	mg/kg	1.32	7.13	mg/kg	0.000713 %		
5		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		83	mg/kg	1.462	121.309	mg/kg	0.0121 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		17	mg/kg	1.126	19.14	mg/kg	0.00191 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		16	mg/kg	1.579	25.272	mg/kg	0.00253 %		
8		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	28	mg/kg	1.56	43.675	mg/kg	0.0028 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.5	mg/kg	2.554	1.277	mg/kg	0.000128 %		
10		zinc { zinc chromate }	024-007-00-3				56	mg/kg	2.774	155.352	mg/kg	0.0155 %		
11		phenanthrene		201-581-5	85-01-8		0.11	mg/kg		0.11	mg/kg	0.000011 %		
12		fluoranthene		205-912-4	206-44-0		0.16	mg/kg		0.16	mg/kg	0.000016 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		pyrene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
			204-927-3	129-00-0									
14		benzo[a]anthracene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
		601-033-00-9	200-280-6	56-55-3									
15		chrysene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
		601-048-00-0	205-923-4	218-01-9									
16		benzo[b]fluoranthene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
		601-034-00-4	205-911-9	205-99-2									
17		benzo[a]pyrene; benzo[def]chrysene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
		601-032-00-3	200-028-5	50-32-8									
18		indeno[123-cd]pyrene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			205-893-2	193-39-5									
19		benzo[ghi]perylene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-883-8	191-24-2									
										Total:	0.0377 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WAC3 0.80

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WAC3 0.80
Sample Depth:
0.80 m
Moisture content:
13.3%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.3% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	confirm TPH has NOT arisen from diesel or petrol					☑					
2	pH			PH		6.9 pH		6.9 pH	6.9 pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		1 mg/kg	13.43	13.43 mg/kg	0.00134 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		3.3 mg/kg	1.32	4.357 mg/kg	0.000436 %		
5	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		89 mg/kg	1.462	130.078 mg/kg	0.013 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12 mg/kg	1.126	13.511 mg/kg	0.00135 %		
7	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		19 mg/kg	1.579	30.01 mg/kg	0.003 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	8.2 mg/kg	1.56	12.79 mg/kg	0.00082 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.6 mg/kg	2.554	1.532 mg/kg	0.000153 %		
10	zinc { zinc chromate }	024-007-00-3				50 mg/kg	2.774	138.707 mg/kg	0.0139 %		
11	phenanthrene		201-581-5	85-01-8		0.03 mg/kg		0.03 mg/kg	0.000003 %		
								Total:	0.034 %		

Key	
	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WAC4 0.40

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WAC4 0.40
Sample Depth:
0.40 m
Moisture content:
7%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

zinc chromate: (compound conc.: 0.156%)

Determinands

Moisture content: 7% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	confirm TPH has NOT arisen from diesel or petrol					☑					
2	pH			PH		7 pH		7 pH	7pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.5 mg/kg	13.43	6.715 mg/kg	0.000672 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15 mg/kg	1.32	19.805 mg/kg	0.00198 %		
5	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1.7 mg/kg	1.285	2.185 mg/kg	0.00017 %		
6	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		171 mg/kg	1.462	249.926 mg/kg	0.025 %		
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		92 mg/kg	1.126	103.582 mg/kg	0.0104 %		
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		49 mg/kg	1.579	77.395 mg/kg	0.00774 %		
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	189 mg/kg	1.56	294.805 mg/kg	0.0189 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2	mg/kg	2.554	5.107	mg/kg	0.000511 %		
		034-002-00-8											
11		zinc { zinc chromate }				562	mg/kg	2.774	1559.07	mg/kg	0.156 %		
		024-007-00-3											
12		phenanthrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			201-581-5	85-01-8									
										Total:	0.221 %		

Key

	User supplied data
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WAC5 0.90

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WAC5 0.90
Sample Depth:
0.90 m
Moisture content:
11.5%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.5% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	confirm TPH has NOT arisen from diesel or petrol					☑					
2	pH			PH		6 pH		6 pH	6pH		
3	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.4 mg/kg	13.43	5.372 mg/kg	0.000537 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		3.5 mg/kg	1.32	4.621 mg/kg	0.000462 %		
5	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		93 mg/kg	1.462	135.925 mg/kg	0.0136 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		8.9 mg/kg	1.126	10.02 mg/kg	0.001 %		
7	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		12 mg/kg	1.579	18.954 mg/kg	0.0019 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	6.7 mg/kg	1.56	10.451 mg/kg	0.00067 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.4 mg/kg	2.554	1.021 mg/kg	0.000102 %		
10	zinc { zinc chromate }	024-007-00-3				28 mg/kg	2.774	77.676 mg/kg	0.00777 %		
11	phenanthrene		201-581-5	85-01-8		0.03 mg/kg		0.03 mg/kg	0.000003 %		
								Total:	0.026 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WAC6 0.60

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WAC6 0.60
Sample Depth:
0.60 m
Moisture content:
12.7%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.7% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		confirm TPH has NOT arisen from diesel or petrol					☑							
2		pH			PH		6.2	pH		6.2	pH	6.2 pH		
3		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.5	mg/kg	13.43	6.715	mg/kg	0.000672 %		
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		5.3	mg/kg	1.32	6.998	mg/kg	0.0007 %		
5		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		75	mg/kg	1.462	109.617	mg/kg	0.011 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		9.9	mg/kg	1.126	11.146	mg/kg	0.00111 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		13	mg/kg	1.579	20.533	mg/kg	0.00205 %		
8		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	15	mg/kg	1.56	23.397	mg/kg	0.0015 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.5	mg/kg	2.554	1.277	mg/kg	0.000128 %		
10		zinc { zinc chromate }	024-007-00-3				35	mg/kg	2.774	97.095	mg/kg	0.00971 %		
11		TPH (C6 to C40) petroleum group			TPH		17	mg/kg		17	mg/kg	0.0017 %		
12		phenanthrene		201-581-5	85-01-8		0.03	mg/kg		0.03	mg/kg	0.000003 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		fluoranthene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			205-912-4	206-44-0									
										Total:	0.0285 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: Force this Hazardous property to non hazardous because No liquid phase

Appendix A: Classifier defined and non CLP determinands

confirm TPH has NOT arisen from diesel or petrol

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 5/25/2015
Risk Phrases: None.
Hazard Statements: None.

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 5/25/2015
Risk Phrases: None.
Hazard Statements: None.

boron tribromide/trichloride/trifluoride (combined) (CAS Number: 10294-33-4, 10294-34-5, 7637-07-2)

Conversion factor: 13.43
Description/Comments: Combines the hazard statements and the average of the conversion factors for boron tribromide, boron trichloride and boron trifluoride
Data source: N/A
Data source date: 8/6/2015
Risk Phrases: R14 , T+ R26/28 , C R34 , C R35
Hazard Statements: EUH014 , Acute Tox. 2 H330 , Acute Tox. 2 H300 , Skin Corr. 1A H314 , Skin Corr. 1B H314

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 7/17/2015
Risk Phrases: R20 , R22 , R36 , R37 , R38 , R42 , R43 , R50/53 , R60 , R61
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

dicopper oxide; copper (I) oxide (EC Number: 215-270-7, CAS Number: 1317-39-1)

CLP index number: 029-002-00-X
Data source: Regulation (EU) 2016/1179 of 19 July 2016 (ATP9)
Additional Risk Phrases: N R50/53 , N R50/53 >= 0.25 %
Additional Hazard Statement(s): None.
Reason for additional Hazards Statement(s)/Risk Phrase(s):
10/10/2016 - N R50/53 risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases
10/10/2016 - N R50/53 >= 0.25 % risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 5/25/2015
Risk Phrases: R10 , R45 , R46 , R51/53 , R63 , R65
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 8/6/2015
Risk Phrases: R22 , R36 , R37 , R38 , R40 , R43 , N R50/53
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 7/17/2015
Risk Phrases: R36 , R37 , R38 , R43 , N R50/53
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 8/21/2015
Risk Phrases: Xn R22 , N R50/53
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 8/21/2015
Risk Phrases: Xi R36/37/38 , N R50/53
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 8/6/2015
Risk Phrases: R40
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 7/23/2015
Risk Phrases: N R50/53
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

Appendix B: Rationale for selection of metal species

boron {boron tribromide/trichloride/trifluoride (combined)}

Worst case species based on hazard statements

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

nickel {nickel dihydroxide}

Worst case species based on hazard statements

lead {lead chromate}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc chromate}

Worst case species based on hazard statements

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition, May 2015
HazWasteOnline Classification Engine Version: 2017.269.3405.6897 (26 Sep 2017)
HazWasteOnline Database: 2017.270.3406.6898 (28 Sep 2017)

This classification utilises the following guidance and legislation:
WM3 - Waste Classification - May 2015
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010