PHASE II INVESTIGATION

LAND OFF TRENCHARD DRIVE

REC REFERENCE: 103580P1R0

REPORT PREPARED FOR: PLP CONSTRUCTION LTD

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A CONCEPT LIFE SCIENCES COMPANY

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EXECUTIVE SUMMARY	
Site Address	Trenchard Drive, Woodhouse Park, Manchester, M22 5NA
Grid Reference	E: 383943 N: 385466
Site Area	Approximately 0.344 hectares
Intrusive Ground Investigation	
Ground Conditions	**Made Ground:** Made ground to a maximum depth of 1.50m bgl (WS109) was encountered. **Superficial:** Superficial till deposits of principally comprising clays with occasional interbedded sand layers to a maximum depth of 5.45m bgl. **Bedrock:** Not encountered. **Groundwater:** Groundwater was encountered during ground investigation at depths of 1.00-4.00m bgl, during subsequent monitoring groundwater was recorded between 0.325 and 1.875m bgl.
Generic Quantitative Risk Assessment	
Human Health	The screening indicates that there is a potential risk from lead within soils from WS109 to human health. As such, the Made Ground in this location potentially poses an outstanding risk to human health.
Controlled Waters	Minor exceedances of controlled waters assessment criteria were recorded but it is considered that these do not pose an unacceptable risk to the environment. As such the risk to controlled waters is considered acceptably low.
Ground Gas	The site has been characterised as Characteristic Situation 1. No ground gas protection measures are required.
Sulphate Assessment	Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE Special Digest 1 (2005).
Recommendations	
To address outstanding risks to human health a remediation strategy should be developed for the site which should also cover any unexpected contamination.	

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1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants Ltd (REC) has been commissioned by PLP Construction Ltd to undertake a Phase II Site Investigation at land off Trenchard Drive, hereinafter referred to as the 'site'. A site location plan is provided as Drawing No 103580-001 in Appendix III.

1.2 Proposed Development

The proposed development comprises 15 No. low rise residential properties with private gardens and an associated access roadway and infrastructure. A proposed development plan is provided as Drawing No 103580-002 in Appendix III.

1.3 Previous Reports

This report should be read in conjunction with the following report:

- Phase I Desk Based Assessment, Land off Trenchard Drive, REC ref 45620p1r1, dated September 2014.

1.4 Objective and Scope of Work

This report is provided to support planning permissions for the development and to establish potential abnormal geo-environmental and geotechnical development constraints and general ground conditions.

A scope of works was developed using the Phase I report issued by REC. In order to meet the objectives, the following scope of works was undertaken:

- Completion of an intrusive investigation of the site comprising the drilling and installation of combined groundwater and ground gas monitoring wells and preliminary geotechnical in-situ testing;
- Chemical analysis of soils to identify potential risks to human health and structures;
- A programme of ground gas monitoring;
- An assessment of the contamination status of the site by Generic Quantitative Risk Assessment (GQRA);
- Assessment of the geotechnical data and preliminary recommendations on foundations;
- Assessment of the soakage of the near surface soils to assist in the design of infiltration based sustainable urban drainage systems (SuDS); and,
- Recommendations regarding future works (if required).

1.5 Limitations and Confidentiality

The limitations of this report are presented in Appendix I. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.

2.0 SITE SETTING

2.1 Site Details

Site details are included within Table 2.1 below. All acronyms used within this report are defined in the glossary presented in Appendix II. A site location plan Drawing No 103580-001 is presented in Appendix III.

Table 2.1 Site Information

Site Address	Trenchard Drive, Woodhouse Park, Manchester, M22 5NA
National Grid Reference	E: 383943 N: 385466
Site Area	Approximately 0.344 hectares

2.2 Current Site Use

The site is an irregular shaped, flat and undeveloped parcel of land located off Trenchard Drive in Manchester. It is bordered by residential properties in all directions and a commercial area associated with air freight is located adjacent to the east.

2.3 Geology & Hydrogeology

The British Geological Survey (BGS) map for the area, (Sheet 98, 1:50,000, Solid & Drift edition) and online GeoIndex indicates that the site is underlain by the following strata as summarised in Table 2.2 below.

Table 2.2 Geological and Hydrogeological Summary

Geological Unit	Classification	Description	Environment Agency Aquifer Classification	Sensitivity
Superficial	Till	Diamicton (Boulder Clay)	Unproductive strata	Low
Bedrock	Bollin Mudstone Member	Mudstone	Secondary (B)	Low

3.0 SITE INVESTIGATION

3.1 Site Investigation Rationale

The ground investigation comprised 9 window sample boreholes with 6 installations as detailed in Table 3.1 below. Works were completed on the 12th December 2018. An exploratory hole location plan is provided as Drawing No 103580-003 in Appendix III. All exploratory hole logs are presented in Appendix IV.

The window sample boreholes were designed to provide geotechnical information and to retrieve environmental samples for chemical testing in order to confirm the conceptual site model (CSM) developed within the Phase I report. Monitoring wells were installed to provide data about groundwater, ground gas and to undertake in-situ permeability tests to assess the effective permeability of the underlying soils.

Table 3.1 Site Investigation Locations

Location Hole	Potential Source/Rationale	Type	Maximum Depth (m bgl)	Monitoring Wells Response Zone (m bgl)
WS101	Ground / baseline conditions	Window Sample Borehole	5.45	1.2-4.2
WS102	Ground / baseline conditions / Permeability test		4.45	0.5-2.5
WS104	Ground / baseline conditions		4.35	0.9-3.9
WS105	Ground / baseline conditions		5.45	N/A
WS106	Ground / baseline conditions		0.80	N/A
WS106A	Ground / baseline conditions		5.45	2.0-4.0
WS108	Ground / baseline conditions		3.9	N/A
WS109	Ground / baseline conditions / Permeability test		4.41	1.5-4.0
WS110	Ground / baseline conditions / Permeability test		5.45	2.0-4.0

3.2 In-Situ Testing

Standard Penetration Tests (SPTs) were carried out in all window sample locations at 1m intervals to provide information about ground consistency and strength. The results are presented on the exploratory hole logs presented in Appendix IV.

3.3 Laboratory Chemical Analysis

All soil samples were submitted to Concept Life Sciences in Manchester for a range of chemical analysis comprising, asbestos ID, metals, pH, total sulphate, water soluble sulphate (2:1 extract), sulphide, cyanide, phenols, total and speciated poly-aromatic hydrocarbons (PAHs), total organic carbon (TOC), soil organic matter (SOM), and banded total petroleum hydrocarbons (TPH). Test certificates are included in Appendix VII.

3.4 Geotechnical Laboratory Analysis

Five soil samples were scheduled for Atterberg limit determinations. The results of the geotechnical analysis are presented in Appendix VI.

3.5 Gas and Groundwater Monitoring

6 No. Gas monitoring with 1 No. combined groundwater sampling visits were proposed and have been completed.

Concentrations of methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), hydrogen sulphide (H_2S) and carbon monoxide (CO) were measured using an infra-red gas analyser (GFM436), calibrated to a reference standard (before and after each survey) and gas flow rates were measured using an attached flow pod. Gas measurements were recorded for a minimum of sixty seconds at each location, at which point the maximum concentration of CH_4, CO_2, H_2S and CO together with the lowest concentration of O_2 were recorded.

Groundwater monitoring was undertaken using an electronic dip meter and interface probe to record the depth to groundwater and the thickness of any free phase hydrocarbon product, if present.

3.6 Variable Head Permeability Testing

In-situ variable (falling) head permeability tests were undertaken within 3 No. monitoring well installations (WS102, WS109 & WS109). Drawing No 103580-003 in Appendix III shows the locations of the tests.

4.0 SITE INVESTIGATION RESULTS

4.1 Ground Conditions

General ground conditions are summarised in Table 4.1 below. Bedrock was not encountered.

Table 4.1 Summary of Ground Conditions

Strata	Typical Description	Min Depth to Top of Strata (m)	Max Depth to Top of Strata (m)	Max Thickness (m)
Made Ground (cohesive)	Dark brown very sandy gravelly clay with a low cobble content and occasional rootlets. Gravel is fine to coarse, angular brick, concrete, slate, glass, quartzite, sandstone and limestone. Cobbles are angular brick.	0.00	0.60	1.20
Made Ground (granular)	Dark brown gravelly fine to medium sand. Gravel is fine to medium, sub-angular concrete, slate, ash and brick.	0.00	0.60	0.60
Clay	Reddish brown / brown slightly gravelly stiff clay. Gravel is fine to medium, sub-rounded sandstone, limestone, quartz.	0.50	4.15	4.25
Sand	Brown slightly gravelly medium sand. Gravel is fine to medium, rounded sandstone and quartz.	0.80	4.65	0.80

Made ground was encountered across the site and consisted of dark brown sandy gravelly cobbly clay or dark brown gravelly sand. Variable superficial deposits of reddish brown / brown gravelly clay were encountered to a maximum depth of 5.45m bgl. Granular superficial deposits of brown slightly gravelly sand were also encountered to a maximum depth of 5.45m bgl.

4.2 Evidence of Contamination

No visual or olfactory evidence of contamination was observed.

4.3 Geotechnical Information

The superficial clay deposits were noted to be of medium to very high strength. 5 samples were analysed for Atterberg limit determinations, the clay was found to be of low plasticity within 4 samples and intermediate in the fifth. A summary is provided in Table 4.2 overleaf.

Table 4.2 Summary of Plasticity Results

Location	Depth (m)	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Plasticity Index (%)	Percentage passing 425µm sieve (%)
WS101	1.00	20	19	42	23	93
WS105	1.60-2.00	14	15	31	16	91
WS106A	1.50-2.00	14	14	29	15	93
WS109	2.00-3.00	13	14	28	14	92
WS110	2.50-3.00	13	15	30	15	96

Chemical analyses for pH and soluble sulphate content is summarised in Table 4.3 below.

Table 4.3 Summary of pH and Sulphate Data

Location	WS102	WS104	WS105	WS108	WS110
Depth (m)	1.80	1.40	1.60	0.60	1.50
pH Value	8.3	7.7	6.5	7.6	8.1
Sulphate Aqueous Extract as SO_4 (mg/l)	<100	200	200	<100	<100

4.4 Percolation Testing

In-situ variable (falling) head permeability tests were undertaken within boreholes WS102, WS109 WS110 during the investigation. The results are presented in Table 4.4 below, copies of the test results are included in Appendix V.

Table 4.4 Soil Infiltration Results

Location	Response Zone (m)	Groundwater Level (m)	Material	Soil Infiltration Rate (m/s)
WS102				
WS109				
WS110				

All results presented as coefficient of permeability (k) in m/s

4.5 Groundwater

Groundwater strikes were encountered during the site investigation in multiple locations at depths of between 1.0-4.0m bgl within WS108 and WS101 respectively. All subsequent groundwater levels are presented in Table 4.5 overleaf.

4.6 Ground Gas

The results of the 6 No rounds of ground gas monitoring are presented in Table 4.5 overleaf.

Table 4.5 Summary of Ground Gas and Groundwater Monitoring Results

Location	Date	CH_4 Max %v/v	CH_4 Steady %v/v	CO_2 Max %v/v	CO_2 Steady %v/v	O_2 %v/v	Flow Max (l/hr)	Flow Steady (l/hr)	Response Zone (mbgl)	Depth to Base (mbgl)	Depth to Water (mbgl)
WS101	02/01/2019	0.1	0.1	0.9	0.4	16.9	0.1	0.1	1.20-4.20	4.345	1.875
	15/01/2019	0.1	0.1	0.5	0.1	19.4	0.1	0.1		4.320	1.845
WS102	02/01/2019	0.1	0.1	0.7	0.3	16.5	0.1	0.1	0.50-2.50	2.345	1.305
	15/01/2019	0.1	0.1	0.9	0.3	17.6	0.1	0.1		2.090	1.040
WS104	02/01/2019	0.1	0.1	4.2	4.2	14.0	0.1	0.1	1.00-3.90	3.250	1.275
	15/01/2019	0.1	0.1	3.6	3.6	16.6	0.1	0.1		2.925	1.260

WS106A	02/01/2019	0.1	0.1	0.1	0.1	17.0	0.1	0.1	2.00-4.00	4.045	0.570
	15/01/2019	0.1	0.1	0.1	0.1	19.8	0.1	0.1		4.060	0.325
WS109	02/01/2019	0.1	0.1	3.5	1.9	15.4	0.1	0.1	2.00-4.00	3.670	1.115
	15/01/2019	0.1	0.1	3.0	2.6	15.9	0.1	0.1		3.610	0.920
WS110	02/01/2019	0.1	0.1	1.6	0.8	19.0	0.2	0.2	2.00-4.00	3.725	0.620
	15/01/2019	0.1	0.1	3.3	1.8	18.8	0.1	0.1		3.715	0.556

5.0 GENERIC QUANTITATIVE RISK ASSESSMENT

5.1 Methodology

The presence of contamination is generally only of concern if an actual or potentially unacceptable risk exists. Legislation and guidance on the assessment of contaminated sites, consistent with European Union best practice, acknowledges the need for a tiered risk based approach. This risk assessment represents a Generic Quantitative Risk Assessment (GQRA), in accordance with CLR11. It compares contaminant levels against generic, highly conservative standards and compliance.

REC has undertaken a GQRA to determine if any potential contaminants within the soils or groundwater will pose an unacceptable level of risk to future receptors. Based on the proposed development the assessment considers residential gardens with plant uptake as the most relevant future land use scenario.

5.2 Human Health Risk Assessment

The assessment has primarily adopted the S4UL (Suitable for Use Levels reference values published by LQM/CIEH in 2015) or Soil Guideline Values published by the Environment Agency. Where these are not available and in order to provide a consistent methodology for assessment of contaminants, a series of Generic Assessment Criteria (GAC) have been calculated by REC using CLEA.

Due to the absence of a published lead S4UL for direct use within the planning regime, the 2014 Defra C4SL (Category 4 Screening Level) has been used as this value is considered to incorporate the latest toxicological, bioaccessibility and exposure modelling research to date.

GACs utilised are linked to the soil organic matter (SOM) present. The mean for SOM of the 6 samples tested was 6.95%. and GACs calculated using CLEA have used an SOM of 6% to be appropriately conservative.

Table 5.1 below summarises the determinands the GAC values used and the results of the screening process.

Table 5.1 Summary of Human Health Toxicity Assessment for a Residential End Use

Determinand	Units	GAC	GAC Source	Primary Pathways	Max. Conc.	Assessment
Arsenic	mg/kg	37	(i)	1	35	No further action
Cadmium	mg/kg	11	(i)	1	<1	
Chromium	mg/kg	910	(i)	1	24	
Lead	mg/kg	200	(iv)	1	2,500	2,500mg/kg -WS104 – 0.3m bgl; 540mg/kg -WS105 – 0.5m bgl; & 320mg/kg -WS109 – 0.4m bgl
Mercury [Inorganic]	mg/kg	40	(i)	1	<1	No further action
Nickel	mg/kg	130	(i)	1	36	
Selenium	mg/kg	250	(i)	1	<3	
Copper	mg/kg	2,400	(i)	1	130	
Zinc	mg/kg	3,700	(i)	1	460	
Cyanide [Total]	mg/kg	3.4	(v)	1	<1	
Phenols	mg/kg	1,100	(ii)	5	<1	No further action
Naphthalene	mg/kg	13	(ii)	4	0.2	
Acenaphthylene	mg/kg	920	(ii)	1	0.1	

Determinand	Units	GAC	GAC Source	Primary Pathways	Max. Conc.	Assessment
Acenaphthene	mg/kg	1,100	(ii)	1	0.2	
Fluorene	mg/kg	860	(ii)	1	0.1	
Phenanthrene	mg/kg	440	(ii)	1	1.8	
Anthracene	mg/kg	11,000	(ii)	1	0.5	
Fluoranthene	mg/kg	890	(ii)	1	3.8	
Pyrene	mg/kg	2,000	(ii)	1	3.6	
Benzo(a)Anthracene	mg/kg	13	(ii)	1	1.6	
Chrysene	mg/kg	27	(ii)	1	1.7	
Benzo(b)Fluoranthene	mg/kg	100	(ii)	1	2	
Benzo(k)Fluoranthene	mg/kg	100	(ii)	1	2	
Benzo(a)Pyrene	mg/kg	3	(ii)	1	2	
Indeno(123-cd)Pyrene	mg/kg	41	(ii)	1	1.5	
Dibenzo(a,h)Anthracene	mg/kg	0.3	(ii)	1	0.3	
Benzo(ghi)Perylene	mg/kg	350	(ii)	1	1.7	
TPH (C5-C6 aliphatic)	mg/kg	160	(iii)	4	<0.01	No further action
TPH (C6-C8 aliphatic)	mg/kg	530	(iii)	4	<0.01	
TPH (C8-C10 aliphatic)	mg/kg	150	(iii)	4	<0.01	
TPH (C10-C12 aliphatic)	mg/kg	760	(iii)	4	<0.01	
TPH (C12-C16 aliphatic)	mg/kg	4300	(iii)	4	<0.01	
TPH (C6-C7 aromatic)		300	(iii)	4	<0.01	
TPH (C7-C8 aromatic)		660	(iii)	4	<0.01	
TPH (C8-C10 aromatic)		190	(iii)	4	<0.01	
TPH (C10-C12 aromatic)		380	(iii)	4	4	
TPH (C12-C16 aromatic)		660	(iii)	4	4	
TPH (C16-C21 aromatic)		930	(iii)	4	5	
TPH (C21-C35 aromatic)	mg/kg	1,700	(iii)	4	170	
Asbestos	N/A	Detect	-	1	Not detected	No further action

Generic Assessment Criteria (GAC) Source

(i) LQM/CIEH Suitable For Use Level (S4UL) (2015);
(ii) S4UL;
(iii) S4UL assumed worst case aliphatic / aromatic compound;
(iv) Defra Category 4 Screening Level (2014);
(v) CLEA 1.06 Derived Value.

Primary Pathways

1 Ingestion of soil and indoor dust and / or oral background exposure;
2 Consumption of home-grown produce and attached soil;
3 Inhalation of dust (background and indoor);
4 Inhalation of vapour (background and indoor);
5 Direct dermal / skin contact.

The screening indicates that there is a potential risk from lead within soils. Review of the borehole logs from WS105 and WS109 which have moderately elevated levels of lead show the Made Ground to be gravelly reworked clay with brick and did not display notably contaminated soils.

In the case of the sample from WS109, the concentration is high enough that lead may have been visible in the sample. Whilst there was no visual evidence of lead in the sample, the Made Ground here contained ash between 0.2m and 0.8m, not recorded anywhere else. As such, the Made Ground in this location potentially poses an outstanding risk to human health.

5.3 Controlled Waters

A Tier II risk assessment has been undertaken with concentrations of determinants compared with the relevant thresholds. The phase 1 report lists the closest surface water receptor as 311m to the north and the Till present beneath the site will limit horizontal migration of any contamination. As such, risks to surface waters are considered to be acceptably low. Groundwater results have therefore been screened against ground water and drinking water standards as aquifers beneath the site represent the principal controlled waters receptor. These are presented in Table 5.2.

Table 5.1 Summary of Controlled Waters Assessment

Determinand	Units	Ground Water Screening Values	Drinking Water Screening Values	Max Conc.	Assessment
Arsenic	µg/l	5(6)	10 (3)	1.2	No Further Action
Cadmium	µg/l		5 (3)	0.09	
Chromium VI	µg/l	1(6)	50 (3)	<0.003	
Copper	µg/l		2000 (3)	7.6	
Cyanide	µg/l		50 (3)	<0.05	
Lead	µg/l	5(6)	10 (3)	<0.3	
Nickel	µg/l		20 (3)	7	
Selenium	µg/l		10 (3)	<0.5	
Sulphate (SO_4)	mg/l		250 (3)	140	
Zinc	µg/l		5000 (3)	35	
Phenol	µg/l		0.5 (3)	<0.5	
Benzo(a)Pyrene	µg/l	0.005(6)	0.03 (3)	<0.01	
Benzo(ghi)perylene	µg/l	0.05(6)	-	<0.01	
Indeno(123-cd) pyrene	µg/l	0.05(6)	-	<0.01	
Anthracene	µg/l	0.05(6)	-	0.02	
Benzene	µg/	0.5(6)	1 (3)	<1	
Toluene	µg/	350(6)	700 (7)	<1	
Ethylbenzene	µg/		300 (7)	<1	
o-Xylene	µg/		500 (7)	<1	
MTBE	µg/		15 (7)	<1	
TPH aliphatic C_5-C_6	µg/l		1 (4)	<10	
TPH aliphatic C_6-C_8	µg/l		1 (4)	<10	
TPH aliphatic C_8-C_{10}	µg/l		300 (4)	<10	
TPH aliphatic C_{10}-C_{12}	µg/l		300 (4)	<10	
TPH aliphatic C_{12}-C_{16}	µg/l		300 (4)	<10	
TPH aliphatic C_{16}-C_{35}	µg/l		300 (4)	10	
TPH aromatic C5-7	µg/l		1 (4)	<10	
TPH aromatic C7-8	µg/l		700(4)	<10	
TPH aromatic C8-10	µg/l		300(4)	<10	
TPH aromatic C10-12	µg/l		90(4)	<10	
TPH aromatic C12-16	µg/l		90(4)	66	
TPH aromatic C16-21	µg/l		90(4)	120	See below discussion
TPH aromatic C21-35	µg/l		90(4)	580	

(1) Water Framework Directive – EQS Specific Pollutant
(2) Water Framework Directive – EQS for priority Hazardous Substances. Annual Average concentration unless otherwise stated. MAC = Maximum admissible concentration unless otherwise stated.
(3) Drinking Water Screening Values – The Water Supply (Water Quality) Regulations 2016
(4) WHO DWS for TPH (2008)
(5) Sum of Four PAHs (benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene and indeno[1,2,3-c,d]pyrene)
(6) UKTAG definition for hazardous substances, UK Technical Advisory Group on the Water Framework Directive Tech report on Groundwater Hazardous Substances, 11b(iii) v12 , Final version for website. Annual mean value.
(7) WHO Drinking water Guideline
(8) EA/SNIFFER (2001) – non statutory

There were exceedance of long chain aromatic hydrocarbons, however a detailed quantitative risk assessment for controlled waters is not considered necessary on the basis that:

- Hydrocarbons with chain lengths longer than 12 are generally immobile in groundwater and would likely take thousands of years to travel a distance of 50m or more;
- Both the superficial and bedrock aquifers present beneath the site are low permeability deposits, further restricting the vertical or lateral migrations of contamination; and
- Due to the relatively low permeability of the deposits, groundwater is not likely to be abstracted for drinking within the immediate vicinity, particularly as a mains supply is present.

5.4 Ground Gas

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in BS8485:2015. The results of the ground gas monitoring visits have been used to calculate an interim borehole hazardous gas flow rate (Qhg) and relevant characteristic situation (CS), as shown in Table 5.3. The maximum observed flow rate and maximum observed concentration during any monitoring event have been used to provide a 'worst case scenario'.

Table 5.3 Calculation of Hazardous Gas Flow Rate (Qhg)

Flow rate (L/h)	Maximum CH_4 (%)	Maximum CO_2 (%)	CH4 Qhg (l/h)	CO2 Qhg Rate (l/h)	Implied CH_4 CS	Implied CO_2 CS
0.2	0.1	4.2	0.0002	0.0084	1	1

The maximum hazardous bulk ground gas flow rate is considered to be 0.0084 l/h. This is within the range for CS1 (<0.07 l/h) and no ground gas protection measures are required.

6.0 CONCEPTUAL SITE MODEL (CSM)

In accordance with Environment Agency, CLR11 (2004) and BSI 10175 (Code of Practice for Investigation of Potentially Contaminated Land), the Conceptual Site Model (CSM) presented within the Phase 1 report has been developed based on the findings of the ground investigation. It identifies potential contamination sources, migration pathways and receptors.

6.1 Contaminant Sources

Potential sources of contamination have been identified as follows:

On site

- Made Ground in relation to historic development of the site.

The following off-site sources have been discounted due to either their historic nature, distance from the site or that they are hydraulically up-gradient of the site and groundwater would not flow towards the development site:

- Infilled ponds within 250m; and
- Electricity substations within 250m.

6.2 Potential Pathways

Receptors may be potentially at risk from the identified potential sources of contamination via the following pathways:

- Migration of mobile contaminants on or off site via services, sewers and manmade conduits;
- Direct contact, ingestion and inhalation of contaminants on site;
- Migration of mobile contaminants into groundwater; and
- Migration of hazardous ground gases.

6.3 Potential Receptors

Human Receptors

- Future users of the site and buildings; and
- Users of adjacent areas due to off-site migration of gases or vapours.

Controlled Waters

- Groundwater within the underlying aquifers.

Construction workers are not considered to be a plausible receptor as exposure will be managed through the use of appropriate PPE and hygienic working practices, as required under HSE/CDM regulations. Furthermore, potential exposure to possible contaminants is not expected to be over prolonged work duration thereby limiting any impact to ground workers.

6.4 Risk Appraisal Methodology

CIRIA 552: Contaminated Land Risk Assessment 'A Guide to Good Practice', 2001 provides guidance on the approach to risk assessment. For any potential contaminant linkage consideration is given to:

- The potential severity of the risk; and
- The likelihood of the risk occurring.

Severity is assessed with consideration to the receptor and magnitude of impact. Table 6.1 provides details of each category.

Table 6.1 Severity Categories

Category	Description
Minor	Requirement for protective equipment during site works to mitigate health effects. Damage to non-sensitive ecosystems or species.
Mild	Pollution of non-sensitive water resources.
Medium	Chronic (long-term) risk to human health; Pollution of sensitive controlled waters (surface waters or aquifers)
Severe	Acute (short term) risks to human health; Major pollution of controlled waters (watercourses or groundwater)

The probability of a risk occurring considers the plausibility and sustainability of the contaminant linkage. Table 6.2 provides details of each category.

Table 6.2 Probability Categories

Category	Description
Unlikely	Contaminant linkage may be present, but the circumstances under which harm would occur are improbable.
Low Likelihood	Contaminant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Likely	Contaminant linkage may be present, and it is probable that the risk will occur over the long term.
High Likelihood	Contaminant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor.

Table 6.3 compares the probability against the severity to provide an overall risk rating for each contaminant linkage.

Table 6.3 Comparison of Probability and Severity

Probability	Severity			
	Minor	**Mild**	**Medium**	**Severe**
Unlikely	Very Low Risk	Very Low Risk	Low Risk	Low / Moderate Risk
Low Likelihood	Very Low Risk	Low Risk	Low / Moderate Risk	Moderate Risk
Likely	Low Risk	Low / Moderate Risk	Moderate Risk	High Risk
High Likelihood	Low / Moderate Risk	Moderate Risk	High Risk	Very High Risk

Typical consequences for each category of risk rating and likely required actions are provided in Table 6.4.

Table 6.4 Typical Risk Category Consequences and Actions

Risk Category	Typical Consequence and Actions
Very Low Risk	Harm is unlikely to occur and be any worse than mild.
Low Risk	Harm could occur and at worst would normally be mild. Limited further investigation may be required to clarify the risk. Remediation works are unlikely to be required and would be limited.
Low /Moderate Risk	Harm could occur, but it is unlikely that it would be severe. Limited further investigation may be required to clarify the risk. If required, remediation works are likely to be limited.
Moderate Risk	Harm could occur, but there is a low likelihood that it would be severe. Harm is likely to be mild. Some remediation works may be required in the short-term or long-term.
High Risk	Harm is likely to occur, and is likely to be severe, unless appropriate remediation or mitigation measures are completed. Remedial works may be required in the short-term and are likely to be required over the long-term.
Very High Risk	Severe harm might already be occurring, or a high likelihood that severe harm will occur unless immediate remediation or mitigation measures are completed.

It should be noted that the identification of potential contaminant linkages does not indicate that they are significant.

6.5 Conceptual Site Model

A site specific CSM has therefore been created using the above information and is provided on the following page.

Table 6.5 Revised Conceptual Site Model

Source	Contaminant	Potential migration pathway	Potential Receptors	Likelihood of Occurrence	Severity	Overall Risk Rating	Active / Inactive
Made Ground in relation to historic development.	Heavy Metals	Ingestion of and dermal contact with soils	Future site users	Low likelihood	Medium	Low / Moderate	Outstanding risk for lead contamination in vicinity of WS104 to human health.
		Leaching to groundwater and vertical and lateral migration	Groundwater aquifers	Low likelihood	Medium	Low / Moderate	
			Surface Waters	Low likelihood	Mild	Low	
	Hydrocarbons	Inhalation of vapours, ingestion of and dermal contact with soils	Future Site Users	Low likelihood	Medium	Low / Moderate	Generic Quantitative Risk Assessment does not indicate elevated contaminant concentrations
		Leaching to groundwater and vertical and lateral migration	Groundwater aquifers	Low likelihood	Medium	Low / Moderate	
			Surface Waters	Low likelihood	Mild	Low	
	PAHs	Inhalation of vapours, ingestion of and dermal contact with soils	Future site users	Low likelihood	Medium	Low / Moderate	Generic Quantitative Risk Assessment does not indicate elevated contaminant concentrations
		Leaching to groundwater and vertical and lateral migration	Groundwater aquifers	Low likelihood	Medium	Low / Moderate	
			Whitfield Brook	Low likelihood	Mild	Low	
	Asbestos fibres	Inhalation of fibres	Future site users	Low likelihood	Medium	Low / Moderate	Not detected
	Ground gases	Inhalation of gases	Future site users	Low likelihood	Mild	Low	Ground gas monitoring indicates no mitigation measures required.

7.0 GEOTECHNICAL ASSESSMENT

7.1 Proposed Development

REC has undertaken the assessment on the basis of low rise residential buildings. Details of the proposed loadings are not known at this stage and therefore a line loading of 75kN/m^2 has been assumed for preliminary assessment purposes only.

7.2 Summary of Ground Conditions

Ground conditions comprise made ground to a maximum depth of 1.5m bgl (WS109) overlying superficial Till Deposits, principally comprising clays with occasional interbedded sand layers to a maximum excavated depth of 5.45m bgl. Bedrock was not encountered during the investigation.

7.3 Foundation Conditions

The underlying geology is noted to comprise slightly gravelly sandy clay. The underlying clay has been classified as being of low to intermediate plasticity, therefore the clay may be susceptible to shrink and swell caused by changes in moisture content due to the presence of trees and seasonal effects and consideration should be given to this feature when designing the structure.

7.4 Concrete Durability

Based upon the results of the chemical analyses it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with the recommendations provided in BRE Special Digest 1 (2005).

7.0 CONCLUSIONS & RECOMMENDATIONS

Summary of Conceptual Site Model
Human Health The screening indicates that there is a potential risk from lead within soils from WS109 to human health. As such, the Made Ground in this location potentially poses an outstanding risk to human health. **Controlled Waters** Minor exceedances of controlled waters assessment criteria were recorded but it is considered that these do not pose an unacceptable risk to the environment. As such the risk to controlled waters is considered acceptably low. **Ground Gas** The site has been characterised as Characteristic Situation 1. No ground gas protection measures are required.
Recommendations
To address outstanding risks to human health a remediation strategy should be developed for the site which should also cover any unexpected contamination.

END OF REPORT

APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between REC Ltd and the Client.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. In addition to the above REC Ltd note that when investigating, or developing, potentially contaminated land it is important to recognise that sub-surface conditions may vary spatially and also with time. The absence of certain ground, ground gas, and contamination or groundwater conditions at the positions tested is not a guarantee that such conditions do not exist anywhere across the site. Due to the presence of existing buildings and structures access could not be obtained to all areas. Additional contamination may be identified following the removal of the buildings or hard standing.

5. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

6. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

7. This report presents an interpretation of the geotechnical information. Whilst every effort is made in interpretative reporting to assess the soil conditions over the Site it should be noted that natural strata vary from point to point and that man-made deposits are subject to an even greater diversity. Groundwater conditions are dependent on seasonal and other factors. Consequently there may be conditions present not revealed by this investigation.

8. REC cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by REC is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by REC in this connection without their explicit written agreement there to by REC.

9. Rather, this investigation has been undertaken to provide a preliminary characterisation of the existing sub-surface geotechnical characteristics and make up and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II

GLOSSARY

TERMS

ABC	Actual Bearing Capacity
ACM	Asbestos Containing Materials
AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
C4SLs	Category 4 Screening Levels
CBR	California Bearing Ratio
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Poly Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo Ionisation Detector
QA	Quality Assurance
S4UL	Suitable for Use Levels
SGV	Soil Guideline Value
SPT	Standard Penetration Test
SuDS	Sustainable Urban Drainage System
SVOC	Semi Volatile Organic Compound
TPH	Total Petroleum Hydrocarbon
TPHCWG	Total Petroleum Hydrocarbon (Criteria Working Group)
UKWIR	United Kingdom Water Industry Research
UST	Underground Storage Tank
VCCs	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation

APPENDIX III

DRAWINGS

KEY:

N

Site Boundary





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Job Title:	Land off Trenchard Drive
Client:	PLP Construction Ltd
Drawing No:	001
Drawn By:	AR
Approved by:	PH
Notes:	N.T.S
Drawing Title:	Site Location Plan

KEY:

N



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Job Title:	Land off Trenchard Drive
Client:	PLP Construction Ltd
Drawing No:	002
Drawn By:	AR
Approved by:	PH
Notes:	N.T.S
Drawing Title:	Proposed Development Plan

KEY:

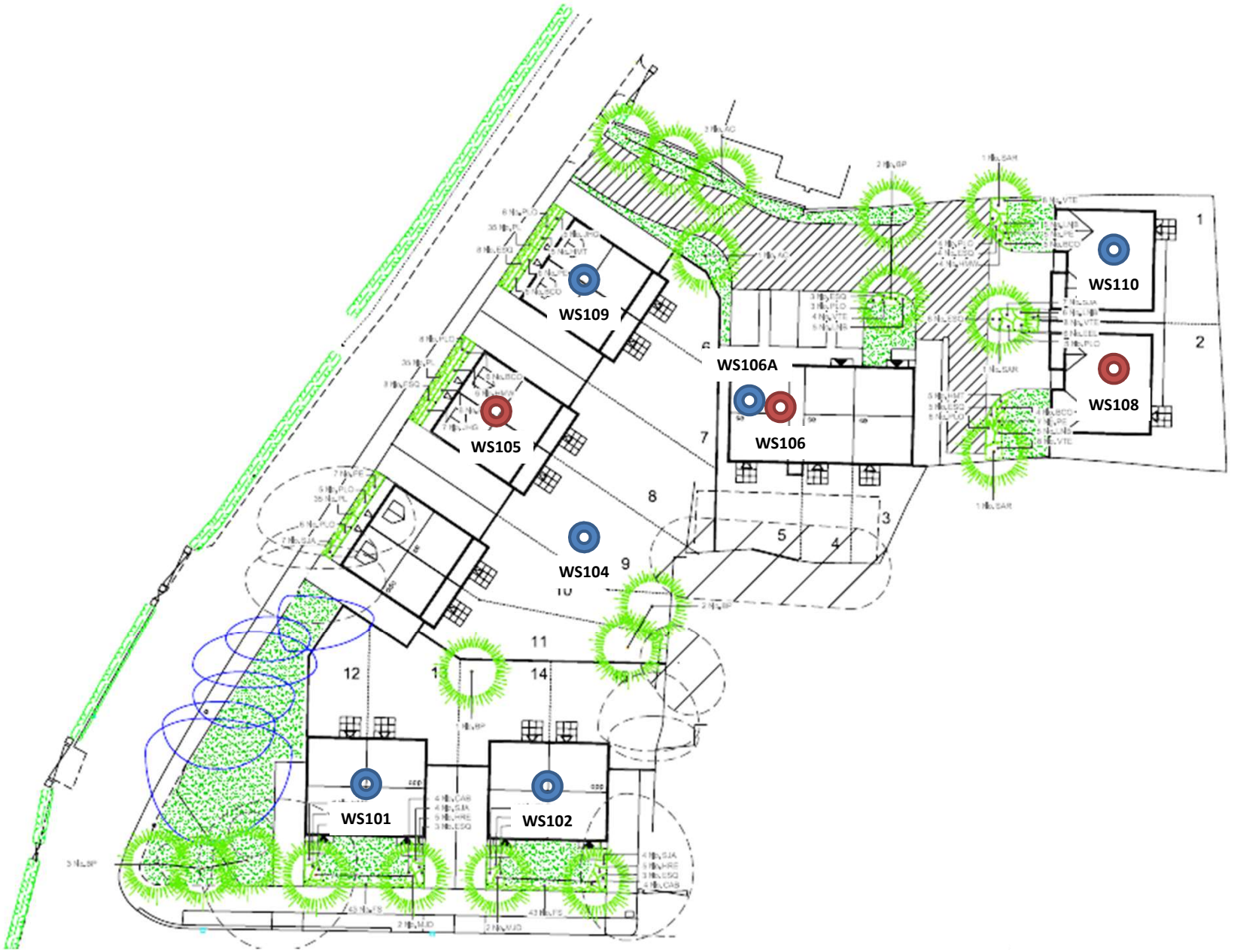
N

Approximate Location of Window Sample with Installation

WS101

Approximate Location of Window Sample without Installation

WS101



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Job Title:	Land off Trenchard Drive
Client:	PLP Construction Ltd
Drawing No:	003
Drawn By:	AR
Approved by:	PH
Notes:	N.T.S
Drawing Title:	Exploratory Hole Location Plan

APPENDIX IV

EXPLORATORY LOGS

Borehole Log

Borehole No. **WS101**

Sheet 1 of 1

Project Name:	Phase II Ground Investigation	Proj. ID: 103580		Easting:	Hole Type: WS
Location:	Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart		Northing: Level (m AOD):	Scale: 1:30
Client:	PLP Construction Ltd	Crew: Earth Engineering		Final Depth (m): 5.45	REC Engineer: PH
				Start Date: 12/12/2018	
				End Date: 12/12/2018	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES		0.50			Dark brown very sandy gravelly reworked clay with low cobble content and occasional rootlets. Sand is fine to medium. Gravel is fine to coarse angular brick. Cobbles are angular brick. [MADE GROUND]
		0.60	ES					Stiff brown slightly gravelly CLAY with low cobble content. Gravel is fine to medium sub-rounded sandstone, limestone and quartz. Cobbles are sub-rounded limestone. [GLACIAL TILL]
		1.00	B					
		1.20	SPT	N=12 (3,3/3,3,3,3)				
		2.00	SPT	N=19 (2,4/5,4,4,6)				*After 2.0m bgl: Clay is very stiff.* *Between 2.2m and 2.3m bgl: Sand lens.*
	▼	3.00	SPT	N=32 (5,5/7,7,9,9)	3.10			Brown medium SAND.
					3.30			Very stiff reddish brown slightly gravelly CLAY. Gravel is fine to medium sub-rounded sandstone and limestone. [GLACIAL TILL]
	▼	4.00	SPT	N=35 (4,6/8,8,9,10)	4.10			Brown medium SAND.
					4.15			Very stiff reddish brown slightly gravelly CLAY. Gravel is fine to medium sub-rounded sandstone and limestone. [GLACIAL TILL]
		5.00	SPT	N=41 (5,8/9,10,10,12)	4.65			Dense brown slightly gravelly fine to medium SAND. Gravel is rounded coarse quartzite.
					5.45			End of Borehole at 5.45m

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Inspection pit undertaken to 1.2m bgl. Groundwater encountered at 3.00 & 4.00m bgl. Exploratory location installed with 50mm internal diameter ground gas monitoring standpipe and fitted with a steel cover upon completion.

Borehole Log

Borehole No. **WS102**

Sheet 1 of 1

Project Name:	Phase II Ground Investigation	Proj. ID: 103580	Easting:		Hole Type: WS
			Northing:		
Location:	Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart	Level (m AOD):		Scale: 1:30
			Final Depth (m):	4.45	
Client:	PLP Construction Ltd	Crew: Earth Engineering	Start Date:	12/12/2018	REC Engineer: PH
			End Date:	12/12/2018	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES		0.45			Dark brown very sandy gravelly reworked clay with low cobble content. Sand is fine to medium. Gravel is fine to coarse angular brick. Cobbles are angular brick. [MADE GROUND]
		0.50	ES					Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse sub-rounded sandstone and limestone. [GLACIAL TILL]
		1.20	SPT	N=17 (2,3/3,4,4,6)	1.50			
					1.65			Brown slightly gravelly coarse SAND. Gravel is fine to medium rounded sandstone and limestone.
		1.80	ES					Very stiff reddish brown slightly gravelly CLAY. Gravel is fine to medium sub-rounded sandstone and limestone. [GLACIAL TILL]
		2.00	SPT	N=22 (2,4/5,5,5,7)	2.40			
	▼							Brown slightly gravelly coarse SAND. Gravel is fine to medium rounded sandstone and quartz.
		3.00	SPT	N=50 (25 for 140mm/12,13,13,12)	3.00			Very stiff brown slightly gravelly CLAY. Gravel is fine to medium rounded sandstone. [GLACIAL TILL]
		4.00	SPT	N=32 (5,7/6,8,9,9)	4.45			End of Borehole at 4.45m

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Inspection pit undertaken to 1.2m bgl. Groundwater encountered at 2.40m bgl. Exploratory location installed with 50mm internal diameter ground gas monitoring standpipe and fitted with a steel cover upon completion.

Borehole Log

Borehole No. **WS104**

Sheet 1 of 1

Project Name:	Phase II Ground Investigation	Proj. ID: 103580	Easting:		Hole Type: WS
			Northing:		
Location:	Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart	Level (m AOD):		Scale: 1:30
			Final Depth (m):	4.35	
Client:	PLP Construction Ltd	Crew: Earth Engineering	Start Date:	12/12/2018	REC Engineer: PH
			End Date:	12/12/2018	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			Dark brown gravelly reworked clay. Gravel is fine to coarse angular brick. [MADE GROUND]
					0.20			Concrete (probable paving slab). [MADE GROUND]
		0.40	ES					Dark brown gravelly fine to medium sand. Gravel is fine to medium sub-angular ash and brick. [MADE GROUND]
					0.80			
		0.90	ES					Red slightly clayey slightly gravelly coarse SAND. Gravel is rounded sandstone.
		1.20	SPT	N=9 (1,2/1,2,3,3)				
					1.30			
		1.40	ES					Stiff reddish brown slightly gravelly clay. Gravel is fine to coarse sub-rounded sandstone and limestone. [GLACIAL TILL]
	▼				1.70			
					1.80			Brown slightly gravelly fine to medium SAND. Gravel is rounded coarse quartzile.
		2.00	SPT	N=14 (2,3/3,3,4,4)				Stiff reddish brown slightly gravelly CLAY. Gravel is fine to medium sub-rounded sandstone and limestone. [GLACIAL TILL]
		3.00	SPT	N=32 (4,6/7,7,9,9)				*After 3.0m bgl: Clay is very stiff.*
		3.90	SPT	N=50 (12,13/15,12,12,11)				
					4.35			End of Borehole at 4.35m

1 2 3 4 5 6

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Inspection pit undertaken to 1.2m bgl. Hole terminated upon refusal of SPT at 4.35m bgl. Groundwater encountered at 2.40m bgl. Exploratory location installed with 50mm internal diameter ground gas monitoring standpipe and fitted with a steel cover upon completion.

Borehole Log

Borehole No. **WS105**

Sheet 1 of 1

Project Name:	Phase II Ground Investigation	Proj. ID: 103580	Easting:		Hole Type: WS
			Northing:		
Location:	Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart	Level (m AOD):		Scale: 1:30
			Final Depth (m):	5.45	
Client:	PLP Construction Ltd	Crew: Earth Engineering	Start Date:	12/12/2018	REC Engineer: PH
			End Date:	12/12/2018	

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.50	ES					Dark brown very sandy gravelly reworked clay with low cobble content. Sand is fine to medium. Gravel is fine to coarse angular to rounded brick, quartzite, sandstone and limestone. Cobbles are angular brick. [MADE GROUND]
		1.20	SPT	N=2 (0,0/0,0,1,1)	1.20			
		1.30	ES					Light brown very sandy gravelly reworked clay. Sand is fine to medium. Gravel is fine to coarse angular brick [MADE GROUND]
		1.60	ES		1.40			Very soft dark brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium sub-angular sandstone and limestone. [GLACIAL TILL]
		1.60 - 2.00	B					
		2.00	SPT	N=15 (2,2/3,4,3,5)	2.10			Stiff reddish brown slightly gravelly CLAY. Gravel is fine to medium sub-rounded sandstone and limestone. [GLACIAL TILL]
	▼	3.00	SPT	N=40 (5,5/8,11,11,10)	3.10			Brown slightly clayey GRAVEL. Gravel is medium to coarse angular limestone.
					3.30			Very stiff brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular sandstone and limestone. [GLACIAL TILL]
		4.00	SPT	N=37 (5,6/9,9,10,9)				*Between 4.3m and 4.6m bgl: Poor recovery.*
					4.60			Very stiff brown slightly gravelly CLAY. Gravel is fine sub-angular sandstone. [GLACIAL TILL]
		5.00	SPT	N=51 (6,10/11,11,12,17)				
					5.45			End of Borehole at 5.45m

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Groundwater encountered at 3.00m bgl. Inspection pit undertaken to 1.2m bgl. Hole terminated upon refusal of SPT at 5.45m bgl.

Borehole Log

Borehole No. **WS106**

Sheet 1 of 1

Project Name: Phase II Ground Investigation	Proj. ID: 103580	Easting: / Northing:	Hole Type: WS
Location: Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart	Level (m AOD): / Final Depth (m): 0.50	Scale: 1:30
Client: PLP Construction Ltd	Crew: Earth Engineering	Start Date: 12/12/2018 / End Date: 12/12/2018	REC Engineer: CD

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.50			Dark brown very gravelly fine to medium sand with high cobble content. Gravel is fine to coarse angular of concrete brick and slate. Cobbles are angular brick. [MADE GROUND]
								End of Borehole at 0.50m

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Inspection pit undertaken to 1.2m bgl. No groundwater encountered. Pit terminated at 0.5m bgl due to difficult ground conditions. Exploratory location backfilled with arisings in reverse order.

Borehole Log

Borehole No. **WS106A**

Sheet 1 of 1

Project Name:	Phase II Ground Investigation	Proj. ID: 103580	Easting:		Hole Type: WS
			Northing:		
Location:	Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart	Level (m AOD):		Scale: 1:30
			Final Depth (m):	5.45	
Client:	PLP Construction Ltd	Crew: Earth Engineering	Start Date:	12/12/2018	REC Engineer: CD
			End Date:	12/12/2018	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES					Dark brown very gravelly fine to medium sand with high cobble content. Gravel is fine to coarse angular of concrete brick and slate. Cobbles are angular brick. [MADE GROUND]
		0.40	ES					
		0.60	ES		0.60			Light brown very sandy gravelly reworked clay. Sand is fine to medium. Gravel is fine to coarse angular brick and slate. [MADE GROUND]
		1.20	SPT	N=7 (2,2/2,1,2,2)				
		1.50 - 2.00	B		1.50			Very stiff light brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse sub-rounded sandstone and limestone. [GLACIAL TILL]
		2.00	SPT	N=21 (2,2/2,4,5,10)				*Between 2.4m and 2.9m bgl: Clay is sandy.*
	▼	3.00	SPT	N=25 (7,8/7,5,5,8)				*Between 3.0m and 3.5m bgl: Clay is loose, sandy and gravelly.*
								Between 3.5m and 4.0m bgl: Clay is dry and very stiff.
	▼	4.00	SPT	N=30 (4,5/6,7,8,9)				*Between 4.0m and 4.5m bgl: Clay is loose, sandy and gravelly.*
								Between 4.5m and 5.0m bgl: Clay is dry and very stiff.
		5.00	SPT	N=38 (4,7/7,10,10,11)	5.45			End of Borehole at 5.45m

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Inspection pit undertaken to 1.2m bgl. Groundwater encountered at 3.00 & 4.00m bgl. Exploratory location installed with 50mm internal diameter ground gas monitoring standpipe and fitted with a steel cover upon completion.

Borehole Log

Borehole No. **WS108**

Sheet 1 of 1

Project Name:	Phase II Ground Investigation	Proj. ID: 103580	Easting:	Hole Type	WS
			Northing:		
Location:	Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart	Level (m AOD):	Scale:	1:30
			Final Depth (m): 3.90		
Client:	PLP Construction Ltd	Crew: Earth Engineering	Start Date: 12/12/2018	REC Engineer:	CD
			End Date: 12/12/2018		

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15	ES		0.25			Dark brown gravelly slightly clayey fine to medium sand. Gravel is fine to medium sub-angular to sub-rounded brick and concrete. [MADE GROUND]
		0.30	ES					
					0.45			Fine to medium crushed concrete. [MADE GROUND]
		0.60	ES		0.60			Light brown very sandy gravelly reworked clay. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded crushed concrete. [MADE GROUND]
	▼	0.90	ES					Firm reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded sandstone. [GLACIAL TILL]
		1.20	SPT	N=9 (1,2/2,2,2,3)				
		1.65	SPT	N=17 (2,4/3,4,5,5)				
		2.10	SPT	N=35 (4,5/5,8,10,12)				
		2.55	SPT	N=33 (5,6/7,8,9,9)				
		3.00	SPT	N=36 (4,6/6,9,10,11)				
		3.45	SPT	N=35 (6,7/7,8,9,11)				
					3.90			End of Borehole at 3.90m

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Inspection pit undertaken to 1.2m bgl. Groundwater encountered at 1.00m bgl. Continual SPT undertaken to 3.9m bgl. Exploratory location backfilled with arisings in reverse order.

Borehole Log

Borehole No. **WS109**

Sheet 1 of 1

Project Name:	Phase II Ground Investigation	Proj. ID: 103580	Easting:	Hole Type	WS
			Northing:		
Location:	Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart	Level (m AOD):	Scale:	1:30
			Final Depth (m): 4.41		
Client:	PLP Construction Ltd	Crew: Earth Engineering	Start Date: 12/12/2018	REC Engineer:	CD
			End Date: 12/12/2018		

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.20	ES					Dark brown slightly gravelly slightly clayey fine to medium sand. Gravel is fine to medium sub-angular to sub-rounded brick glass and concrete. [MADE GROUND]
		0.40 - 0.60	ES		0.40			Dark brown slightly gravelly slightly clayey fine to medium sand. Gravel is fine to medium sub-angular to sub-rounded sandstone. [MADE GROUND]
		0.80	ES		0.80			Light brown sandy gravelly reworked clay. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded sandstone. [MADE GROUND]
		1.20	SPT	N=10 (1,2/2,2,3,3)				*Between 1.0 and 1.3m bgl: Clay is firm to stiff.*
		2.00 - 3.00	B		1.35			Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded sandstone. [GLACIAL TILL]
		2.00	SPT	N=13 (2,2/2,3,4,4)				
		3.00	SPT	N=26 (3,4/5,6,7,8)				*After 3.0m bgl: Clay is very stiff.*
		4.00	SPT	N=50 (6,8/50 for 260mm)				
					4.41			End of Borehole at 4.41m

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Inspection pit undertaken to 1.2m bgl. No groundwater encountered. Hole terminated upon refusal of SPT at 4.41m bgl. Exploratory location installed with 50mm internal diameter ground gas monitoring standpipe and fitted with a steel cover upon completion.

Borehole Log

Borehole No. **WS110**

Sheet 1 of 1

Project Name:	Phase II Ground Investigation	Proj. ID: 103580	Easting:	Hole Type	WS
			Northing:		
Location:	Trenchard Drive, Wythenshawe, Manchester	Plant: Archway Dart	Level (m AOD):	Scale:	1:30
			Final Depth (m): 5.45		
Client:	PLP Construction Ltd	Crew: Earth Engineering	Start Date: 12/12/2018	REC Engineer:	CD
			End Date: 12/12/2018		

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			Dark brown gravelly slightly clayey fine to medium sand. Gravel is fine to medium sub-angular to sub-rounded brick and concrete. [MADE GROUND]
		0.40	ES					Fine to medium crushed concrete. [MADE GROUND]
		0.70	ES		0.60			Dark brown gravelly fine to medium sand. Gravel is fine to medium sub-angular brick and concrete. [MADE GROUND]
	▼				1.10			
		1.20	ES					Light brown sandy gravelly reworked clay. Sand is fine to medium. Gravel is fine to medium sub-angular brick and concrete. [MADE GROUND]
		1.20	SPT	N=9 (1,1/2,1,3,3)	1.30			
		1.50	ES					Stiff reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded sandstone. [GLACIAL TILL]
		2.00	SPT	N=15 (2,2/2,4,4,5)				
		2.50 - 3.00	B					
		3.00	SPT	N=29 (4,6/7,6,7,9)				*After 3.0m bgl: Clay is very stiff.*
		4.00	SPT	N=40 (4,6/8,9,11,12)				
		5.00	SPT	N=47 (9,10/10,11,13,13)				
					5.45			End of Borehole at 5.45m

Remarks:

Location scanned and cleared for services using CAT prior to breaking ground. Inspection pit undertaken to 1.2m bgl. Groundwater encountered at 1.00m bgl. Exploratory location installed with 50mm internal diameter ground gas monitoring standpipe and fitted with a steel cover upon completion.

APPENDIX V

PERMEABILITY TESTING RESULTS

APPENDIX VI

GEOTECHNICAL TESTING

LABORATORY REPORT

4043

Contract Number: PSL19/0125

Report Date: 21 January 2019

Client's Reference: 103580

Client Name: REC Manchester
Osprey House
Pacific Quay
Broadway
Manchester
M50 2UE

For the attention of: Phil Hill

Contract Title: Trenchard Drive

Date Received: 2/1/2019
Date Commenced: 2/1/2019
Date Completed: 21/9/2019

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:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	L Pavey (Senior/Quality Technician)	S Wilson (Senior Technician)

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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS101			1.00		Brown slightly gravelly sandy CLAY.
WS105			1.60	2.00	Brown slightly gravelly very sandy CLAY.
WS106A			1.50	2.00	Brown slightly gravelly very sandy CLAY.
WS109			2.00	3.00	Brown slightly gravelly very sandy CLAY.
WS110			2.50	3.00	Brown slightly gravelly very sandy CLAY.

UKAS TESTING
4043

PSL
Professional Soils Laboratory

Trenchard Drive

Contract No:
PSL19/0125
Client Ref:
103580

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
WS101			1.00		20			42	19	23	93	Intermediate plasticity CI.
WS105			1.60	2.00	14			31	15	16	91	Low plasticity CL.
WS106A			1.50	2.00	14			29	14	15	93	Low plasticity CL.
WS109			2.00	3.00	13			28	14	14	92	Low plasticity CL.
WS110			2.50	3.00	13			30	15	15	96	Low plasticity CL.

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

UKAS TESTING 4043

PSL Professional Soils Laboratory

Trenchard Drive

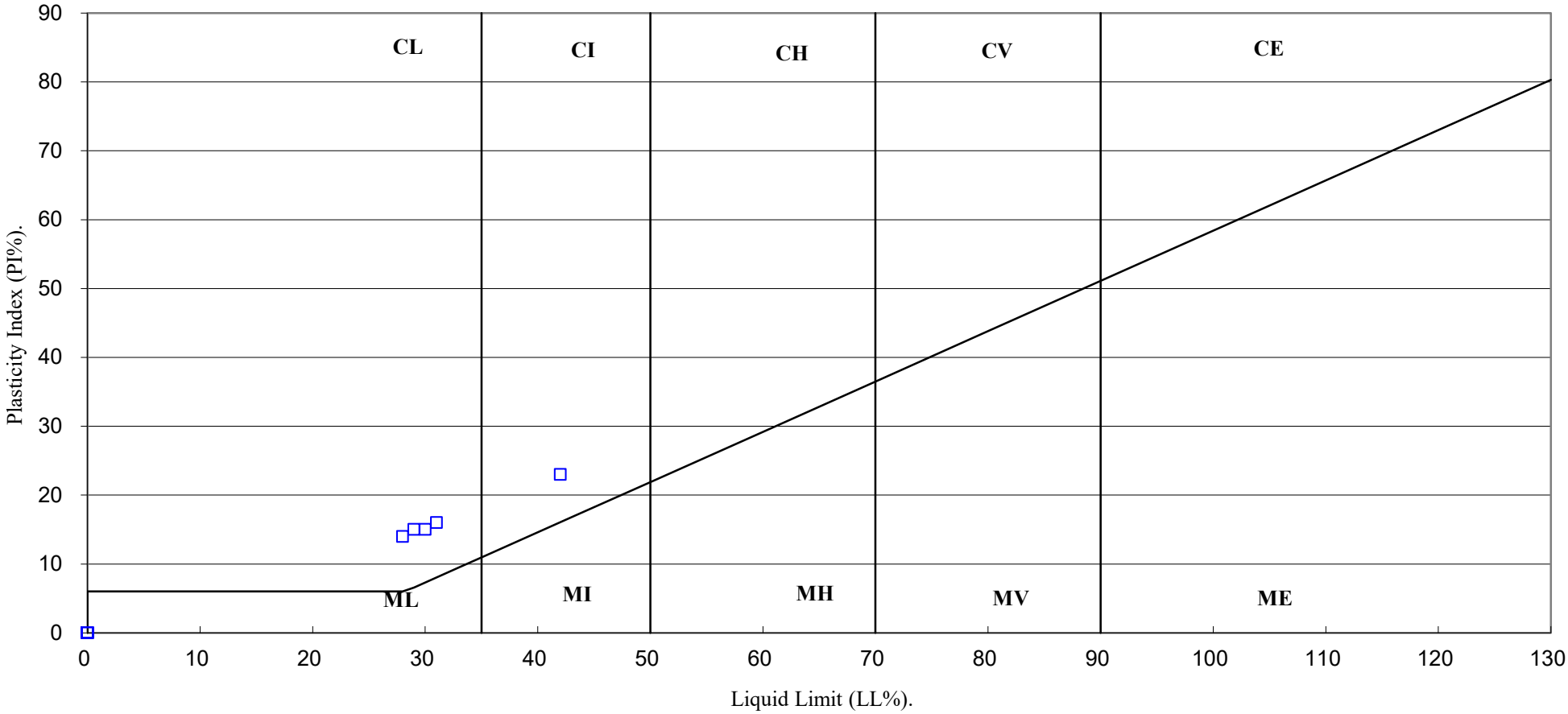
Contract No:

PSL19/0125

Client Ref:

103580

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Trenchard Drive	Contract No: PSL19/0125 Client Ref: 103580

APPENDIX VII

CHEMICAL TESTING

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences

Certificate of Analysis

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

Report Number: 790079-1

Date of Report: 20-Dec-2018

Customer: Resource Environmental Consultants Ltd
Osprey House
Pacific Quay
Broadway
Salford
M50 2UE

Customer Contact: Mr Phil Hill

Customer Job Reference: 103580
Customer Purchase Order: 006008
Customer Site Reference: Trenchard Drive
Date Job Received at Concept: 13-Dec-2018
Date Analysis Started: 14-Dec-2018
Date Analysis Completed: 20-Dec-2018

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

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

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

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

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual

UKAS TESTING
1549

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked
and authorised by :
Toni Morris
Customer Service Advisor

Issued by :
Toni Morris
Customer Service Advisor

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	**790079 001**	**790079 006**	**790079 009**	**790079 019**	**790079 021**
				Customer Sample Reference	**WS101**	**WS104**	**WS105**	**WS106A**	**WS109**
				Bottom Depth					**0.6**
				Top Depth	**0.30**	**0.40**	**0.50**	**0.60**	**0.40**
				Date Sampled	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**
				Matrix Class	**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Moisture @105C	T162	AR	0.1	%	**19**	**17**	**16**	**14**	**22**
Retained on 10mm sieve	T2	M40	0.1	%	**35.8**	**49.7**	**50.3**	**45.9**	**42.7**

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	**790079 024**
				Customer Sample Reference	**WS110**
				Bottom Depth	
				Top Depth	**0.70**
				Date Sampled	**12-DEC-2018**
				Matrix Class	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Moisture @105C	T162	AR	0.1	%	**8.3**
Retained on 10mm sieve	T2	M40	0.1	%	**31.0**

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
REC Ltd 002S

				Concept Reference	**790079 001**	**790079 006**	**790079 009**	**790079 019**	**790079 021**
				Customer Sample Reference	**WS101**	**WS104**	**WS105**	**WS106A**	**WS109**
				Bottom Depth					**0.6**
				Top Depth	**0.30**	**0.40**	**0.50**	**0.60**	**0.40**
				Date Sampled	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**
				Matrix Class	**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Arsenic	T6	M40	2	mg/kg	**21**	**20**	**24**	**11**	**35**
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	**20**	**17**	**22**	**24**	**23**
Lead	T6	M40	1	mg/kg	**170**	**2500**	**540**	**150**	**320**
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3
Copper	T6	M40	1	mg/kg	**83**	**130**	**67**	**36**	**110**
Nickel	T6	M40	1	mg/kg	**21**	**21**	**28**	**28**	**36**
Zinc	T6	M40	1	mg/kg	**110**	**460**	**200**	**120**	**310**
pH	T7	A40			**7.1**	**7.5**	**7.6**	**7.7**	**7.3**
SO4(Total)	T6	A40	0.01	%	**0.42**	**1.2**	**0.17**	**0.15**	**0.11**
SO4(2:1)	T6	AR	0.1	g/l	**0.3**	**1.4**	**0.3**	**0.3**	<0.1
Chromium VI	T6	A40	1	mg/kg	<1	<1	<1	<1	<1
Barium	T6	A40	1	mg/kg	**150**	**660**	**250**	**160**	**310**
Beryllium	T6	A40	2	mg/kg	<2	<2	<2	<2	<2
Boron (water-soluble)	T6	A40	1	mg/kg	<1	<1	<1	<1	<1
Cyanide(Total)	T921	M105	1	mg/kg	<1	<1	<1	<1	<1
Phenols(Mono)	T921	M105	1	mg/kg	<1	<1	<1	<1	<1
Vanadium	T6	M40	1	mg/kg	**31**	**24**	**35**	**29**	**38**

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
REC Ltd 002S

Concept Reference	**790079 024**
Customer Sample Reference	**WS110**
Bottom Depth	
Top Depth	**0.70**
Date Sampled	**12-DEC-2018**
Matrix Class	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units	
Arsenic	T6	M40	2	mg/kg	**14**
Cadmium	T6	M40	1	mg/kg	<1
Chromium	T6	M40	1	mg/kg	**19**
Lead	T6	M40	1	mg/kg	**160**
Mercury	T6	M40	1	mg/kg	<1
Selenium	T6	M40	3	mg/kg	<3
Copper	T6	M40	1	mg/kg	**58**
Nickel	T6	M40	1	mg/kg	**19**
Zinc	T6	M40	1	mg/kg	**400**
pH	T7	A40			**7.9**
SO4(Total)	T6	A40	0.01	%	**0.11**
SO4(2:1)	T6	AR	0.1	g/l	<0.1
Chromium VI	T6	A40	1	mg/kg	<1
Barium	T6	A40	1	mg/kg	**480**
Beryllium	T6	A40	2	mg/kg	<2
Boron (water-soluble)	T6	A40	1	mg/kg	<1
Cyanide(Total)	T921	M105	1	mg/kg	<1
Phenols(Mono)	T921	M105	1	mg/kg	<1
Vanadium	T6	M40	1	mg/kg	**20**

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
PAH US EPA 16 (B and K split) and Phenol

Concept Reference	**790079 001**	**790079 006**	**790079 009**	**790079 019**	**790079 021**
Customer Sample Reference	**WS101**	**WS104**	**WS105**	**WS106A**	**WS109**
Bottom Depth					**0.6**
Top Depth	**0.30**	**0.40**	**0.50**	**0.60**	**0.40**
Date Sampled	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**
Matrix Class	**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	<1.0[9]	<0.1	<0.1	<0.1	**0.2**
Acenaphthylene	T207	M105	0.1	mg/kg	<1.0[9]	<0.1	<0.1	<0.1	**0.1**
Acenaphthene	T207	M105	0.1	mg/kg	<1.0[9]	<0.1	**0.2**	<0.1	**0.1**
Fluorene	T207	M105	0.1	mg/kg	<1.0[9]	<0.1	**0.1**	<0.1	**0.1**
Phenanthrene	T207	M105	0.1	mg/kg	**1.8**	**1.0**	**1.3**	**0.3**	**1.8**
Anthracene	T207	M105	0.1	mg/kg	<1.0[9]	**0.2**	**0.4**	<0.1	**0.5**
Fluoranthene	T207	M105	0.1	mg/kg	**3.8**	**1.8**	**2.1**	**0.7**	**2.8**
Pyrene	T207	M105	0.1	mg/kg	**3.6**	**1.5**	**1.9**	**0.6**	**2.6**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**1.6**	**1.2**	**1.1**	**0.4**	**1.6**
Chrysene	T207	M105	0.1	mg/kg	**1.7**	**1.3**	**1.1**	**0.4**	**1.7**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**2.0**	**1.2**	**1.1**	**0.4**	**1.3**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	**2.0**	**0.9**	**0.9**	**0.3**	**1.4**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**2.0**	**1.0**	**1.2**	**0.4**	**1.6**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	**1.5**	**0.6**	**0.7**	**0.2**	**0.9**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<1.0[9]	**0.3**	**0.2**	<0.1	**0.3**
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	**1.7**	**0.7**	**0.7**	**0.2**	**1.0**
PAH(total)	T207	M105	0.1	mg/kg	**22**	**12**	**13**	**3.8**	**18**
Phenol	T207	M105	0.1	mg/kg	<1.0[9]	<0.1	<0.1	<0.1	<0.1

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil

PAH US EPA 16 (B and K split) and Phenol

Concept Reference	**790079 024**
Customer Sample Reference	**WS110**
Bottom Depth	
Top Depth	**0.70**
Date Sampled	**12-DEC-2018**
Matrix Class	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units	
Naphthalene	T207	M105	0.1	mg/kg	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	**0.8**
Anthracene	T207	M105	0.1	mg/kg	**0.2**
Fluoranthene	T207	M105	0.1	mg/kg	**1.3**
Pyrene	T207	M105	0.1	mg/kg	**1.2**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**0.7**
Chrysene	T207	M105	0.1	mg/kg	**0.6**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**0.5**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	**0.5**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**0.6**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	**0.3**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	**0.1**
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	**0.3**
PAH(total)	T207	M105	0.1	mg/kg	**7.0**
Phenol	T207	M105	0.1	mg/kg	<0.1

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
TPH UKCWG

				Concept Reference	**790079 001**	**790079 006**	**790079 009**	**790079 019**	**790079 021**
				Customer Sample Reference	**WS101**	**WS104**	**WS105**	**WS106A**	**WS109**
				Bottom Depth					**0.6**
				Top Depth	**0.30**	**0.40**	**0.50**	**0.60**	**0.40**
				Date Sampled	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**
				Matrix Class	**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Benzene	T209	M105	0.010	mg/kg	<0.010(13)	<0.010(13)	<0.010(13)	<0.010(13)	<0.010(13)
Toluene	T209	M105	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
EthylBenzene	T209	M105	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
M/P Xylene	T209	M105	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
O Xylene	T209	M105	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
Methyl tert-Butyl Ether	T209	M105	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10 aliphatic)	T209	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C10-C12 aliphatic)	T909	M105	1	mg/kg	**4(13)**	**2(13)**	**4(13)**	**2(13)**	<1(13)
TPH (C12-C16 aliphatic)	T909	M105	1	mg/kg	<1(13)	**3(13)**	**2(13)**	**4(13)**	**3(13)**
TPH (C16-C21 aliphatic)	T909	M105	1	mg/kg	<1(13)	**3(13)**	<1(13)	**3(13)**	**3(13)**
TPH (C21-C35 aliphatic)	T909	M105	2	mg/kg	**170(13)**	**21(13)**	**150(13)**	**18(13)**	**26(13)**
TPH (Aliphatic) total	T85	M105		mg/kg	**180(13)**	**29(13)**	**160(13)**	**27(13)**	**31(13)**
TPH (C6-C7 aromatic)	T209	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C7-C8 aromatic)	T209	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10 aromatic)	T209	M105	100	µg/kg	<100	<100	<100	<100	<100
TPH (C10-C12 aromatic)	T909	M105	2	mg/kg	<2(13)	<2(13)	<2(13)	<2(13)	<2(13)
TPH (C12-C16 aromatic)	T909	M105	1	mg/kg	**10(13)**	**8(13)**	**10(13)**	**3(13)**	**8(13)**
TPH (C16-C21 aromatic)	T909	M105	1	mg/kg	**52(13)**	**23(13)**	**65(13)**	**5(13)**	**26(13)**
TPH (C21-C35 aromatic)	T909	M105	1	mg/kg	**210(13)**	**100(13)**	**180(13)**	**24(13)**	**92(13)**
TPH (Aromatic) total	T85	M105		mg/kg	**270(13)**	**130(13)**	**250(13)**	**32(13)**	**130(13)**
TPH (Aliphatic+Aromatic) (sum)	T85	M105		mg/kg	**452(13)**	**159(13)**	**412(13)**	**59.3(13)**	**157(13)**

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
TPH UKCWG

				Concept Reference	**790079 024**
				Customer Sample Reference	**WS110**
				Bottom Depth	
				Top Depth	**0.70**
				Date Sampled	**12-DEC-2018**
				Matrix Class	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Benzene	T209	M105	0.010	mg/kg	<0.010(13)
Toluene	T209	M105	0.010	mg/kg	<0.010
EthylBenzene	T209	M105	0.010	mg/kg	<0.010
M/P Xylene	T209	M105	0.010	mg/kg	<0.010
O Xylene	T209	M105	0.010	mg/kg	<0.010
Methyl tert-Butyl Ether	T209	M105	0.010	mg/kg	<0.010
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	<0.100
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	<0.10
TPH (C8-C10 aliphatic)	T209	M105	0.10	mg/kg	<0.10
TPH (C10-C12 aliphatic)	T909	M105	1	mg/kg	<1(13)
TPH (C12-C16 aliphatic)	T909	M105	1	mg/kg	**2(13)**
TPH (C16-C21 aliphatic)	T909	M105	1	mg/kg	**5(13)**
TPH (C21-C35 aliphatic)	T909	M105	2	mg/kg	**120(13)**
TPH (Aliphatic) total	T85	M105		mg/kg	**130(13)**
TPH (C6-C7 aromatic)	T209	M105	0.10	mg/kg	<0.10
TPH (C7-C8 aromatic)	T209	M105	0.10	mg/kg	<0.10
TPH (C8-C10 aromatic)	T209	M105	100	µg/kg	<100
TPH (C10-C12 aromatic)	T909	M105	2	mg/kg	<2(13)
TPH (C12-C16 aromatic)	T909	M105	1	mg/kg	**10(13)**
TPH (C16-C21 aromatic)	T909	M105	1	mg/kg	**20(13)**
TPH (C21-C35 aromatic)	T909	M105	1	mg/kg	**54(13)**
TPH (Aromatic) total	T85	M105		mg/kg	**84(13)**
TPH (Aliphatic+Aromatic) (sum)	T85	M105		mg/kg	**215(13)**

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
BRE SD1

				Concept Reference	**790079 005**	**790079 008**	**790079 011**	**790079 015**	**790079 026**
				Customer Sample Reference	**WS102**	**WS104**	**WS105**	**WS108**	**WS110**
				Top Depth	**1.80**	**1.40**	**1.60**	**0.60**	**1.50**
				Date Sampled	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Ammonia expressed as NH4	T4	AR	0.5	mg/kg	**9.0**	**9.0**	**18**	**5.8**	**3.9**
(Water soluble) Cl-	T710	A40	0.01	g/l	<0.01	<0.01	<0.01	<0.01	<0.01
Magnesium water soluble	T6	AR	0.1	g/l	**0.7**	**0.4**	**6.7**	<0.1	**1.1**
(Water soluble) NO3	T710	A40	0.01	g/l	<0.01	**0.01**	<0.01	<0.01	<0.01
pH	T7	A40			**8.3**	**7.7**	**6.5**	**7.6**	**8.1**
SO4(Total)	T6	A40	0.01	%	**0.05**	**0.25**	**0.14**	**0.06**	**0.04**
SO4(2:1)	T6	AR	0.1	g/l	<0.1	**0.2**	**0.2**	<0.1	<0.1
Sulphur (total)	T21	AR	0.05	%	<0.05	<0.05	**0.07**	<0.05	<0.05

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
REC TOC and SOM

Concept Reference					**790079 001**	**790079 006**	**790079 009**	**790079 019**	**790079 021**
Customer Sample Reference					**WS101**	**WS104**	**WS105**	**WS106A**	**WS109**
Bottom Depth									**0.6**
Top Depth					**0.30**	**0.40**	**0.50**	**0.60**	**0.40**
Date Sampled					**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**
Matrix Class					**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Soil Organic Matter	T287	A40	0.1	%	**7.0**	**6.3**	**8.5**	**5.0**	**10**
Total Organic Carbon	T21	A40	0.1	%	**4.1**	**3.6**	**4.9**	**2.9**	**5.9**

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
REC TOC and SOM

Concept Reference					**790079 024**
Customer Sample Reference					**WS110**
Bottom Depth					
Top Depth					**0.70**
Date Sampled					**12-DEC-2018**
Matrix Class					**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Soil Organic Matter	T287	A40	0.1	%	**4.9**
Total Organic Carbon	T21	A40	0.1	%	**2.9**

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Misc

Concept Reference					**790079 001**	**790079 006**	**790079 009**	**790079 019**	**790079 021**
Customer Sample Reference					**WS101**	**WS104**	**WS105**	**WS106A**	**WS109**
Bottom Depth									**0.6**
Top Depth					**0.30**	**0.40**	**0.50**	**0.60**	**0.40**
Date Sampled					**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**	**12-DEC-2018**
Matrix Class					**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Asbestos ID	T27	A40			N.D.	N.D.	N.D.	N.D.	N.D.
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1

Concept Reference: 790079
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Misc

Concept Reference					**790079 024**
Customer Sample Reference					**WS110**
Bottom Depth					
Top Depth					**0.70**
Date Sampled					**12-DEC-2018**
Matrix Class					**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Asbestos ID	T27	A40			N.D.
Cyanide(Total)	T546	AR	1	mg/kg	<1

Index to symbols used in 790079-1

Value	Description
AR	As Received
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
A40	Assisted dried < 40C
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
N.D.	Not Detected
9	LOD raised due to dilution of sample
13	Results have been blank corrected.
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos testing was subcontracted to REC Asbestos.

Method Index

Value	Description
T4	Colorimetry
T21	OX/IR
T287	Calc TOC/0.58
T6	ICP/OES
T2	Grav
T7	Probe
T162	Grav (1 Dec) (105 C)
T909	GCxGC
T27	PLM
T207	GC/MS (MCERTS)
T921	Colorimetry (CF) (MCERT)
T85	Calc
T546	Colorimetry (CF)
T710	2:1 Extraction / Discrete Analyser
T209	GC/MS (Head Space)(MCERTS)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Benzene	T209	M105	0.010	mg/kg	M	001,006,009,019,021,024
Toluene	T209	M105	0.010	mg/kg	M	001,006,009,019,021,024
EthylBenzene	T209	M105	0.010	mg/kg	M	001,006,009,019,021,024
M/P Xylene	T209	M105	0.010	mg/kg	M	001,006,009,019,021,024
O Xylene	T209	M105	0.010	mg/kg	M	001,006,009,019,021,024
Methyl tert-Butyl Ether	T209	M105	0.010	mg/kg	M	001,006,009,019,021,024
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	N	001,006,009,019,021,024
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	N	001,006,009,019,021,024
TPH (C8-C10 aliphatic)	T209	M105	0.10	mg/kg	N	001,006,009,019,021,024
TPH (C10-C12 aliphatic)	T909	M105	1	mg/kg	M	001,006,009,019,021,024
TPH (C12-C16 aliphatic)	T909	M105	1	mg/kg	M	001,006,009,019,021,024
TPH (C16-C21 aliphatic)	T909	M105	1	mg/kg	M	001,006,009,019,021,024
TPH (C21-C35 aliphatic)	T909	M105	2	mg/kg	M	001,006,009,019,021,024
TPH (Aliphatic) total	T85	M105		mg/kg	N	001,006,009,019,021,024
TPH (C6-C7 aromatic)	T209	M105	0.10	mg/kg	N	001,006,009,019,021,024
TPH (C7-C8 aromatic)	T209	M105	0.10	mg/kg	N	001,006,009,019,021,024
TPH (C8-C10 aromatic)	T209	M105	100	µg/kg	N	001,006,009,019,021,024
TPH (C10-C12 aromatic)	T909	M105	2	mg/kg	M	001,006,009,019,021,024
TPH (C12-C16 aromatic)	T909	M105	1	mg/kg	M	001,006,009,019,021,024
TPH (C16-C21 aromatic)	T909	M105	1	mg/kg	M	001,006,009,019,021,024
TPH (C21-C35 aromatic)	T909	M105	1	mg/kg	M	001,006,009,019,021,024
TPH (Aromatic) total	T85	M105		mg/kg	N	001,006,009,019,021,024
TPH (Aliphatic+Aromatic) (sum)	T85	M105		mg/kg	N	001,006,009,019,021,024

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Arsenic	T6	M40	2	mg/kg	M	001,006,009,019,021,024
Cadmium	T6	M40	1	mg/kg	M	001,006,009,019,021,024
Chromium	T6	M40	1	mg/kg	M	001,006,009,019,021,024
Lead	T6	M40	1	mg/kg	M	001,006,009,019,021,024
Mercury	T6	M40	1	mg/kg	M	001,006,009,019,021,024
Selenium	T6	M40	3	mg/kg	M	001,006,009,019,021,024
Copper	T6	M40	1	mg/kg	M	001,006,009,019,021,024
Nickel	T6	M40	1	mg/kg	M	001,006,009,019,021,024
Zinc	T6	M40	1	mg/kg	M	001,006,009,019,021,024
pH	T7	A40			M	001,006,009,019,021,024
SO4(Total)	T6	A40	0.01	%	N	001,005-006,008-009,011,015,019,021,024,026
SO4(2:1)	T6	AR	0.1	g/l	N	001,005-006,008-009,011,015,019,021,024,026
Chromium VI	T6	A40	1	mg/kg	N	001,006,009,019,021,024
Barium	T6	A40	1	mg/kg	U	001,006,009,019,021,024
Beryllium	T6	A40	2	mg/kg	U	001,006,009,019,021,024
Boron (water-soluble)	T6	A40	1	mg/kg	N	001,006,009,019,021,024
Cyanide(Total)	T921	M105	1	mg/kg	M	001,006,009,019,021,024
Phenols(Mono)	T921	M105	1	mg/kg	M	001,006,009,019,021,024
Vanadium	T6	M40	1	mg/kg	M	001,006,009,019,021,024
Naphthalene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Acenaphthylene	T207	M105	0.1	mg/kg	U	001,006,009,019,021,024
Acenaphthene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Fluorene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Phenanthrene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Anthracene	T207	M105	0.1	mg/kg	U	001,006,009,019,021,024
Fluoranthene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Pyrene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Chrysene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
PAH(total)	T207	M105	0.1	mg/kg	U	001,006,009,019,021,024
Phenol	T207	M105	0.1	mg/kg	M	001,006,009,019,021,024
Asbestos ID	T27	A40			SU	001,006,009,019,021,024
Cyanide(Total)	T546	AR	1	mg/kg	M	001,006,009,019,021,024
Ammonia expressed as NH4	T4	AR	0.5	mg/kg	N	005,008,011,015,026
(Water soluble) Cl-	T710	A40	0.01	g/l	N	005,008,011,015,026
Magnesium water soluble	T6	AR	0.1	g/l	N	005,008,011,015,026
(Water soluble) NO3	T710	A40	0.01	g/l	N	005,008,011,015,026
pH	T7	A40			U	005,008,011,015,026
Sulphur (total)	T21	AR	0.05	%	N	005,008,011,015,026
Moisture @105C	T162	AR	0.1	%	N	001,006,009,019,021,024
Retained on 10mm sieve	T2	M40	0.1	%	N	001,006,009,019,021,024
Soil Organic Matter	T287	A40	0.1	%	N	001,006,009,019,021,024
Total Organic Carbon	T21	A40	0.1	%	N	001,006,009,019,021,024

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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Concept Life Sciences

Certificate of Analysis

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Report Number: 795572-1

Date of Report: 22-Jan-2019

Customer: Resource Environmental Consultants Ltd
Osprey House
Pacific Quay
Broadway
Salford
M50 2UE

Customer Contact: Mr Phil Hill

Customer Job Reference: 103580
Customer Purchase Order: 006183
Customer Site Reference: Trenchard Drive
Date Job Received at Concept: 15-Jan-2019
Date Analysis Started: 17-Jan-2019
Date Analysis Completed: 22-Jan-2019

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

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

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

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual

UKAS TESTING
1549

Report checked
and authorised by :
Toni Morris
Customer Service Advisor

Issued by :
Toni Morris
Customer Service Advisor

Concept Reference: 795572
Project Site: Trenchard Drive
Customer Reference: 103580

Water Analysed as Water
REC Metals Suite

Concept Reference	**795572 001**	**795572 002**
Customer Sample Reference	**WS101**	**WS110**
Date Sampled	**15-JAN-2019**	**15-JAN-2019**
Sample Received (ml)	**3080**	**3080**

Determinand	Method	Test Sample	LOD	Units		
Sb (Dissolved)	T281	F	1	µg/l	<1	<1
As (Dissolved)	T281	F	0.2	µg/l	**1.2**	**0.8**
Ba (Dissolved)	T281	F	1	µg/l	**120**	**170**
Be (Dissolved)	T281	F	0.05	µg/l	<0.05	<0.05
Boron	T6	AR	0.01	mg/l	**0.09**	**0.09**
Cd (Dissolved)	T281	F	0.02	µg/l	**0.07**	**0.09**
Cr (Dissolved)	T281	F	1	µg/l	<1	<1
Chromium VI	T686	F	0.003	mg/l	<0.003	<0.003
Cu (Dissolved)	T281	F	0.5	µg/l	**7.6**	**2.4**
Pb (Dissolved)	T281	F	0.3	µg/l	<0.3	<0.3
Hg (Dissolved)	T281	F	0.05	µg/l	<0.05	<0.05
Ni (Dissolved)	T281	F	1	µg/l	**6**	**7**
Se (Dissolved)	T281	F	0.5	µg/l	<0.5	<0.5
V (Dissolved)	T281	F	2	µg/l	<2	<2
Zn (Dissolved)	T281	F	2	µg/l	**35**	**12**

Concept Reference: 795572
Project Site: Trenchard Drive
Customer Reference: 103580

Water Analysed as Water
REC TPH (CWG)

Concept Reference	**795572 001**	**795572 002**
Customer Sample Reference	**WS101**	**WS110**
Date Sampled	**15-JAN-2019**	**15-JAN-2019**
Sample Received (ml)	**3080**	**3080**

Determinand	Method	Test Sample	LOD	Units		
Benzene	T54	AR	1	µg/l	<1(13)	<1(13)
Toluene	T54	AR	1	µg/l	<1	<1
EthylBenzene	T54	AR	1	µg/l	<1	<1
M/P Xylene	T54	AR	1	µg/l	<1	<1
O Xylene	T54	AR	1	µg/l	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/l	<1	<1
TPH (C5-C6 aliphatic)	T215	AR	10	µg/l	<10	<10
TPH (C6-C8 aliphatic)	T215	AR	10	µg/l	<10	<10
TPH (C8-C10 aliphatic)	T215	AR	10	µg/l	<10	<10
TPH (C10-C12 aliphatic)	T910	AR	10	µg/l	<10(13)	<10(13)
TPH (C12-C16 aliphatic)	T910	AR	10	µg/l	<10(13)	<10(13)
TPH (C16-C35 aliphatic)	T910	AR	10	µg/l	**10(13)**	<10(13)
TPH (Aliphatic) total	T85	AR		µg/l	**10(13)**	N.D.(13)
TPH (C5-C7 aromatic)	T215	AR	10	µg/l	<10	<10
TPH (C7-C8 aromatic)	T215	AR	10	µg/l	<10	<10
TPH (C8-C10 aromatic)	T215	AR	10	µg/l	<10	<10
TPH (C10-C12 aromatic)	T910	AR	10	µg/l	<10(13)	<10(13)
TPH (C12-C16 aromatic)	T910	AR	10	µg/l	<10(13)	**66(13)**
TPH (C16-C21 aromatic)	T910	AR	10	µg/l	**12(13)**	**390(13)**
TPH (C21-C35 aromatic)	T910	AR	10	µg/l	**14(13)**	**120(13)**
TPH (Aromatic) total	T85	AR		µg/l	**20(13)**	**580(13)**
TPH (Aliphatic+Aromatic) (sum)	T85	AR		µg/l	**30(13)**	**580(13)**

Concept Reference: 795572
Project Site: Trenchard Drive
Customer Reference: 103580

Water Analysed as Water
PAH US EPA 16 (B and K split) and Phenol

				Concept Reference	**795572 001**	**795572 002**
				Customer Sample Reference	**WS101**	**WS110**
				Date Sampled	**15-JAN-2019**	**15-JAN-2019**
				Sample Received (ml)	**3080**	**3080**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Naphthalene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Acenaphthylene	T149	AR	0.01	µg/l	**0.01(13)**	**0.01(13)**
Acenaphthene	T149	AR	0.01	µg/l	<0.01(13)	**0.01(13)**
Fluorene	T149	AR	0.01	µg/l	<0.01(13)	**0.01(13)**
Phenanthrene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Anthracene	T149	AR	0.01	µg/l	<0.01(13)	**0.02(13)**
Fluoranthene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Pyrene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Benzo(a)Anthracene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Chrysene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Benzo(b)fluoranthene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Benzo(k)fluoranthene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Benzo(a)Pyrene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Indeno(123-cd)Pyrene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Dibenzo(ah)Anthracene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
Benzo(ghi)Perylene	T149	AR	0.01	µg/l	<0.01(13)	<0.01(13)
PAH(total)	T149	AR	0.01	µg/l	**0.01**	**0.05**
Phenol	T149	AR	0.5	µg/l	<0.5(13)	<0.5(13)

Concept Reference: 795572
Project Site: Trenchard Drive
Customer Reference: 103580

Water Analysed as Water
Miscellaneous

				Concept Reference	**795572 001**	**795572 002**
				Customer Sample Reference	**WS101**	**WS110**
				Date Sampled	**15-JAN-2019**	**15-JAN-2019**
				Sample Received (ml)	**3080**	**3080**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Cyanide(Total)	T4	AR	50	µg/l	<50	<50
Ammoniacal nitrogen	T686	F	50	µg/l	<50	**1200**

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Water Analysed as Water
pH and Sulphate

				Concept Reference	**795572 001**	**795572 002**
				Customer Sample Reference	**WS101**	**WS110**
				Date Sampled	**15-JAN-2019**	**15-JAN-2019**
				Sample Received (ml)	**3080**	**3080**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
pH	T7	AR			**7.01**	**6.86**
Sulphate	T686	F	500	µg/l	**120000**	**140000**

Index to symbols used in 795572-1

Value	Description
AR	As Received
F	Filtered
N.D.	Not Detected

13	Results have been blank corrected.
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Method Index

Value	Description
T281	ICP/MS (Filtered)
T6	ICP/OES
T686	Discrete Analyser
T215	GC/MS (Headspace)(LV)
T910	GCxGC (LV)
T7	Probe
T54	GC/MS (Headspace)
T85	Calc
T4	Colorimetry
T149	GC/MS (SIR)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
pH	T7	AR			U	001-002
Sulphate	T686	F	500	µg/l	U	001-002
Benzene	T54	AR	1	µg/l	U	001-002
Toluene	T54	AR	1	µg/l	U	001-002
EthylBenzene	T54	AR	1	µg/l	U	001-002
M/P Xylene	T54	AR	1	µg/l	U	001-002
O Xylene	T54	AR	1	µg/l	U	001-002
Methyl tert-Butyl Ether	T54	AR	1	µg/l	U	001-002
TPH (C5-C6 aliphatic)	T215	AR	10	µg/l	N	001-002
TPH (C6-C8 aliphatic)	T215	AR	10	µg/l	N	001-002
TPH (C8-C10 aliphatic)	T215	AR	10	µg/l	N	001-002
TPH (C10-C12 aliphatic)	T910	AR	10	µg/l	N	001-002
TPH (C12-C16 aliphatic)	T910	AR	10	µg/l	N	001-002
TPH (C16-C35 aliphatic)	T910	AR	10	µg/l	N	001-002
TPH (Aliphatic) total	T85	AR		µg/l	N	001-002
TPH (C5-C7 aromatic)	T215	AR	10	µg/l	N	001-002
TPH (C7-C8 aromatic)	T215	AR	10	µg/l	N	001-002
TPH (C8-C10 aromatic)	T215	AR	10	µg/l	N	001-002
TPH (C10-C12 aromatic)	T910	AR	10	µg/l	N	001-002
TPH (C12-C16 aromatic)	T910	AR	10	µg/l	N	001-002
TPH (C16-C21 aromatic)	T910	AR	10	µg/l	N	001-002
TPH (C21-C35 aromatic)	T910	AR	10	µg/l	N	001-002
TPH (Aromatic) total	T85	AR		µg/l	N	001-002
TPH (Aliphatic+Aromatic) (sum)	T85	AR		µg/l	N	001-002
Cyanide(Total)	T4	AR	50	µg/l	U	001-002
Ammoniacal nitrogen	T686	F	50	µg/l	U	001-002
Naphthalene	T149	AR	0.01	µg/l	U	001-002
Acenaphthylene	T149	AR	0.01	µg/l	U	001-002
Acenaphthene	T149	AR	0.01	µg/l	U	001-002
Fluorene	T149	AR	0.01	µg/l	U	001-002
Phenanthrene	T149	AR	0.01	µg/l	U	001-002
Anthracene	T149	AR	0.01	µg/l	U	001-002
Fluoranthene	T149	AR	0.01	µg/l	U	001-002
Pyrene	T149	AR	0.01	µg/l	U	001-002
Benzo(a)Anthracene	T149	AR	0.01	µg/l	U	001-002
Chrysene	T149	AR	0.01	µg/l	U	001-002
Benzo(b)fluoranthene	T149	AR	0.01	µg/l	U	001-002
Benzo(k)fluoranthene	T149	AR	0.01	µg/l	U	001-002
Benzo(a)Pyrene	T149	AR	0.01	µg/l	U	001-002
Indeno(123-cd)Pyrene	T149	AR	0.01	µg/l	U	001-002
Dibenzo(ah)Anthracene	T149	AR	0.01	µg/l	U	001-002
Benzo(ghi)Perylene	T149	AR	0.01	µg/l	U	001-002
PAH(total)	T149	AR	0.01	µg/l	U	001-002
Phenol	T149	AR	0.5	µg/l	U	001-002
Sb (Dissolved)	T281	F	1	µg/l	U	001-002
As (Dissolved)	T281	F	0.2	µg/l	U	001-002
Ba (Dissolved)	T281	F	1	µg/l	U	001-002
Be (Dissolved)	T281	F	0.05	µg/l	U	001-002

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Boron	T6	AR	0.01	mg/l	N	001-002
Cd (Dissolved)	T281	F	0.02	µg/l	U	001-002
Cr (Dissolved)	T281	F	1	µg/l	U	001-002
Chromium VI	T686	F	0.003	mg/l	U	001-002
Cu (Dissolved)	T281	F	0.5	µg/l	U	001-002
Pb (Dissolved)	T281	F	0.3	µg/l	U	001-002
Hg (Dissolved)	T281	F	0.05	µg/l	U	001-002
Ni (Dissolved)	T281	F	1	µg/l	U	001-002
Se (Dissolved)	T281	F	0.5	µg/l	U	001-002
V (Dissolved)	T281	F	2	µg/l	U	001-002
Zn (Dissolved)	T281	F	2	µg/l	U	001-002