PADDOCK GEO ENGINEERING

8-10 Carlton Road, Chiswick, W4 5DY

GROUND INVESTIGATION

Fornacelli Limited

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P20-180gi

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1	21/08/2020	Stephen Fisk BSc FGS	-
		Checked and Approved By	
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For and on behalf of Paddock Geo Engineering Limited			

1.0 INTRODUCTION

Paddock Geo Engineering Limited (PGE) were instructed by IML Consulting (UK) Ltd on behalf of Fornacelli Limited, the Client, to undertake a Ground Investigation including a geotechnical appraisal and Intrusive Contamination Investigation as Phase 2 of a Site Contamination Assessment for the subject site, referred to as 8-10 Carlton Road, Chiswick, W4 5DY.

The overall objective of the Ground Investigation was to inform the Client of the ground conditions for geotechnical design and undertake a secondary contamination assessment (SCA) to identify risks relating to the development of the site. The Risk Assessment undertaken relates to the demolition of the existing single storey building currently occupying the site (formerly an Adult's Day Centre Building) and subsequent redevelopment for 9 no. residential dwellings with associated car parking and private gardens

1.1 Terms of Reference

- British Standards BS 10175:2011 Investigation of Potentially Contaminated Sites – Code of Practice.
- CLR11 Model Procedures for the Management of Land Contamination, 2010, DEFRA/Environment Agency.
- PPG23 (PPS23) Planning and pollution control (contaminated land aspects), 2002
- GPLC1 Guiding Principles for Land Contamination, 2010, Environment Agency
- Environmental Protection Act: 1990 – Contaminated Land Statutory Guidance, April 2012, DEFRA
- CIRIA C665 Assessing risks posed by hazardous ground gases to buildings. CIRIA 2007
- BS 5930:2015 Site Investigation Code of Practice
- BS EN 1997-2, Eurocode 7. Geotechnical design. Ground investigation and testing
- BS EN ISO 22475 Series (1-3), Geotechnical investigation and testing. Sampling methods and groundwater measurements.
- NHBC Standards Chapter 4.2 2006, Building Near Trees
- TRL Laboratory Report 1132:1984 – The Structure of Bituminous Road, Appendix C Table C1

1.2 Objective

The objective of the Ground Investigation for the site comprised the following elements:

- An Intrusive Investigation
- A Geotechnical Appraisal including infiltration testing and in-situ CBR testing
- A Site Contamination Assessment and Generic Human Health Risk Assessment, including an initial ground gas risk assessment

The scope of work was based on the SI specification produced by the Client's Engineer; Pringuer-James and was agreed with the Client prior to commencement. The investigation was carried out in order to provide data on the sub-soil characteristics of the site, the groundwater regime, the foundations of the current structure and also to recover samples for geotechnical laboratory testing and chemical analysis. This data was employed to produce a geotechnical appraisal to derive foundation design criteria and a generic human health contamination risk assessment for the site including an initial ground gas risk assessment.

2.0 THE SITE

2.1 Site Description

The subject site is located within an urban area within Chiswick, a district of West London. The site comprises a roughly rectangular parcel of land with an access road leading to Carlton Road on the east of the site. The site is bound by timber panel fencing with residential properties and their associated private gardens surrounding the site.

The study area covers an area of approximately 0.25 hectares, with the centre of the site at approximate national grid reference 520650, 179440 and postcode W4 5DY.

Site Location Plans and an Aerial Photograph are presented in Appendix A.

2.2 Proposed Development

The proposed development scheme involves the demolition of the current single storey day centre building on site and the subsequent development of 9no. three storey residential dwelling, including associated car parking, private gardens and landscaped areas.

As private garden areas are to be included soil contamination exposure characteristics for the proposed development will be analogous to residential with plant uptake.

A proposed development plan is presented within Appendix A.

3.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT SUMMARY

An associated Preliminary Contamination Risk Assessment (PRA) have been carried out for the site by PGE reference P20-180pra dated August 2020, with which reference should be made. Salient data from the PRA are summarised and extracted from the PRA and presented in the following Sections.

3.1 Geology, Hydrogeology and Hydrology

Information on the underlying geology at the site has been obtained from the British Geological Survey (BGS) Sheet 256 (scale: 1:50,000 dated 2006) for North London, the BGS Geological Map Viewer and Geological Mapping provided by Landmark within the Envirocheck Report (a copy of which is provided in Appendix C of the PRA report).

The superficial deposits underlying the site comprise Langley Silt Member, which were formed up to 2 million years ago during the Quaternary Period in a local environment dominated by wind-blown deposits The Langley Silt Member is known to comprise clay and silt.

The bedrock at the site is indicated to comprise the London Clay Formation which was formed approximately 48 to 56 million years ago during the Jurassic Period in a local environment dominated by deep seas. These deposits are known to comprise predominantly clay, silt and mudstone.

The geological maps provided within the Envirocheck Report (Appendix C) identifies seven areas of Worked Ground or Made Ground within 1km of the site. The closest is approximately 150m northeast of the subject site and appears to be located on an outcrop of Kempton Park Gravel Member, so could have been a historic mineral extraction facility. Other Made Ground noted within 1km of the site are suspected to be related to road construction.

The groundwater vulnerability maps for the site and the surrounding areas indicates that both the superficial and bedrock aquifers are designated as unproductive strata. The Kempton Park Gravel Member soils suspected to underlie the outcropping Langley Silt are classified as a Secondary A Aquifer.

There are no discharge consents, groundwater abstraction licences or surface water abstraction licences identified within 500m of the subject site.

The site is not located within a Groundwater Source Protection Zone (SPZ) and there are no SPZs within 1km.

Given the hydrogeological status of the site, the groundwater beneath the site is considered to be of Low sensitivity with regards to near surface contamination.

The BGS groundwater flood susceptibility mapping area indicates there is not a potential for groundwater flooding of properties on site. The BGS records indicate there is the potential for groundwater flooding from 122m northeast at its closest, this flooding has been identified as potential for groundwater flooding at surface.

Envirocheck reports the nearest surface water feature to the site is situated 617m north. Upon inspection of online maps this feature appears to be a drainage ditch or small pond.

No pollution incidents to controlled waters are recorded by Envirocheck within 1km of the site.

The site and surrounding areas do not fall within a flood risk zone.

The property is indicated within the Envirocheck Report to be in a lower probability radon area, with less than 1% of homes estimated to be at or above the action level. Therefore, no radon protection measures are necessary in the construction of any new dwellings, buildings or extensions on site.

3.2 Historic Land Use on the Site and Surrounding Area

The available historical maps span a period of 155 years, dating back to 1865. In the earliest historical maps, the site was an agricultural field. Before 1920 a single building labelled as a Laundry was located on the southern half of the site. The Laundry was replaced in approximately 1979-1987 with a new building which appears to match the present day care facility structure. A small extension to the south-eastern section of the care facility was indicated around 1991-1994.

In the earliest historical maps, the area surrounding site was predominantly rural. By the late 1800s the area around the site was being developed for a mix of residential and commercial land use.

A Nursery was indicated adjacent to the south of the site between 1896 to 1915 at which the time area surrounding the site was developed for residential land use.

From approximately 150m north and northeast of the site was a brick works and brick field from before 1896 to around 1935 when it was indicated to be disused and renamed a Playing Fields. The contouring on some of the maps suggest that shallow excavations were not infilled on the site.

3.3 Landfill Sites

The Envirocheck Report indicated that there were no BGS recorded landfill sites or historical landfill sites located within 1km of the subject site.

3.4 Ground Stability and Mining

The site is not located within an area with a history of coal mining and no mining records or records of natural cavities are listed within 1km.

There are 8 no. recorded mineral sites are listed within the Envirocheck Report within 1km of the subject site, all of which are indicated to have ceased operation. The closest five of these entries refers to Southfields Brick Works located at its closest 138m northeast of the site to 324m northeast. These were exploited Clay and Shale of the Langley Silt Member and may be associated with the area of Made Ground noted on the geological mapping to the northeast of the site

The other records refer to Starch Green Pit, located 731m – 832m east of the site and also exploited Clay and Shale from the Langley Silt Member. The last entry is Acton Curve Gravel Pit located 921m southwest of the site which exploited sand and gravel of the Kempton Park Gravel Formation.

3.5 Unexploded Ordnance Threat Assessment

A Preliminary Unexploded Ordnance (UXO) Threat Assessment was sourced from Landmark Information Group as the site is located within an area of London known to be at risk from UXO following bomb damage from WWII.

The report (a copy of which is presented within Appendix E of the PRA report) indicates the potential for UXO hazard to occur at this site is likely, the most probably threat being posed by WWII German HE bombs due to the high density of WWII bombing per hectares recorded within the area.

The report recommends that a Detailed UXO Threat and Risk Assessment should be obtained for the site. It is recommended that intrusive investigations are supervised by a suitably qualified UXO Engineer.

3.6 Potential Contaminant Sources Summary

The potential contaminants are based on the data within CL8, Department of the Environment (DoE) Industry Profiles, the current and historic site uses.

Current Potential On-Site Contaminant Sources	Potential Contaminants
Use of site as a former care facility with parking	Vehicle related hydrocarbons (fuels and lubricants) and potentially asbestos
Historic Potential On-Site Sources	**Potential Contaminants**
Use of site as a Laundry to before 1979	Heavy metals, hydrocarbons, acids, organics, volatiles, surfactants and Asbestos
Current Potential Off-Site Contaminant Sources	**Potential Contaminants**
Residential.	None Significant
Historical Potential Off-Site Contaminant Sources	**Potential Contaminants**
Potentially infilled brick pits closed 1935 from c.150m north and northeast of the site.	Ground gases
Commercial/Industrial land uses in the site area.	Heavy metals, hydrocarbons, acids, organics, and volatiles.

3.7 Conceptual Contaminant-Pathway-Receptor Model

The information gathered from the associated Preliminary Contaminated Land Risk Assessment was compiled to produce a Contaminant-Pathway-Receptor (C-P-R) model, which has been extracted and presented below.

The risk posed to site construction workers has not been assessed as any risks are considered to be mitigated through good site practices.

Preliminary Contamination Source-Pathway-Receptor Table

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Current Former single storey brick care facility	Dermal / direct contact	Current site users	No	
	Direct ingestion		No	
	Direct inhalation		No	
	Inhalation of Radon		No	
	Inhalation of wind-blown dust		No	
	Vapour migration		No	
	Ground gas migration		No	
Historic	Dermal / direct contact	Future site users (equivalent to residential use with plant uptake)	Yes	Low
	Direct ingestion		Yes	Low
	Direct inhalation		Yes	Low
	Inhalation of Radon gas		No	
	Inhalation of wind-blown dust		Yes	Low

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Laundry of site between 1920 and before 1979. Potentially infilled brick field closed 1935 from c.150m north and northeast of the site.	Vapour Migration onto the site	Services (following redevelopment)	Yes	Low
	Ground gas migration		Yes	Low to Moderate
	Direct contact		Yes	Low
	Migration of contaminants: non-aqueous phase		Yes	Low
	Migration of contaminants: aqueous phase		Yes	Low
	Migration of contaminants off-site: non-aqueous phase	Adjacent Properties	No	
	Migration of contaminants off site: aqueous phase		No	
	Vapour migration		No	
	Inhalation of wind-blown dust	Ecological Impacts	No	
	Migration of contaminants: non-aqueous phase		No	
	Migration of contaminants: aqueous phase		No	
	Migration of contaminants from site: non-aqueous phase	Controlled groundwater	No	
	Migration of contaminants from site: aqueous phase		No	
	Migration of Contaminants: non-aqueous phase	Surface Waters	No	-
	Migration of contaminants: aqueous phase		No	-

3.8 PRA Conclusions

The preliminary contamination risk assessment has identified complete Contaminant-Pathway-Receptor (CPR) linkages with a maximum **Low to Moderate** risk level from the potential contamination sources and risk drivers identified on the site and surrounding area.

The most significant of these potential source drivers representing the greatest potential to impact the proposed site user (equivalent to residential with plant uptake) is the use of the site as a Laundry from 1920/1935 to 1975. There could be residual contamination such as surfactants (detergents)

relating to this use. However, given the age of the Laundry it is considered that the likelihood of residual contamination would be low, especially highly soluble surfactants. Further to this there is a risk deemed from demolition rubble from the redevelopment of the site for its current use which could contain asbestos.

Given the age of the current structure on site it is also possible that asbestos could be contained within the building fabric. It is recommended that an asbestos survey is undertaken of the building on site to determine the presence of asbestos-containing materials. If present, removal works will need to be undertaken by a specialist contractor prior to the demolition phase. These works will reduce the potential risks to site end users and neighbouring residents to a negligible risk.

A further risk is considered from the potentially infilled brick fields located from c.150m north and northeast of the site. It is not clear if these features have been infilled as contouring of some maps show a depression on the site, which is currently a playing field. Therefore, the risk is deemed Low to Moderate.

The proposed residential with plant uptake and private gardens site use will potentially allow the proposed user to come into contact with potential contaminants through direct contact, ingestion and inhalation pathways. There is also a viable pathway for ground gas migration to impact the site.

The Preliminary UXO Threat Assessment indicate that the potential for a UXO hazard to occur on site classified as LIKELY. As such, it is recommended that Detailed UXO Threat and Risk Assessment is undertaken. Clearance by a suitably qualified UXO Engineer should be undertaken for any intrusive works.

Given the discussion above, to prevent 'Significant Possibility of Significant Harm' from potential contamination sources to the proposed future residential site users it is recommended that an intrusive soil investigation be undertaken. We would highly recommend ground gas be included within the next stage of works due to the potential for migration from contaminative sources onto the site.

Further to this, should any unexpected contamination be identified during the future development groundworks, then a suitably qualified and experienced Geo-Environmental Engineer should be consulted and if necessary further assessment should be undertaken.

A very low geotechnical risk was identified with the Envirocheck Report. A geotechnical appraisal would be recommended in order to determinate the ground profile and conditions to allow the derivation of foundation design criteria.

4.0 INTRUSIVE INVESTIGATION FIELDWORKS

The purpose of the intrusive investigation was to establish the sub-soil characteristics in relation to the proposed development, to gather geotechnical data to derive foundation design criteria and to assess the contamination status of the near surface soils beneath the site to confirm the findings of the preliminary contamination risk assessment (PRA) Phase of the investigation.

The main fieldworks were carried between 20th and 22nd July 2020 and comprised the forming of 1no. borehole using cable percussion drilling techniques, 2no. machine excavated Trial Pits, 3no. hand excavated trial pits, 4no. percussion liner sampling boreholes and 6no. insitu CBR test to assess the ground conditions, recover samples, confirm existing foundation arrangements and undertaken infiltration testing.

The initial exploratory positions were formed within accessible locations as specified by the Client's Engineer; Pringuer-James, as per their site investigation specification (Ref E19-29-RP-001, dated June 2020). The exact locations of the exploratory points were amended locally on site to avoid buried or above ground services, maintain access and position exploratory location within accessible areas.

The depths of the exploratory positions, sample details, strata descriptions and comments on the groundwater conditions are detailed on the Logs which are presented in Appendix B along with an Exploratory Point Location Plan.

Schematic sections of the foundation trial pits are also presented in Appendix B.

The Borehole and Trial Pits were formed to assess the geological succession beneath the site, near surface contamination and to gather geotechnical and groundwater data to derive geotechnical design parameters and to add data to the Ground Model for the site.

The percussion liner boreholes were targeted to 10m depth, however, where sampling could not be undertaken to the full 10.0m depth due to refusal of the light drilling technique within dense strata, the borehole positions were continued using dynamic probing techniques. The cable percussion borehole was formed to a targeted depth of 20.0m below ground level (bgl).

The machine excavated trial pits were formed to assess shallow strata and allow infiltration testing to the BRE365 methodology.

The hand excavated trial pits were formed in external areas of the site as indicated on the associated SI specification for the purpose of exposing foundation arrangements of the existing structure.

Soil strength testing was undertaken in the field employing Standard Penetration Test (SPT) carried out at 1.0m intervals within the percussion liner sampler boreholes. Hand vane soil strength testing was carried out on any fine-grained soils encountered. SPTs within the cable percussion borehole were carried out at 1.0m centres to 5.00m depth and 1.50m centres below this within the boreholes. The SPT testing was alternated with frequent U100 undisturbed samples within the deeper cable percussion borehole.

The intrusive investigations were supervised by a suitably qualified UXO Engineer.

The trial pits were backfilled with arisings once logged and tested.

All of the boreholes were installed with monitoring wells, comprising between 3.00m – 9.00m of perforated 35mm internal diameter pipe with a screened 3-6mm gravel pack, with 1.00m of solid pipe at the surface and a wetted bentonite pellet seal. The wells were sealed with a bung and gas tap with a stainless steel cover installed flush with ground level.

Photographs of the siteworks are included within Appendix B.

4.1 Encountered Strata

The borehole arisings were logged by a Geotechnical Engineer generally in accordance with BS5930: 2015.

A log of the exploratory holes and Exploratory Point Location Plan showing the positions investigated are presented in Appendix B.

The strata encountered beneath the site is summarised below.

MADE GROUND

The Made Ground was highly variably in depth and lateral extend across the site.

The Made Ground material varied between sandy / gravelly CLAY and clayey sandy GRAVEL with the gravel fraction comprising brick, concrete, ash, glass, plastic, flint, tile and decaying organic matter.

The CLAY and GRAVEL strata also indicated highly variable insitu strength and compactness, ranging from very soft to stiff for the fine grained deposits and very loose to medium dense for the coarse grained soils.

Made Ground was typically present to depth of between 0.45m (TP1) and 1.0m bgl (WS2), but was much deeper on the north and central eastern areas of site with a maximum depth of 5.50m bgl in BH1 and 4.70m in WS1.

LANGLEY SILT MEMBER

Deposits of the Langley Silt Member were encountered within trial pits TP1 and TP2, boreholes WS2 and WS4, and within hand excavated trial pits HTP1 and HTP3.

Within borehole WS2 and WS4 and TP1 the Langley Silt Member deposits comprised stiff brown dark brown occasionally mottled grey brown to orange brown (slightly sandy) silty CLAY within occasional rootlets, encountered at a depth of between 0.45m to 1.30m and proven up to a maximum of 2.10m within the boreholes and 3.00m within TP1.

KEMPTON PARK GRAVEL MEMBER

Kempton Park Gravel Member deposits were encountered directly beneath the Made Ground within all of the boreholes BH1 and WS1-WS4 at between 2.0m (WS3) and 5.5m (BH1) depth. The Kempton Park Gravel Member deposits were not encountered within either of the trial pits due to their basal depth not being sufficient.

The Kempton Park Gravel Member deposits comprised medium dense to dense orange brown, yellow brown and brown slightly clayey slightly sandy GRAVEL to clayey gravelly SAND. Within boreholes WS3 and WS4 an upper unit of the Kempton Park Gravel Member soils was identified at the top of the strata as a thin band of stiff variably sandy variably gravelly CLAY was encountered at the interface with the Made Ground to 2.10 - 2.80 m and 2.00 - 2.70m depth, respectively.

LONDON CLAY FORMATION

London Clay Formation deposits were proven within the deeper borehole BH1, at 10.10m depth and comprised stiff blue grey silty CLAY. Such deposits were proven to the base of the borehole at 20.0m depth.

The geological profile encountered generally agrees with the reviewed available published record, except for the relatively deep Made Ground deposits, which were not mapped. There were noted to significant depth, particularly on the centre of the site.

DYNAMIC PROBING

Follow on Dynamic Probing (DP) was undertaken within all four percussion liner sample borehole to 10m depth. The results of the probing can be correlated to sampled strata such as that from BH1 to indicate potential strata changes due to significant changes of blow count. The DP plots presented in Appendix B do not show any significant changes of blow count that could be attributed to a change in geology and therefore, it is considered that the base of the Kempton Park Gravel Member soils is below 10.0m across the site.

It is conjectured that excavations may have taken place on site and the deep made ground is the result of subsequent infilling of these excavation, possibly as unrecorded mineral workings prior to the earliest mapping on the site. The shallow deposits on the site comprise Langley Silt Member deposits which we frequently used as brickearth for brick production. It is possible that the brick field to the north actually extended further south than mapped or that additional small scale excavations were undertaken on site. The excavations do not appear to cover the whole of the site as natural Langley Silt Member deposits appear to be present at shallow depth near to the boundaries and of the site.

4.2 Groundwater Conditions

Groundwater was encountered within all of the sufficiently deep exploratory points (i.e. not the infiltration testing trial pits) at a depth of generally 4.00m to 5.50m bgl within the Kempton Park Gravel Member deposits. A minor groundwater seepage was also noted within one of the hand trial pit, HTP3. The struck groundwater levels are summarised below.

	Struck Groundwater Level (m bgl) and observations
BH1	Slow groundwater ingress at 5.5m depth, rising to 4.8m depth after 20 minutes
WS1	Groundwater encountered at 4.7m depth.
WS2	Groundwater encountered at 4.3m depth.
WS3	Groundwater encountered at 4.0m depth.
WS4	Groundwater encountered at 4.0m depth.
TP1	No groundwater encountered.
TP2	No groundwater encountered.
HTP1	No groundwater encountered.
HTP2	No groundwater encountered.
HTP3	Minor seepage at 1.4m depth.

Subsequent monitoring of the groundwater level was carried out within the wells installed in all boreholes on three visits of a planned six visits to date. The results are summarised below and will be updated upon completion of the monitoring programme.

	Groundwater Level (m bgl) and Monitoring Data					
	30/07/20	05/08/20	13/08/20	TBC	TBC	TBC
BH1	4.50	4.50	4.50	TBC	TBC	TBC
WS1	4.02	4.00	4.08	TBC	TBC	TBC
WS2	4.20	4.20	4.18	TBC	TBC	TBC
WS3	DRY	DRY	DRY	TBC	TBC	TBC
WS4	DRY	DRY	DRY	TBC	TBC	TBC

4.3 Ground Gas Conditions

The associated PRA highlighted the potential for ground gases to be generated by potentially infilled brick pits c.150m to the north and northeast, which has the potential to migrate onto the site via the granular Kempton Park Gravel Member deposits. In addition, significant depth of Made Ground (up to 5.5m) of Made Ground deposits were encountered on site during the investigation. Following the PRA desk top study and ground investigation, the overall risk from ground gas at the site was deemed to be Low to Moderate.

A programme of ground gas monitoring has been undertaken to allow a ground risk assessment to apply a precautionary approach given the highly sensitive proposed residential land use on the site.

All of the boreholes were installed with monitoring wells to allow monitoring of the groundwater and ground gas levels.

Ground gas contaminant monitoring comprising an initial 3no. visits has been carried out on the site during July and August 2020. A further three monitoring visit are scheduled to be undertaken in August / September dependent upon weather and atmospheric conditions (lower atmospheric pressure). The report and ground gas risk assessment will be updated upon completion of the monitoring programme.

4.4 Sampling Strategy

Disturbed and undisturbed samples were recovered for geotechnical testing from each of the exploratory points and from each stratum encountered. These were used to gather soil data to allow classification of the soils encountered in relation to the derivation of foundation design criteria.

Samples were recovered in suitable containers for chemical analysis from the top metre of soils from the general site area, or at greater depths where deeper Made Ground deposits were encountered.

5.0 CONTAMINATION ASSESSMENT

5.1 Chemical Analysis

A total of 9no. soil samples were sent to an external laboratory to obtain total soil concentrations for a range of priority contaminants. The suite of analysis was decided based on consultation of the Contamination Exposure Assessment (CLEA) supporting documents and an assessment of the former site and surrounding area land uses carried out for the PRA stage of the investigation.

The suite of testing included:

- Asbestos screen for near surface Made Ground samples with subsequent quantification if identified
- Metals and Inorganic compounds
- Polyaromatic Hydrocarbons (PAH) USPEA Priority 16 Compounds
- Total Petroleum Hydrocarbons (TPH) Screen (C10 – C40 band)

Initial in-house screening levels derived for three band TPH fractions (roughly equivalent to PRO, DRO and Mineral Oil) are employed to initiate fully speciated hydrocarbon analysis to the TPH Committee Working Group Methodology (TPHCWG).

Results of the chemical analysis are presented in Appendix C.

5.2 Human Health Assessment Criteria

The assessment has been carried out in accordance with the Contaminated Land Exposure Assessment (CLEA) methodology as detailed within CLR11 2004. The assessment criteria employed are based on the proposed final land use of the site. For this site, a worst-case proposed land use of 'Residential with Home Grown Produce' will be employed for the site which is an overall conservative approach for the proposed school development as some soft landscaping is to present to the rear of the existing building but is not anticipated to comprised productive gardens.

In March 2014 DEFRA published new guidance detailing the Category 4 Screening Levels (C4SL) system for the classification of contaminated land. The C4SL system was published to assist with revised statutory guidance published in 2012 for Part 2a of the Environmental Protection Act.

It introduces a new four category system for the classification of land under Part 2a where a Significant Possibility of Significant Harm to human health has been concluded. The categories correspond to Category 1 – land where the level of risk is clearly unacceptable, to Category 4 – where the level of risk posed is acceptably low. In short, land that passes the category 4 test "should not be capable of being determined as contaminated land under Part 2a".

Currently no statutory chemical guidance levels for land and controlled waters contamination exist in the UK. Therefore, the reported soil total contaminants concentrations will be compared to In-House Generic Assessment Criteria (GAC) used as C4SLs.

These In-House GACs are presented in Appendix C and are generally based on the LQM/CIEH S4UL values.

The S4UL values employed are based on a Soil Organic Material (SOM) concentration of 2.5% for the initial screening.

A S4UL has not been published for lead. The GAC value employed has been derived using the DEFRA C4SL[1] toxicological data and exposure parameters and the CLEA Software V1.071:2015.

The C4SL value employed for the lead GAC, for a residential with plant uptake land use scenario, is based on a blood lead level of 3.5ug/dl for the lower level of toxicological concern employing the Integrated Exposure Uptake Biokinetic model (IEBUK) estimated blood lead concentrations in children and employs the exposure parameters within the DEFRA C4SL report.

[1] DEFRA SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Final Project Report (Revision 2) 2014

A minimal risk approach was employed to derive the S4UL values, whereas the C4SL model uses a lower level for risk model, which is deemed generally less conservative than the minimal risk approach. However, the use of a lower level for risk model screening criteria is considered strongly precautionary and is generally considered appropriate for use within the planning regime.

However, with consideration of the C4SL and S4UL values there still remain some gaps in the available chemical and/or toxicological data for non-priority contaminants and therefore a limited number of previously used CLEA SGVs and ICRCL guideline values have been retained and include those for pH, sulphide, sulphur and water-soluble boron.

Should an exceedance be noted when site priority contaminant concentrations are compared to the employed GACs, a site specific assessment criteria can be derived using CLEA software or similar human health risk assessment software. This can also include consideration of bio-availability of the contaminants if required.

Further to the above, samples of near surface Topsoil and Made Ground are generally screened for asbestos presence. Generic assessment criteria do not exist currently for asbestos presence in soil within the UK. Therefore, where asbestos is identified in soil it is recommended that further risk assessment be carried out by suitably qualified and registered persons.

5.3 Groundwater Assessment Criteria

A detailed controlled groundwater risk assessment was outside the scope of this report.

6.0 GENERIC SITE CONTAMINATION RISK ASSESSMENT

Statistical analysis of the data set is carried out employing the statistical method detailed in CL:AIRE Document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration', if exceedances are noted on individual comparison of the contaminant concentrations to the employed assessment criteria, which allows a derivation of a true mean concentration (μ).

The statistical analysis also assesses if the data is normally distributed and considers high levels to determine if they are part of the underlying data set due to 'site wide contamination' or due to contamination 'outliers'. The statistical analysis derives a 95th percentile upper confidence limit of μ for each determinands for comparison to the suitable employed guidance level (GAC) or 'Critical Concentration (Cc)'.

The reported soil sample total contaminant concentrations data set was not separated into averaging areas for the site due to the similar sample recovery strata and small sample data set.

Further to this the data was compared individually to the PGE In-House GACs presented in Appendix C. This was carried out to mitigate any bias resulting from the small data set if the statistical analysis were to be employed.

6.1 Total Soil Concentrations

The total priority contaminant concentrations from the 9no. samples analysed, and a summary of the results are presented in Appendix C and are detailed in the following section.

Heavy Metals

The comparison of the reported hydrocarbon priority determinand concentrations within the samples analysed indicated 95th percentile upper confidence limit of μ concentrations for the heavy metals beryllium, lead and phytotoxic copper which were in excess of the Residential with Home Grown Produce land use scenario employed.

Statistical analysis of the data set indicated that the 95th percentile upper confidence limit of μ concentrations for the exceeding PAH compounds are due to contamination hotspots.

The UCL was reduced to below the relevant threshold after removal of the contamination hotspot values.

Individual comparison of the reported heavy metal priority determinand concentrations within the samples analysed indicated concentrations which exceeded the respective Human Health GAC for Residential with Home Grown Produce land use scenario employed.

Determinand	Assessment Criteria ($mgkg^{-1}$)	Exploratory Position and Depth (m bgl) (strata)	Maximum Reported Concentration ($mgkg^{-1}$)	95th Percentile Upper Confidence Limit ($mgkg^{-1}$) (with exceedances removed)
Arsenic	37	WS1 at 1.80m	66	N/A
Beryllium	1.7	WS1 at 0.90m WS1 at 1.80m WS2 at 1.50m WS4 at 0.90m	1. 8.1 2.4 2.9	1.6
Lead	190	WS1 at 1.80m WS4 at 0.90m	4500 270	136
Copper (Phytotoxic)	111	WS1 at 1.8m	390	64

Hydrocarbons

The comparison of the reported hydrocarbon priority determinand concentrations within the samples analysed indicated 95th percentile upper confidence limit of μ concentrations for the PAH indicative compound dibenzo[a,h,]anthracene which were in excess of the Residential with Home Grown Produce land use scenario employed.

Statistical analysis of the data set indicated that the 95th percentile upper confidence limit of μ concentrations for the exceeding PAH compounds are due to contamination hotspots.

The UCL was reduced to below the relevant threshold after removal of the contamination hotspot values.

Individual comparison of the reported hydrocarbon priority determinand concentrations within the samples analysed indicated concentrations which exceeded the respective Human Health GAC for Residential with Home Grown Produce land use scenario employed.

Heavy Metal GAC Exceedances

Determinand	Assessment Criteria ($mgkg^{-1}$)	Exploratory Position and Depth (m bgl) (strata)	Maximum Reported Concentration ($mgkg^{-1}$)	95th Percentile Upper Confidence Limit ($mgkg^{-1}$) (with exceedances removed)
Benzo[a]pyrene	2.7	WS1 at 1.80m	6.2	N/A
Dibenzo[a,h,]anthracene	0.28	WS1 at 1.80m WS4 at 0.90m	1.2	0.15

Headspace analysis was carried out on the soil samples using a PID to assess the Volatile Organic Compound (VOCs) concentrations. This did not indicate any VOCs within the samples tested.

Other Priority Contaminants

The comparison of the reported other priority concentrations within the samples analysed did not indicate any 95th percentile upper confidence limit of μ concentrations for any other priority contaminants which were in excess of the Human Health GAC for Residential with Home Grown Produce land use scenario employed.

Individual comparison of the reported other priority contaminant concentrations within the samples analysed did not indicate any concentrations which exceeded the respective Human Health GAC for Residential with Home Grown Produce land use scenario employed.

All nine samples subject to testing were analysed for the presence of asbestos. No asbestos was recorded within any of the samples subject to testing.

6.2 Controlled Water Risk Assessment

A controlled water risk assessment was beyond the scope of this assessment.

6.3 Ground Gas Risk Assessment

A ground The PRA report concluded that there was a Low to Moderate risk of contamination of the site from ground gases. Therefore, monitoring standpipes were installed during the fieldworks for the purpose of monitoring ground gas and groundwater level.

6.3.1 Sources

The associated PRA report indicated a potentially infilled brick field c.150m north and northeast of the site.

The underlying natural strata comprises highly variable Made Ground of reworked CLAY and GRAVEL with high proportions of ash and organic matter observed within some of the exploratory positions. Given the depth (up to a maximum of 5m depth), highly variably nature and organic matter observed in some locations the Made Ground soils on site should be considered as a potential source and potentially likely to generate ground gases and to present a significant risk to the end users.

Groundwater was encountered at depth of between 4.00m to 5.50m bgl and therefore, is unlikely to allow significant retardation of ground gas migration onto the site, especially give the on site source from the deep Made Ground materials.

On the above basis there is the possibility that ground gases will be generated and migrate onto the site and have the potential to accumulate within any enclosed spaces on site.

Therefore, based upon the above discussion, a Low to Moderate Environmental Risk classification for the generation of carbon dioxide and methane gases on site has been concluded for the site in accordance with CIRIA C665 and BS8576:2013.

6.3.2 Pathways

The predominating pathway concluded in the CGM is for the migration of ground gases from the off-site potential gas generation sources and migration to impact any proposed structures through the likely permeably Kempton Park Gravel Member and highly variable Made Ground strata.

Groundwater was encountered at depths of between 4.0m and 5.50m on the site during the siteworks. On this above basis minimal retardation of ground gas flow beneath the site is likely to occur due to groundwater and only for off-site sources.

6.3.3 Receptors

The main receptors of concern are the future site users of the proposed residential development on the site through inhalation of asphyxiant gases (CO_2) and explosion from flammable gases (CH_4) within any new structures.

6.3.4 Ground Gas Monitoring

Monitoring wells were installed within all 5no. of the boreholes (BH1 and WS1 – WS4) on the site during associated ground investigation works on 20-23rd July 2020.

The borehole monitoring positions within WS1-WS4 were each installed to between 4.00m and 5.00m bgl with 35mm internal diameter HDPE well pipe at the base and 1.0m of plain well pipe at the surface.

The borehole monitoring position within BH1 was installed to a depth of 10.0m bgl with 35mm internal diameter HDPE well pipe at the base and 1.0m of plain well pipe at the surface.

The borehole installations were backfilled with 3-6mm gravel and a pelleted bentonite seal was created for the top 1.0m of pipe. The well was finished with a bung and gas valve and finished as ground level with a stainless steel flush cover. An Exploratory Point Location Plan showing the monitoring well locations are presented in Appendix B.

The wells were positioned to give general site coverage for subsequent ground gas and groundwater monitoring. The monitoring was carried out by PGE using a Geotech GA5000 Gas Analyser.

A total of 3.no ground gas monitoring visits were carried out on site in July and August 2020. The results of the monitoring are summarised in the table below, with the highest gas level within each well highlighted. The monitoring data is presented in Appendix E.

Ground Gas Monitoring Summary

Borehole	Date	GW Level (mbgl)	Atmospheric Pressure (Mb)	Maximum Methane (% v/v)	Maximum Carbon Dioxide (% v/v)	Lowest Oxygen (% v/v)	Max sustained Flow (l/hr)	VOC
BH1	30/07/2020	4.50	1019-1024	1.00	5.10	0.40	0.2	0.00
	05/08/2020	4.50		1.00	5.70	0.70	0.1	-
	13/08/2020	4.50		1.00	5.70	0.30	0.1	-
WS1	30/07/2020	4.02		0.00	8.20	9.00	0.1	0.00
	05/08/2020	4.00		0.00	7.50	10.5	0.1	-
	13/08/2020	4.08		0.00	10.1	6.90	0.1	-
WS2	30/07/2020	4.20		0.00	2.50	13.8	0.1	0.00
	05/08/2020	4.20		0.00	2.00	18.1	0.1	-
	13/08/2020	4.18		0.00	2.70	17.2	0.1	-
WS3	30/07/2020	DRY		0.00	7.40	8.80	0.1	0.00
	05/08/2020	DRY		0.00	13.3	8.70	0.1	-
	13/08/2020	DRY		0.00	7.70	13.5	-0.1	-
WS4	30/07/2020	DRY		0.00	3.70	14.10	0.2	0.00
	05/08/2020	DRY		0.00	4.50	16.30	0.2	-
	13/08/2020	DRY		0.00	5.10	13.60	0.2	-

Notes
* - Where no flow detected assumed as 0.1 l/h

The ground gas monitoring on the site indicated methane concentrations were recorded at a maximum level of 1.00% v/v on all three occasions within BH1. Carbon dioxide concentrations were recorded at a maximum level of 13.3% v/v on 05/08/2020 in WS3.

A PID was also employed as a basic screening tool to identify potential hydrocarbon / vapour within the boreholes. No measurable concentrations of VOCs were identified during the monitoring visits.

Sustained gas flows were recorded within the monitoring standpipes BH1 and WS4 at a maximum flow of 0.2l/hr. Where no flow was recorded and flow of 0.1l/hr has been assumed for modelling purposes during calculation of the GSV.

6.3.5 Ground Gas Risk Assessment

The proposed development comprised residential housing and thus based upon BS8485:2015, Table 3, the proposed development would be classified as;

> **Type A building –** Private ownership with no building management controls on alterations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises.

As outline in Note 3 for Table 3 – Building Type within BS8485:2015 highlights that the NHBC "Traffic Light" system is for use on residential developments and typically applies to Type A buildings. The NHBC guidance assumes these Type A categorised buildings utilised beam and block floor construction with clear void ventilation.

Where this is the case the development may be categorised, per Figure 8.1 CIRIA C665 2007, as falling under CIRIA Situation B;

> **Situation B -** Low rise building with minimum ventilated under floor void (minimum 150m)

Where the development fulfils these criteria the gas risk for the site may been assess utilising either the NHBC "Traffic Light System" as outline in NHBC report No 10627-R01(04) / CIRIA C665 or the Characteristic Situation based upon the modified Wilson and Card classification, again as outlined within CIRIA C665.

Otherwise the development should be classified as

> **Situation A –** Any development other than Situation B e.g. factories, shops, commercial, warehouses, school, cinema, sports centres, stadiums, high rise housing with basements etc

For the proposed development the site will be assessed under **Situation A** due to the proposed basements beneath the proposed domestic dwellings.

A maximum methane concentration of 1.0% v/v and carbon dioxide concentration of 13.3% v/v were identified during the monitoring with a maximum sustained gas flow rate of 0.1 l/hr detected.

This gives a maximum Gas Screening value of 0.002l/hr for methane and a maximum Gas Screening value of 0.0266l/hr for carbon dioxide.

Based upon the calculated GSVs from monitoring undertaken to date the site falls into Characteristic Situation 1 as per Table 2 within BS 8485:2015 or as Green based upon NHBC traffic light system outlined in NHBC report No 10627-R01(04). However, given that concentrations of over 5% CO2 were recovered on several occasions within several boreholes, it is recommended that the site is classified as **Characteristic Situation 2 (CS2) / NHBC Traffic Light System Amber 1.**

Ground Gas Protection Measures

Gas protection measures should be designed based upon a gas protection score, which is employed to ensure the required level of protection is achieved by the gas protective measures put in place. This takes into account the type of building and the characteristic situation of the proposed development as detailed in Table 4 within BS8485:2015.

Tables 5, 6 and 7 within BS8485:20015 outline the various measures for structural barriers, ventilation measures, and gas resistant membranes that produce points and can contribute to the total point score required for gas protection measures.

6.3.6 Ground Gas Risk Assessment Conclusions

A Conceptual Gas Model has been produced for the site which indicates a Low to Moderate ground gas risk to the proposed residential end site users.

Ground gas monitoring comprising 6no. visits has been carried out on the site in July to August 2020. Further monitoring is planned for August / September 2020.

The gas monitoring results so far gave a worst-case gas screening value of 0.002l/hr for methane and 0.0266l/hr l/hr for CO_2.

The calculated gas screening values are less than 0.7 l/hr for methane and carbon dioxide, which allows a 'Green' classification employing the NHBC Traffic light system detailed in CIRIA C665 2007 or Characteristic Situation 1 as per the modified Wilson and Card classification as outlined in CIRIA C665 2007.

However, given the maximum carbon dioxide of 13.3% v/v recorded in WS3 and that several other concentrations of Carbon Dioxide were recorded over 5%, this requires that the site classification is increased to 'Amber 1' / Characteristic Situation 2 (CS2) as per the modified Wilson and Card system as per CIRIA C665.

The protection measures should comprise:

> **For Amber 1**
> "Low to intermediate gas regime identified, which requires low-level gas protection measures, comprising a membrane and ventilated sub-floor void to create a permeability contrast to limit the ingress of gas into buildings. Gas protection measures should be as prescribed in BRE Report 414 (Johnson, 2001). Ventilation of the sub-floor void should facilitate a minimum of one complete volume change per 24 hours."

As outlined in CIRIA C665. Additional details are outlined within Table 1: Typical NHBC expectations and verification requirements of NHBC Technical Extra Issue 20 dated April 2016

> **Ventilation** – subfloor venting to achieve at least one air exchange per day (minimum 150mm void height; 1500mm2/m air vent opening or 500mm2/m2 floor area spaced at not more than 2m centres on at least two opposing sides).
> **Membrane** – must be suitable for purpose. On this site no significant VOC concentration were noted so a hydrocarbon resistant membrane is not deemed necessary
> **Membrane installation / design** – to achieve complete integrity across the entire building footprint. Penetration and joints sealed.

for **Characteristic Situation 2** from the modified Wilson and Card classification (CIRIA C665 2007)

a. Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM and underfloor venting.
b. Beam and block or pre-cast concrete and 2000g DPM / reinforced gas membrane and underfloor venting.
   All joints and penetrations sealed.

The gas membrane should be fitted by a suitably qualified person and the fitment validated by the Remediation Engineer.

A minimum of 9 visits over a period of 6 months is recommended for a residential development with a low to moderate classification of gas generation potential with at least 2 no. at atmospheric pressures below 1000mb as per the CIRIA C665 guidance. A further three monitoring visits are scheduled for August / September at which point the assessment will be updated.

6.4 Conceptual Site Model

An assessment of the risk posed by the identified contaminant concentrations has been carried out employing the Source-Pathway-Receptor (S-P-R) methodology detailed within the CLEA methodology.

Potential On-Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Elevated lead, arsenic, beryllium phytotoxic copper and PAH compounds in Made Ground across the site. **No asbestos identified in samples subject to screening.** **Ground gas indicate Amber 1 / Characteristic Situation 2**	Dermal/Direct Contact	Current site users	N	
	Direct Ingestion		N	
	Direct Inhalation		N	
	Inhalation of Radon Gas		N	
	Inhalation of Wind Blown Dust		N	
	Vapour Migration		N	
	Gas Migration		N	
	Dermal/Direct Contact	Future site users (equivalent to residential use with plant uptake)	Y	Low to Moderate
	Direct Ingestion		Y	Low to Moderate
	Direct Inhalation		Y	Low to Moderate
	Inhalation of Radon Gas		N	
	Inhalation of Wind Blown Dust		Y	Low to Moderate
	Vapour Migration		N	
	Ground Gas Migration		Y	Low to Moderate
	Direct Contact	Services (following development)	Y	Low
	Migration of Contaminants – Non-Aqueous Phased		Y	Low
	Migration of Contaminants – Aqueous Phased		Y	Low
	Migration of Contaminants – Non-Aqueous Phased	Adjacent Properties	N	
	Migration of Contaminants – Aqueous Phased		N	
	Vapour Migration		N	
	Inhalation of Wind Blown Dust	Ecological Impacts	N	
	Migration of Contaminants – Non-Aqueous Phased		N	
	Migration of Contaminants – Aqueous Phased		N	
	Migration of Contaminants from site – Non-Aqueous Phased	Controlled groundwater	N	
	Migration of Contaminants from site – Aqueous Phased		N	

Potential On-Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
	Migration of Contaminants – Non-Aqueous Phased	Surface Waters	N	
	Migration of Contaminants – Aqueous Phased		N	

The risk to construction workers has not been assessed as generally any risks posed to site construction workers from identified contamination can be mitigated through good site practices and robust sitework risk assessment.

However, works carried out on sites where any asbestos fibres have been identified must be carried out by a suitable contractor and a site specific Health and Safety Plan for site construction workers must be produced in line with CAR 2012[2].

6.5 Soil Waste Assessment

The HazWaste online classification system was employed to assess the waste classification employing the total determinand concentrations within samples of the near surface Made Ground and separately, the near surface natural soils, in relation to groundworks arising disposal. This indicated the majority of Made Ground tested and all of the natural soils tested to have a Non-Hazardous classification with EWC code **17 05 04.** The Made Ground samples from WS1 at 1.80m indicated a Hazardous waste classification based on lead, with an EWC code **17 05 03.**

Waste Acceptance Criteria (WAC) testing was also carried out to determine if the soils tested could be disposed of into an inert facility on two composite samples of near surface soils. This indicates that the samples of soils had leachable determinand levels generally below the related guidance levels for disposal into an inert facility on the samples both from shallow Made Ground soils and natural soils at greater depth.

The sample from WS1 was noted to contain fragments of brick, tile, ceramic and plastic which is considered likely to be the source of the elevated lead concentration and requires a hazardous classification. As such soils from this vicinity will likely be unsuitable for disposal as inert material, however, as no other concentration were elevated and the generally low levels of leachates recorded within the WAC testing, soils from this area will likely be suitable for disposed as non-reactive hazardous waste.

The results of the soil waste classification testing are presented in Appendix C.

On the above basis, it is considered that the natural soils and the majority of the Made ground soils tested would classify as non-hazardous waste and may be suitable for disposal into an inert facility.

The limited depth of Made Ground soils in the vicinity of WS1 require a separate treatment and a hazardous classification.

[2] Control of Asbestos Regulations 2012

All waste classification should be confirmed with the waste receiving facility prior to disposal. The waste receiving facility, especially if not an inert landfill, may also require the total soil priority contaminant concentrations which are also presented in Appendix C.

6.6 Potable Water Supply Pipe

Guidance on the type of potable water supply pipe to be employed on residential development sites is given by UKWIR, who have published guidance for the type of potable water supply pipework to be employed for new structures on reused land.

The results of the chemical analysis carried out on samples recovered from shallow depth and around the suspected depth of pipe burial (0.80m) on the site, although not strictly to the UKWIR required standard, indicated hydrocarbon priority determinand concentrations in excess of detection levels. Therefore, regular PE potable water supply pipe are not deemed suitable for buried potable water supply pipework on the site and any new pipes laid to the rear area of the site should be barrier type pipe.

6.7 Site Contamination Assessment Discussion

Elevated lead, arsenic, beryllium, phytotoxic copper and PAH indicative compounds levels were identified within the Made Ground from beneath the current building footprint when compared to the conservative Residential with productive planting land use scenario. Volatile contaminants were not identified.

The proposed development is to be residential in nature and to include private garden areas. As such there is a complete pathway between the identified non-volatile contaminants and the proposed end site users via direct dermal contact, ingestion and inhalation.

Statistical analysis of the data set indicated that the 95th percentile upper confidence limit of μ concentrations for the exceeding PAH compounds are due to contamination hotspots, however, given the high degree of variability in depth, consistency and lateral extend of Made Ground on site, it is unlikely to be feasibly to accurately delineate any hotspots of contamination with significant additional testing.

Given this, it is considered that risk reduction or remediation works will be required in proposed open areas of the site to protect the end site users. This would most likely consist of separation of the site users from any contaminated soils through the excavation of soil and importation of clean fill and Topsoil in open and garden areas of the proposed development.

A Remediation Options Appraisal and Method Statement (RMS) would be required by concerned regulatory parties for any soil and ground gas remediation works on the site.

No asbestos fibres were identified within the soil samples subject to screening. However, given the age of the structure, asbestos material may be present within the fabric of the structure that could potentially be disturbed as part of the redevelopment.

It is recommended that an asbestos survey of the existing structure be carried out to confirm whether further sources of asbestos are present on site. Any asbestos materials encountered should be removed by a licensed asbestos contractor in line with the Control of Asbestos Regulations (CAR 2012) prior to the construction phase of the proposed development.

Notwithstanding the above assessment, if any unexpected or previously unidentified contamination is discovered during the site development works, a suitably qualified and experienced person should be contacted so any further assessment required can be carried out.

7.0 FOUNDATION DESIGN CRITERIA

7.1 Geotechnical Laboratory Testing

A number of representative samples were sent to an external laboratory following visual assessment and logging of the borehole arisings. The testing programme was designed to classify the properties of the encountered soils and to determine the chemistry of the soil in relation to the design of buried concrete.

7.1.1 Atterberg Limits

The results of 8 no. Atterberg Limit determinations on the fine grained Langley Silt Member, Kempton Park Gravel Member and London Clay Formation soils are presented in Appendix D. The results have also been plotted on a Casegrande Plasticity Chart, also presented in Appendix D.

The soils tested have been assessed for their volume change potential (VCP) in accordance with NHBC Standards Chapter 4.2 and are detailed in the table below.

Atterberg Limit Results

Exploratory Point	Depth (m)	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing 0.425mm	Casegrande Classification	NHBC Modified Plasticity Index	NHBC Volume Change Potential
Made Ground									
HTP2	1.70	19	50	35	15	45	SiH	6	Non-plastic
London Clay Formation									
BH1	12.50	25	73	26	47	100	CIV	47	High
BH1	15.00	26	75	27	48	100	CIV	48	High
BH1	18.00	26	74	25	49	100	CIV	49	High
BH1	19.50	29	72	26	46	100	CIV	46	High
Langley Silt Member									
HTP1	1.60	25	68	30	38	96	CIH	36	Medium
HTP3	1.50	38	78	35	43	99	CIV	43	High

Exploratory Point	Depth (m)	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing 0.425mm	Casegrande Classification	NHBC Modified Plasticity Index	NHBC Volume Change Potential
Kempton Park Gravel Member									
WS2	2.20	15	44	21	23	100	CIM	23	Medium

The Made Ground possibly had a modified plasticity index of 6%, therefore, can be classified as '**Medium'** to '**High'** Volume Change Potential (VCP) employing the NHBC classification scheme due to the fine grained fraction.

The natural shallow Langley Silt Member soils had a modified plasticity index of between 36% and 43%, therefore, can be classified as '**Medium'** to '**High'** Volume Change Potential (VCP) employing the NHBC classification scheme due to the fine grained fraction.

The initial Kempton Park Gravel Member soils had a modified plasticity index 23%, therefore, can be classified as '**Medium'** Volume Change Potential (VCP) employing the NHBC classification scheme due to the fine grained fraction.

The natural deep London Clay Formation soils had a modified plasticity index of between 46% and 49%, therefore, can be classified as '**High'** Volume Change Potential (VCP) employing the NHBC classification scheme due to the fine grained fraction.

7.1.2 Natural Moisture Content

The natural moisture content (NMC) of the fine-grained soil subjected to Atterberg Limit testing and selected samples from within the exploratory holes. The results were used to assist in the geological profile and assessment of the encountered strata with published data.

The results are presented in Appendix D.

7.1.3 Laboratory Soil Strength Testing

Three undisturbed sample of London Clay Formation soils from the borehole BH1 were sent for soil strength testing within a triaxial cell.

One sample underwent single stage triaxial testing and indicated a shear strength of 85kPa at 17.0m depth.

Two of the samples were selected for multi-stage triaxial testing and indicated a range of shear strength from 80-85kPa at 11.0m depth and 168-181kPa at 14.0m depth.

7.1.4 Particle Size Distribution Testing

Particle Size Distribution (PSD) testing was carried out to classify the grading of the granular Kempton Park Gravel Member soil encountered. The results of the testing are presented in Appendix D and on the logs presented in Appendix B.

The grading of the Kempton Park Gravel Member deposits indicates a fines content of 6.3% and 8.2% and thus, as below 35% fines, the soils can be considered as non-plastic and hence non-shrinkable with associated volume change potential as outlined in NHBC and LABC guidance.

7.1.5 pH and SOx

The level of pH, sulphate and other determinands within the BRE SD1 Suite have been determined for selected samples from above and at the proposed likely shallow foundation invert level to assess the appropriate Design Sulphate Class for buried concrete in accordance with BRE Special Digest 1 Table 2. The results of the analysis are presented in Appendix C along with the chemical laboratory results.

The table below summarises the reported pH values, Total Sulphate and 2:1 Water Soluble Sulphate concentrations and any samples from the contamination assessment which were noted to have Total Sulphate levels in excess of the DS-1 Concrete Design Sulphate Class allowable concentration.

Design Sulphate Class for Site

Borehole	Depth	pH	Water Soluble Sulphate (2:1 Water Extract) (mg/l)	Total Sulphate (%)	Appropriate Design Sulphate Class
Made Ground					
BH1	1.20	9.3	854	0.208	DS-2
BH1	3.50	7.7	1450	0.198	DS-2
BH1	5.00	7.5	2560	0.360	DS-3
WS1	4.50	7.9	379	0.046	DS-1
Langley Silt Member					
TP2	1.80	7.7	398	0.057	DS-1
Kempton Park Gravel Member					
BH1	7.50	8.4	13.0	0.010	DS-1
WS2	3.50	7.7	60.3	0.014	DS-1
WS4	2.4	7.7	104	0.019	DS-1
London Clay Formation					

BH1	12.00	8.2	397	0.039	DS-1
BH1	14.00	8.5	248	0.035	DS-1
BH1	17.00	8.4	504	0.047	DS-2

The above assessment assumes that all of the Total Sulphate (%) is in a suitable form that following ground disturbance could oxidise.

The Design Sulphate Class was variable with depth beneath the site ranging from DS-1 to DS-3 within the Made Grounds soils and DS-1 to DS-2 within the underlying natural Langley Silt Member, Kempton Park Gravel Member and London Clay Formation deposits.

The worst case scenario for the site should be assumed as such **DS-3** should be adopted for design purposes. There is a worst case Aggressive Chemical Environment for Concrete (ACEC) site classification is **AC-2.**

It should be noted that increased testing including oxidisable sulphate may result in a reduction of DS-class as in some cases not all total sulphate is readily oxidisable upon disturbance.

7.2 In-Situ Testing

Standard Penetration Testing (SPT) was carried out at 1.0m centres to full depth within boreholes WS1-WS4 and within BH1 at 1.00m centre to 5.00m depth and 1.50m to full depth within the boreholes. The testing was alternated with the recovery of undisturbed U100 samples within the deeper London Clay Formation soils encountered from 10.00m bgl within the borehole. The SPT summaries are presented with the Borehole Logs in Appendix B.

The standard penetration testing within the Made Ground indicated SPT 'N' values of between 0 and 24.

The underlying Langley Silt Member soils indicated an SPT N value of 10. Fine grained soil shear strength can be estimated from the SPT 'N' values based on the correlation by Stroud and Butler, 1975. This shows that the SPT 'N' value can be multiplied by a factor of either 5.0 or 4.5, based on Plasticity Index of less than 40% or greater than 40% respectively, to estimate the soil shear strength in kilo Pascal (kPa). Given that fine grained soils encountered beneath the site have a plasticity index value of generally below 40% the correlated shear strength of the soils tested was 50kPa. Shear vane testing within the Langley Silt Member deposits recorded results of between 78kPa and 143kPa.

The standard penetration testing within the Kempton Park Gravel Member indicated SPT 'N' values of between 12 and 41, indication a classification of medium dense to dense.

The underlying London Clay Formation soils indicated SPT N values of between 17 and 34, with a general increase with depth. Fine grained soil shear strength can be estimated from the SPT 'N' values based on the correlation by Stroud and Butler, 1975. This shows that the SPT 'N' value can be multiplied by a factor of either 5.0 or 4.5, based on Plasticity Index of less than 40% or greater than 40% respectively, to estimate the soil shear strength in kilo Pascal (kPa). Given that fine grained soils encountered beneath the site have a plasticity index value of generally above 40% the correlated shear strength of the soils tested ranged from 76.5kPa and 153kPa.

The resulting derived shears strength indicate a general progressive increase in strength with respect to depth and along with the laboratory triaxial testing are well within the envelope of the expected shear strength profile for London Clay Formation deposits.

The Dynamic Probing results are plotted against depth and presented in Appendix B. The probing gives a Standard Penetration test (SPT or SPTc) equivalent value in 100mm increments (N_{100}). These N_{100} values can then be added into groups of three to produce an equivalent SPT or SPTc N_{300} value to use as a soil strength parameter in general calculation and comparison.

8.0 ENGINEERING EVALUATION

8.1 Introduction

The proposed development scheme involves the demolition of the current single storey day centre building on site and the subsequent development of 9no. three storey residential dwelling, including associated car parking, private gardens and landscaped areas. Some of the dwellings are proposed to have single storey basements.

8.2 Foundation Design Considerations

The Made Ground was highly variably in depth and lateral extend across the site. Made Ground was typically present to depth of between 0.45m (TP1) and 1.0m bgl (WS2), but was much deeper on the north and central eastern areas of site with a maximum depth of 5.50m bgl in BH1 and 4.70m in WS1.

The Made Ground material varied between sandy / gravelly CLAY and clayey sandy GRAVEL with the gravel fraction comprising brick, concrete, ash, glass, plastic, flint, tile and decaying organic matter. The CLAY and GRAVEL strata were also highly variable in insitu strength and compactness, ranging from very soft to stiff for the fine grained deposits and very loose to medium dense for the coarse grained soils.

Deposits of the Langley Silt Member were encountered within trial pits TP1 and TP2, boreholes WS2 and WS4, and within hand excavated trial pits HTP1 and HTP3. Within borehole WS2 and WS4 and TP1 the Langley Silt Member deposits comprised stiff brown dark brown occasionally mottled grey brown to orange brown (slightly sandy) silty CLAY within occasional rootlets, encountered at a depth of between 0.45m to 1.30m and proven up to a maximum of 2.10m within the boreholes and 3.00m within TP1.

Kempton Park Gravel Member deposits were encountered directly beneath the Made Ground within all of the boreholes BH1 and WS1-WS4 at between 2.0m (WS3) and 5.5m (BH1) depth. The Kempton Park Gravel Member deposits were not encountered within either of the trial pits due to their basal depth not being sufficient. The Kempton Park Gravel Member deposits comprised medium dense to dense orange brown, yellow brown and brown slightly clayey slightly sandy GRAVEL to clayey gravelly SAND. Within boreholes WS3 and WS4 an upper unit of the Kempton Park Gravel Member soils was identified at the top of the strata as a thin band of stiff variably sandy variably gravelly CLAY was encountered at the interface with the Made Ground to 2.10 - 2.80 m and 2.00 - 2.70m depth, respectively.

London Clay Formation deposits were proven within the deeper borehole BH1, at 10.10m depth and comprised stiff blue grey silty CLAY. Such deposits were proven to the base of the borehole at 20.0m depth.

Groundwater was encountered at depth of between 4.00 - 5.50m within the boreholes WS1 - WS4 and BH1.

The strength of the Made Ground, especially the deeper Made Ground is variable across the site.

The strength of the Langley Silt Member soils beneath the site have been assessed through standard penetration testing (SPT) in the field and laboratory triaxial strength testing, the results of which are summarised and presented with the logs in Appendix B and show the soils beneath the site to be of soft to high strength.

The strength of the Kempton Park Gravel Member soils beneath the site have been assessed through standard penetration testing (SPT) in the field, the results of which are summarised and presented with the logs in Appendix B and show the granular soils beneath the site to of be of medium dense to dense classification for insitu density.

The strength of the London Clay Formation soils beneath the site have been assessed through standard penetration testing (SPT) in the field and laboratory triaxial strength testing, the results of which are summarised and presented with the logs in Appendix B and show the soils beneath the site to be of high strength.

8.2.1 Soil Volume Change Assessment

Atterberg Limit testing and assessment using the NHBC Standards Chapter 4.2 indicated the fine-grained Langley Silt Member soils sampled to be of Medium to High Volume Change Potential (VCP).

Particle size distribution testing of the coarse grained deposits indicated the Kempton Park Gravel Member have less than 35% fine and as such should be considered a non-plastic. The thin fine grained upper unit of the Kempton Park Gravel Member encountered in WS3 and WS4 was noted to be of Medium VCP.

Atterberg Limit testing and assessment using the NHBC Standards Chapter 4.2 indicated the fine-grained London Clay Formation soils sampled to be of High Volume Change Potential (VCP).

For any plots employing conventional shallow foundations, consideration should be given to minimum foundation depths in relation to tree root action for the trees mainly located around the site boundaries.

8.2.2 Shallow Excavations

Shallow excavations should be readily achieved within the near surface soils using conventional plant, however, where Made Ground / reworked Langley Silt Member was observed to significant depths, this was highly variable and excavation beyond 1.0m depth are likely to encounter a mixture of fine and coarse grained materials, some of which are in a loose / soft state. On this basis, some shoring is likely to be required for excavation beyond 1.0m depth, especially during period of inclement weather.

Groundwater was encountered at depth of between 4.00m - 5.50 m within the boreholes WS1-WS4 and BH1 and c. 4.00m to 4.50m bgl within subsequent monitoring.

At no time should any excavations be entered by personnel with correct shoring and only after an assessment of whether the task can be completed without entry to the excavation has been completed.

8.3 Floor Slabs

Based on the strata encountered during the investigation, such as the presence of significant depth of Made Ground at the surface, the use of ground bearing floors is not recommended for ground level movement sensitive structures as detailed in Section 5.1 of the NHBC Standards.

In areas of the site where basements are proposed a ground bearing floor slab could be utilised if the floor slab level allows it to bear below any Made Ground onto the coarse grained Kempton Park Gravel Member deposits across the footprint of the structure. In areas of deeper Made Ground, such as around BH1 and WS1 in the northeast area of the site, the floor slab may need to be suspected.

8.4 Foundation Options Discussion

The proposed development involves the demolition of the current single storey day centre building on site and the subsequent development of 9no. three storey residential dwelling, including associated car parking, private gardens and landscaped areas and single storey basements beneath some of the dwellings.

Beneath most areas of the site Made Ground was encountered to a maximum depth of around 2.1m, generally 0.45m to 1.00m. As such, it may be feasible to adopt a spread foundation solution for some of the structures where Made Ground does not extend to below around 2.1m depth, and the foundation can be formed to bear upon the Kempton Park Gravel Member soils.

For any of the proposed dwellings without basements it may be possible for conventional foundations to employed. These should be extended down to the Kempton Park Gravel strata where reachable (c.<2.50m depth) as the overlying Made Ground and Langley Silt Member Deposits are not considered suitable bearing strata due to their variability in composition and general low strength.

For any plots employing conventional shallow foundations, consideration should be given to minimum foundation depths in relation to tree root action for the trees mainly located around the site boundaries.

We understand that some of the proposed dwellings are to include single storey basements. In the northeast of the site Made Ground was encountered to a maximum of 5.50m bgl within BH1. With a suspected basement basal level of c. 3.50m bgl, the Made Ground would not be penetrated and as such it is recommended that in these areas a deeper piled foundation be employed.

Due to high variability of the depths of Made Ground across the site, for the detailed design stage additional investigation is required to allow delineation of the zone of deep Made Ground and a profile of Made Ground depth/depth to bearing strata across the site. This could be achieved using a closely space grid of dynamic probing across the site.

The above foundation options and design approaches are subject to detailed Structural Engineer design and regulator agreement.

8.5 Bearing Capacity

Where conventional shallow foundations are deemed feasible, then at a minimum depth of approximately 2.0m bgl bearing into the coarse grained Kempton Park Gravel Member soils, an allowable bearing capacity would be of the order of **160kPa**.

For new strip foundations, such as retaining walls for the basements, bearing on soils at a depth of 3.00m to 4.00m below existing ground levels onto the granular Kempton Park Gravel Member soil, the allowable bearing capacity would be in the order of **250kPa**.

For a raft foundation or ground bearing floor slab, such as the floor slab for the proposed basement, bearing on soils at a depth of 3.00m to 4.00m below existing ground levels onto Kempton Park Gravel Member soils, the allowable bearing capacity would be in the order of **150kPa**.

These estimates further include a factor of safety of 3 against general shear failure and should keep settlements within tolerable limits.

Any excavations for the footings should be inspected by a suitably qualified person to assess the variability of the soils and groundwater conditions. If, following inspection, the soil conditions differ from those identified within this geotechnical appraisal the recommendations may require reassessment. Any roots, organic matter, and in particular any 'soft/loose' or otherwise unsuitable material encountered at the founding depth should be removed prior to pouring of any concrete.

8.6 Retaining Structures Design Criteria

It is considered that retaining structures may be required for the proposed works as basement are to be present within some of the proposed dwellings. For the design of retaining structures, the groundwater details in Section 4.2 should be noted. In summary groundwater was encountered within the boreholes at its shallowest depth of 4.00m bgl.

Site specific testing was not carried out for the derivation of retaining structure design coefficients. However, much geotechnical data is available for the strata encountered beneath the site from published sources, best practice and PGE's experience of similar ground conditions in the area of the site. Therefore, the most appropriate effective stress design coefficients have been selected and are summarised below. The design values may be taken as 'worst credible' following the guidance of CIRIA C580 Embedded retaining walls - guidance for economic design: 2003.

Retaining Structure Design Criteria

Strata	Bulk Density (Mgm^{-3})	Effective Cohesion (c') kNm^{-2}	Effective Friction Angle (φ') (degrees)
Made Ground	1.70	0	20^{o}
Kempton Park Gravel Member	1.90	0	35^{0}

8.7 Basement Excavation

On the basis of the investigation and monitoring data obtained to date it is considered that an excavation up to the suspected proposed basement floor depth of 3.50m bgl is not considered likely to encounter significant groundwater at its base. Further groundwater monitoring is planned.

The natural soils encountered are considered to remain stable in the short term above the groundwater level within shallow excavations from assessment of the stability of the boreholes and

trial pits. However, where Made Ground / reworked Langley Silt Member was observed to significant depths, this was highly variable and excavation beyond 1.0m depth are likely to encounter a mixture of fine and coarse grained materials, some of which are in a loose / soft state. On this basis, some shoring is likely to be required for excavation beyond 1.0m depth, especially during period of inclement weather.

8.8 Excavation Heave

The basement excavation is considered likely to be approximately 3.50m depth (3.00m of basement and 0.50m for structure), and this soil removal is likely to result in the unloading of the formation soils by some 75kN/m^2, which should be considered in basement slab design.

The borehole BH1 indicated that the London Clay Formation deposits are present at below 10.10m bgl beneath the Kempton Park Gravel Member soils. As the London Clay Formation soils are fine grained, such stress reduction could potentially result in heave movements within the underlying London Clay Formation.

Given the depth of the London Clay Formation of greater than 10.10m bgl and the cover of granular Kempton Park Gravel soils between the basement basal level of 3.50m bgl and this level, significant heave that will adversely affect the basement slab is unlikely to occur.

Groundwater was encountered at a depth of between c.4.00m and 5.50m within the boreholes during the investigation and between c. 4.00m and 4.50m in subsequent monitoring. On the above basis uplift due to potential hydrostatic pressures from groundwater are not considered to be likely to occur at a basal basement depth of 3.50m bgl.

8.9 Sub-Surface Concrete

The Design Sulphate Class was variable with depth beneath the site ranging from DS-1 to DS-3 within the Made Grounds soils and DS-1 to DS-2 within the underlying natural Langley Silt Member, Kempton Park Gravel Member and London Clay Formation deposits.

The worst case scenario for the site should be assumed as such **DS-3** should be adopted for design purposes. There is a worst case Aggressive Chemical Environment for Concrete (ACEC) site classification is **AC-2.**

8.10 Foundations of Existing Structures

Foundation Trial Pits were excavated to expose the foundations of the existing structures.

A concrete footing was encountered within all three trial pits bearing at approximately 1.50m depth. The footing appears to be placed onto Made Ground within HTP2 and on possibly Langley Silt Member deposits within HTP1 and HTP3.

The trial pits were excavated by handheld equipment and once completed and logged, were backfilled with arisings.

The location of the Foundation Trial Pit, schematic sections and photographs of the foundations exposed are presented in Appendix B.

8.11 Piled Foundation Parameters

The table below summarises the ultimate coefficients which may be employed for preliminary pile design. These values are based on the SPT and cohesion data detailed above and in the Appendices.

Preliminary Piled Foundation Coefficients

Unit	Encountered Depth (m begl)	Max. Thickness (m)	SPT N	Cu (kPa)	Ultimate Skin Friction (kN/m2)	Ultimate End Bearing (kN/m2)
Made Ground	GL – 5.5m max.	5.5 max.	0 -24	-	N/A	N/A
Langley Silt Member (encountered locally only)	0.45-0.90	2.5 max.	-	-	N/A	N/A
Kempton Park Gravel Member	2.1-5.5	5.5 max.	5-41	-	50	NR
London Clay Formation	>10.5	Proven to 20.00m depth	17-34	76-153*	30 – 61**	1377***
Notes * Assumed to increasing linearly with depth and maximum SPT of N=27. ** using 0.4 * Cu *** Assuming 20m pile length						

The piles are to be founded at a minimum of two pile diameters into bearing strata.

Groundwater was encountered at depth of between 4.00 - 5.50m depth within the borehole.

The piles will likely extend beyond the maximum depth of any soil desiccation. Where trees are to be remove, rewetting of soils may result in expansion of soils and possible negative skin friction on the upper section of piles. Therefore, this potential ground movement should be allowed for in the design of the piled foundation solution.

8.12 Surface Water Soakaways and Soil Permeability

Infiltration testing was carried out on the site within the Trial Pits TP1 and TP2 within the Langley Silt Member strata employing the BRE365 methodology. These tests indicated insignificant infiltration within 3 hours so were considered to be a failure.

Infiltration Testing Results

Trial Pit	Cycle	Depth of Test (m begl)	Infiltration Factors (ms^{-1})
TP1	1	2.60-3.00	Insufficient infiltration in over 3 hours – Test Failed
TP2	1	1.20-2.00	Insufficient infiltration in over 3 hours – Test Failed

Given the infiltration values calculated, it is considered that conventional soakaways would **NOT** be effective on the site within the underlying natural Langley Silt Member deposits. The granular Kempton Park Gravel Member soils encountered at depth beneath the site have proven to be effectively permeable from other projects carried out by PGE in the site area. As such another method for disposal of surface water further down the hierarchy of preference should be sought.

8.13 Access Roadways and Parking Areas

Due to the hardstanding present across the site, and high variability of soils on site some containing grain sizes of greater than 20mm, CBR determinations using a CBR plunger were considered unsuitable. Thus in-situ CBR determinations were carried out in three locations with a Mexe Cone Penetrometer. The Mexe Cone Penetrometer is a lightweight apparatus designed to measure in-situ resistance to penetration and provide a direct correlation in terms of California Bearing Ratio (CBR) value. The location of the testing is indicated on the exploratory point location plan and are summarised in the table below.

Penetration (mm)	CBR1 (%)	CBR2 (%)	CBR3 (%)	CBR4 (%)	CBR5 (%)	CBR6 (%)
75	8	4	4	9	8	8
150	14+	6	5	7	13	8
225	-	7	5	6	4	14+
300	-	7	4	6	4	-
375	-	8	6	5	5	-

Employing the worst case values, a design CBR value of 4% should be employed for highway design founding at approximate 0.30m bgl.

8.14 Recommendation for further works

Due to the highly variable depths of Made Ground and low strength highly organic Langley Silt Member deposits encountered a conventional shallow foundation option is unsuitable for some plots.

Further intrusive works would be required at detailed design stage to confirm the depth of Made Ground / soft Langley Silt Member deposits at each plot to assess the best foundation solution.

9.0 CERTIFICATION

This report is produced for the sole use of the Client, and no responsibility of any kind, whether for negligence or otherwise, can be accepted for any Third Party who may rely upon it.

The conclusions and recommendations given in this report are based on our understanding of the future plans for the site and based on a scope of works agreed by the Client and afforded by the agreed budget. No responsibility is accepted for conditions not encountered, which are between exploratory points or outside of the agreed scope of work.

If the future plans for the site are changed, such as the site is developed for a more or less sensitive use, then a different interpretation might be appropriate.

The report has been prepared generally following the guidelines and principles established in the British Standards, BS5930:1999+A2:2010, BS 10175:2011, entitled 'Investigation of Potentially Contaminated Sites – Code of Practice' and the DEFRA/EA Contaminated Land Reports CLR7 and CLR8.

It necessarily relies on the co-operation of other organisations and the free availability of information and total access. No responsibility can, therefore, be accepted for conditions arising from information that was not available to the investigating team as a result of information being withheld or access being denied.

This report may suggest an opinion on a suspected configuration of strata or conditions between exploratory points and below the maximum depth of investigation. However, this is for guidance only and no liability can be accepted for its accuracy. Comments on the groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. It should be noted, however, that groundwater levels might vary due to seasonal or other effects.

It should be noted that this report is based solely on the samples collected in the borehole locations investigated. During the works and following general site clearance, should the sub-soil conditions in other areas of the site appear to be inconsistent with those found in the areas sampled then this geotechnical appraisal and site contamination assessment may need to be reviewed.

This report is prepared and written in the context of the proposals stated in the introduction to this report and it should not be used in a differing context. Furthermore, new information, improved practices and changes in legislation may require an alteration to the report in whole or in part after its submission. Therefore, with any changes in circumstances, or after one year from the date of the report, the report should be referred back to Paddock Geo Engineering Limited for re-assessment (and, if necessary, for an estimate for the cost of such).

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APPENDIX A – MAPS AND PLANS

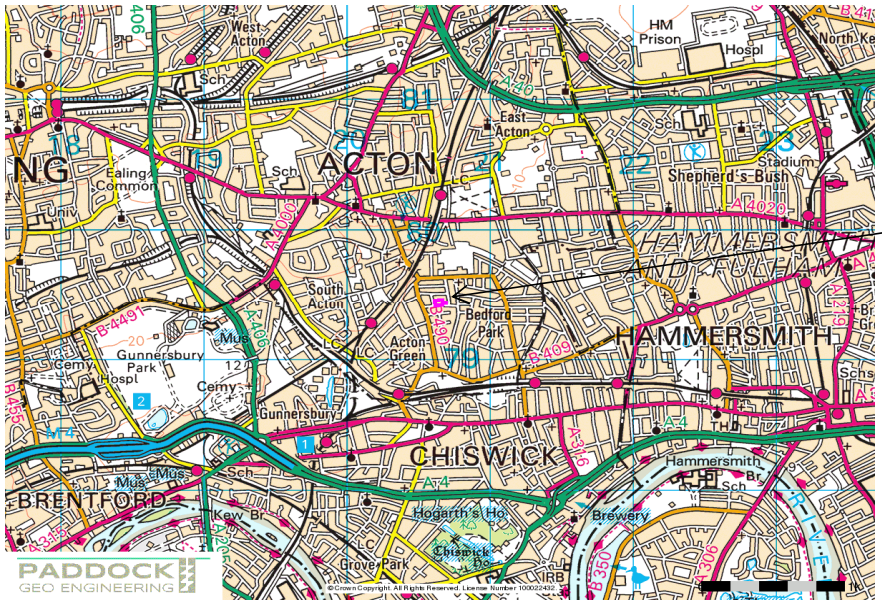
Site Location Plan

Site Plan

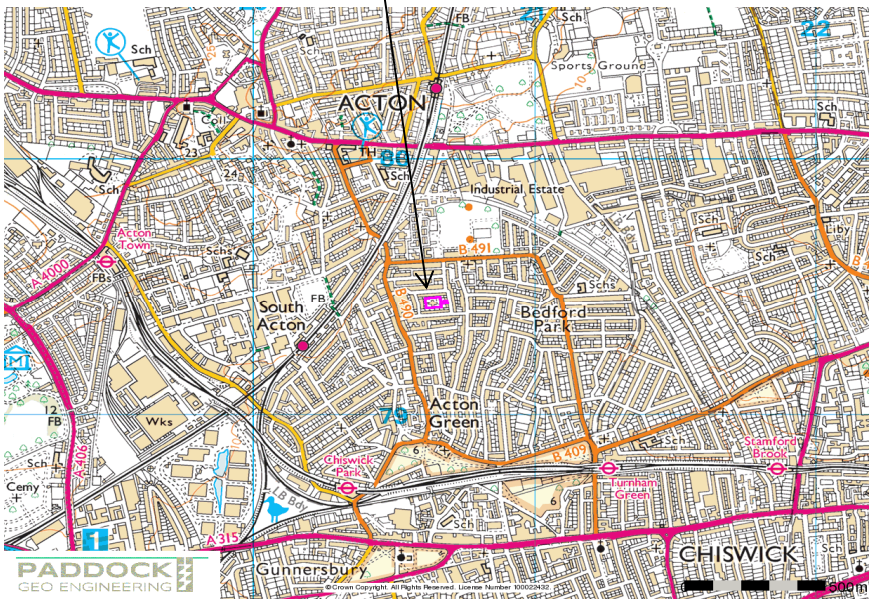
Aerial Photograph

Proposed Development Plan

SITE LOCATION PLAN

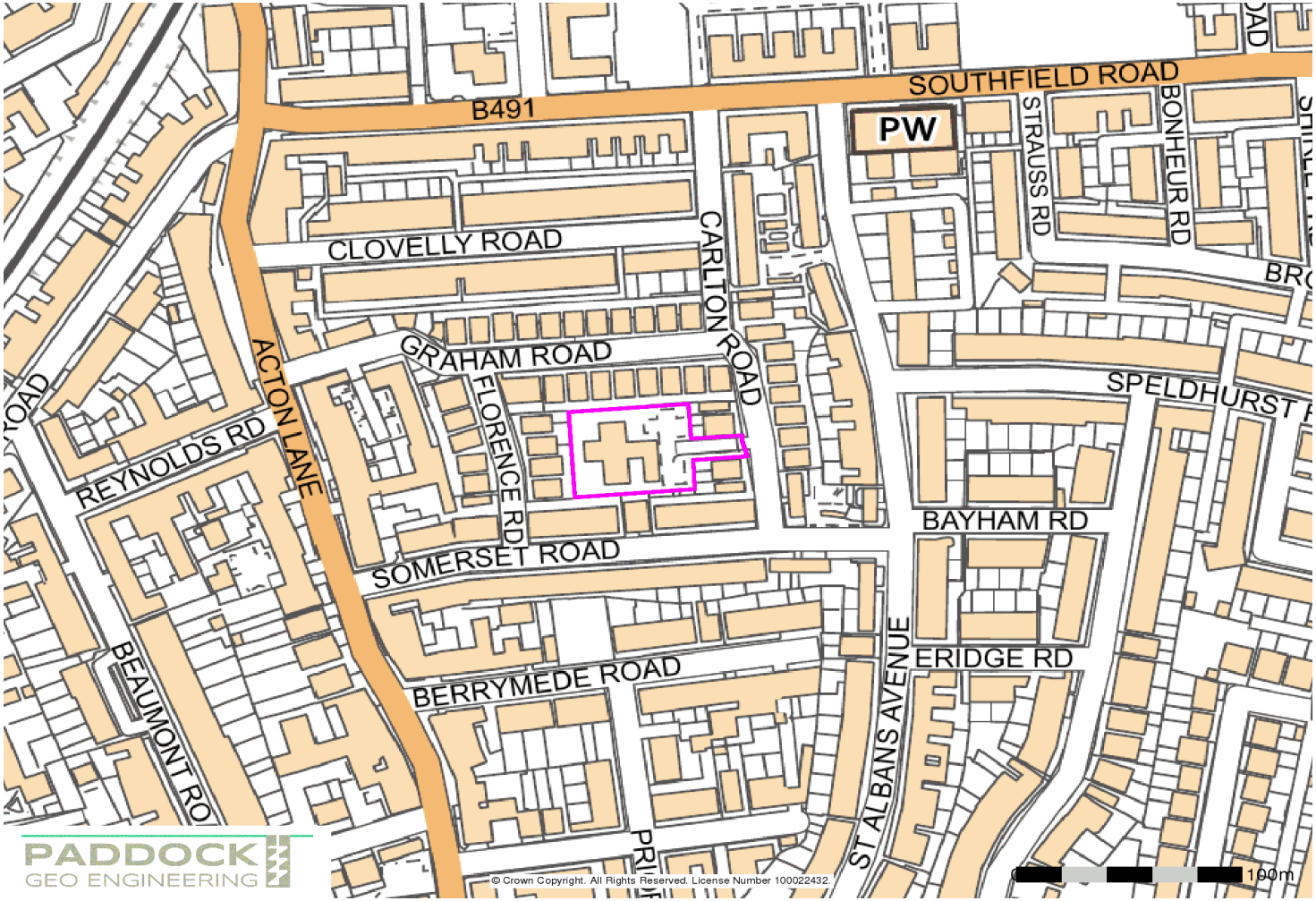


Site Location



CLIENT:	Fornacelli Limited
PROJECT No:	P20-180
PROJECT TITLE:	8-10 Carlton Road, Chiswick, W4 5DY

SITE PLAN



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	PROJECT No:	P20-180
	PROJECT TITLE:	8-10 Carlton Road, Chiswick, W4 5DY

AERIAL PHOTOGRAPH

PADDOCK GEO ENGINEERING	**CLIENT:**	Fornacelli Limited
	PROJECT No:	P20-180
	PROJECT TITLE:	8-10 Carlton Road, Chiswick, W4 5DY


GRAHAM ROAD
CAMILTON ROAD
FLORENCE ROAD

APPENDIX B – SITE DETAILS

Exploratory Point Location Plan

Borehole Logs

Dynamic Probing Logs

Trial Pit Logs

Foundation Trial Pit Schematic Sections

Site Photographs

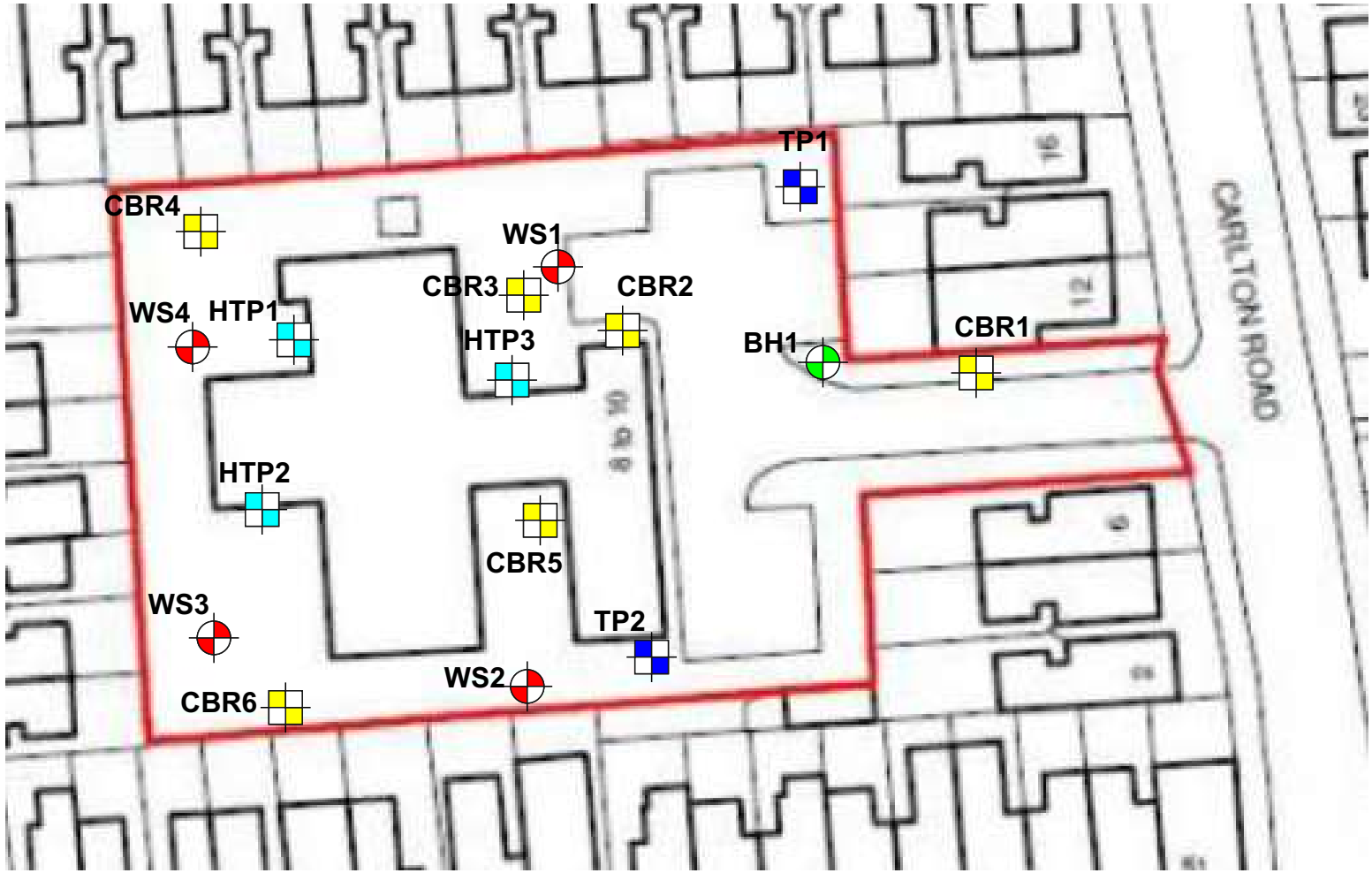
PADDOCK GEO ENGINEERING

Exploratory Point Location Plan

8-10 Carlton Road, Chiswick, W4 5DY

Fornacelli Limited

August 2020



- Machine Excavated Trial Pit Location
- Hand Excavated Trial Pit Location
- In-situ CBR Test Location
- Cable Percussion Borehole Location
- Window Sample Borehole Location

Not to scale.
All positions are approximate and subject to change.
Plan based on plan provided by Peringuer-James

PADDOCK GEO ENGINEERING

Site	Borehole Number
8-10 Carlton Road, Chiswick, W4 5DY	BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	0.15mm cased to 20.00m		Fornacelli Limited	P20-180

Location	Dates	Project Contractor	Sheet
	01/08/2020	PGE	1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.40 0.50	C D					(1.00)	Grass onto dark brown sandy GRAVEL with rootlets and occasional cobbles. Gravel is brick, concrete, flint, plastic and glass. Cobbles are brick and concrete. (MADE GROUND)			
						1.00				
1.10 1.20-1.65 1.20	C SPT(C) N=4 D	1.00		1,1/1,1,1,1			Dark brown to brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse angular to sub-rounded flint and brick. (MADE GROUND)			
2.00-2.45 2.00	SPT(C) N=5 D	1.50		1,1/1,2,1,1			... organic inclusions from 2.0m depth.			
2.50	D									
3.00-3.45	SPT(C) N=7	1.50		1,1/1,3,1,2		(4.50)				
3.50	D									
4.00-4.45 4.00	SPT(C) N=5 D	1.50		1,1/2,1,1,1						
4.50	D								1	
5.00-5.45 5.00	SPT(C) N=5 D	1.50		1,1/1,1,1,2						
				SLOW(1) at 5.50m, rose to 4.80m in 20 mins.		5.50	Medium dense brown slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse sub-round flint. (KEMPTON PARK GRAVEL MEMBER)		1	
6.00	D									
6.50-6.95 6.50	SPT(C) N=24 D	6.50		2,4/4,5,7,8						
7.50	D									
8.00-8.45	SPT(C) N=30	8.00		4,6/5,7,8,10		(5.00)	... becoming dense from 8.0m depth.			
9.00	D			20/07/2020:8.00m 21/07/2020:8.00m						
9.50-9.95	SPT(C) N=31	9.50		5,5/6,8,8,9						

Remarks
Waiting to gain access to site from 8:00am to 11:45am.
Hand excavated to 1.2m depth for service clearance trial pit.
UXO engineer in attendance.
Monitoring standpipe installed upon completion.

Scale (approx)	Logged By
1:50	

Figure No. P20-180.BH1

PADDOCK GEO ENGINEERING

Site	Borehole Number
8-10 Carlton Road, Chiswick, W4 5DY	BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	0.15mm cased to 20.00m		Fornacelli Limited	P20-180
	Location	**Dates** 01/08/2020	**Project Contractor** PGE	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00	D					10.50				
11.00	U			53 blows			Stiff blue grey silty CLAY. (LONDON CLAY FORMATION)			
12.00	D									
12.50-12.95	SPT(C) N=17	10.00		3,3/4,3,5,5						
12.50	D									
13.50	D									
14.00	U			78 blows						
15.00	D					(9.50)				
15.50-15.95	SPT(C) N=21	10.00		4,5/5,5,6,5						
15.50	D									
16.50	D									
17.00	U			85 blows						
18.00	D									
18.50-18.95	SPT(C) N=31	10.00		5,6/6,8,8,9						
18.50	D									
19.50	D									
				21/07/2020:N/A						
20.00	D					20.00				

Remarks
Waiting to gain access to site from 8:00am to 11:45am.
Hand excavated to 1.2m depth for service clearance trial pit.
UXO engineer in attendance.
Monitoring standpipe installed upon completion.

Scale (approx)	Logged By
1:50	

Figure No. P20-180.BH1

PADDOCK GEO ENGINEERING

Site	Borehole Number
8-10 Carlton Road, Chiswick, W4 5DY	BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	0.15mm cased to 20.00m		Fornacelli Limited	P20-180
	Location	**Dates** 01/08/2020	**Project Contractor** PGE	**Sheet** 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
20.00-20.45	SPT(C) N=34	10.00		5,7/6,8,9,11						

Remarks

Scale (approx)	Logged By
1:50	

Figure No. P20-180.BH1

PADDOCK GEO ENGINEERING

Site	Number
8-10 Carlton Road, Chiswick, W4 5DY	WS1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	87mm to 1.00m 57mm to 4.00m 77mm to 2.00m 47mm to 5.00m 67mm to 3.00m 47mm to 6.00m		Fornacelli Limited	P20-180
	Location	**Dates** 21/07/2020	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.30)	Grass onto brown to grey brown slightly sandy very gravelly CLAY with rootlets. Gravel is flint and brick. (MADE GROUND)			
0.40	C				0.30				
0.40	D					Stiff grey brown slightly sandy slightly gravelly CLAY with rootlets to 1.45m depth. Gravel of fine to coarse sub-angular to sub-rounded flint and occasional brick and concrete. (MADE GROUND)			
0.90	C				(1.10)				
1.00-1.45	SPT(C) N=8		1,1/2,2,2,2						
					1.40	Dark grey silty very gravelly SAND. Gravel is brick, flint, tile, concrete, plastic and ceramic. (MADE GROUND)			
1.80	C				(0.90)				
1.80	D								
2.00-2.45	SPT(C) N=0		1,1/		2.30	Soft dark brown grey to dark grey black slightly gravelly sandy CLAY with organic inclusions (MADE GROUND)			
2.90	D								
3.00-3.45	SPT(C) N=0		1/						
					(2.40)				
4.00-4.45	SPT(C) N=0		1/						
4.50	D							▽1	
			Water strike(1) at 4.70m.		4.70	Medium dense dark orange brown slightly clayey very sandy GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded flint. (KEMPTON PARK GRAVEL MEMBER)			
5.00-5.45	SPT(C) N=25		9,6/7,6,5,7						
					(1.30)				
5.50	D								
					6.00	Complete at 6.00m			

Remarks
Groundwater encountered at 4.7m depth.
Terminated at 6m and continued as dynamic probe, see DP1.
Collapse between 5.0-6.0m depth.
UXO engineer in attendance.

Scale (approx)	Logged By
1:50	MC

Figure No. P20-180.WS1

PADDOCK GEO ENGINEERING

Site	Number
8-10 Carlton Road, Chiswick, W4 5DY	WS2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	87mm to 1.00m, 77mm to 2.00m, 67mm to 3.00m, 57mm to 4.00m, 47mm to 5.00m		Fornacelli Limited	P20-180
	Location	**Dates** 21/07/2020	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.30)	Vegetation onto dark grey brown gravelly sandy CLAY with roots and rootlets. Gravel is flint, brick and concrete. (MADE GROUND)			
0.40	D				0.30				
					(0.70)	Stiff grey brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is brick, flint and concrete. (MADE GROUND)			
0.90	C								
1.00-1.45	SPT(C) N=10		2,2/2,3,2,2,3		1.00	Stiff brown mottled grey brown to orange brown silty CLAY with occasional rootlets to 2.0m depth. (LANGLEY SILT MEMBER)			
1.50	C				(1.10)				
1.50	D								
2.00-2.45	SPT(C) N=19		3,3/4,3,5,7		2.10				
2.20	D				(0.40)	Stiff dark orange brown speckled black variably sandy gravelly CLAY. (REWORKED KEMPTON PARK GRAVEL MEMBER)			
					2.50				
					(0.35)	Medium dense brown to orange brown to grey clayey gravelly SAND. Gravel is fine to coarse angular to sub-rounded flint. (KEMPTON PARK GRAVEL MEMBER)			
2.70	D				2.85				
3.00-3.45	SPT(C) N=24		7,6/6,6,6,6			Dense light brown to yellow brown clayey very gravelly SAND. Gravel is fine to medium sub-rounded flint. (KEMPTON PARK GRAVEL MEMBER)			
3.50	D				(1.35)				
4.00-4.45	SPT(C) N=34		5,7/8,9,9,8						
			Water strike(1) at 4.30m.		4.20	Dense dark yellow brown to light brown slightly silty very sandy GRAVEL. Gravel is fine to medium sub-rounded flint. (KEMPTON PARK GRAVEL MEMBER)		▽1	
4.50	D				(0.80)				
					5.00	Complete at 5.00m			

Remarks
Terminated at 5m and continued as dynamic probe, see DP2.
Groundwater encountered at 4.3m depth.
Collapse between 4.3-5.0m depth.
UXO engineer in attendance.

Scale (approx)	Logged By
1:50	MC

Figure No. P20-180.WS2

PADDOCK GEO ENGINEERING

Site	Number
8-10 Carlton Road, Chiswick, W4 5DY	WS3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	87mm to 1.00m 57mm to 4.00m 77mm to 2.00m 67mm to 3.00m		Fornacelli Limited	P20-180
	Location	**Dates** 22/07/2020	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					0.05	CONCRETE paving slab. (MADE GROUND)			
0.40	C				(0.75)	Stiff brown grey slightly sandy CLAY. (MADE GROUND)			
0.40	D				0.80				
1.00-1.45	SPT(C) N=8		1,1/1,2,2,3			Medium dense variably dark grey to dark brown to black very gravelly clayey SAND. Gravel is brick, tile, ash, clinker, occasional glass and organic matter. (MADE GROUND)			
1.40	C				(1.30)				
1.40	D								
2.00-2.45	SPT(C) N=8		0,1/2,2,2,2		2.10				
2.40	D					Stiff dark orange brown speckled black variably sandy gravelly CLAY. (REWORKED KEMPTON PARK GRAVEL MEMBER)			
2.50	SV 149kPa				(0.70)				
					2.80				
3.00-3.45	SPT(C) N=41		10,11/11,10,10,10			Dense light brown to yellow brown clayey gravelly SAND. Gravel is fine to medium sub-rounded flint. (KEMPTON PARK GRAVEL MEMBER)			
3.40	D				(1.20)				
			Water strike(1) at 4.00m.		4.00			▽1	
						Complete at 4.00m			

Remarks
Groundwater encountered at 4.0m depth.
Terminated at 4m and continued as dynamic probe, see DP3.
UXO engineer in attendance.

Scale (approx)	Logged By
1:50	MC

Figure No. P20-180.WS3

PADDOCK GEO ENGINEERING

Site	Number
8-10 Carlton Road, Chiswick, W4 5DY	WS4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler	87mm to 1.00m, 77mm to 2.00m, 67mm to 3.00m, 57mm to 4.00m, 47mm to 5.00m		Fornacelli Limited	P20-180
	Location	**Dates** 21/07/2020	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.15) 0.15	Grass onto dark brown sandy gravelly CLAY with frequent rootlets. Gravel is concrete and flint. (MADE GROUND)			
0.40	D				(0.65)				
					0.80	Stiff grey very gravelly CLAY with occasional rootlets. Gravel is concrete. (MADE GROUND)			
0.90	C								
1.00-1.45	SPT(C) N=9		1,1/2,3,2,2		(0.50)	Loose dark grey to grey very gravelly SAND. Gravel is concrete, brick, and rare tile fragments. (MADE GROUND)			
					1.30				
					(0.70)	Firm to stiff brown to dark brown occasionally speckled black slightly sandy silty CLAY. (LANGLEY SILT MEMBER)			
1.70	D								
1.80	SV 156kPa								
2.00-2.45	SPT(C) N=12		2,2/2,3,4,3		2.00				
					(0.70)	Stiff dark orange brown speckled black variably sandy gravelly CLAY. (REWORKED KEMPTON PARK GRAVEL MEMBER)			
2.40	D								
2.50	SV 98kPa								
					2.70				
2.90	D					Stiff brown to dark orange brown to grey slightly sandy very gravelly CLAY. Gravel is fine to coarse angular to sub-rounded flint. (KEMPTON PARK GRAVEL MEMBER)			
3.00-3.45	SPT(C) N=24		4,2/3,5,7,9		(1.00)				
					3.70				
3.80	D					Medium dense brown to light brown clayey gravelly SAND. Gravel is fine to medium sub-rounded flint. (KEMPTON PARK GRAVEL MEMBER)		▽1	
			Water strike(1) at 4.00m.						
4.00-4.45	SPT(C) N=20		5,4/4,5,5,6		(1.30)				
4.80	D								
					5.00	Complete at 5.00m			

Remarks
Collapse between 4.0-5.0m depth.
Terminated at 5m and continued as dynamic probe, see DP4.
Groundwater encountered at 4.0 depth.
UXO engineer in attendance.

Scale (approx)	Logged By
1:50	MC

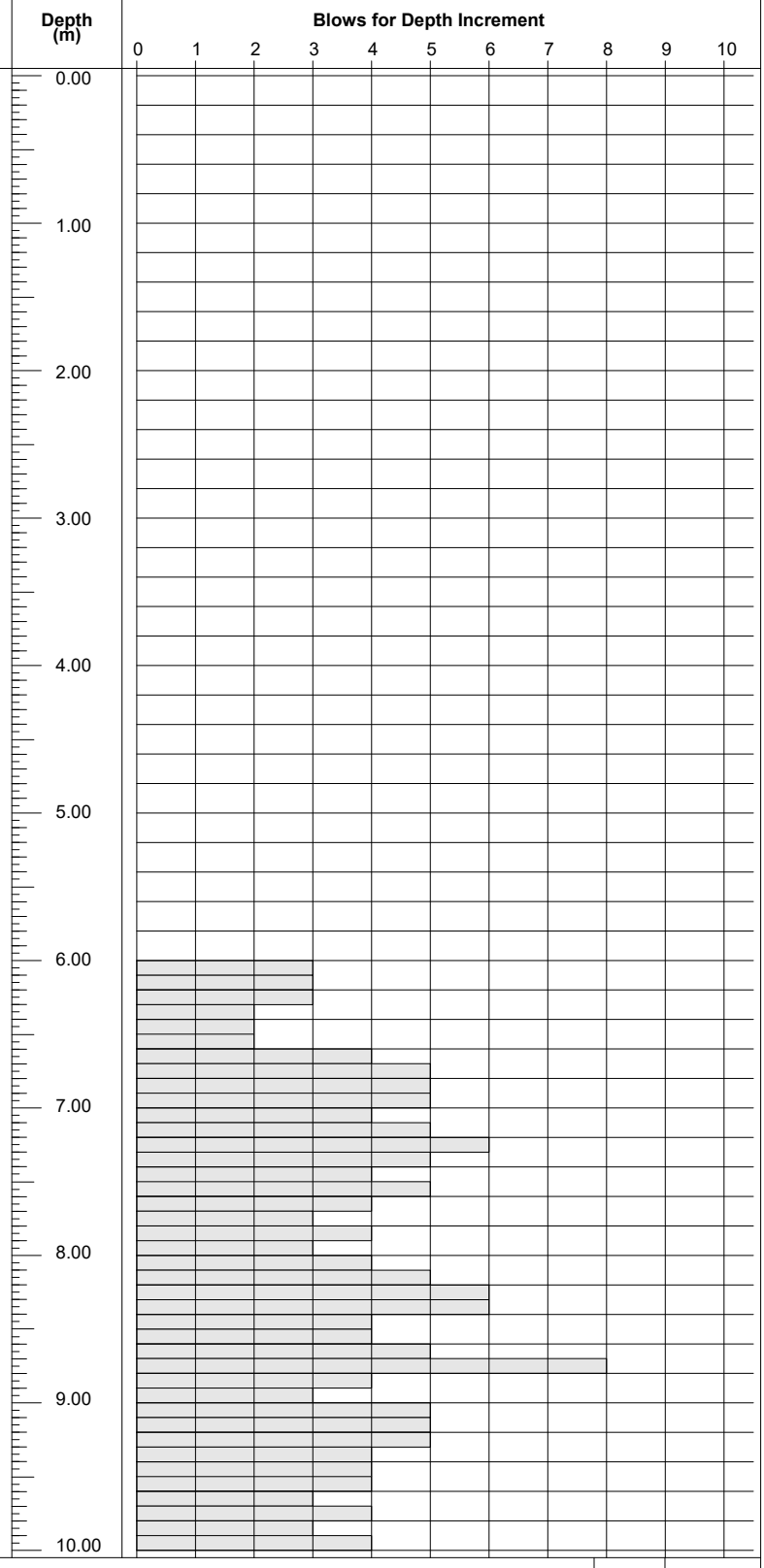
Figure No. P20-180.WS4

PADDOCK GEO ENGINEERING

Site	Probe Number
8-10 Carlton Road, Chiswick, W4 5DY	DP1

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probing			Fornacelli Limited	P20-180
	Location	**Dates**	**Engineer**	**Sheet**
		21/07/2020		1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)
6.00-6.10	3		
6.10-6.20	3		
6.20-6.30	3		
6.30-6.40	2		
6.40-6.50	2		
6.50-6.60	2		
6.60-6.70	4		
6.70-6.80	5		
6.80-6.90	5		
6.90-7.00	5		
7.00-7.10	4		
7.10-7.20	5		
7.20-7.30	6		
7.30-7.40	5		
7.40-7.50	4		
7.50-7.60	5		
7.60-7.70	4		
7.70-7.80	3		
7.80-7.90	4		
7.90-8.00	3		
8.00-8.10	4		
8.10-8.20	5		
8.20-8.30	6		
8.30-8.40	6		
8.40-8.50	4		
8.50-8.60	4		
8.60-8.70	5		
8.70-8.80	8		
8.80-8.90	4		
8.90-9.00	3		
9.00-9.10	5		
9.10-9.20	5		



Remarks

Scale (approx)	Logged By
1:50	MC

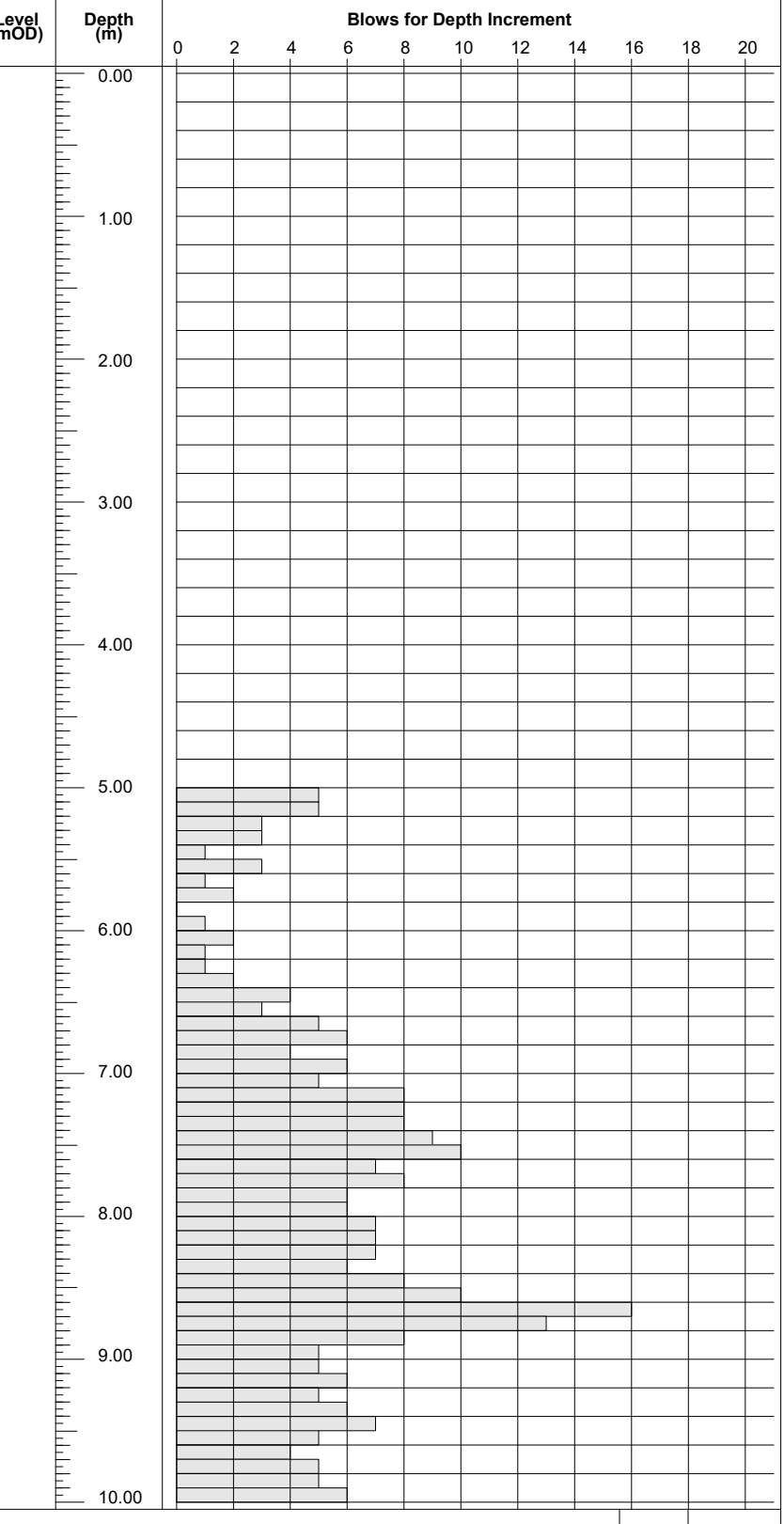
Figure No. P20-180.DP1

PADDOCK GEO ENGINEERING

Site	Probe Number
8-10 Carlton Road, Chiswick, W4 5DY	DP2

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probing			Fornacelli Limited	P20-180
	Location	**Dates**	**Engineer**	**Sheet**
		21/07/2020		1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)
5.00-5.10	5		
5.10-5.20	5		
5.20-5.30	3		
5.30-5.40	3		
5.40-5.50	1		
5.50-5.60	3		
5.60-5.70	1		
5.70-5.80	2		
5.80-5.90	0		
5.90-6.00	1		
6.00-6.10	2		
6.10-6.20	1		
6.20-6.30	1		
6.30-6.40	2		
6.40-6.50	4		
6.50-6.60	3		
6.60-6.70	5		
6.70-6.80	6		
6.80-6.90	4		
6.90-7.00	6		
7.00-7.10	5		
7.10-7.20	8		
7.20-7.30	8		
7.30-7.40	8		
7.40-7.50	9		
7.50-7.60	10		
7.60-7.70	7		
7.70-7.80	8		
7.80-7.90	6		
7.90-8.00	6		
8.00-8.10	7		
8.10-8.20	7		
8.20-8.30	7		
8.30-8.40	6		
8.40-8.50	8		
8.50-8.60	10		
8.60-8.70	16		
8.70-8.80	13		
8.80-8.90	8		
8.90-9.00	5		



Remarks

Scale (approx)	Logged By
1:50	MC

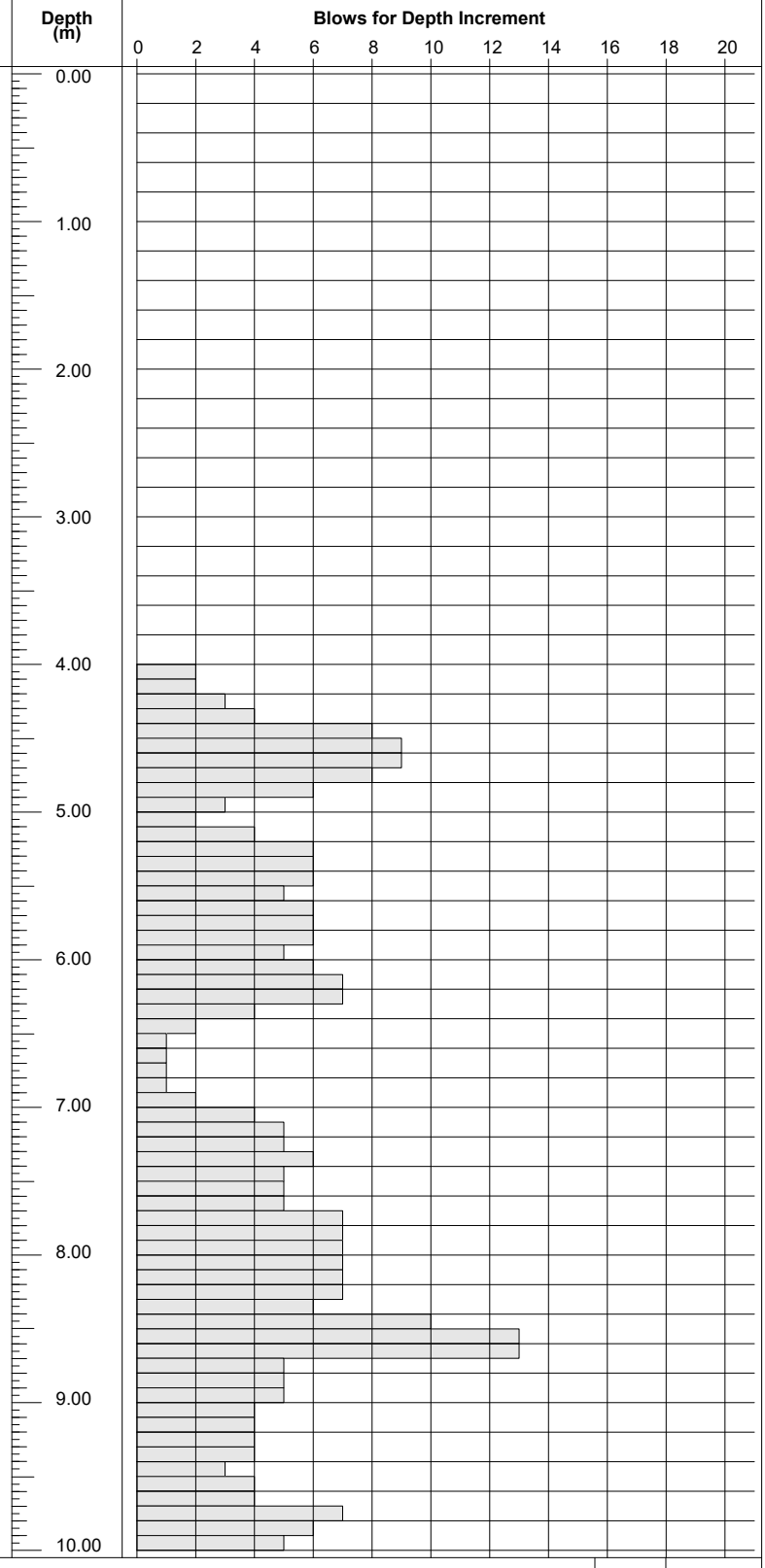
Figure No. P20-180.DP2

PADDOCK GEO ENGINEERING

Site	Probe Number
8-10 Carlton Road, Chiswick, W4 5DY	DP3

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probing			Fornacelli Limited	P20-180
	Location	**Dates**	**Engineer**	**Sheet**
		22/07/2020		1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)
4.00-4.10	2		
4.10-4.20	2		
4.20-4.30	3		
4.30-4.40	4		
4.40-4.50	8		
4.50-4.60	9		
4.60-4.70	9		
4.70-4.80	8		
4.80-4.90	6		
4.90-5.00	3		
5.00-5.10	2		
5.10-5.20	4		
5.20-5.30	6		
5.30-5.40	6		
5.40-5.50	6		
5.50-5.60	5		
5.60-5.70	6		
5.70-5.80	6		
5.80-5.90	6		
5.90-6.00	5		
6.00-6.10	6		
6.10-6.20	7		
6.20-6.30	7		
6.30-6.40	4		
6.40-6.50	2		
6.50-6.60	1		
6.60-6.70	1		
6.70-6.80	1		
6.80-6.90	1		
6.90-7.00	2		
7.00-7.10	4		
7.10-7.20	5		
7.20-7.30	5		
7.30-7.40	6		
7.40-7.50	5		
7.50-7.60	5		
7.60-7.70	5		
7.70-7.80	7		
7.80-7.90	7		
7.90-8.00	7		
8.00-8.10	7		
8.10-8.20	7		
8.20-8.30	7		
8.30-8.40	6		
8.40-8.50	10		
8.50-8.60	13		
8.60-8.70	13		
8.70-8.80	5		



Remarks

Scale (approx)	Logged By
1:50	MC

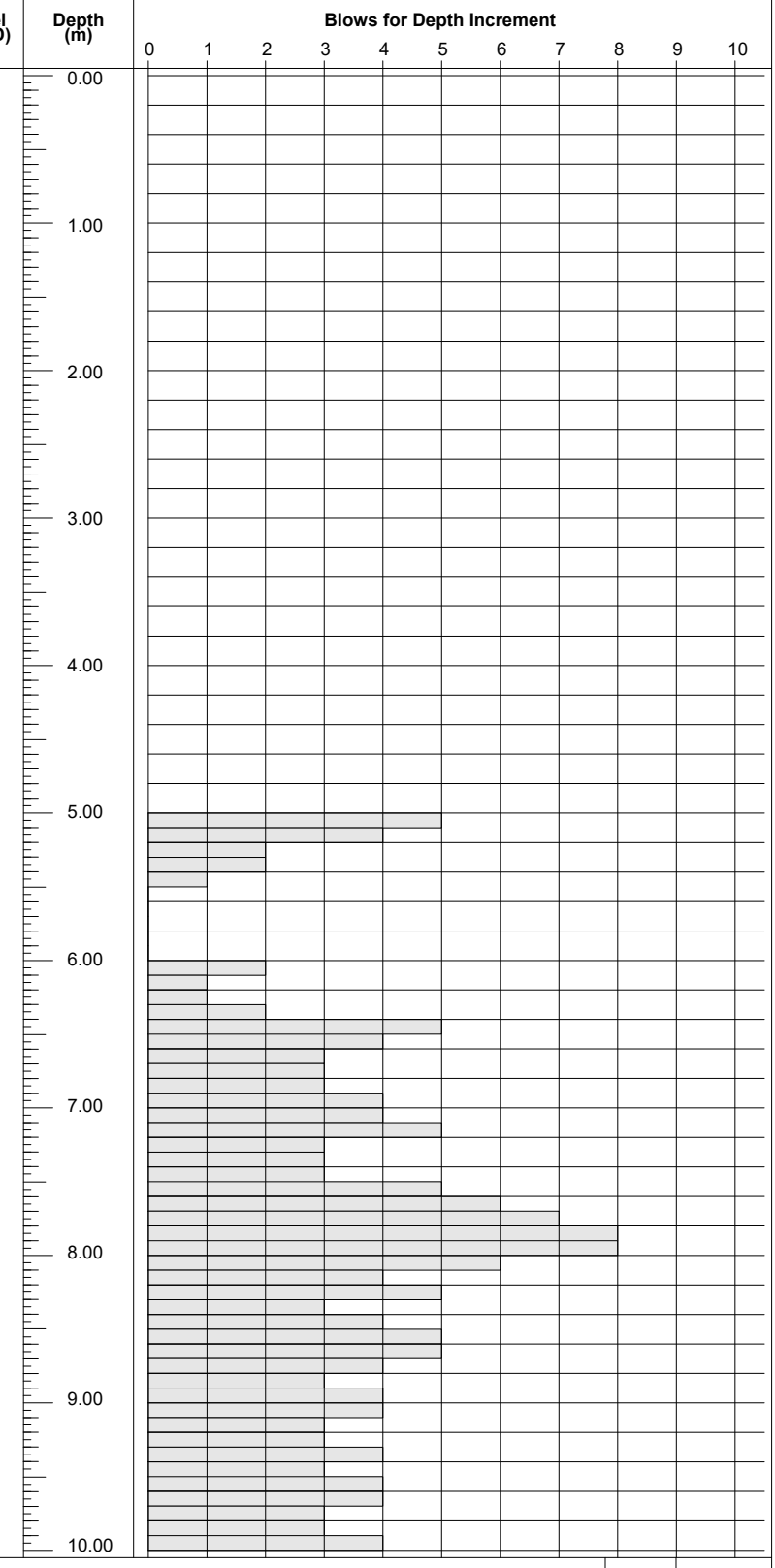
Figure No. P20-180.DP3

PADDOCK GEO ENGINEERING

Site	Probe Number
8-10 Carlton Road, Chiswick, W4 5DY	DP4

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probing			Fornacelli Limited	P20-180
	Location	**Dates**	**Engineer**	**Sheet**
		22/07/2020		1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)
5.00-5.10	5		
5.10-5.20	4		
5.20-5.30	2		
5.30-5.40	2		
5.40-5.50	1		
5.50-5.60	0		
5.60-5.70	0		
5.70-5.80	0		
5.80-5.90	0		
5.90-6.00	0		
6.00-6.10	2		
6.10-6.20	1		
6.20-6.30	1		
6.30-6.40	2		
6.40-6.50	5		
6.50-6.60	4		
6.60-6.70	3		
6.70-6.80	3		
6.80-6.90	3		
6.90-7.00	4		
7.00-7.10	4		
7.10-7.20	5		
7.20-7.30	3		
7.30-7.40	3		
7.40-7.50	3		
7.50-7.60	5		
7.60-7.70	6		
7.70-7.80	7		
7.80-7.90	8		
7.90-8.00	8		
8.00-8.10	6		
8.10-8.20	4		
8.20-8.30	5		
8.30-8.40	3		
8.40-8.50	4		
8.50-8.60	5		
8.60-8.70	5		
8.70-8.80	4		
8.80-8.90	3		
8.90-9.00	4		



Remarks

Scale (approx)	Logged By
1:50	MC

Figure No. P20-180.DP4

PADDOCK GEO ENGINEERING

Standard Penetration Test Results

Site : 8-10 Carlton Road, Chiswick, W4 5DY

Client : Fornacelli Limited

Project Contractor : PGE

Job Number P20-180

Sheet 1 / 1

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
BH1	1.20	1.35	1.65	CPT	1	1	1	1	1	1	N=4	
BH1	2.00	2.15	2.45	CPT	1	1	1	2	1	1	N=5	
BH1	3.00	3.15	3.45	CPT	1	1	1	3	1	2	N=7	
BH1	4.00	4.15	4.45	CPT	1	1	2	1	1	1	N=5	
BH1	5.00	5.15	5.45	CPT	1	1	1	1	1	2	N=5	
BH1	6.50	6.65	6.95	CPT	2	4	4	5	7	8	N=24	
BH1	8.00	8.15	8.45	CPT	4	6	5	7	8	10	N=30	
BH1	9.50	9.65	9.95	CPT	5	5	6	8	8	9	N=31	
BH1	12.50	12.65	12.95	CPT	3	3	4	3	5	5	N=17	
BH1	15.50	15.65	15.95	CPT	4	5	5	5	6	5	N=21	
BH1	18.50	18.65	18.95	CPT	5	6	6	8	8	9	N=31	
BH1	20.00	20.15	20.45	CPT	5	7	6	8	9	11	N=34	
WS1	1.00	1.15	1.45	CPT	1	1	2	2	2	2	N=8	
WS1	2.00	2.15	2.45	CPT	1	1					N=0	
WS1	3.00	3.15	3.45	CPT	1						N=0	
WS1	4.00	4.15	4.45	CPT	1						N=0	
WS1	5.00	5.15	5.45	CPT	9	6	7	6	5	7	N=25	
WS2	1.00	1.15	1.45	CPT	2	2	2	3	2	3	N=10	
WS2	2.00	2.15	2.45	CPT	3	3	4	3	5	7	N=19	
WS2	3.00	3.15	3.45	CPT	7	6	6	6	6	6	N=24	
WS2	4.00	4.15	4.45	CPT	5	7	8	9	9	8	N=34	
WS3	1.00	1.15	1.45	CPT	1	1	1	2	2	3	N=8	
WS3	2.00	2.15	2.45	CPT	0	1	2	2	2	2	N=8	
WS3	3.00	3.15	3.45	CPT	10	11	11	10	10	10	N=41	
WS4	1.00	1.15	1.45	CPT	1	1	2	3	2	2	N=9	
WS4	2.00	2.15	2.45	CPT	2	2	2	3	4	3	N=12	
WS4	3.00	3.15	3.45	CPT	4	2	3	5	7	9	N=24	
WS4	4.00	4.15	4.45	CPT	5	4	4	5	5	6	N=20	

PADDOCK GEO ENGINEERING

Site	Trial Pit Number
8-10 Carlton Road, Chiswick, W4 5DY	TP1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit	0.35m x 1.50m		Fornacelli Limited	P20-180
	Location	**Dates** 21/07/2020	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.45)	Grass onto dark brown sandy very gravelly CLAY with rootlets. Gravel is brick, concrete, flint and occasional plastic and glass. (MADE GROUND)		
0.40	C				0.45			
0.40	D					Firm to stiff brown slightly sandy silty CLAY. (LANGLEY SILT MEMBER)		
0.90	D							
1.10	SV 110kPa							
						... becoming blue grey from 1.4m depth.		
1.60	SV 78kPa							
1.60	D				(2.55)			
2.20	D							
2.60	SV 104kPa							
2.90	D				3.00			
						Complete at 3.00m		

Remarks

UXO engineer in attendance.
No groundwater encountered.
Trial pit side upright and stable.
Infiltration testing undertaken.

Scale (approx)	Logged By	Figure No.
1:20	MC	P20-180.TP1

PADDOCK GEO ENGINEERING

Site	Trial Pit Number
8-10 Carlton Road, Chiswick, W4 5DY	TP2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit	0.35m x 1.40m		Fornacelli Limited	P20-180
	Location	**Dates** 21/07/2020	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.90)	Vegetation over dark brownn to brown grey occasionally red brown very sandy GRAVEL with rootlets and occasional cobbles. Gravel is brick, concrete, plastic, flint and glass. Cobbles are brick and concrete. (MADE GROUND)		
0.50	C				0.90			
1.10	SV 143kPa					Stiff brown slightly sandy silty CLAY with occasional rootlets throughout. Gravel is fine to coarse angular to sub-rounded flint. Cobbles are of flint. (LANGLEY SILT MEMBER)		
1.10	C							
1.10	D				(1.10)			
						... slightly gravelly and mottled orange brown.		
1.80	D				2.00			
						Complete at 2.00m		

Remarks

UXO engineer in attendance.
No groundwater encountered.
Trial pit side upright and stable.
Infiltration testing undertaken.

Scale (approx)	Logged By	Figure No.
1:20	MC	P20-180.TP2

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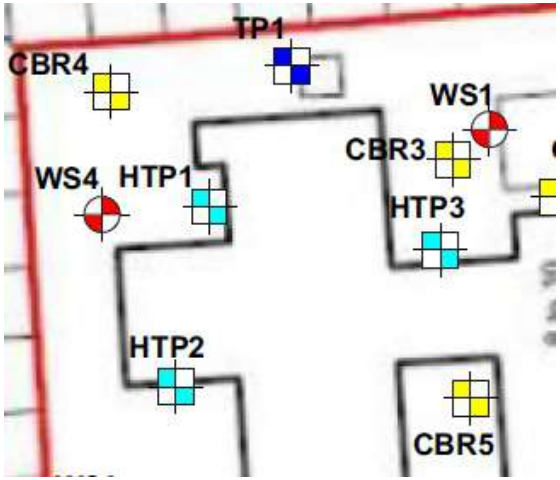
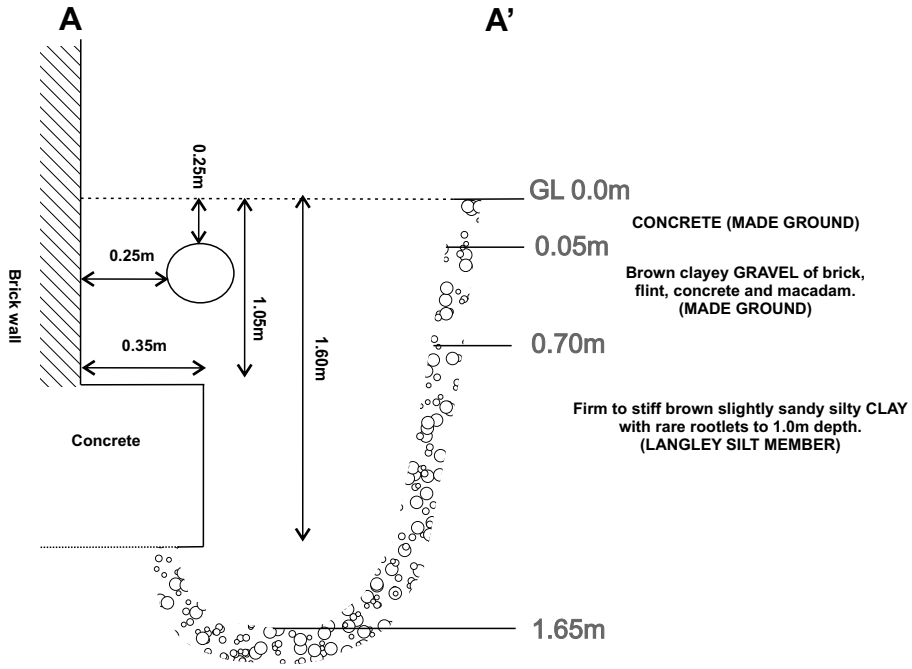
A

HTP1 - Photo



Site Plan

HTP1 - Section



PADDOCK GEO ENGINEERING

Trial Pit HTP1- Schematic Section

8-10 Carlton Road, Chiswick, W4 5DY.

Fornacelli Limited

August 2020

Samples:
0.80m - C
1.60m - D

Hand Vane:
None

Groundwater:
None

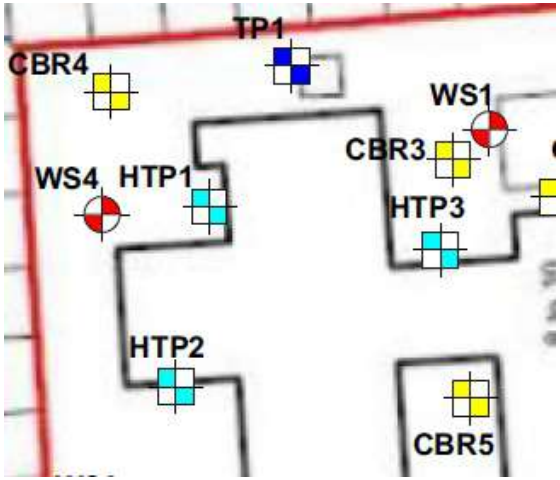
Notes:
Plastic drain pipe observed at 0.25m depth - surrounded by pea gravel.

Not to scale.
All positions are approximate.
Plan provided by the Client.

A

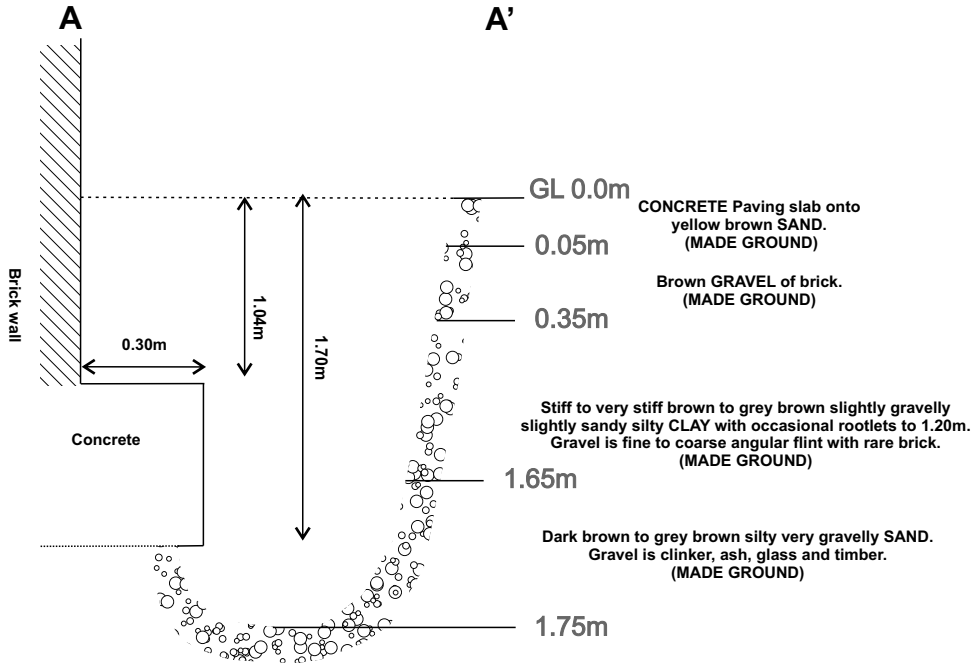
A’

HTP2 - Photo



Site Plan

HTP2 - Section



PADDOCK GEO ENGINEERING

Trial Pit HTP2-
Schematic Section

8-10 Carlton Road,
Chiswick,
W4 5DY.

Fornacelli Limited

August 2020

Samples:
0.50m - C/D
1.70m - C/D

Hand Vane:
None

Groundwater:
None

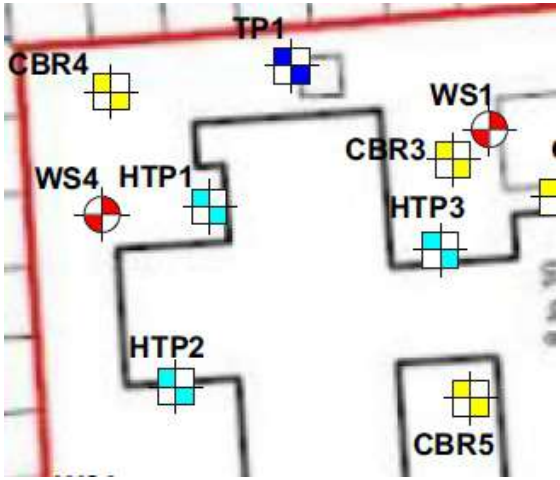
Notes:

Not to scale.
All positions are approximate.
Plan provided by the Client.

A

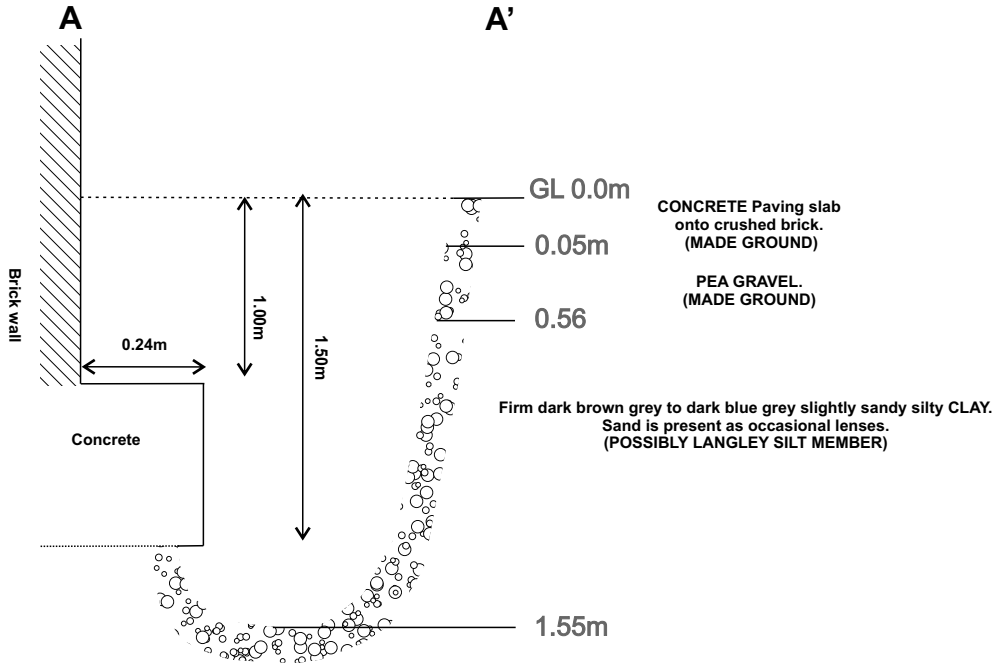
A’

HTP3 - Photo



Site Plan

HTP3 - Section



PADDOCK GEO ENGINEERING

Trial Pit HTP3- Schematic Section

8-10 Carlton Road, Chiswick, W4 5DY.

Fornacelli Limited

August 2020

Samples:
0.70m - C
1.50m - D

Hand Vane:
None

Groundwater:
Minor seepage at 1.4m depth.

Notes:

Not to scale.
All positions are approximate.
Plan provided by the Client.

Photograph of arisings from borehole WS1.

Photograph of arisings from borehole WS2.

PADDOCK GEO ENGINEERING

Client:	**Fornacelli Limited C/O PJCE**
Project No:	**P20-180**
Project Title:	**18-20 Carlton Road, Chiswick, W4 5DY**
Date:	**August 2020**

Photograph of arisings from borehole WS3.

Photograph of arisings from borehole WS4.

PADDOCK GEO ENGINEERING

Client:	**Fornacelli Limited C/O PJCE**
Project No:	**P20-180**
Project Title:	**18-20 Carlton Road, Chiswick, W4 5DY**
Date:	**August 2020**

Photograph of trial pit TP1.

Photograph of arisings trial pit TP1.

PADDOCK GEO ENGINEERING

Client:	**Fornacelli Limited C/O PJCE**
Project No:	**P20-180**
Project Title:	**18-20 Carlton Road, Chiswick, W4 5DY**
Date:	**August 2020**

Photograph of trial pit TP2.

Photograph of trial pit HTP1.

PADDOCK GEO ENGINEERING

Client:	**Fornacelli Limited C/O PJCE**
Project No:	**P20-180**
Project Title:	**18-20 Carlton Road, Chiswick, W4 5DY**
Date:	**August 2020**

Photograph of trial pit HTP2.

Photograph of trial pit HTP3.

PADDOCK GEO ENGINEERING

Client:	**Fornacelli Limited C/O PJCE**
Project No:	**P20-180**
Project Title:	**18-20 Carlton Road, Chiswick, W4 5DY**
Date:	**August 2020**

APPENDIX C – CHEMICAL ASSESSMENT DATA

Chemical Analysis Reports

Chemical Analysis Results Summary

PGE In-House GACs

Waste Classification Data

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Paddock Geo Engineering
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Milton Keynes
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e: Paddock Engineering

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

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-21016

Project / Site name:	Land at 18-20 Carlton Road, Chiswick, W4 5DY	**Samples received on:**	23/07/2020
Your job number:	P20-180 S01	**Sample instructed/ Analysis started on:**	23/07/2020
Your order number:	P20-180	**Analysis completed by:**	03/08/2020
Report Issue Number:	1	**Report issued on:**	03/08/2020
Samples Analysed:	9 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist

For & on behalf of i2 Analytical Ltd.

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

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

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

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

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-21016

Project / Site name: Land at 18-20 Carlton Road, Chiswick, W4 5DY
Your Order No: P20-180

Lab Sample Number				1571186	1571187	1571188	1571189	1571190
Sample Reference				BH1	TP1	TP2	WS1	WS1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.50	0.90	1.80
Date Sampled				20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	13	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	6.4	9.3	12	18	20
Total mass of sample received	kg	0.001	NONE	0.47	1.7	0.40	0.36	0.77
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.7	7.9	7.4	7.2	7.1
Total Sulphate as SO_4	mg/kg	50	MCERTS	1700	370	1500	1100	9700
Loss on Ignition @ 450°C	%	0.2	MCERTS	4.7	2.5	4.4	3.1	9.6
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.25
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.36
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.34
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.38	0.59	4.9
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.6
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.89	1.4	13
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.93	1.4	13
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.43	0.80	9.1
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.40	0.58	5.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.62	0.74	10
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.25	0.22	2.0
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	0.46	6.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.27	0.27	3.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.2
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.32	0.27	3.1
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	4.91	6.73	74.0
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	16	15	15	66
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.4	1.3	1.3	1.7	8.1
Boron (water soluble)	mg/kg	0.2	MCERTS	1.6	1.9	2.5	4.0	7.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.4	1.1	0.4	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	40	46	37	50	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	55	47	35	38	390
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	38	84	80	4500
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	< 0.3	< 0.3	1.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	28	37	30	44	74
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	49	62	66	90	97
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	99	98	92	460
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	590

Analytical Report Number: 20-21016

Project / Site name: Land at 18-20 Carlton Road, Chiswick, W4 5DY
Your Order No: P20-180

Lab Sample Number				1571191	1571192	1571193	1571194	
Sample Reference				WS2	WS2	WS3	WS4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.40	1.50	0.40	0.90	
Date Sampled				20/07/2020	20/07/2020	20/07/2020	20/07/2020	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	15	17	19	3.5	
Total mass of sample received	kg	0.001	NONE	0.53	1.1	1.1	0.42	
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	7.2	7.1	7.8	
Total Sulphate as SO_4	mg/kg	50	MCERTS	460	960	10000	410	
Loss on Ignition @ 450°C	%	0.2	MCERTS	3.6	5.2	3.8	7.7	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.8	
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.32	
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	2.7	
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	2.6	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.9	
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.1	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	2.1	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.77	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.6	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.99	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.33	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.1	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	17.1	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	16	25	32	
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.5	2.4	1.6	2.9	
Boron (water soluble)	mg/kg	0.2	MCERTS	2.8	3.2	2.6	2.1	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	50	63	55	26	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	27	10	29	110	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	23	24	21	270	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.5	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	43	43	50	40	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	79	91	84	72	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	85	98	90	120	
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	

Analytical Report Number : 20-21016

Project / Site name: Land at 18-20 Carlton Road, Chiswick, W4 5DY

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1571186	BH1	None Supplied	0.40	Brown sandy loam with gravel and vegetation.
1571187	TP1	None Supplied	0.40	Brown clay and sand with stones.
1571188	TP2	None Supplied	0.50	Brown clay and sand with rubble.
1571189	WS1	None Supplied	0.90	Brown clay.
1571190	WS1	None Supplied	1.80	Brown sand with clinker.
1571191	WS2	None Supplied	0.40	Brown clay.
1571192	WS2	None Supplied	1.50	Brown clay.
1571193	WS3	None Supplied	0.40	Brown clay.
1571194	WS4	None Supplied	0.90	Brown sand with gravel and clinker

Analytical Report Number : 20-21016

Project / Site name: Land at 18-20 Carlton Road, Chiswick, W4 5DY

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS2		S	20-21016	1571191	b	Speciated EPA-16 PAHs in soil	L064-PL	b

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

Matt Paddock
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Watford,
Herts,
WD18 8YS

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f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-21615

Project / Site name:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	**Samples received on:**	23/07/2020
Your job number:	P20-180 S01	**Sample instructed/ Analysis started on:**	28/07/2020
Your order number:	P20-180	**Analysis completed by:**	07/08/2020
Report Issue Number:	1	**Report issued on:**	07/08/2020
Samples Analysed:	11 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist

For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-21615

Project / Site name: Land At 18-20 Carlton Road, Chiswick, W4 5DY
Your Order No: P20-180

Lab Sample Number				1574260	1574261	1574262	1574263	1574264
Sample Reference				BH1	BH1	BH1	BH1	BH1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	3.50	5.00	7.50	12.00
Date Sampled				20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	19	22	23	0.11	17
Total mass of sample received	kg	0.001	NONE	1.5	1.5	1.5	1.5	1.5
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.3	7.7	7.5	8.4	8.2
Total Sulphate as SO_4	%	0.005	MCERTS	0.208	0.198	0.360	0.010	0.039
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	1700	2900	5100	26	790
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.85	1.4	2.6	0.013	0.40
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	854	1450	2560	13.1	397

Analytical Report Number: 20-21615

Project / Site name: Land At 18-20 Carlton Road, Chiswick, W4 5DY
Your Order No: P20-180

Lab Sample Number				1574265	1574266	1574267	1574268	1574269
Sample Reference				BH1	BH1	TP2	WS1	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				14.00	17.00	1.80	4.50	3.50
Date Sampled				20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	15	16	12	16	3.2
Total mass of sample received	kg	0.001	NONE	1.5	1.5	0.75	0.70	1.4
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.5	8.4	7.7	7.9	7.7
Total Sulphate as SO_4	%	0.005	MCERTS	0.035	0.047	0.057	0.046	0.014
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	490	1000	800	760	120
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.25	0.50	0.40	0.38	0.060
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	248	504	398	379	60.3

Analytical Report Number: 20-21615

Project / Site name: Land At 18-20 Carlton Road, Chiswick, W4 5DY
Your Order No: P20-180

Lab Sample Number				1574270				
Sample Reference				WS4				
Sample Number				None Supplied				
Depth (m)				2.40				
Date Sampled				20/07/2020				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	14				
Total mass of sample received	kg	0.001	NONE	0.60				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.7				
Total Sulphate as SO_4	%	0.005	MCERTS	0.019				
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	210				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.10				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	104				

Analytical Report Number : 20-21615

Project / Site name: Land At 18-20 Carlton Road, Chiswick, W4 5DY

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1574260	BH1	None Supplied	1.20	Brown clay with gravel.
1574261	BH1	None Supplied	3.50	Brown clay.
1574262	BH1	None Supplied	5.00	Brown clay and sand.
1574263	BH1	None Supplied	7.50	Non Soil**
1574264	BH1	None Supplied	12.00	Brown clay.
1574265	BH1	None Supplied	14.00	Brown clay.
1574266	BH1	None Supplied	17.00	Brown clay.
1574267	TP2	None Supplied	1.80	Brown clay and sand.
1574268	WS1	None Supplied	4.50	Brown clay.
1574269	WS2	None Supplied	3.50	Light brown sand.
1574270	WS4	None Supplied	2.40	Brown clay.

** NON MCERTS MATRIX

Analytical Report Number : 20-21615

Project / Site name: Land At 18-20 Carlton Road, Chiswick, W4 5DY

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 20-21020

Project / Site name:	Land at 18-20 Carlton Road, Chiswick, W4 5DY	**Samples received on:**	23/07/2020
Your job number:	P20-180 S01	**Sample instructed/ Analysis started on:**	23/07/2020
Your order number:	P20-180	**Analysis completed by:**	06/08/2020
Report Issue Number:	1	**Report issued on:**	06/08/2020
Samples Analysed:	2 10:1 WAC samples		

Signed: A. Czerwińska

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

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Waste Acceptance Criteria Analytical Results

Report No:	**20-21020**						
					Client:	**PADDOCK**	
Location	**Land at 18-20 Carlton Road, Chiswick, W4 5DY**						
Lab Reference (Sample Number)	1571206 / 1571207				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	20/07/2020				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH1+TP1+TP2+WS3+HTP1 Combined						
Depth (m)	0.90-1.10						
Solid Waste Analysis							
TOC (%)**	1.8				3%	5%	6%
Loss on Ignition (%) **	7.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	2.38				100	--	--
pH (units)**	7.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	4.1				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0054			0.0486	0.5	2	25
Barium *	0.0163			0.145	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0008			0.0076	0.5	10	70
Copper *	0.0030			0.027	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0038			0.0341	0.5	10	30
Nickel *	0.0009			0.0082	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0024			0.022	4	50	200
Chloride *	2.2			20	800	15000	25000
Fluoride	0.22			2.0	10	150	500
Sulphate *	43			380	1000	20000	50000
TDS*	85			760	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	7.63			68.1	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	83						
Moisture (%)	17						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.
*= UKAS accredited (liquid eluate analysis only)
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation
** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Waste Acceptance Criteria Analytical Results

Report No:	**20-21020**						
					Client:	**PADDOCK**	
Location	**Land at 18-20 Carlton Road, Chiswick, W4 5DY**						
Lab Reference (Sample Number)	1571208 / 1571209				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	20/07/2020				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS1+WS2+WS4+HTP2+HTP3 Combined						
Depth (m)	0.40-2.90						
Solid Waste Analysis							
TOC (%)**	1.0				3%	5%	6%
Loss on Ignition (%) **	4.2				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	5.91				100	--	--
pH (units)**	8.3				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.8				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0043			0.0391	0.5	2	25
Barium *	0.0262			0.236	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0041			0.037	0.5	10	70
Copper *	0.0086			0.078	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0131			0.118	0.5	10	30
Nickel *	0.0052			0.047	0.4	10	40
Lead *	0.0094			0.084	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.014			0.13	4	50	200
Chloride *	1.7			15	800	15000	25000
Fluoride	0.46			4.2	10	150	500
Sulphate *	18			160	1000	20000	50000
TDS*	57			510	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	8.62			77.6	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	87						
Moisture (%)	13						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.
*= UKAS accredited (liquid eluate analysis only)
Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation
** = MCERTS accrediited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 20-21020

Project / Site name: Land at 18-20 Carlton Road, Chiswick, W4 5DY

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1571206	P1+TP2+WS3	Combined	0.90-1.10	Brown clay.
1571208	S2+WS4+HTF	Combined	0.40-2.90	Brown clay with gravel.

Analytical Report Number : 20-21020

Project / Site name: Land at 18-20 Carlton Road, Chiswick, W4 5DY

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	ISO 17025

Analytical Report Number : 20-21020

Project / Site name: Land at 18-20 Carlton Road, Chiswick, W4 5DY

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Human Health Generic Contamination Risk Assessment - 8-10 Carlton Road,, Chiswick, W4 5DY (9 Samples)

Determinand	Units	95th Percentile Upper Confidence Limit (Mean)	Assessment Criteria Residential with Home Grown Produce Concentration (cc)	Mean Exceeds cc	Outliers	True Mean (μ)	Exceeding Samples
Metals/Metaloids							
Arsenic	mg kg^{-1}	34.86	37.0				
Berylium	mg kg^{-1}	3.90	1.7	Y	Y	1.6	WS1 at 0.90m WS1 at 1.80m WS2 at 1.50m WS4 at 0.90m
Cadmium	mg kg^{-1}	0.76	11.0				
Chromium	mg kg^{-1}	52	910				
Inorganic Mercury	mg kg^{-1}	0.81	40.0				
Nickel	mg kg^{-1}	52	180				
Lead	mg kg^{-1}	1542	190	Y	Y	136.0	WS1 at 1.80m WS4 at 0.90m
Selenium	mg kg^{-1}	1.00	250				
Copper	mg kg^{-1}	160	2400				
Zinc	mg kg^{-1}	220	3700				
Vanadium	mg kg^{-1}	86.99	410				
Phytotoxic Metals (Phytotoxicity)							
Copper	mg kg^{-1}	160	111	Y	Y	64.0	WS1 at 1.80m
Zinc	mg kg^{-1}	220	330				
Hydrocarbons							
Total Petroleum Hydrocarbons							
TPH EC6-EC10 (PRO)	mg kg^{-1}	N/A	65				
TPH EC10-EC21 (DRO)	mg kg^{-1}	N/A	300				
TPH EC21-EC40 (Min.Oil)	mg kg^{-1}	N/A	1500				
Total TPH	mg kg^{-1}	201.59	600				
Poly Aromatic Hydrocarbons							
Benzo(a)pyrene	mg kg^{-1}	2.32	2.70				
Napthalene	mg kg^{-1}	0.12	5.60				
Dibenzo(a,h) anthracene	mg kg^{-1}	0.46	0.28	Y	Y	0.15	WS1 at 1.80m WS4 at 0.90m
Flourene	mg kg^{-1}	0.15	400.00				
Phenols	mg kg^{-1}	NE	420.00				
OTHER							
pH	-	8.2	<5, >12				
Sulphur	mg kg^{-1}	N/A	2500				
Water Soluble Boron	mg kg^{-1}	4.15	290				
Asbestos Screen	Detection	Not Detected	Not Detected				
Asbestos Quantification	%	-	N/A				

NOTE:

na - Not applicable
ne - Not evaluated, all results below the appropriate guideline level
nc - not displayed as results are not meaningful due to large uncertainty from small data set

PADDOCK GEO ENGINEERING

CLIENT:	Fornacelli Limited
PROJECT No:	P20-180
PROJECT TITLE	8-10 Carlton Road,, Chiswick, W4 5DY

RESULTS SUMMARY - MAX VALUE TEST - LESS THAN 1.0M DEPTH (RESIDENTIAL WITH GARDENS)

8-10 Carlton Road,

DETERMINAND	**Beryllium**
SITE ASSESSMENT CRITERIA	**1.7 mg/kg**

LOCATION	DEPTH
BH1	0.4
TP1	0.4
TP2	0.5
WS1	0.9
WS1	1.8
WS2	0.4
WS2	1.5
WS3	0.4
WS4	0.9

CONC ($mgkg^{-1}$)
1.4
1.3
1.3
1.7
8.1
1.5
2.4
1.6
2.9

N	T Values
2	6.314
3	2.92
4	2.353
5	2.132
6	2.015
7	1.943
8	1.895
9	1.86
10	1.833
11	1.812
12	1.796
13	1.782
14	1.771
15	1.761
16	1.753
17	1.746
18	1.74
19	1.734
20	1.729
21	1.725
22	1.721
23	1.717
24	1.714
25	1.711
26	1.708
27	1.706
28	1.703
29	1.701
30	1.699

MEAN CONC (x)	**2.47**
CONC ST. DEV. (	**2.181169**
Number (n)	**9**
Y Max	**8.10**
Calculated T value	**2.5827**
Representitive T value	**1.86**

Max Value Test	**Failed**
Outlier?	**Contamination Hotspots Present**

PADDOCK GEO ENGINEERING

Client: Fornacelli Limited

Project No: P20-180
Project: 8-10 Carlton Road, Chiswick, W4 5DY

RESULTS SUMMARY - MAX VALUE TEST - LESS THAN 1.0M DEPTH (RESIDENTIAL WITH GARDENS)

8-10 Carlton Road,

DETERMINAND	**Lead**
SITE ASSESSMENT CRITERIA	**190 mg/kg**

LOCATION	DEPTH
BH1	0.4
TP1	0.4
TP2	0.5
WS1	0.9
WS1	1.8
WS2	0.4
WS2	1.5
WS3	0.4
WS4	0.9

CONC ($mgkg^{-1}$)
110
38
84
80
4500
23
24
21
270

N	T Values
2	6.314
3	2.92
4	2.353
5	2.132
6	2.015
7	1.943
8	1.895
9	1.86
10	1.833
11	1.812
12	1.796
13	1.782
14	1.771
15	1.761
16	1.753
17	1.746
18	1.74
19	1.734
20	1.729
21	1.725
22	1.721
23	1.717
24	1.714
25	1.711
26	1.708
27	1.706
28	1.703
29	1.701
30	1.699

MEAN CONC (x)	**572.22**
CONC ST. DEV. (	**1474.979**
Number (n)	**9**
Y Max	**4500.00**
Calculated T value	**2.6629**
Representitive T value	**1.86**

Max Value Test	**Failed**
Outlier?	**Contamination Hotspots Present**

PADDOCK GEO ENGINEERING

Client: Fornacelli Limited

Project No: P20-180
Project: 8-10 Carlton Road, Chiswick, W4 5DY

RESULTS SUMMARY - MAX VALUE TEST - LESS THAN 1.0M DEPTH (RESIDENTIAL WITH GARDENS)

8-10 Carlton Road,

DETERMINAND	**Phytotoxic Copper**
SITE ASSESSMENT CRITERIA	**111 mg/kg**

LOCATION	DEPTH
BH1	0.4
TP1	0.4
TP2	0.5
WS1	0.9
WS1	1.8
WS2	0.4
WS2	1.5
WS3	0.4
WS4	0.9

CONC ($mgkg^{-1}$)
55
47
35
38
390
27
10
29
110

N	T Values
2	6.314
3	2.92
4	2.353
5	2.132
6	2.015
7	1.943
8	1.895
9	1.86
10	1.833
11	1.812
12	1.796
13	1.782
14	1.771
15	1.761
16	1.753
17	1.746
18	1.74
19	1.734
20	1.729
21	1.725
22	1.721
23	1.717
24	1.714
25	1.711
26	1.708
27	1.706
28	1.703
29	1.701
30	1.699

MEAN CONC (x)	**82.33**
CONC ST. DEV. (	**118.7245**
Number (n)	**9**
Y Max	**390.00**
Calculated T value	**2.5914**
Representitive T value	**1.86**

Max Value Test	**Failed**
Outlier?	**Contamination Hotspots Present**

PADDOCK GEO ENGINEERING

Client: Fornacelli Limited

Project No: P20-180
Project: 8-10 Carlton Road, Chiswick, W4 5DY

RESULTS SUMMARY - MAX VALUE TEST - LESS THAN 1.0M DEPTH (RESIDENTIAL WITH GARDENS)

8-10 Carlton Road,

DETERMINAND	**Dibenzo(a,h)anthracene**
SITE ASSESSMENT CRITERIA	**0.28 mg/kg**

LOCATION	DEPTH
BH1	0.4
TP1	0.4
TP2	0.5
WS1	0.9
WS1	1.8
WS2	0.4
WS2	1.5
WS3	0.4
WS4	0.9

CONC ($mgkg^{-1}$)
0.05
0.05
0.05
0.05
1.2
0.05
0.05
0.05
0.33

N	T Values
2	6.314
3	2.92
4	2.353
5	2.132
6	2.015
7	1.943
8	1.895
9	1.86
10	1.833
11	1.812
12	1.796
13	1.782
14	1.771
15	1.761
16	1.753
17	1.746
18	1.74
19	1.734
20	1.729
21	1.725
22	1.721
23	1.717
24	1.714
25	1.711
26	1.708
27	1.706
28	1.703
29	1.701
30	1.699

MEAN CONC (x)	**0.21**
CONC ST. DEV. (	**0.383029**
Number (n)	**9**
Y Max	**1.20**
Calculated T value	**2.5876**
Representitive T value	**1.86**

Max Value Test	**Failed**
Outlier?	**Contamination Hotspots Present**

PADDOCK GEO ENGINEERING

Client: Fornacelli Limited

Project No: P20-180
Project: 8-10 Carlton Road, Chiswick, W4 5DY

GENERIC HUMAN HEALTH SCREENING TOTAL SOIL CONCENTRATION ASSESSMENT CRITERIA (GAC)

DETERMINAND		RESIDENTIAL (mg/kg)		COMMERCIAL (mg/kg)
Chemical	**GAC Sources and units**	**With Home Grown produce**	**Without Home Grown produce**	
Asbestos Screen & ID*	-	Detected	Detected	Detected
Cyanide - Total	SNIFFER	53.25	53.25	53.25
Cyanide - Free	SNIFFER	53.25	53.25	53.25
Loss on Ignition @ 450^{o}C	-	-	-	-
Sulphate (as SO_4) - Total	BRE****	2400	2400	2400
Sulphide	ICRCL	2500	2500	2500
Sulphur - Total	ICRCL	2500	2500	2500
Phenol (Total Monohydric)	CLEA	420	420	3200
pH	ICRCL	<5,>12	<5,>12	-
Metals and Metalloids (CLEA Metals)				
Arsenic	LQM S4UL	37	40	640
Beryllium	LQM S4UL	1.7	1.7	12
Cadmium	LQM S4UL	11	85	190
Chromium III	LQM S4UL	910	910	8600
Lead	DEFRA C4SL	190	310	2300
Mercury (Total)	LQM S4UL (Inorganic)	40	56	1100
Selenium	LQM S4UL	250	430	12000
Copper (phytotoxicity)	LQM S4UL	2400 (111)	7100	68000
Nickel	LQM S4UL	180	180	980
Zinc (phytotoxicity)	LQM S4UL	3700 (330)	40000	730000
Vanadium	LQM S4UL	410	1200	9000
Boron - Water Soluble	LQM S4UL	290	11000	240000
Total Petroleum Hydrocarbons**				
TPH (EC6-EC10) - PRO	LQM S4UL (2.5% SOM)	65	100	4800
TPH (EC10-EC21) - DRO	LQM S4UL (2.5% SOM)	300	600	23000
TPH (EC21-EC40) - Min. Oil	LQM S4UL (2.5% SOM)	1500	1900	28000
Total TPH (EC10-EC40)	LQM S4UL (2.5% SOM)	600	900	23000
Polycyclic Aromatic Hydrocarbons***				
Naphthalene	LQM S4UL (2.5% SOM)	5.6	5.6	460
Flourene	LQM S4UL (2.5% SOM)	400	3800	68000
Benzo[a]pyrene	LQM S4UL (2.5% SOM)	2.7	3.2	35
Dibenzo[a,h]anthracene	LQM S4UL (2.5% SOM)	0.28	0.32	3.6

Notes

The Generic Assessment Criteria (GAC) are based on CLEA Soil Guidance Values published values and CIEH/LQM S4CLs where available or ICRCL, DoE, BRE and HSE levels where necessary.
Where gaps remain GACs were calculated using the latest CLEA spreadsheet using DEFRA C4SL toxicology and physiochemical parameters from DEFRA SP1010.

* Guidance level set at any fibre identification.

** TPH 3 band is employed as a screening tool to instigate detailed speciated analysis to the TPHCWG methodology. Based on mean of fractions included

*** Testing based on USEPA Priority 16 compounds. GACs for four compounds and total PAH with published GACs only, used as a screening tool.

**** BRE SD1 - DS-1 Concrete Sulphate Design Class limit. Sulphate is not considered to pose a significant risk to human health under normal circumstances.

PADDOCK GEO ENGINEERING

CLIENT:	Fornacelli Limited
PROJECT No:	P20-180
PROJECT TITLE:	8-10 Carlton Road, Chiswick, W4 5DY

GENERIC HUMAN HEALTH HYDROCARBON TOTAL SOIL CONCENTRATION ASSESSMENT CRITERIA (GAC)

DETERMINAND		RESIDENTIAL (mg/kg)		COMMERCIAL (mg/kg)
Chemical	**GAC Sources and units**	**With Home Grown produce**	**Without Home Grown produce**	
TPH CWG				
Aliphatic EC 5-6	LQM S4UL (2.5% SOM)	78	78	5900
Aliphatic EC >6-8	LQM S4UL (2.5% SOM)	230	230	17000
Aliphatic EC >8-10	LQM S4UL (2.5% SOM)	65	65	4800
Aliphatic EC >10-12	LQM S4UL (2.5% SOM)	330	330	23000
Aliphatic EC >12-16	LQM S4UL (2.5% SOM)	2400	2400	82000
Aliphatic EC >16-35	LQM S4UL (2.5% SOM)	92000	92000	1700000
Aliphatic EC >35-44	LQM S4UL (2.5% SOM)	92000	92000	1700000
Aromatic EC 5-7 (Benzene)	LQM S4UL (2.5% SOM)	140	690	46000
Aromatic EC >7-8 (Toluene)	LQM S4UL (2.5% SOM)	290	1800	110000
Aromatic EC >8-10	LQM S4UL (2.5% SOM)	83	110	8100
Aromatic EC >10-12	LQM S4UL (2.5% SOM)	180	590	28000
Aromatic EC >12-16	LQM S4UL (2.5% SOM)	330	2300	37000
Aromatic EC >16-21	LQM S4UL (2.5% SOM)	540	1900	28000
Aromatic EC >21-35	LQM S4UL (2.5% SOM)	1500	1900	28000
Aromatic EC >35-44	LQM S4UL (2.5% SOM)	1500	1900	28000
Aliphatic and Aromatic EC >44	LQM S4UL (2.5% SOM)	1500	1900	28000
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	LQM S4UL (2.5% SOM)	510	4700	97000
Acenaphthylene	LQM S4UL (2.5% SOM)	420	4600	97000
Anthracene	LQM S4UL (2.5% SOM)	5400	35000	540000
Benzo[a]anthracene	LQM S4UL (2.5% SOM)	11	14	170
Benzo[a]pyrene	LQM S4UL (2.5% SOM)	2.7	3.2	35
Benzo[b]fluoranthene	LQM S4UL (2.5% SOM)	3.3	4	44
Benzo[ghi]perylene	LQM S4UL (2.5% SOM)	340	360	4000
Benzo[k]fluoranthene	LQM S4UL (2.5% SOM)	93	110	1200
Chrysene	LQM S4UL (2.5% SOM)	22	31	350
Dibenzo[ah]anthracene	LQM S4UL (2.5% SOM)	0.28	0.32	3.6
Fluoranthene	LQM S4UL (2.5% SOM)	560	1600	23000
Fluorene	LQM S4UL (2.5% SOM)	400	3800	68000
Indeno[123-cd]pyrene	LQM S4UL (2.5% SOM)	36	46	510
Naphthalene	LQM S4UL (2.5% SOM)	5.6	5.6	460
Phenanthrene	LQM S4UL (2.5% SOM)	220	1500	22000
Pyrene	LQM S4UL (2.5% SOM)	1200	3800	54000
Coal Tar (BaP as marker)	LQM S4UL (2.5% SOM)	0.98	1.2	15

Notes
The Generic Assessment Criteria (GAC) are based on CIEH/LQM S4ULs.

PADDOCK GEO ENGINEERING

CLIENT:	Fornacelli Limited
PROJECT No:	P20-180
PROJECT TITLE:	8-10 Carlton Road, Chiswick, W4 5DY

PADDOCK GEO ENGINEERING

HazWasteOnline™

Waste Classification Report

TY5BF-6M2MC-BMQAY

Job name

Carlton Road, Chiswick

Description/Comments

Project

P20-180

Site

8-10 Carlton Road, Chiswick, W4 5DY

Related Documents

#	Name	Description
None		

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Matthew Paddock
Date:
20 Aug 2020 13:29 GMT
Telephone:
07377 422528

Company:
Paddock Geo Engineering
The Annex,
14 Burns Road
Milton Keynes
MK3 5A

HazWasteOnline™ Training Record:

Course	Date
Hazardous Waste Classification	-
Advanced Hazardous Waste Classification	-

Report

Created by: Matthew Paddock
Created date: 20 Aug 2020 13:29 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	BH1	0.4	Non Hazardous		3
2	TP1	0.4	Non Hazardous		5
3	TP2	0.5	Non Hazardous		7
4	WS1	0.9	Non Hazardous		9
5	WS1[2]	1.8	Hazardous	HP 7, HP 10, HP 14	11
6	WS2	0.4	Non Hazardous		14
7	WS2[2]	1.5	Non Hazardous		16
8	WS3	0.4	Non Hazardous		18
9	WS4	0.9	Non Hazardous		20

Classification of sample: BH1

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

Sample details

Sample Name:
BH1
Sample Depth:
0.4 m

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: 0% 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	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14	mg/kg	1.32	18.485	mg/kg	0.00185 %		
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.4	mg/kg	2.775	3.885	mg/kg	0.000389 %		
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		1.6	mg/kg	3.22	5.152	mg/kg	0.000515 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.4	mg/kg	1.142	1.599	mg/kg	0.00016 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		40	mg/kg	1.462	58.462	mg/kg	0.00585 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		55	mg/kg	1.126	61.924	mg/kg	0.00619 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	110	mg/kg	1.56	171.58	mg/kg	0.011 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.6	mg/kg	1.353	0.812	mg/kg	0.0000812 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		28	mg/kg	2.976	83.335	mg/kg	0.00833 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	2.554	2.554	mg/kg	0.000255 %		
11	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		130	mg/kg	1.245	161.813	mg/kg	0.0162 %		
12	TPH (C6 to C40) petroleum group			TPH		10	mg/kg		10	mg/kg	0.001 %		
13	pH			PH		9.7	pH		9.7	pH	9.7 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		0.05	mg/kg		0.05	mg/kg	0.000005 %		
15	acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-695-5	86-73-7									
18		phenanthrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-581-5	85-01-8									
19		anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-371-1	120-12-7									
20		fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-912-4	206-44-0									
21		pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-036-00-5	205-916-6	207-08-9									
26		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									
27		indeno[123-cd]pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-883-8	191-24-2									
										Total:	0.0519 %		

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): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: TP1

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

Sample details

Sample Name:
TP1
Sample Depth:
0.4 m

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: 0% 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	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	21.125	mg/kg	0.00211 %		
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.3	mg/kg	2.775	3.608	mg/kg	0.000361 %		
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		1.9	mg/kg	3.22	6.118	mg/kg	0.000612 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.1	mg/kg	1.142	1.257	mg/kg	0.000126 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		46	mg/kg	1.462	67.232	mg/kg	0.00672 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		47	mg/kg	1.126	52.917	mg/kg	0.00529 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	38	mg/kg	1.56	59.273	mg/kg	0.0038 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.3	mg/kg	1.353	0.406	mg/kg	0.0000406 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		37	mg/kg	2.976	110.122	mg/kg	0.011 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	2.554	2.554	mg/kg	0.000255 %		
11	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		99	mg/kg	1.245	123.227	mg/kg	0.0123 %		
12	TPH (C6 to C40) petroleum group			TPH		10	mg/kg		10	mg/kg	0.001 %		
13	pH			PH		7.9	pH		7.9	pH	7.9 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		0.05	mg/kg		0.05	mg/kg	0.000005 %		
15	acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-695-5	86-73-7									
18		phenanthrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-581-5	85-01-8									
19		anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-371-1	120-12-7									
20		fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-912-4	206-44-0									
21		pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-036-00-5	205-916-6	207-08-9									
26		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									
27		indeno[123-cd]pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-883-8	191-24-2									
										Total:	0.0437 %		

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): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: TP2

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

Sample details

Sample Name:
TP2

Sample Depth:
0.5 m

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: 0% 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	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15	mg/kg	1.32	19.805	mg/kg	0.00198 %		
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.3	mg/kg	2.775	3.608	mg/kg	0.000361 %		
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		2.5	mg/kg	3.22	8.05	mg/kg	0.000805 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4	mg/kg	1.142	0.457	mg/kg	0.0000457 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		37	mg/kg	1.462	54.078	mg/kg	0.00541 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		35	mg/kg	1.126	39.406	mg/kg	0.00394 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	84	mg/kg	1.56	131.024	mg/kg	0.0084 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.3	mg/kg	1.353	0.406	mg/kg	0.0000406 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		30	mg/kg	2.976	89.288	mg/kg	0.00893 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	2.554	2.554	mg/kg	0.000255 %		
11	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		98	mg/kg	1.245	121.982	mg/kg	0.0122 %		
12	TPH (C6 to C40) petroleum group			TPH		10	mg/kg		10	mg/kg	0.001 %		
13	pH			PH		7.4	pH		7.4	pH	7.4 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		0.05	mg/kg		0.05	mg/kg	0.000005 %		
15	acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-695-5	86-73-7									
18		phenanthrene				0.38	mg/kg		0.38	mg/kg	0.000038 %		
			201-581-5	85-01-8									
19		anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-371-1	120-12-7									
20		fluoranthene				0.89	mg/kg		0.89	mg/kg	0.000089 %		
			205-912-4	206-44-0									
21		pyrene				0.93	mg/kg		0.93	mg/kg	0.000093 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.43	mg/kg		0.43	mg/kg	0.000043 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.4	mg/kg		0.4	mg/kg	0.00004 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.62	mg/kg		0.62	mg/kg	0.000062 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.25	mg/kg		0.25	mg/kg	0.000025 %		
		601-036-00-5	205-916-6	207-08-9									
26		benzo[a]pyrene; benzo[def]chrysene				0.42	mg/kg		0.42	mg/kg	0.000042 %		
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.32	mg/kg		0.32	mg/kg	0.000032 %		
			205-883-8	191-24-2									
										Total:	0.0439 %		

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): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS1

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

Sample details

Sample Name:	LoW Code:
WS1	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
0.9 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% 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	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15	mg/kg	1.32	19.805	mg/kg	0.00198 %		
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.7	mg/kg	2.775	4.718	mg/kg	0.000472 %		
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		4	mg/kg	3.22	12.88	mg/kg	0.00129 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.2	mg/kg	1.142	0.228	mg/kg	0.0000228 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		50	mg/kg	1.462	73.078	mg/kg	0.00731 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		38	mg/kg	1.126	42.784	mg/kg	0.00428 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	80	mg/kg	1.56	124.785	mg/kg	0.008 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.3	mg/kg	1.353	0.406	mg/kg	0.0000406 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		44	mg/kg	2.976	130.956	mg/kg	0.0131 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	2.554	2.554	mg/kg	0.000255 %		
11	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		92	mg/kg	1.245	114.514	mg/kg	0.0115 %		
12	TPH (C6 to C40) petroleum group			TPH		10	mg/kg		10	mg/kg	0.001 %		
13	pH			PH		7.2	pH		7.2	pH	7.2 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		0.05	mg/kg		0.05	mg/kg	0.000005 %		
15	acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-695-5	86-73-7									
18		phenanthrene				0.59	mg/kg		0.59	mg/kg	0.000059 %		
			201-581-5	85-01-8									
19		anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-371-1	120-12-7									
20		fluoranthene				1.4	mg/kg		1.4	mg/kg	0.00014 %		
			205-912-4	206-44-0									
21		pyrene				1.4	mg/kg		1.4	mg/kg	0.00014 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.8	mg/kg		0.8	mg/kg	0.00008 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.58	mg/kg		0.58	mg/kg	0.000058 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.74	mg/kg		0.74	mg/kg	0.000074 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.22	mg/kg		0.22	mg/kg	0.000022 %		
		601-036-00-5	205-916-6	207-08-9									
26		benzo[a]pyrene; benzo[def]chrysene				0.46	mg/kg		0.46	mg/kg	0.000046 %		
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
			205-883-8	191-24-2									
										Total:	0.0499 %		

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): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS1[2]

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

Sample details

Sample Name:	LoW Code:	
WS1[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1.8 m	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. 1B; 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:

lead chromate: (Note 1 conc.: 0.45%)

HP 10: Toxic for reproduction "waste which has adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring"

Hazard Statements hit:

Repr. 1A; H360Df "May damage the unborn child. Suspected of damaging fertility."

Because of determinand:

lead chromate: (Note 1 conc.: 0.45%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinand:

lead chromate: (Note 1 conc.: 0.45%)

Determinands

Moisture content: 0% 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		arsenic { arsenic trioxide }				66	mg/kg	1.32	87.141	mg/kg	0.00871 %		
		033-003-00-0	215-481-4	1327-53-3									
2		beryllium { beryllium oxide }				8.1	mg/kg	2.775	22.48	mg/kg	0.00225 %		
		004-003-00-8	215-133-1	1304-56-9									
3		boron { diboron trioxide; boric oxide }				7	mg/kg	3.22	22.539	mg/kg	0.00225 %		
		005-008-00-8	215-125-8	1303-86-2									
4		cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.228	mg/kg	0.0000228 %		
		048-002-00-0	215-146-2	1306-19-0									
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				33	mg/kg	1.462	48.231	mg/kg	0.00482 %		
			215-160-9	1308-38-9									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
6		copper { dicopper oxide; copper (I) oxide }				390	mg/kg	1.126	439.096	mg/kg	0.0439 %		
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead chromate }			1	4500	mg/kg	1.56	7019.168	mg/kg	0.45 %		
		082-004-00-2	231-846-0	7758-97-6									
8		mercury { mercury dichloride }				1.7	mg/kg	1.353	2.301	mg/kg	0.00023 %		
		080-010-00-X	231-299-8	7487-94-7									
9		nickel { nickel chromate }				74	mg/kg	2.976	220.244	mg/kg	0.022 %		
		028-035-00-7	238-766-5	14721-18-7									
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.554	mg/kg	0.000255 %		
		034-002-00-8											
11		zinc { zinc oxide }				460	mg/kg	1.245	572.568	mg/kg	0.0573 %		
		030-013-00-7	215-222-5	1314-13-2									
12		TPH (C6 to C40) petroleum group				590	mg/kg		590	mg/kg	0.059 %		
				TPH									
13		pH				7.1	pH		7.1	pH	7.1 pH		
				PH									
14		naphthalene				0.25	mg/kg		0.25	mg/kg	0.000025 %		
		601-052-00-2	202-049-5	91-20-3									
15		acenaphthylene				0.36	mg/kg		0.36	mg/kg	0.000036 %		
			205-917-1	208-96-8									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.34	mg/kg		0.34	mg/kg	0.000034 %		
			201-695-5	86-73-7									
18		phenanthrene				4.9	mg/kg		4.9	mg/kg	0.00049 %		
			201-581-5	85-01-8									
19		anthracene				1.6	mg/kg		1.6	mg/kg	0.00016 %		
			204-371-1	120-12-7									
20		fluoranthene				13	mg/kg		13	mg/kg	0.0013 %		
			205-912-4	206-44-0									
21		pyrene				13	mg/kg		13	mg/kg	0.0013 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				9.1	mg/kg		9.1	mg/kg	0.00091 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				5.6	mg/kg		5.6	mg/kg	0.00056 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				10	mg/kg		10	mg/kg	0.001 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				2	mg/kg		2	mg/kg	0.0002 %		
		601-036-00-5	205-916-6	207-08-9									
26		benzo[a]pyrene; benzo[def]chrysene				6.2	mg/kg		6.2	mg/kg	0.00062 %		
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				3.1	mg/kg		3.1	mg/kg	0.00031 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				1.2	mg/kg		1.2	mg/kg	0.00012 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				3.1	mg/kg		3.1	mg/kg	0.00031 %		
			205-883-8	191-24-2									
										Total:	0.658 %		

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.059%)

Classification of sample: WS2

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

Sample details

Sample Name:
WS2
Sample Depth:
0.4 m

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: 0% 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	arsenic { arsenic trioxide }		14 mg/kg	1.32	18.485 mg/kg	0.00185 %		
	033-003-00-0 / 215-481-4 / 1327-53-3							
2	beryllium { beryllium oxide }		1.5 mg/kg	2.775	4.163 mg/kg	0.000416 %		
	004-003-00-8 / 215-133-1 / 1304-56-9							
3	boron { diboron trioxide; boric oxide }		2.8 mg/kg	3.22	9.016 mg/kg	0.000902 %		
	005-008-00-8 / 215-125-8 / 1303-86-2							
4	cadmium { cadmium oxide }		0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %		
	048-002-00-0 / 215-146-2 / 1306-19-0							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		50 mg/kg	1.462	73.078 mg/kg	0.00731 %		
	/ 215-160-9 / 1308-38-9							
6	copper { dicopper oxide; copper (I) oxide }		27 mg/kg	1.126	30.399 mg/kg	0.00304 %		
	029-002-00-X / 215-270-7 / 1317-39-1							
7	lead { lead chromate }	1	23 mg/kg	1.56	35.876 mg/kg	0.0023 %		
	082-004-00-2 / 231-846-0 / 7758-97-6							
8	mercury { mercury dichloride }		0.3 mg/kg	1.353	0.406 mg/kg	0.0000406 %		
	080-010-00-X / 231-299-8 / 7487-94-7							
9	nickel { nickel chromate }		43 mg/kg	2.976	127.979 mg/kg	0.0128 %		
	028-035-00-7 / 238-766-5 / 14721-18-7							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		1 mg/kg	2.554	2.554 mg/kg	0.000255 %		
	034-002-00-8 / /							
11	zinc { zinc oxide }		85 mg/kg	1.245	105.801 mg/kg	0.0106 %		
	030-013-00-7 / 215-222-5 / 1314-13-2							
12	TPH (C6 to C40) petroleum group		10 mg/kg		10 mg/kg	0.001 %		
	/ / TPH							
13	pH		7.5 pH		7.5 pH	7.5 pH		
	/ / PH							
14	naphthalene		0.05 mg/kg		0.05 mg/kg	0.000005 %		
	601-052-00-2 / 202-049-5 / 91-20-3							
15	acenaphthylene		0.05 mg/kg		0.05 mg/kg	0.000005 %		
	/ 205-917-1 / 208-96-8							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-695-5	86-73-7									
18		phenanthrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-581-5	85-01-8									
19		anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-371-1	120-12-7									
20		fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-912-4	206-44-0									
21		pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-036-00-5	205-916-6	207-08-9									
26		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									
27		indeno[123-cd]pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-883-8	191-24-2									
										Total:	0.0406 %		

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): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS2[2]

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

Sample details

Sample Name:
WS2[2]
Sample Depth:
1.5 m

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: 0% 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	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	21.125	mg/kg	0.00211 %		
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		2.4	mg/kg	2.775	6.661	mg/kg	0.000666 %		
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		3.2	mg/kg	3.22	10.304	mg/kg	0.00103 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.2	mg/kg	1.142	0.228	mg/kg	0.0000228 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		63	mg/kg	1.462	92.078	mg/kg	0.00921 %		
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	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	24	mg/kg	1.56	37.436	mg/kg	0.0024 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.3	mg/kg	1.353	0.406	mg/kg	0.0000406 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		43	mg/kg	2.976	127.979	mg/kg	0.0128 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	2.554	2.554	mg/kg	0.000255 %		
11	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		98	mg/kg	1.245	121.982	mg/kg	0.0122 %		
12	TPH (C6 to C40) petroleum group			TPH		10	mg/kg		10	mg/kg	0.001 %		
13	pH			PH		7.2	pH		7.2	pH	7.2 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		0.05	mg/kg		0.05	mg/kg	0.000005 %		
15	acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-695-5	86-73-7									
18		phenanthrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-581-5	85-01-8									
19		anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-371-1	120-12-7									
20		fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-912-4	206-44-0									
21		pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-036-00-5	205-916-6	207-08-9									
26		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									
27		indeno[123-cd]pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-883-8	191-24-2									
										Total:	0.0429 %		

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): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS3

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

Sample details

Sample Name:
WS3
Sample Depth:
0.4 m

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: 0% 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	arsenic { arsenic trioxide }		25 mg/kg	1.32	33.008 mg/kg	0.0033 %		
	033-003-00-0 / 215-481-4 / 1327-53-3							
2	beryllium { beryllium oxide }		1.6 mg/kg	2.775	4.441 mg/kg	0.000444 %		
	004-003-00-8 / 215-133-1 / 1304-56-9							
3	boron { diboron trioxide; boric oxide }		2.6 mg/kg	3.22	8.372 mg/kg	0.000837 %		
	005-008-00-8 / 215-125-8 / 1303-86-2							
4	cadmium { cadmium oxide }		0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %		
	048-002-00-0 / 215-146-2 / 1306-19-0							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		55 mg/kg	1.462	80.386 mg/kg	0.00804 %		
	/ 215-160-9 / 1308-38-9							
6	copper { dicopper oxide; copper (I) oxide }		29 mg/kg	1.126	32.651 mg/kg	0.00327 %		
	029-002-00-X / 215-270-7 / 1317-39-1							
7	lead { lead chromate }	1	21 mg/kg	1.56	32.756 mg/kg	0.0021 %		
	082-004-00-2 / 231-846-0 / 7758-97-6							
8	mercury { mercury dichloride }		0.3 mg/kg	1.353	0.406 mg/kg	0.0000406 %		
	080-010-00-X / 231-299-8 / 7487-94-7							
9	nickel { nickel chromate }		50 mg/kg	2.976	148.813 mg/kg	0.0149 %		
	028-035-00-7 / 238-766-5 / 14721-18-7							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		1 mg/kg	2.554	2.554 mg/kg	0.000255 %		
	034-002-00-8 / /							
11	zinc { zinc oxide }		90 mg/kg	1.245	112.024 mg/kg	0.0112 %		
	030-013-00-7 / 215-222-5 / 1314-13-2							
12	TPH (C6 to C40) petroleum group		10 mg/kg		10 mg/kg	0.001 %		
	/ / TPH							
13	pH		7.1 pH		7.1 pH	7.1 pH		
	/ / PH							
14	naphthalene		0.05 mg/kg		0.05 mg/kg	0.000005 %		
	601-052-00-2 / 202-049-5 / 91-20-3							
15	acenaphthylene		0.05 mg/kg		0.05 mg/kg	0.000005 %		
	/ 205-917-1 / 208-96-8							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-695-5	86-73-7									
18		phenanthrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-581-5	85-01-8									
19		anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-371-1	120-12-7									
20		fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-912-4	206-44-0									
21		pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-036-00-5	205-916-6	207-08-9									
26		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									
27		indeno[123-cd]pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			205-883-8	191-24-2									
										Total:	0.0455 %		

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): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS4

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

Sample details

Sample Name:
WS4
Sample Depth:
0.9 m

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: 0% 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	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		32	mg/kg	1.32	42.25	mg/kg	0.00423 %		
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		2.9	mg/kg	2.775	8.048	mg/kg	0.000805 %		
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		2.1	mg/kg	3.22	6.762	mg/kg	0.000676 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.2	mg/kg	1.142	0.228	mg/kg	0.0000228 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		26	mg/kg	1.462	38	mg/kg	0.0038 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		110	mg/kg	1.126	123.848	mg/kg	0.0124 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	270	mg/kg	1.56	421.15	mg/kg	0.027 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.5	mg/kg	1.353	0.677	mg/kg	0.0000677 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		40	mg/kg	2.976	119.051	mg/kg	0.0119 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	2.554	2.554	mg/kg	0.000255 %		
11	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		120	mg/kg	1.245	149.366	mg/kg	0.0149 %		
12	TPH (C6 to C40) petroleum group			TPH		10	mg/kg		10	mg/kg	0.001 %		
13	pH			PH		7.8	pH		7.8	pH	7.8 pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3		0.05	mg/kg		0.05	mg/kg	0.000005 %		
15	acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-469-6	83-32-9									
17		fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-695-5	86-73-7									
18		phenanthrene				1.8	mg/kg		1.8	mg/kg	0.00018 %		
			201-581-5	85-01-8									
19		anthracene				0.32	mg/kg		0.32	mg/kg	0.000032 %		
			204-371-1	120-12-7									
20		fluoranthene				2.7	mg/kg		2.7	mg/kg	0.00027 %		
			205-912-4	206-44-0									
21		pyrene				2.6	mg/kg		2.6	mg/kg	0.00026 %		
			204-927-3	129-00-0									
22		benzo[a]anthracene				1.9	mg/kg		1.9	mg/kg	0.00019 %		
		601-033-00-9	200-280-6	56-55-3									
23		chrysene				1.1	mg/kg		1.1	mg/kg	0.00011 %		
		601-048-00-0	205-923-4	218-01-9									
24		benzo[b]fluoranthene				2.1	mg/kg		2.1	mg/kg	0.00021 %		
		601-034-00-4	205-911-9	205-99-2									
25		benzo[k]fluoranthene				0.77	mg/kg		0.77	mg/kg	0.000077 %		
		601-036-00-5	205-916-6	207-08-9									
26		benzo[a]pyrene; benzo[def]chrysene				1.6	mg/kg		1.6	mg/kg	0.00016 %		
		601-032-00-3	200-028-5	50-32-8									
27		indeno[123-cd]pyrene				0.99	mg/kg		0.99	mg/kg	0.000099 %		
			205-893-2	193-39-5									
28		dibenz[a,h]anthracene				0.33	mg/kg		0.33	mg/kg	0.000033 %		
		601-041-00-2	200-181-8	53-70-3									
29		benzo[ghi]perylene				1.1	mg/kg		1.1	mg/kg	0.00011 %		
			205-883-8	191-24-2									
										Total:	0.0788 %		

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): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Appendix A: Classifier defined and non CLP determinands

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

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

- **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: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

- **pH** (CAS Number: PH)

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

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

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: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

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: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

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: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **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: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **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: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **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: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **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: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **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: 06 Aug 2015
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: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

beryllium {beryllium oxide}

Reasonable case CLP species based on hazard statements/molecular weight. Industrial sources include: most common (non alloy) form, used in ceramics (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

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

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

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

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc oxide}

No evidence of industries utilizing zinc on site

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.224.4427.8663 (11 Aug 2020)
HazWasteOnline Database: 2020.224.4427.8663 (11 Aug 2020)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
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
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
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

APPENDIX D – GEOTECHNICAL DATA

Geotechnical Laboratory Testing Results

Infiltration Testing Report

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

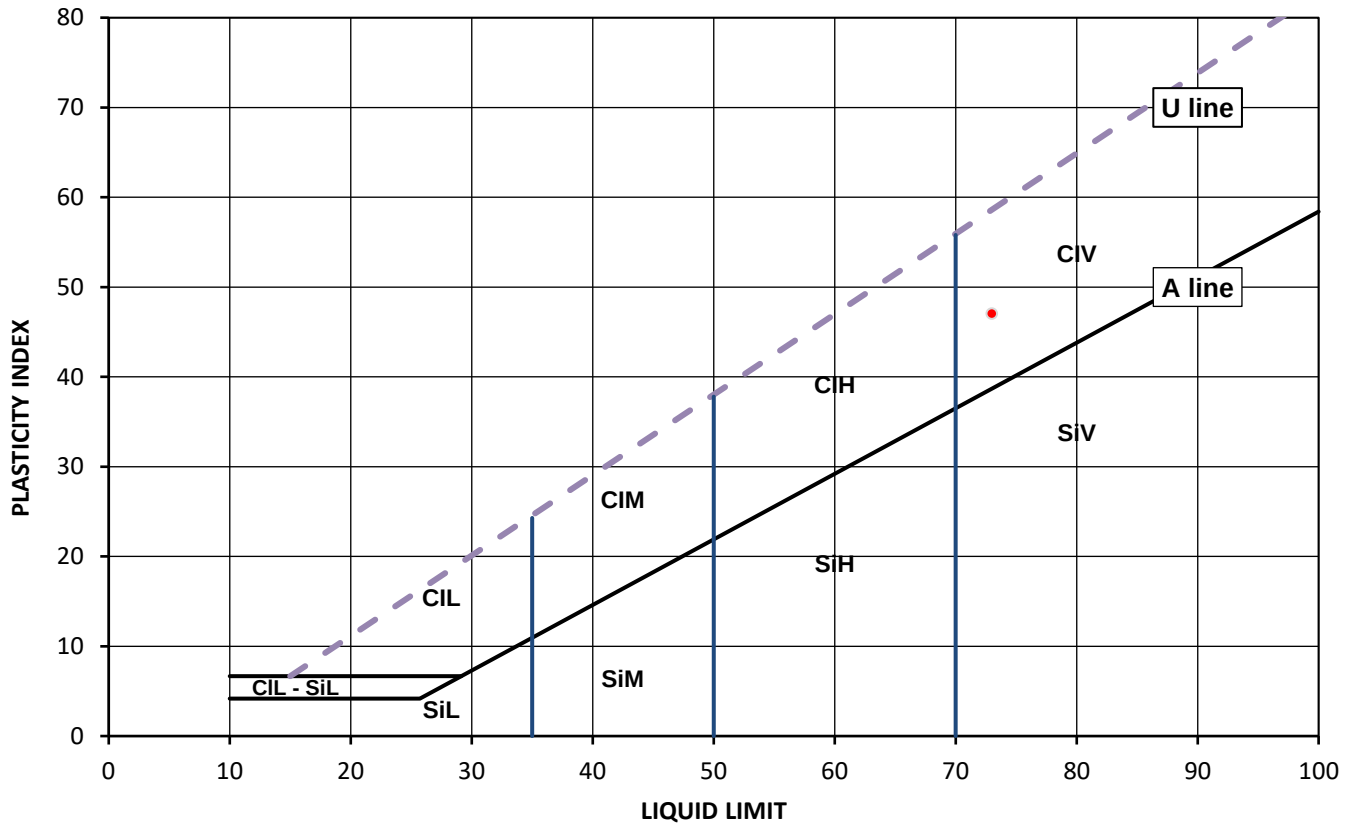
Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	20/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	06/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574186	Depth Top [m]:	12.50
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brownish grey CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
25	73	26	47	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

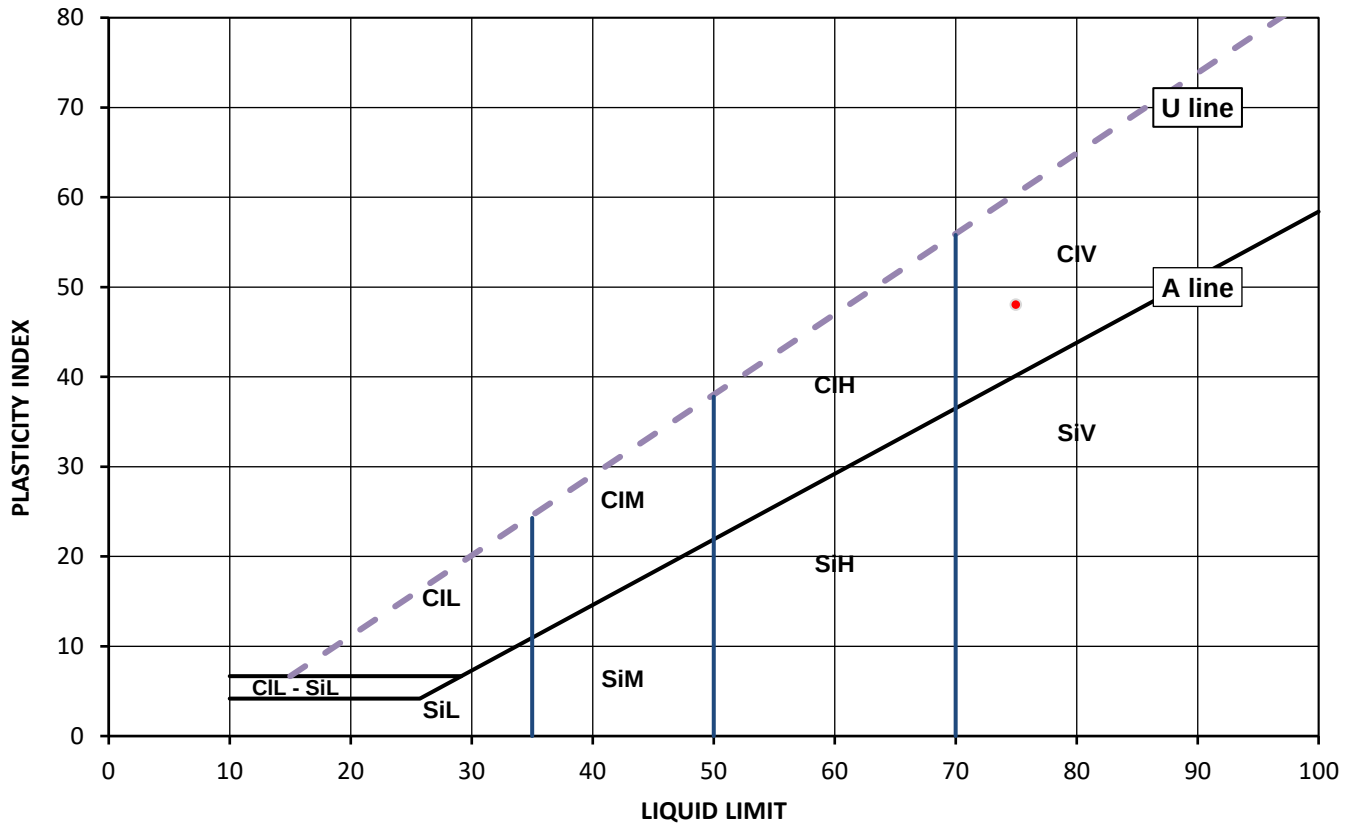
Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	20/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	06/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574187	Depth Top [m]:	15.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brownish grey CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
26	75	27	48	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

			Plasticity	Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	20/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	06/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

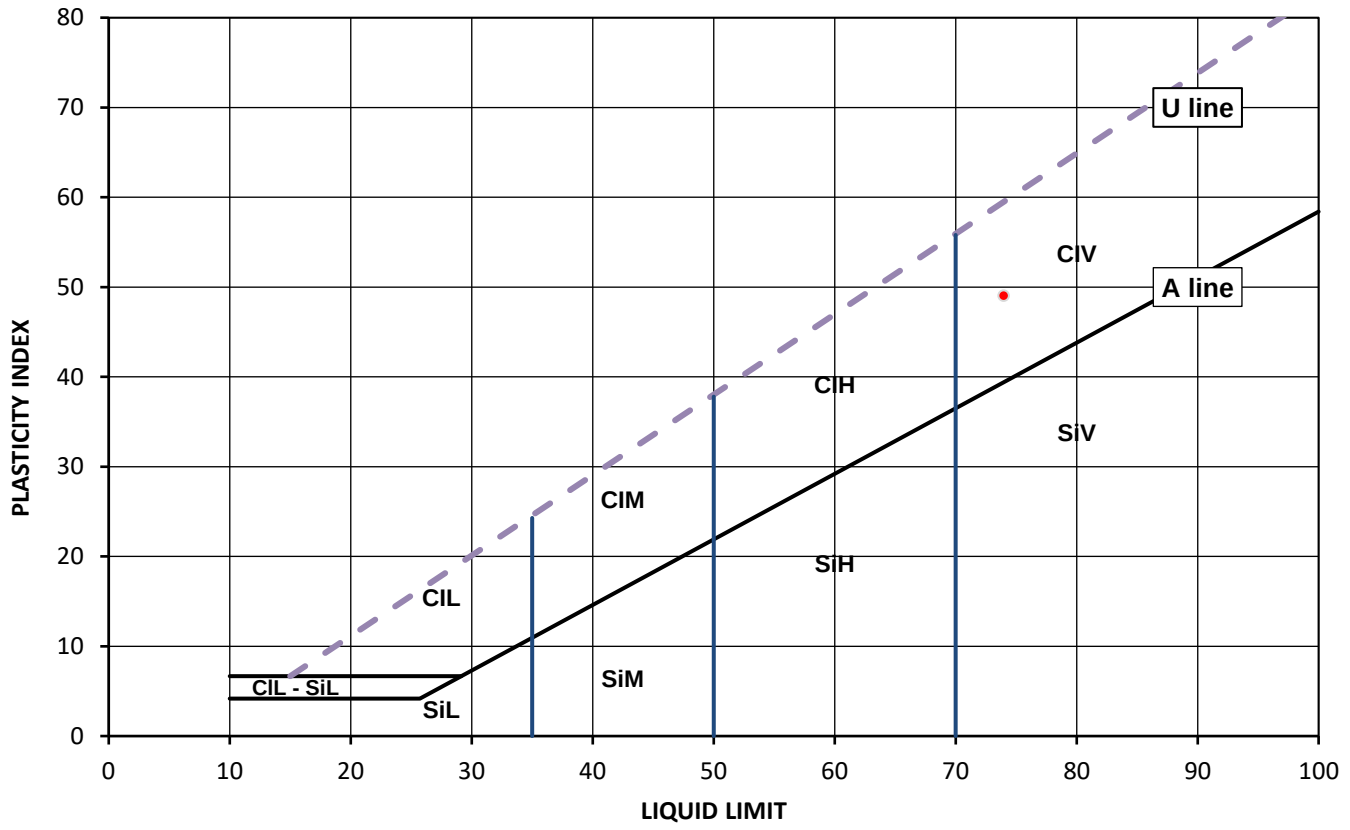
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574188	Depth Top [m]:	18.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Greyish brown CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
26	74	25	49	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

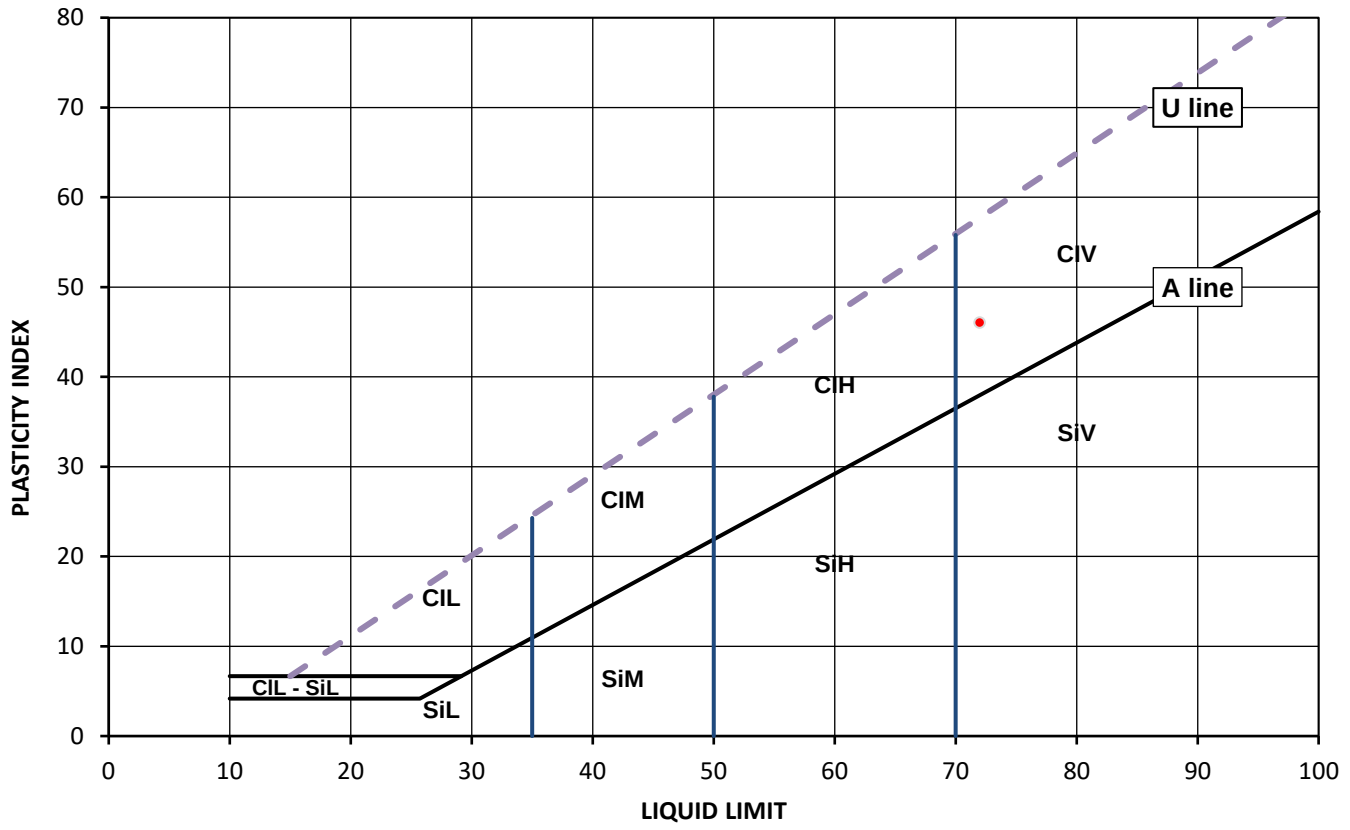
Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	20/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	06/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574189	Depth Top [m]:	19.50
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brownish grey CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
29	72	26	46	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

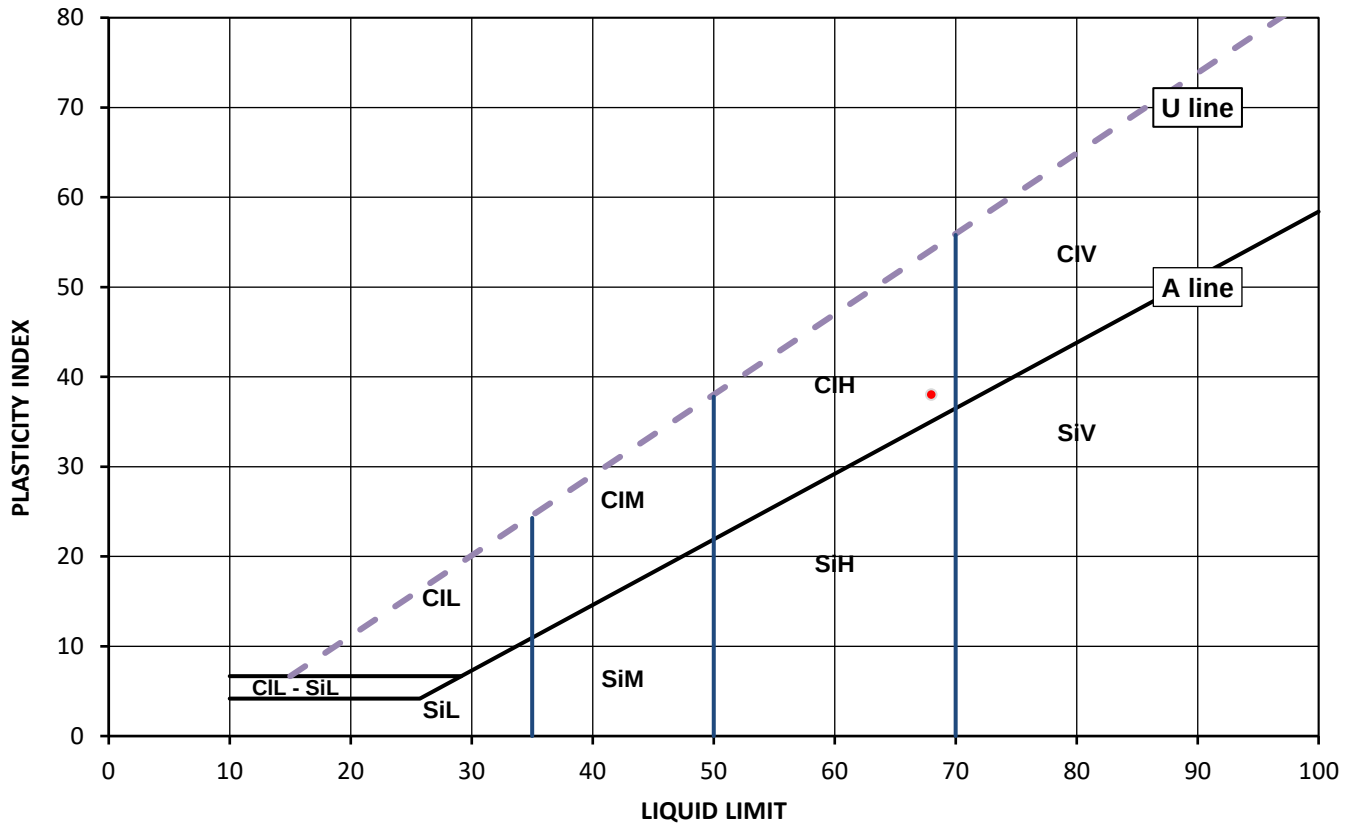
Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	21/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	06/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574201	Depth Top [m]:	1.60
Hole No.:	HTP1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark brown slightly gravelly CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
25	68	30	38	96



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

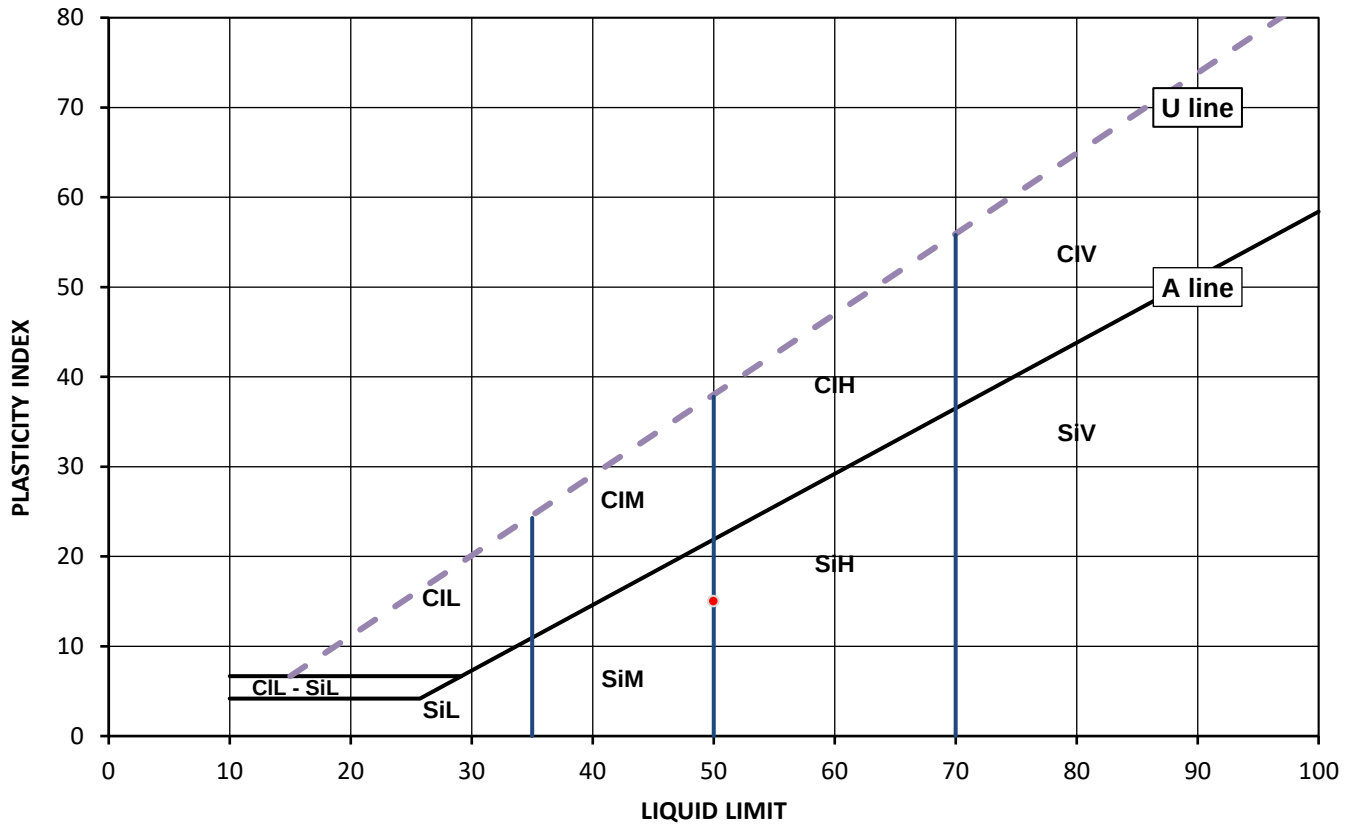
Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	21/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	06/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574202	Depth Top [m]:	1.70
Hole No.:	HTP2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark brown gravelly slity CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
19	50	35	15	45



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

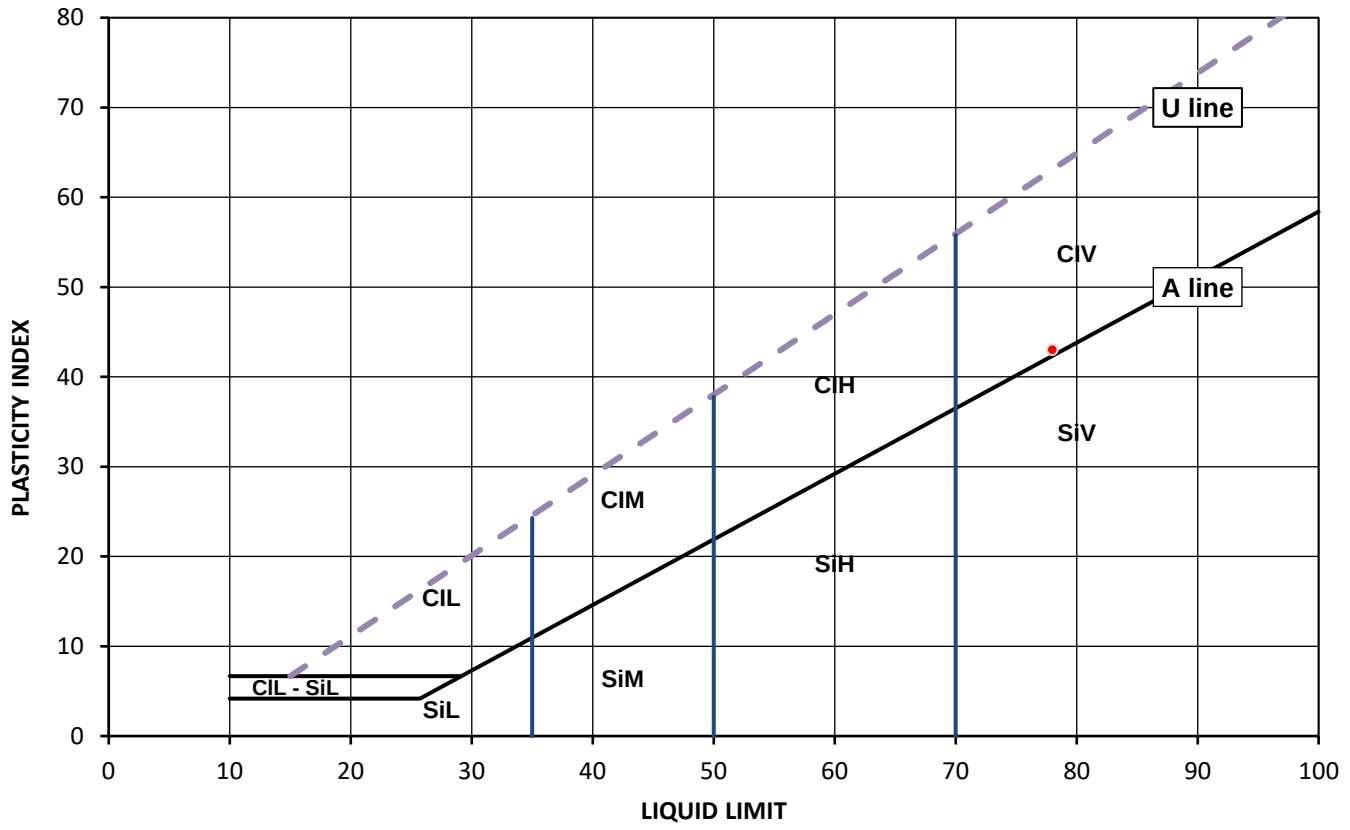
Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	21/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	06/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574203	Depth Top [m]:	1.50
Hole No.:	HTP3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brownish grey slightly gravelly CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
38	78	35	43	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

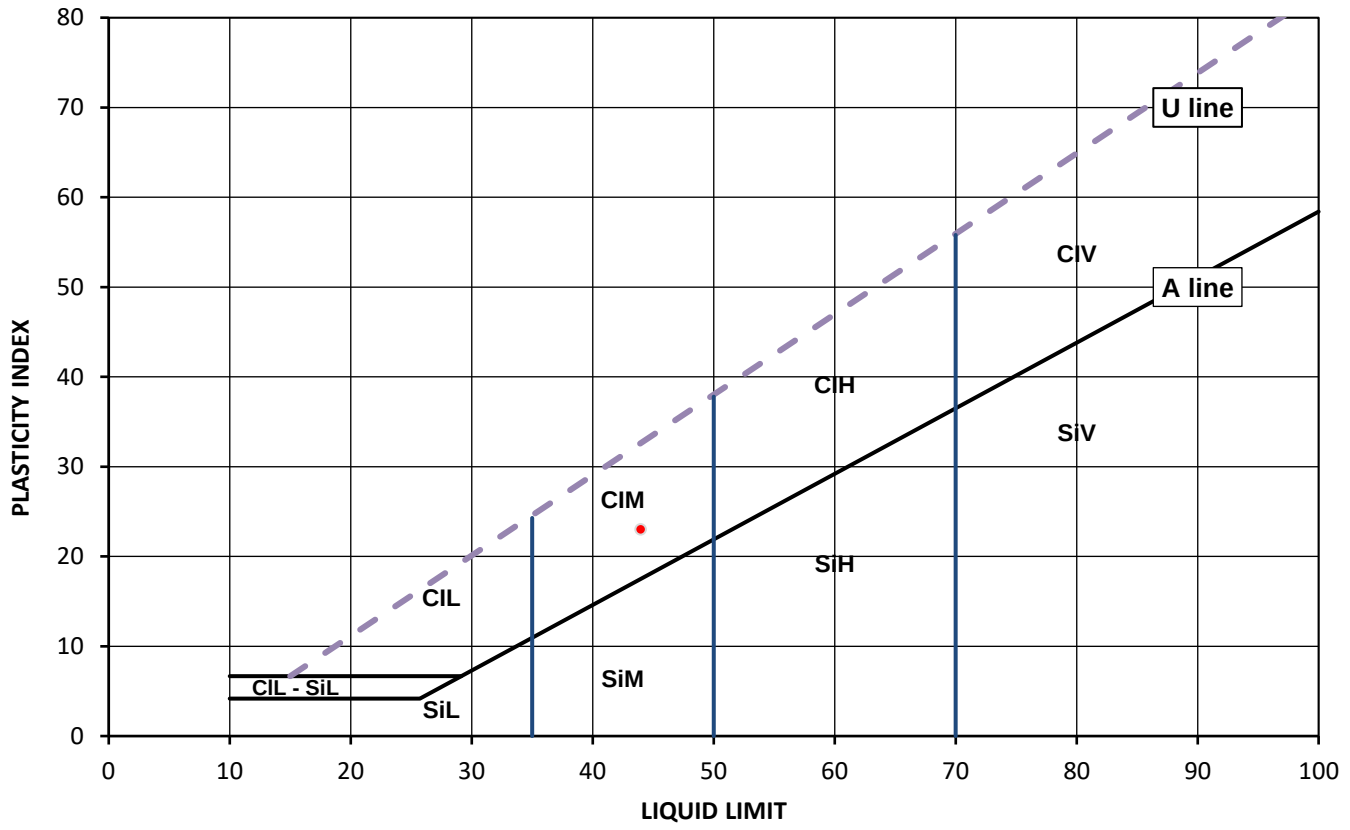
Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	21/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	31/07/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574690	Depth Top [m]:	2.20
Hole No.:	WS2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Mottled brown sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
15	44	21	23	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 232.10

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Paddock Geo Engineering

Client Address: 14 Burns Road, Bletchley, Milton Keynes, MK3 5AL

Contact: Matt Paddock

Site Address: Land At 18-20 Carlton Road, Chiswick, W4 5DY

Client Reference: P20-180 S01
Job Number: 20-21603
Date Sampled: 20/07 - 21/07/2020
Date Received: 23/07/2020
Date Tested: 31/07 - 06/08/2020
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
1574186	BH1	Not Given	12.50	Not Given	D	Brownish grey CLAY	Atterberg 1 Point	25		100	73	26	47						
1574187	BH1	Not Given	15.00	Not Given	D	Brownish grey CLAY	Atterberg 1 Point	26		100	75	27	48						
1574188	BH1	Not Given	18.00	Not Given	D	Greyish brown CLAY	Atterberg 1 Point	26		100	74	25	49						
1574189	BH1	Not Given	19.50	Not Given	D	Brownish grey CLAY	Atterberg 1 Point	29		100	72	26	46						
1574201	HTP1	Not Given	1.60	Not Given	D	Dark brown slightly gravelly CLAY	Atterberg 1 Point	25		96	68	30	38						
1574202	HTP2	Not Given	1.70	Not Given	D	Dark brown gravelly slity CLAY	Atterberg 1 Point	19		45	50	35	15						
1574203	HTP3	Not Given	1.50	Not Given	D	Brownish grey slightly gravelly CLAY	Atterberg 1 Point	38		99	78	35	43						
1574690	WS2	Not Given	2.20	Not Given	D	Mottled brown sandy CLAY	Atterberg 1 Point	15		100	44	21	23						
1574691	WS4	Not Given	2.90	Not Given	D	Mottled brown clayey sandy GRAVEL		7.7											

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 234.12

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

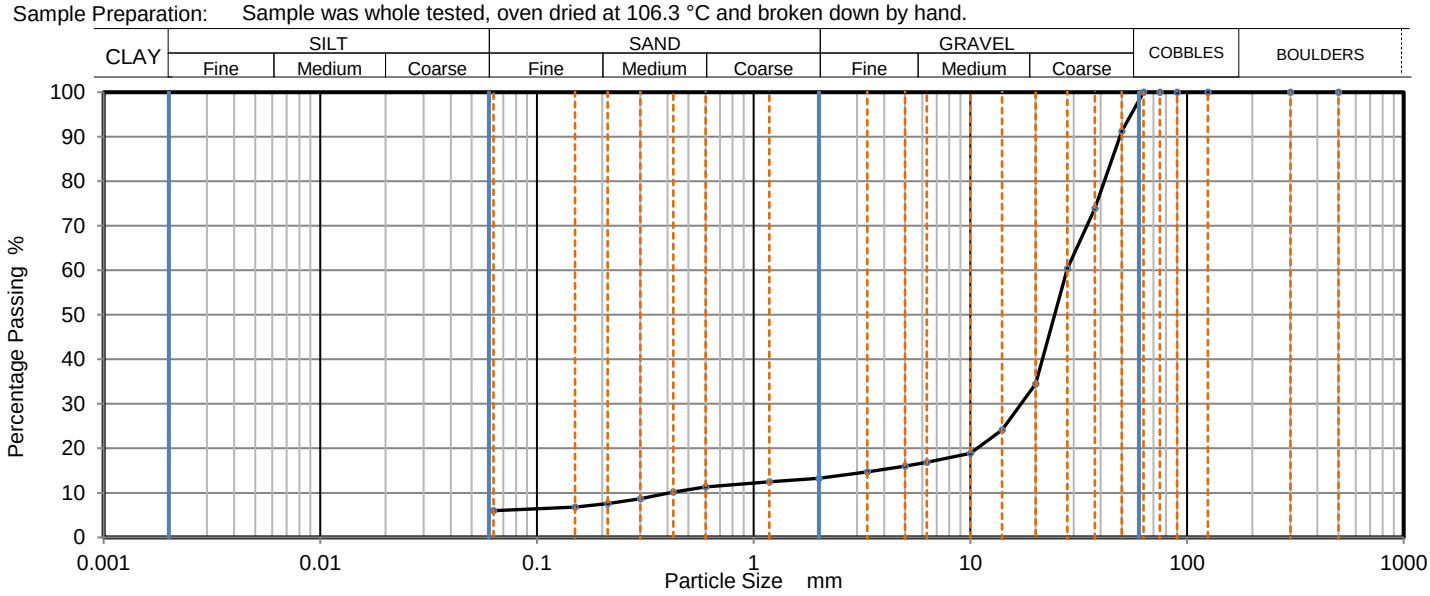
4041

Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	20/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	31/07/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574185	Depth Top [m]:	6.00
Hole No.:	BH1 Combined	Depth Base [m]:	10.00
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Greyish brown slightly clayey slightly sandy GRAVEL		
Sample Preparation:	Sample was whole tested, oven dried at 106.3 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	91		
37.5	74		
28	60		
20	35		
14	24		
10	19		
6.3	17		
5	16		
3.35	15		
2	13		
1.18	13		
0.6	11		
0.425	10		
0.3	9		
0.212	8		
0.15	7		
0.063	6		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	86.70
Sand	7.10
Fines <0.063mm	6.30

Grading Analysis		
D100	mm	63
D60	mm	27.8
D30	mm	17.1
D10	mm	0.409
Uniformity Coefficient		68
Curvature Coefficient		26

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 100.18

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

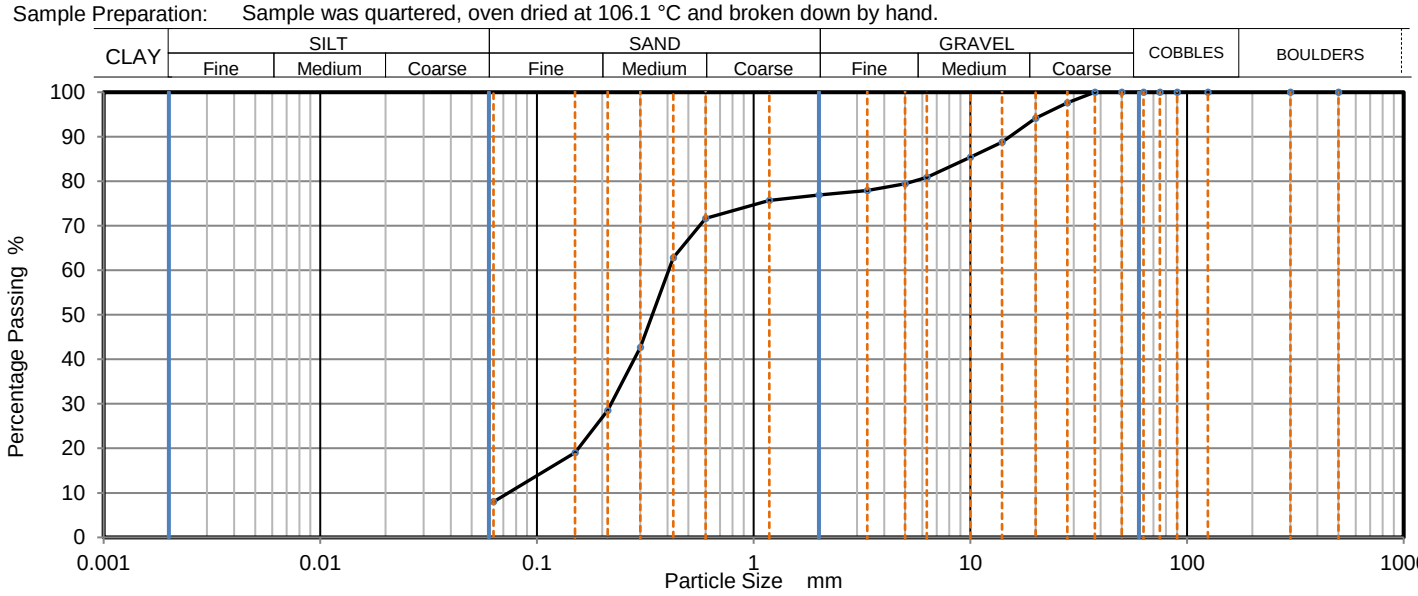
4041

Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	21/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	31/07/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1574200	Depth Top [m]:	2.70
Hole No.:	WS2 + WS3 + WS4	Depth Base [m]:	4.80
Sample Reference:	Combined	Sample Type:	D
Sample Description:	Yellowish brown clayey gravelly SAND		
Sample Preparation:	Sample was quartered, oven dried at 106.1 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	94		
14	89		
10	85		
6.3	81		
5	79		
3.35	78		
2	77		
1.18	76		
0.6	72		
0.425	63		
0.3	43		
0.212	29		
0.15	19		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	23.10
Sand	68.70
Fines <0.063mm	8.20

Grading Analysis		
D100	mm	37.5
D60	mm	0.405
D30	mm	0.22
D10	mm	0.0728
Uniformity Coefficient		5.6
Curvature Coefficient		1.6

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 100.18

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

Tested in Accordance with:
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	20/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	08/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

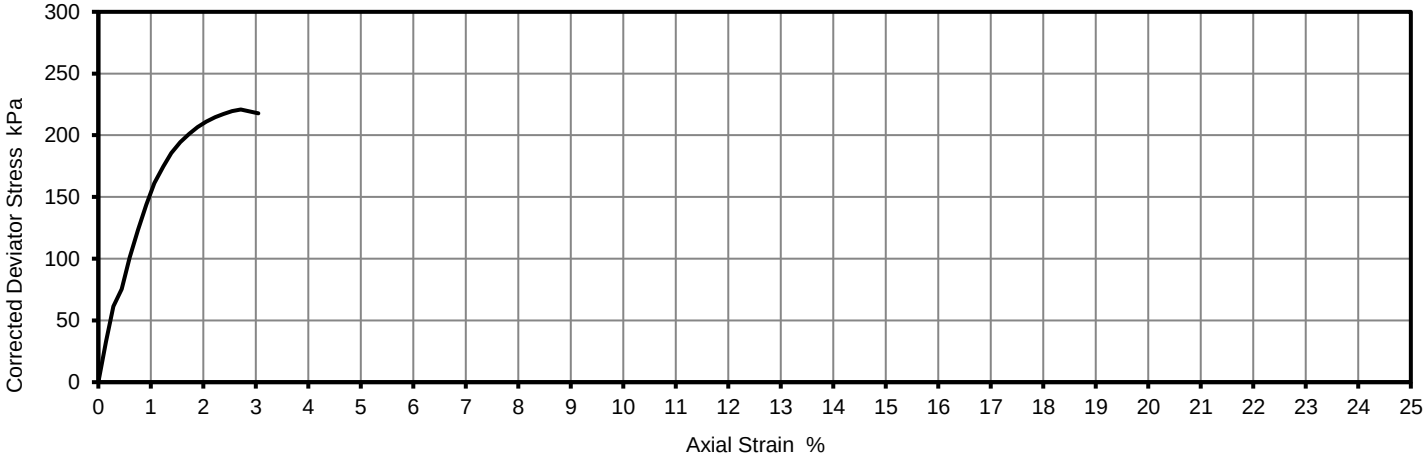
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

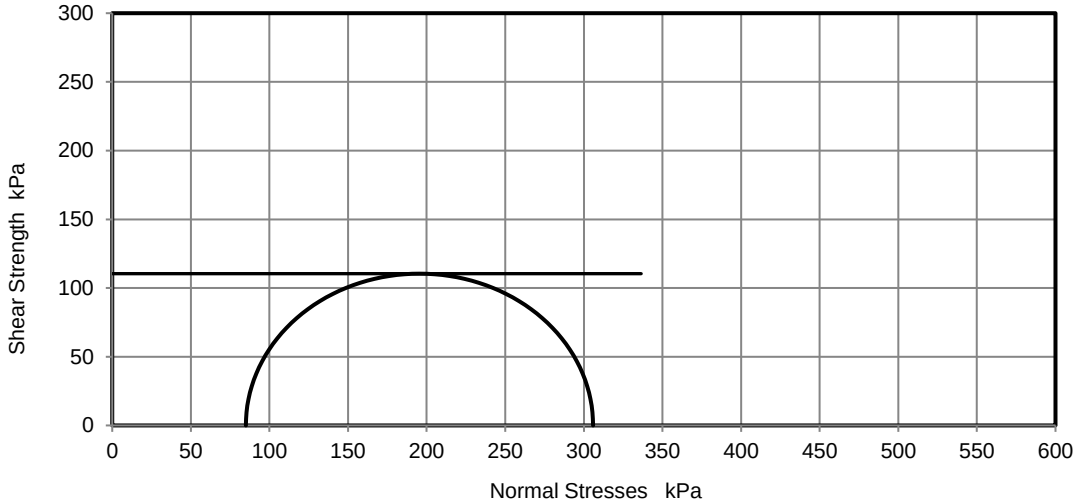
Laboratory Reference:	1574192	Depth Top [m]:	17.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		

Test Number	1		Rate of Strain	1.99	%/min	
Length	201.12	mm	Cell Pressure	85	kPa	
Diameter	104.08	mm	Axial Strain at failure	2.7	%	
Bulk Density	1.98	Mg/m3	Deviator Stress, (σ1 - σ3)f	221	kPa	
Moisture Content	27	%	Undrained Shear Strength, cu	110	kPa	½(σ1 - σ3)f
Dry Density	1.56	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.16	kPa	Membrane thickness	0.22	mm	

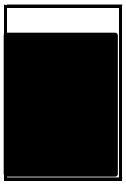
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks: Sample failed at first stage. Unable to achive multistage.Reported as a single stage.

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	20/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	08/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

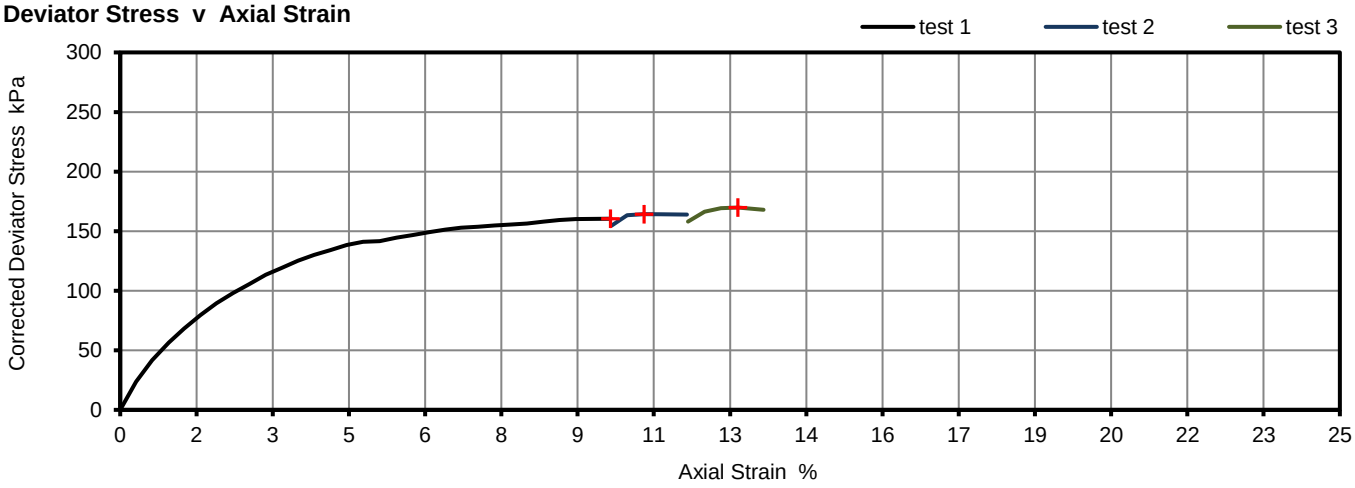
Test Results:

Laboratory Reference:	1574190	Depth Top [m]:	11.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		

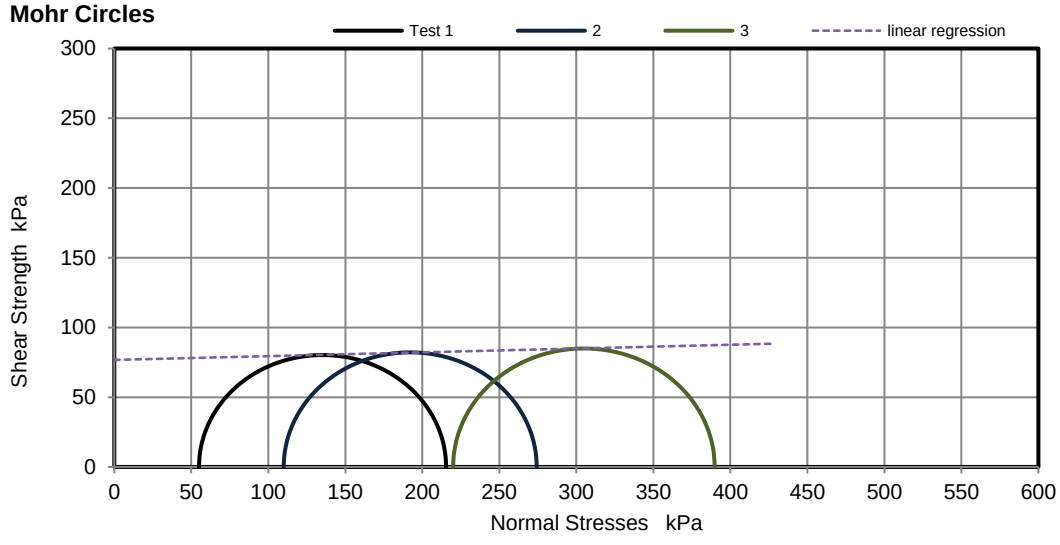
Length	185.34	mm
Diameter	103.39	mm
Bulk Density	1.93	Mg/m3
Moisture Content	28	%
Dry Density	1.51	Mg/m3
Membrane thickness	0.23	mm

Rate of Strain	2.00			%/min
Stage Number	1	2	3	
Cell Pressure	55	110	220	kPa
Axial Strain at failure	10.0	10.7	12.7	%
Deviator Stress, (σ1 - σ3)f	160	164	170	kPa
Shear strength, cu	80	82	85	kPa
Mode of failure	Brittle			
Membrane Correction	0.50	0.52	0.59	kPa

Deviator Stress v Axial Strain



Mohr Circles



Position within sample

Linear Regression

ϕu	1.6	°
cu	77	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 55kPa=27N, 110kPa=61N, 220kPa=98N.

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 186.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	Paddock Geo Engineering	Client Reference:	P20-180 S01
Client Address:	14 Burns Road, Bletchley, Milton Keynes, MK3 5AL	Job Number:	20-21603
		Date Sampled:	20/07/2020
		Date Received:	23/07/2020
Contact:	Matt Paddock	Date Tested:	08/08/2020
Site Address:	Land At 18-20 Carlton Road, Chiswick, W4 5DY	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

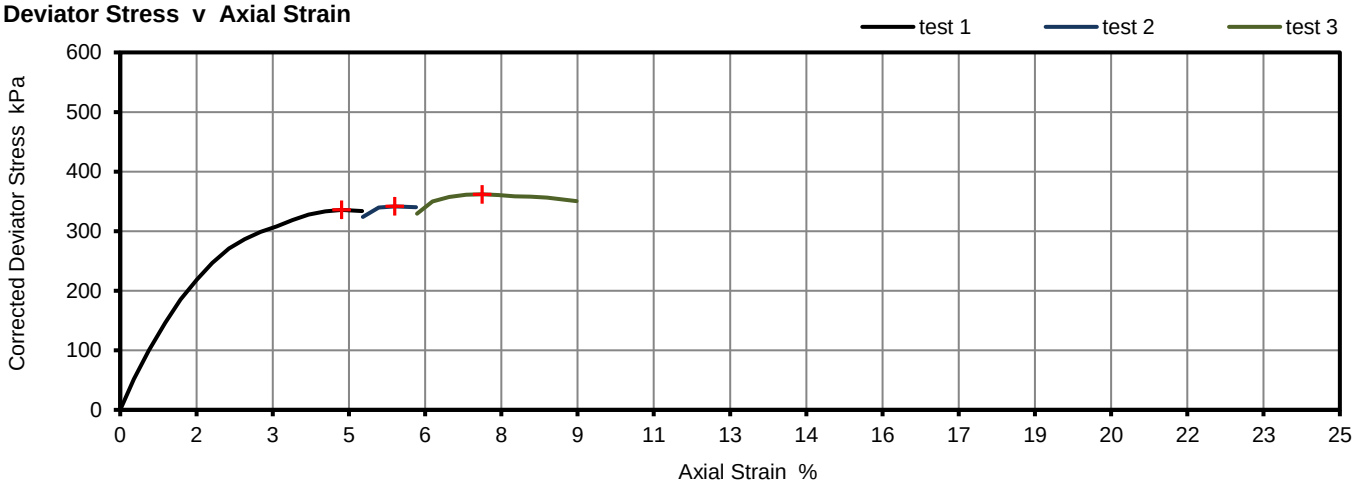
Test Results:

Laboratory Reference:	1574191	Depth Top [m]:	14.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		

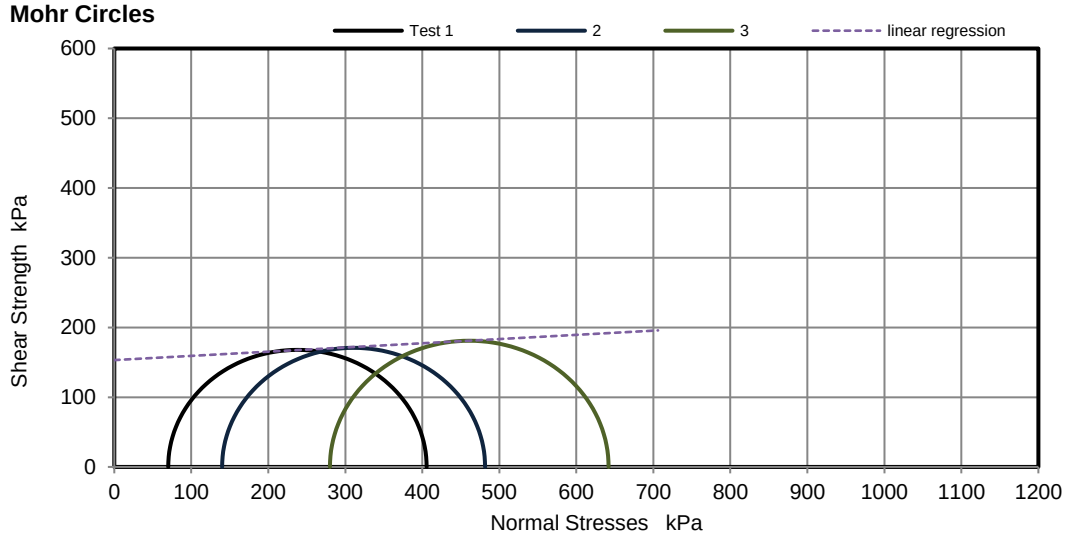
Length	195.43	mm
Diameter	104.39	mm
Bulk Density	1.99	Mg/m3
Moisture Content	24	%
Dry Density	1.60	Mg/m3
Membrane thickness	0.26	mm

Rate of Strain	2.00			%/min
Stage Number	1	2	3	
Cell Pressure	70	140	280	kPa
Axial Strain at failure	4.5	5.6	7.4	%
Deviator Stress, (σ1 - σ3)f	336	342	362	kPa
Shear strength, cu	168	171	181	kPa
Mode of failure	Brittle			
Membrane Correction	0.31	0.38	0.45	kPa

Deviator Stress v Axial Strain



Mohr Circles



Position within sample

Linear Regression

ϕu	3.5	°
cu	153	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 70kPa=36N, 140kPa=61N, 280kPa=113N.

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 10/08/2020

GF 186.11

Infiltration Test to BRE365 - TP1 Test 1

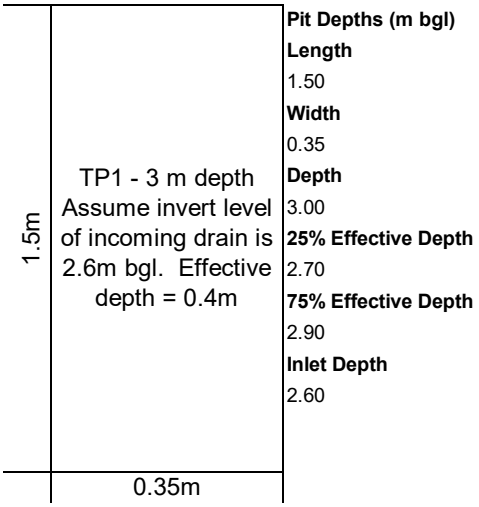
Field Data

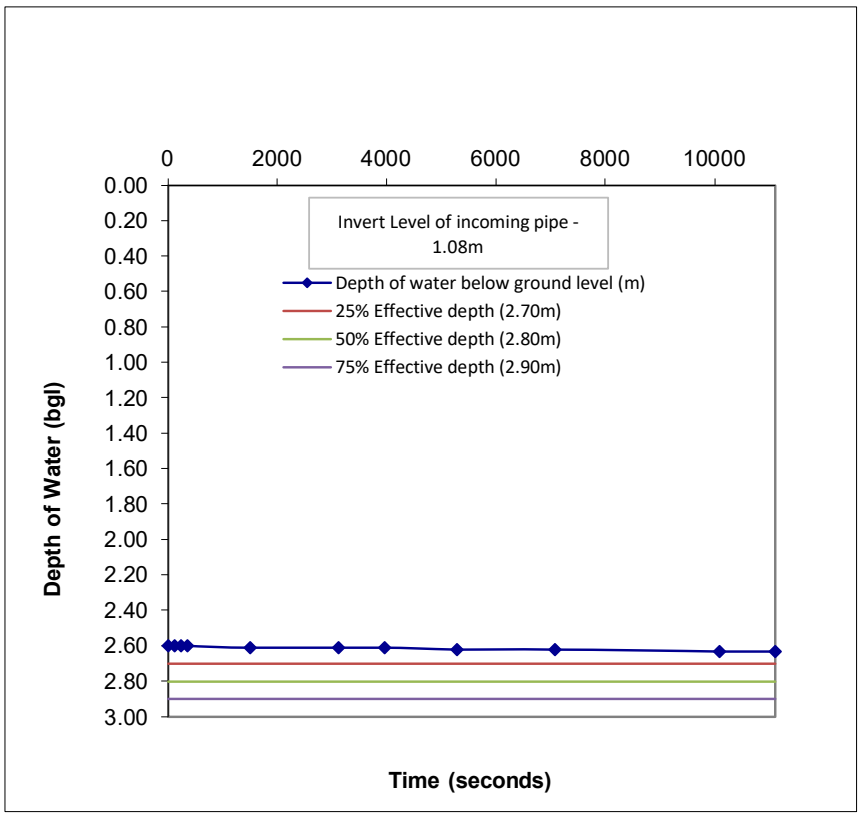
Time	Time Elapsed (min)	Time Elapsed (sec)	Depth of Water below GL (m)
10:30	0.0	0	2.60
10:32	2.0	120	2.60
10:34	4.0	240	2.60
10:36	6.0	360	2.60
10:55	25.0	1500	2.61
11:22	52.0	3120	2.61
11:36	66.0	3960	2.61
11:58	88.0	5280	2.62
12:28	118.0	7080	2.62
13:18	168.0	10080	2.63
13:35	185.0	11100	2.63

Linear extrapolated values for calculation

Location: **TP1** **TEST 1**
Weather: Sunny
Engineer: MC
Date: 21/07/2020

Strata Tested Langley Silt Member





CALCULATION:

Soil Infiltration Rate(f) =
Vp75-25 / (ap50 x tp75-25)

Where:
Vp75-25 = effective storage volume between 75% and 25% effective depth
1.5x0.35x(2.9-2.7)
= **0.105**

ap50 = internal area of TP upto 50% effective depth + base of TP
2(1.5 x) + 2(0.35 x) + (1.5 x 0.35)
= **1.265**

Tp75-25 = the time for water level to fall from 75% - 25% effective depth
= secs

f= **N/A** m/s

Comment
Insufficient infiltration in over 3 hours - Test Failed

PADDOCK GEO ENGINEERING

Client: Fornacelli Limited
Project No: P20-180
Project: 8-10 Carlton Road, Chiswick, W4 5DY

Infiltration Test to BRE365 - TP2 Test 1

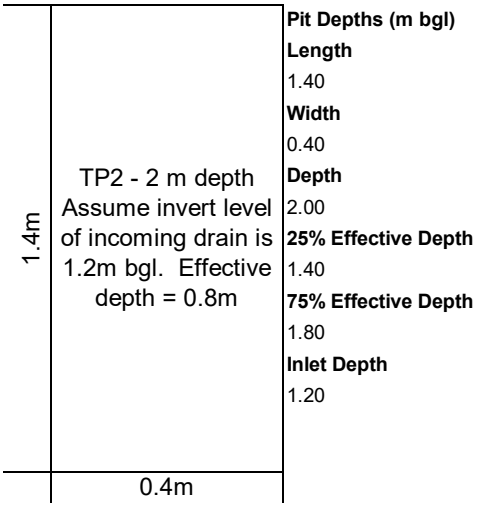
Field Data

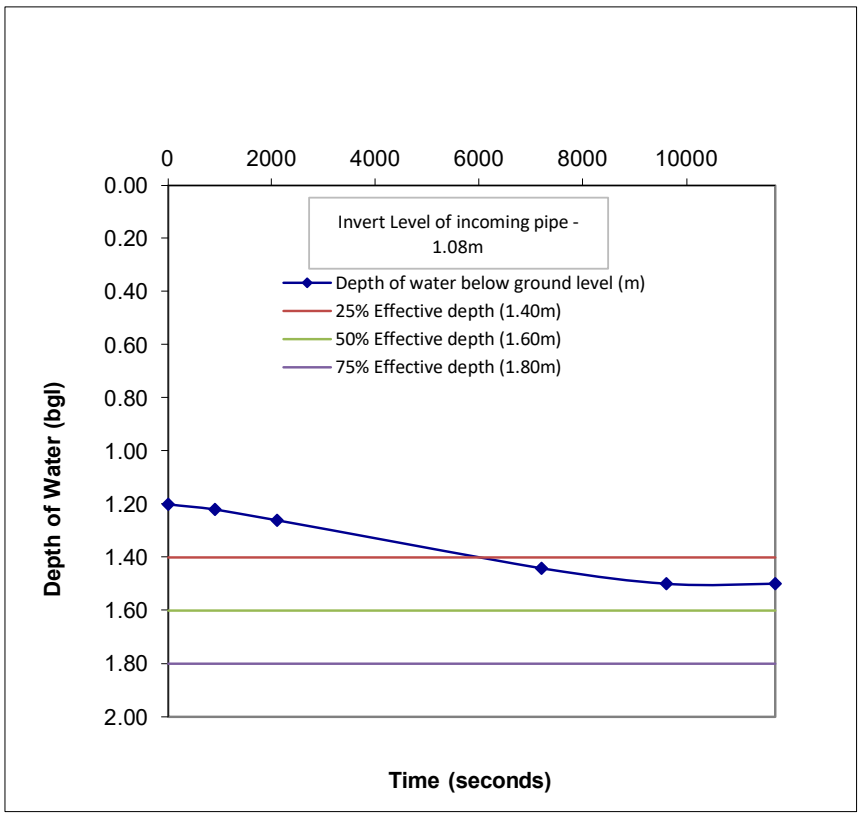
Location: TP2 **TEST 1**
Weather: Sunny
Engineer: MC
Date: 21/07/2020

Strata Tested Langley Silt Member

Time	Time Elapsed (min)	Time Elapsed (sec)	Depth of Water below GL (m)
10:50	0.0	0	1.20
11:05	15.0	900	1.22
11:25	35.0	2100	1.26
12:50	120.0	7200	1.44
13:30	160.0	9600	1.50
14:05	195.0	11700	1.50

Linear extrapolated values for calculation





CALCULATION:

Soil Infiltration Rate(f) =
Vp75-25 / (ap50 x tp75-25)

Where:
Vp75-25 = effective storage volume between 75% and 25% effective depth
1.4x0.4x(1.8-1.4)
= **0.224**

ap50 = internal area of TP upto 50% effective depth + base of TP
2(1.4 x) + 2(0.4 x) + (1.4 x 0.4)
= **2**

Tp75-25 = the time for water level to fall from 75% - 25% effective depth
= secs

f= **N/A** m/s

Comment
Test showed some initial movement over first 160 minuted then slowed with no further infiltration - Test Failed.

PADDOCK GEO ENGINEERING

Client: Fornacelli Limited
Project No: P20-180
Project: 8-10 Carlton Road, Chiswick, W4 5DY