

Geotechnical and Geo- Environmental Ground Investigation Report

Weldale Street, Reading

June 2019



FAIRHURST

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This document has been prepared in accordance with procedure OP/P02 of the Fairhurst Quality and Environmental Management System.

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EXECUTIVE SUMMARY

Site Details & Proposed Development	The site is centred on National Grid Reference 471020 173610 and is located at the address; Weldale Street, West Reading, RG1 7BZ, with access gained to both the eastern and western sections of the site via a security gate located on Weldale Street, which bounds the site to the north. Development proposals for the site comprises the demolition of all existing buildings (including 3 retail units) and structures and the erection of new buildings ranging between lower ground & 4 storeys to lower ground & 11 storeys in height. The proposed development is understood to provide 427 (233x1, 182x2 & 12x3-bed) residential units (Class C3) and 1 flexible ground floor retail shop (Class A1) or restaurant and cafe (Class A3) unit, together with new public realm, landscaping, accesses, parking and associated works. Foundation solutions are considered to include earthworks piling, with continuous flight auger (CFA) piling likely to be the most suitable piling technique for this site. Soft landscaping is proposed, concentrated in central, eastern and southern sections of the site.
Objectives	The report follows on from a previous ground investigation undertaken by CBRE Ltd in 2015, a Geo-Environmental & Geotechnical Phase I Preliminary Risk Assessment (PRA) completed for the site by Fairhurst in April 2016 (Report Reference 112990/R3) and the subsequent intrusive works described in Geo-Environmental Ground Investigation Report, Fairhurst ref. 112990/R4, dated January 2017. This report aims to summarise the results of the historical (2015, 2016) and most recent (2019) investigations carried out over the site, allowing a refined conceptual site model and quantitative risk assessment to be produced and also provides geotechnical recommendations for preliminary design and phasing/level considerations. It is considered that this report will be submitted to the Local Planning Authority and/or Environment Agency for approval.
Ground & Groundwater Conditions	Ground conditions across the three phases of ground investigation comprised hardstanding to proven depths of 39.79 – 42.92m AOD overlying Made Ground to proven depths of 38.04 – 42.00m AOD. This was found to overlie the Taplow Gravel Member located within the north-western, north-eastern and south-eastern sections of the site to proven depths of 36.00 – 41.70m AOD. Soils of the white chalk subgroup were then encountered in exploratory hole locations where they could be advanced to sufficient depths. Structureless chalk was generally recorded at depths of between 36m AOD to 41.70m AOD across the site with structured chalk below these levels to the full depths of drilling to between 11.07m to 1.27m AOD. The groundwater monitoring indicates a relatively stable groundwater table between 35.89 and 36.52m AOD within the White Chalk Subgroup bedrock.
Geo-Environmental Assessment	Human health <i>Contaminants in the Made Ground</i> The provision of suitable topsoil in areas of soft landscaping is likely to be sufficient to reduce the likelihood and/or exposure frequency of future site users to come in contact with Made Ground. <i>Ground Gas & vapour</i> The risk of bulk ground gases to human health and built development was considered to be 'very low'. Generally, PID reading indicates vapour concentrations to be present at low levels. Where reading indicated higher PID reading, vapour samples were taken and analysed. The analysis revealed relatively low concentrations of compounds responsible for the generation of vapour and on that basis risks from vapours are assessed low. <i>Construction Workers</i> In the presence of concentrations of contaminants in shallow soils being low, the risk to construction workers is likely to be low. The information contained in this report should be passed onto the Principal Contractor prior to construction works who should consult with an asbestos specialist in respect to appropriate risk assessments and method statements during below ground works. <i>Controlled Waters</i> Although, the toxicity of these contaminants is likely to be lower than ordinarily reflected by TPH CWG water quality standard (WQS) exceedances - <i>this is due to the fact that concentrations of constituents of potential concern (CoPC) for respective hydrocarbon fractions are being assessed as low</i> – petroleum hydrocarbons in groundwater within the Chalk Principal aquifer are locally present at high concentrations. Outline R&D P20 modelling suggest concentrations of the TPH CWG aromatic EC12-EC16 fraction to have the potential to result in exceedances of the respective 90 µg/l WHO guideline

	value for drinking water quality over a 100 - 200 meters distance from the site. Whilst this would be in excess of the 50 metres default compliance point distance for hazardous substances in accordance with the 'land contamination groundwater compliance points for quantitative risk assessments guidance', based on the absence of constituents of potential concern (CoPC) above water quality standards that would be typical for the nature of the contamination (diesel) and the absence of a known on-site entry point of the contaminant to have entered the groundwater, a formal remediation strategy is not currently considered to be warranted. Notwithstanding this, although the picture is not unambiguous, test results but also indicators (e.g. sulphur odours observed during sampling) noticed during monitoring suggest an area with higher concentrations around monitoring points BH1, WS103B and WS101. On the basis of the above and taking into account the nature of the proposed development, the completion of a formal remediation strategy and validation report is not currently warranted. However the following works are likely to be required: • <i>Foundation works risk assessment:</i> A foundations works risk assessment specifying piling methods is recommended to be completed and to be agreed with the regulator. The foundations works risk assessment, will also to include a groundwater monitoring programme with monitoring to be carried out at different (pre-, during and post) stages of the piling operation. The monitoring is to include an update to the risk assessment to be completed on the basis of the results from two further groundwater monitoring rounds from existing monitoring points. The foundation works risk assessment with the update to the risk assessment is to be agreed with the regulator, prior to the piling works commencing. • <i>Watching brief:</i> A watching brief is recommended to commence as soon as the hardstanding, comprising of asphalt and footprints of existing buildings, is being removed. The watching brief is to emphasise on soil conditions / spots that can visually or olfactometrically be identified for their potential of being impacted by organic contaminants. In areas of soft landscaping, soil samples are also recommended to be taken, analysed and assessed to confirm the risk from leachable concentrations of contaminants in shallow soil to be low. • <i>Soil Arisings Material Management:</i> Based on the soil analysis undertaken to date, Made Ground materials from shallow depth (i.e. 0-3m), if generated as soil arisings and to be disposed off-site, are likely to be classified as non-hazardous and possibly inert in some areas. However, this report does not purport to be a waste classification assessment and it will be the earthworks contractor's responsibility to appropriately classify the material for disposal. • <i>Drinking Water Supply Pipes:</i> At shallow depths (i.e. maximum depths of drinking water supply pipes) organic contaminants have not been found at elevated concentrations. Therefore, based on current results upgraded drinking water supply pipe materials (such as barrier pipe) may not be required to protect any new drinking water supplies to be installed as part of the development. A detailed assessment of risks to water supply pipes should be undertaken once the proposed route of water supply pipes together is known and following advice from the water utility provider.
Geotechnical Assessment	Taking consideration of the proposed development and the findings of the ground investigations, the following geotechnical considerations are noted: • The engineering advice contained within the report should be reviewed once the final development proposals are confirmed. • Foundations are recommended to be piled into structured chalk for the proposed structures across the site. Preliminary pile capacities have been presented however these should be refined further at detailed design stage, taking into consideration the proposed loads at each block and site specific ground conditions. • For proposed piled foundations, a piling risk assessment is recommended due to the potential for localised soil contamination transferring to the chalk aquifer. • An earthworks strategy, earthworks specification and likely material management plans will need to be prepared, including confirmation of the amount of structural fill below the proposed buildings. • Numerous obstructions were recorded during the three phases of the ground investigation. Further below ground structures may remain associated with former structures and in un-

	investigated areas of the site. Detailed design of the foundations will be required following determination of the final engineering levels, development layout and loading conditions, at which time a specialist piling contractor should be consulted. Additionally, it is recommended that the buried structures associated with existing buildings on site (e.g. foundations) are removed as part of the demolition works. • The anticipated loads from the proposed structures would be required to be transferred to the underlying Chalk Formation and therefore suspended floor slabs are likely to be required. However if unsuitable materials were to be removed as part of, for example, cut and fill operations, ground bearing slabs could be considered bearing into or onto the chalk formations, subject to heave and settlement constraints. • Although no evidence of solution features were determined during the site investigations, the appointed contractor should be vigilant throughout development, and particularly during piling operations for any variations to anticipated ground conditions. • Where Made Ground is encountered at road pavement formation levels, a California Bearing Ration of <2.5% should be assumed and full road capping should be allowed for to mitigate total and differential settlements. This could be varied where natural chalk deposits are encountered during construction. It is recommended that in situ CBR or plate load testing is undertaken at formation level during construction to confirm the appropriateness of design CBR values.
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1.0 INTRODUCTION AND OBJECTIVES

1.1 Scope

Fairhurst have been appointed by Ropemaker Properties Ltd (the Client) to undertake a Geotechnical and Geo-environmental Ground Investigation Report (GIR) for the site at Weldale Street, Reading at approximate postcode RG1 7BZ. The location of the site is shown on [Figure 1](#).

This report presents the findings of a geotechnical and geo-environmental investigation. The report follows on from the Geo-Environmental & Geotechnical Phase I Preliminary Risk Assessment (PRA) completed for the site by Fairhurst in April 2016 (Report Reference 112990/R3) and the subsequent intrusive works described in Geo-Environmental Ground Investigation Report, Fairhurst ref. 112990/R4, dated January 2017. Following these reports, it was recommended that a targeted geotechnical and geo-environmental assessment should be undertaken to aid foundation design and delineate the contamination noted on-site to determine whether remedial works are likely to be required.

The following points summarise the objectives of this GIR:

- A brief summary of historical ground investigation and desk study information;
- A summary of the ground investigation works undertaken and a presentation of the factual findings;
- An assessment of the current ground conditions based on the findings of the ground investigations, including a ground model and geotechnical recommendations for foundation options and earthworks;
- An assessment of any potential contamination issues within the ground. It is considered that this report will be submitted to the Local Planning Authority and/or Environment Agency for approval.

Planning conditions are present for the proposed development pertaining to contaminated land and more specifically the presence of unexpected contamination when carrying out the approved development. Further details on the planning status of the site are given in Section 1.3 of this report.

Geo-environmental testing of soil samples has been undertaken in order to further quantify potential risks with respect to unexpected contamination and potential requirements on the site in accordance with the National Planning Policy Framework. The testing was targeted based on the findings of the PRA.

1.2 Development Proposals

Development proposals for the site comprises the demolition of all existing buildings (including 3 retail units) and structures and the erection of new buildings ranging between lower ground & 4 storeys to lower ground & 11 storeys in height. The proposed development is understood to provide 427 (233x1, 182x2 & 12x3-bed) residential units (Class C3) and 1 flexible ground floor retail shop (Class A1) or restaurant and cafe (Class A3) unit, together with new public realm, landscaping, accesses, parking and associated works.

Foundation solutions are considered to include earthworks piling, with continuous flight auger (CFA) piling likely to be the most suitable piling technique for this site. Soft landscaping is proposed, concentrated in central, eastern and southern sections of the site. Proposed development plans are presented in [Appendix A](#).

1.3 Planning Conditions

The site is subject to Reading Borough Council Planning Permission ref: 170326, dated 15th March 2018, within which contained the following planning conditions pertaining to contaminated land and groundworks piling:

Condition 18 – No development shall take place until a detailed remediation scheme to bring the site to a condition suitable for intended use by removing unacceptable risks to human health, buildings and other property and the natural and historic environment. The scheme must include all works to be undertaken, proposed remediation objectives and remediation criteria, an appraisal of remedial options, and proposals of the preferred options and a timetable of works and site management procedures. The scheme must also ensure the site will not qualify as contaminated land in relation to the intended use of the land after remediation.

Condition 19 - The approved remediation scheme shall be implemented in accordance with the approved timetable of works. A validation report should also be submitted to and approved by the LPA prior to construction of the development.

Condition 20 - In the event of contamination is found at any time when carrying out the approved development not previously identified, development shall be halted on that part of the site the contamination reported in writing to the LPA.

An assessment of the nature and extent of the contamination shall be undertaken and where remediation is necessary a remediation scheme, together with a timetable for its implementation, shall be submitted to the LPA for its written approval.

The measures in the approved remediation scheme shall be implemented in accordance with the approved timetable. Halted works shall not be re-commenced until the measures identified in the approved remediation scheme have been completed and a validation report approved in writing by the LPA.

Condition 21 - No development shall take place until a detailed land gas site investigation has been carried out by a competent person to fully and effectively characterize the nature and extent of land gas and its implementation.

Condition 22 - No development shall take place until a scheme showing how the development is to be protected against the possibility of land gas has been submitted to and approved in writing by the LPA. The scheme as approved should be fully implemented and completed before the development is first occupied and those measures incorporated in other development is first occupied and those measures incorporated into the development shall thereafter be retained unless stated otherwise by LPA in writing.

Condition 23 - The land gas remediation scheme shall be implemented in accordance with the approved timetable of works. A validation report (that demonstrates the effectiveness of the remediation carried out) must be submitted and approved by the LPA prior to any part of the accommodation hereby approved is occupied. Unless stated otherwise by LPA in writing.

Condition 36 - Piling or any other foundation designs using penetrative methods shall not be permitted other than with the express written consent of the LPA, which may be given for the part of the site that there is no resultant unacceptable risk to groundwater. The development shall be carried out in accordance with the approved details.

This Ground Investigation Report has been prepared to support discharge of Conditions 21 and 22 and in the absence of risk from ground-gas also Condition 23. Advice on how Conditions 18 & 19 will be further addressed will also be given.

1.4 Sources of Information

The following existing information and documents have been reviewed and form the basis of the assessment:

- Reading Borough Council Planning Portal (April 2019, Ref: 170326);
- Phase I & II Geo-Environmental Assessment – Units 1 – 3, Weldale Street, Reading by CBRE (December 2015 Ref: 50HCD0132651/PI& II). Note that Fairhurst do not have reliance on this report;
- Geo-Environmental & Geotechnical Desk Study Report – Weldale Street, Reading by Fairhurst (January 2017, Ref: 112990/R3);
- Chatham Place Phase 2, Geo-Environmental interpretative Report, Buro Happold, (28th February 2013) Ref. 028863. Note that Fairhurst do not have reliance on this report.;
- Weldale Street, Reading, Due Diligence Feasibility Report, Peter Brett Associates, LLP (December 2014, Ref. 32183);
- Phase II Geo-Environmental Ground Investigation Report by Fairhurst (January 2017 Ref. 112990/R4)

This report provides a geo-environmental and geotechnical interpretation of factual information obtained during an intrusive ground investigation. Ground investigation works were undertaken between 11/02/2019 – 26/02/2019, with a further day of window sampling undertaken on the 02/04/2019 by Dunelm Geotechnical and Geo-Environmental Limited (Dunelm) under part-time monitoring by Fairhurst. Groundwater monitoring was undertaken by Dunelm between 05/02/2019 and 07/05/2019. The ground investigation data is presented in the following report, included as [Appendix B: Factual Report on Site Investigation for land at Weldale Street, Reading, Dunelm Geotechnical and Environmental Limited](#) (April 2019, Ref. D9298).

2.0 BACKGROUND INFORMATION

This section provides a brief summary of the background information provided within the reports referenced in Section 1.4. The purpose of the review is to gain an understanding of the underlying ground conditions and environmental setting of the site.

2.1 Site Description

The site is centred on National Grid Reference 471020 173610 and is located at the address; Weldale Street, West Reading, RG1 7BZ, with access gained to both the eastern and western sections of the site via a security gate located on Weldale Street, which bounds the site to the north. A site location plan is presented in [Figure 1](#).

The central northern portion of the site is occupied by a vacant Iceland supermarket warehouse, with an associated goods / delivery yard positioned in the north-eastern portion of the site. The delivery yard is surfaced in concrete hardstanding. The central southern and south-eastern portions of the site are occupied by a vacant single storey warehouse.

The western third of the site is occupied by car parking with a dual storey parking present in the far western portion. An electrical substation is positioned in the car park, adjacent to former supermarket and the northern site boundary. The car park is accessed via Weldale Street to the north and a ramp on the western site boundary provides egress to Chatham Street to the south of the site, which runs east to west at this location and is bisected from the site by an area of soft landscaping and a public footpath.

To the west, the site is bounded by residential dwellings and to the east a parade of vacant shops bisects the site from the A329, which runs south to north at this location. Visually, the site is relatively level with limited change in elevation. An increase in ground level of approximately 2-3m is noted between the site boundary and Chatham Street to the south.

2.2 Site History

On-site

The historical map data reviewed within the Fairhurst 2016 Desk Study revealed that the site was occupied by residential housing with a central road named 'Somerset Place' by 1879. By 1931, Somerset Place and the residential housing were occupied by a large building with further smaller buildings on the eastern boundary of the site. By 1957, this building had been extended north and was labelled as a Bus Depot. A garage was also noted on the eastern boundary. By 1962, no residential buildings remained and the site was occupied by the bus depot and garage with ancillary buildings and an electricity sub-station. By 1986, the site layout was altered with a large building occupying the central area and a possible car park in the western area, with an additional smaller building in the eastern area. By 1993, a large building was noted in the south-western area, the layout appeared to be similar to the current layout.

Off-site

Immediately off-site, the site has been set in a mixed residential / light industrial / commercial setting since the earliest available historical map in 1879 and as such this has characterised the majority of surrounding land uses. Identified sources of contamination within 250m include:

- Saw mills and later a timber yard approximately 200m south-east between 1879 and the late 1950s;
- Various garages, present immediately adjacent to the south-eastern site boundary, 60m south and approximately 250m south-east, present between the late 1950s and late 1970s; and;
- Garage and trading estate located approximately 20m north and present from the late 1980s.

2.3 Geology

The British Geological Survey (BGS) map sheet 268, Reading, Solid and Drift Edition, 1:50,000 scale, 2000, was reviewed to gain an understanding of the underlying geology in the vicinity of the site. The superficial Taplow Gravel Member, defined by the BGS as '*sand and gravel, locally with lenses of silt, clay or peat*', is presented as underlying the entire site, with the exception of the eastern boundary, where no superficial deposits are recorded. This member extends off-site principally to the west and south-west of the site. The Taplow Gravel Member is underlain by the Seafood and Newhaven Chalk bedrock formations (White Chalk Subgroup), which are defined by the BGS as 'chalk with flints and discrete marl seams'. The chalk bedrock is reported to extend >1km in all directions within the vicinity of the site.

Ground investigation works were undertaken at the site by CBRE between 28th September and 6th October 2015. While the works undertaken have been used in assessing the site and scoping the most recent ground investigation, Fairhurst do not have reliance on the report. The CBRE ground investigation works comprised the following:

- Advancement of three cable percussive boreholes to a maximum depth of 20m bgl (BH1, BH2 and BH4). BH3 was terminated due to an obstruction within Made Ground at 0.7m bgl. The location of this borehole is not given;
- Advancement of nine window sample boreholes to a maximum depth of 6.45m bgl (WS1-WS9);
- Soil and groundwater sampling based on identified contaminants of concern; and
- Three return visits to complete ground gas monitoring, within 9no. boreholes, four of which were installed solely in the White Chalk Subgroup and remaining boreholes were crossed across all strata encountered.

A further ground investigation was undertaken by Dunelm under part time monitoring by Fairhurst between the 8th August and 28th September 2016 and comprised the following:

- Advancement of three cable percussive boreholes to a maximum depth of 10m bgl (BH101, BH102, BH102A, BH103 & BH103A – BH103D). BH102, BH103 and BH103A – BH103D were terminated at depths of 0.34 – 1.20m bgl due to obstructions.
- Advancement of eight window sample boreholes to a maximum depth of 6.45m bgl (WS101 - WS103, WS103B, WS104, WS104A, WS106, WS106A). WS102, WS104, WS104A, WS106 & WS106A were all terminated due to obstructions at 0.30 – 3.40m bgl.
- Excavation of three trial pits to a maximum depth of 3.20m bgl (TP101 – TP103);
- Soil and groundwater sampling based on identified contaminants of concern; and
- Four return visits to complete ground gas monitoring, within available boreholes.

Geological conditions identified in **Table 2-1** were recorded during the CBRE (2016) intrusive ground investigation and Fairhurst (2017) intrusive ground investigation.

Table 2-1 - Summary of ground conditions encountered during the CBRE and Fairhurst Ground Investigations

Lithology	Depth Range to Base (m bgl)	Summary Description / Location
Tarmacadam (Made Ground)	0.00 – 0.30	<u>Fairhurst Ground Investigation only</u> Encountered in BH101, BH102, BH102A, TP103, WS101, WS103, WS103B, WS104, WS104A.
Concrete (Made Ground)	0.00 – 0.40	<u>Fairhurst Ground Investigation only</u> Encountered in BH103, BH103A, BH103B, BH103C, BH103D, TP102 WS102, WS104.
Made Ground	0.20 – 3.10	<u>Fairhurst and CBRE Ground Investigations</u> Generally described as gravel, clayey gravelly sand and gravelly clay in both site investigations. Encountered in all exploratory hole locations.
Taplow Gravel Member*	0.60 – 4.70	<u>Fairhurst and CBRE Ground Investigations</u> Described generally as gravelly sand and sandy gravel, locally slightly sandy gravelly clay. Encountered in one location in the north-eastern portion of the site (2.5m thickness) and encountered in select exploratory hole locations in the eastern third of the site (0.3 – 0.9m thickness) in the CBRE Ground Investigation. Encountered in BH102A, TP102, TP103, WS103 and WS104A in the Fairhurst Ground Investigation.
Seaford and Newhaven Chalk Formations (White Chalk Subgroup)	0.70 - 20.00 (Not proven)	<u>CBRE Ground Investigation</u> Described as structureless chalk comprising sandy clayey gravel and cobbles (Grade Dc) and slightly sandy slightly gravelly to gravelly locally silty clay (Grade Dm). Encountered in all exploratory hole locations where advanced to a sufficient depth. <u>Fairhurst Ground Investigation</u> Generally described as structureless white chalk recovered as sandy/gravelly clay or silt. Gravels comprised pieces of chalk and flint Encountered in BH101, BH102A, TP102, TP103, WS101, WS102, WS103, WS103B, WS104A.

*Superficial deposits in CBRE Ground Investigation were described as River Terrace Deposits, however within this report they will be categorised as “Taplow Gravel Member” deposits.

The findings and results of the previous investigations are incorporated into this report and discussed in further detail in Section 3.0 onwards.

2.4 Hydrology and Hydrogeology

The Environment Agency defines the underlying Taplow Gravel Member and White Chalk Subgroup as Secondary A and Principal Aquifers respectively. The nearest records of licensed abstractions located within 500m relate to an abstraction for retail (drinking, cooking, sanitary and washing) located approximately 140m south east and commercial/industrial (drinking, cooking, sanitary and washing) located approximately 465m north.

There are three named surface water features within 1km of the site including Holy Brook (550m south-east of the site) and the Kennet and Avon Canal (680m south-east of the site), both flowing in a north-easterly direction towards the River Thames (located 750m north-east of the site), flowing in an

easterly direction at this location. The nearest surface water feature is an un-named stream positioned approximately 260m north of the site.

During the CBRE ground investigation (2015), groundwater was encountered in exploratory hole locations between 2 and 6m bgl during the drilling processes. Subsequent monitoring undertaken between 8th October and 16th November 2015 encountered resting groundwater levels between 4.43 and 5.43m bgl (approximate elevation range between 36.41 and 36.14m AOD), within the Chalk deposits.

During the 2017 Fairhurst Ground Investigation, groundwater was struck within the White Chalk Subgroup, at depths of 4.70 – 6.50m bgl (encountered elevation range between 36.28 – 34.53m AOD). Four subsequent rounds of groundwater level monitoring were undertaken between the 6th September and 28th September 2016. Serviceable monitoring wells installed during the CBRE ground investigation were also monitored during this period. The groundwater levels recorded indicates a relatively stable groundwater table between 35.89 and 36.404m AOD (4.28 – 5.34m bgl) within the White Chalk Subgroup bedrock. Groundwater was encountered at the base of the Taplow Gravel within BH102 (strata base at 36m AOD), where this strata was encountered at its greatest thickness. It is considered that this formation is in hydraulic connectivity with the underlying chalk.

It was considered in the CBRE ground investigation that groundwater is flowing in a north-easterly direction. This largely corroborated with results of groundwater monitoring undertaken by Dunelm in the 2017 Ground Investigation, which encountered highest groundwater elevations BH101, BH2 and WS9 in the south-western portion of the site and lowest is WS6 in the north-east as presented in Drawing ref. 112990/9003 within the Phase II Geo-Environmental Ground Investigation Report by Fairhurst (January 2017 Ref. 112990/R4).

2.5 Geo-Environmental Considerations

The potential sources of contamination listed in the PRA are presented below:

On Site

- Former bus depot and garage
- General Made Ground materials including ACM
- Electricity substation in the northern section of the existing car park.

Within 250m

The historical review highlighted a number of potentially contaminative surrounding land uses including a former garage, engineering works, saw mill, smithy, fuel station, presence of tanks and electricity sub-station. Potentially contaminative contemporary surrounding land uses included printers, garages and dry cleaners.

Review of the Chatham Place Report (Chatham Place Phase 2, Geo-Environmental interpretative Report, Buro Happold, (28th February 2013) Ref. 028863) (located 60m south from the site and up hydraulic gradient) confirmed that solvent contaminants (PCE) were present in groundwater at the site. While this source of contamination has been taken considered in the scope of the Fairhurst 2019 ground investigation, Fairhurst do not have reliance on this report.

Details of contaminants of concern and the preliminary conceptual site model are presented in full within the Fairhurst Desk Study Report (January 2017, Ref: 112990/R3); Geo-environmental testing was undertaken as part of the 2016 ground investigation works to assess the identified contaminants of concern. The source-pathway-receptor risk assessment based on the previous Desk Study and Ground Investigation reports is summarised in Table 2-2. It is noted that the development proposals

at the time of reporting in 2017 were indicative only, although generally are in keeping with the currently proposed scheme, in that the development was to include mixed commercial to residential use with areas of multi-storey apartment buildings with associated areas of soft landscaping and car parking.

Table 2-2 – Summary Quantitative Risk Assessment

Source	Potential Pathway (s)	Potential receptor (s)	Comment
On-site sources of contamination	Ingestion, inhalation, dermal contact	Future site users / neighbouring sites	Moderate – The majority of the site is likely to be covered in hard landscaping; however, asbestos has been identified in Made Ground in the CBRE and Fairhurst (2016) Ground Investigation and consequently a moderate risk is determined.
		Construction Workers	Moderate – it is considered that on-site construction workers will use appropriate PPE and adopt appropriate management procedures. As such the potential risk to construction workers is assessed as low; however, due to the presence of asbestos in Made Ground soils, the risk elevates to moderate. Asbestos concentrations in soil have not been quantified.
	Leaching and migration of contaminants	Controlled waters (Underlying Secondary A and Principal Aquifers)	Moderate – contamination has been identified in both soil and groundwater in the previous ground investigations. The granular nature of the Taplow Gravel Member would likely increase vertical migration of soil contamination. However, the presence of cohesive chalk at the top of the bedrock could act as to limit vertical migration as reported by CBRE. Nearest groundwater abstractions are 140m south-east and 470m north. Groundwater flow is considered to be north-west and consequently it is possible that the former is not a receptor. Unnamed stream approximated 260m north of the site is considered to possibly be in hydraulic connectivity with groundwater. Holy Brook and the River Kennet are discounted as these are considered to be up hydraulic gradient of the site. The River Thames is discounted due to distance. Underlying aquifer receptors cannot be discounted due to their sensitivity and classification (Secondary A and Principal Aquifer).
	Direct contact	Underground building structures / services	Low to Moderate – limited shallow soil contamination was identified by the CBRE and Fairhurst (2016) Ground Investigation.

Source	Potential Pathway (s)	Potential receptor (s)	Comment
	Migration of soil gases into the site building receptors	Future site users / neighbouring sites	Moderate / low – ground gas monitoring undertaken as part of the CBRE report noted that the site is classified as characteristic situation 1 (i.e. very low risk); however, it was noted that further monitoring would be likely required as part of any planning condition. Furthermore, the presence of organic contamination (petroleum hydrocarbons) and volatiles in groundwater may contribute to further gas generation.
		Migration of soil gases into the site building receptors	Further ground-gas monitoring undertaken within the Fairhurst (2016) ground investigation report also classified the site as characteristic situation 1. However, an isolated occurrence of elevated VOCs was recorded in BH1 (steady concentration 35ppm). During excavation of this location as part of the CBRE ground investigation, maximum PID concentrations recorded in this borehole were 133ppm, and grey staining and a hydrocarbon odour was noted at the top of the water table, and is considered likely to be the source of elevated concentrations recorded within this borehole during monitoring. Given its isolated, and relatively low level, it is considered unlikely to pose a risk to human health following development, however gas sampling in BH1 was recommended to determine the composition of VOCs at this location.
Off-site sources of contamination	Ingestion, inhalation, dermal contact	Future site users	Moderate / low – limited exposure pathways are identified, given that the majority of the site is to be capped in hard landscaping. Risk of exposure still present in soft landscaped areas.
		Construction workers	Low – it is considered that on-site construction workers will use appropriate PPE and adopt appropriate management procedures. As such the potential risk to construction workers is assessed as low from off-site sources.
	Leaching and lateral / vertical migration of contaminants to controlled water receptors	Controlled waters	Moderate – given the light industrial, commercial and residential setting of the site and identified historic and current potential sources of contamination, this cannot be discounted. Furthermore, elevated concentrations of chlorinated solvents have been identified adjacent south of the site and on the southern boundary of the subject site.

Source	Potential Pathway (s)	Potential receptor (s)	Comment
Ground gases – associated with off-site sources	Migration of soil gases into the site building receptors	Future site users	Moderate / low – Ground gas monitoring undertaken as part of the CBRE and Fairhurst reports noted that the site is classified as characteristic situation 1 (i.e. very low risk); however, it was noted that further monitoring would be likely required as part of any planning condition, as well as gas sampling from BH1 to determine the speciation of VOCs. Furthermore, the presence of organic contamination (petroleum hydrocarbons) and chlorinated solvents in groundwater may contribute to further gas generation.

The overall risks associated with the redevelopment of the site was therefore considered to be **MODERATE**.

2.6 Geotechnical Considerations

Based on the proposed development plans and information reviewed, the following Geotechnical considerations were noted:

- The presence of existing services;
- Potential for buried obstructions associated with historic structures on site;
- Potential presence of Made Ground / infilled deposits of poor engineering properties;
- Variability of near-surface soil conditions across the site in terms of thickness and composition;
- Made Ground/Natural Soils containing elevated sulphates with potential for sulphate attack on buried concrete;
- Potential for perched/shallow groundwater within the Superficial or Chalk Deposits; and
- Potential for solution features within the underlying chalk.

3.0 GROUND INVESTIGATION

3.1 *Scheme of Investigation*

Following a review of the existing available information presented in the first phase (CBRE 2015) and second phase (Fairhurst 2017) of ground investigation works and the results of the PRA, and with consideration of the current development proposals, an intrusive ground investigation was designed to allow a representative assessment of the current ground conditions beneath the site and determine potential geotechnical and geo-environmental constraints to the development.

The intrusive ground investigation works were undertaken by Dunelm under the management of Fairhurst. Geotechnical and geo-environmental laboratory testing was scheduled by Fairhurst on samples recovered from the exploratory holes, and testing was undertaken at UKAS and MCERTS accredited laboratories. The first stage of works were undertaken between the 11th February and 25th March 2019 and comprised the following:

- Service avoidance survey and topographic levelling of exploratory hole locations;
- 1No. rotary borehole with core recovery to a depth of 30m bgl;
- 1No. open hole rotary borehole to a depth of 30m bgl
- 4No. cable percussive boreholes with rotary follow on to depths of 30 - 40m bgl;
- 1No. cable percussive borehole to 18.37m bgl;
- 4No. machine excavated trial pits to maximum depths of 3.50m bgl;
- 4No. foundation pits to a maximum depth of 1.20m bgl. 2No. of the foundation pits were hand excavated and 2No. machine excavated;
- 5No. windowless sample boreholes to maximum depths of 6.45m bgl;
- Standard Penetration (SPT) testing and U100 samples in the cable percussive boreholes and SPT testing in the windowless sample and rotary boreholes; and
- 4No. rounds of ground gas and groundwater level monitoring and 1No. round of groundwater sampling.

The second stage of site works was undertaken between 2nd April and 14th May 2019 and comprised the following:

- Service avoidance and topographic levelling of exploratory hole locations;
- 6No. windowless sample boreholes to a maximum depth of 6.45m bgl;
- SPT testing in the windowless sample boreholes; and
- 1No. round of ground-gas and groundwater level monitoring and 1No. round of ground-gas and groundwater sampling.

The ground investigation was specified in accordance with the ICE UK Specification for Ground Investigation (2012) and was undertaken in general accordance with techniques outlined in Eurocodes 7 - BS EN 1997-1:2004, BS5930:2015 Code of Practice for Site Investigations and BS10175 Investigation of potentially contaminated sites. The works were carried out under the supervision of an engineer from SOC with a part time site presence from Fairhurst.

The locations of the exploratory positions for both ground investigations are shown on [Figure 2](#).

The full factual record of the intrusive ground investigation works undertaken are detailed in the Dunelm Factual Report as presented in [Appendix B](#) of this report.

The rationale for the exploratory holes undertaken during the 2019 ground investigation is detailed within the scheme of investigation documents prepared by Fairhurst and Dunelm (2019) included as [Appendix C](#).

3.2 Monitoring Well Installations

10 No. boreholes were installed with combined ground gas and groundwater monitoring wells as detailed in Table 3-1. Details of ground and groundwater conditions encountered are summarised in Section 4.0.

Table 3-1 - Monitoring Well Installation Details

Borehole		Ground Level (m AOD)	Screen top and base (m bgl)	Screen top and base (m OD)	Targeted Strata
2019	BHA	41.07	1.80– 30.00	39.27 – 11.07	WHCK (Structured and Structureless)
	BHB	41.39	2.00 – 12.00	39.39 – 29.39	WHCK (Structureless)
	BHC	41.15	13.50 – 30.00	27.65 – 11.15	WHCK (Structured)
	BHD1	40.44	4.00 – 12.50	36.44 – 27.94	WHCK (Structureless)
	BHD1	40.44	1.00 – 3.00	39.44 – 37.44	MG
	BHE	41.41	15.00 – 40.00	26.41 – 1.41	WHCK (Structured)
	BHF	41.27	2.50 – 16.00	38.77 – 25.27	WHCK (Structureless)
	BHF	41.27	0.50 – 1.50	40.77 – 39.77	MG
	WSF	42.44	1.50 – 4.00	40.94 – 38.44	WHCK (Structureless)
	WSIC	40.89	1.00 – 6.00	39.89 – 34.89	MG / TG / WHCK (Structureless)

3.3 Gas and Groundwater Monitoring

Ground-gas and groundwater level monitoring was completed on five occasions (05/02/2019, 11/02/2019, 12/03/2019, 25/03/2019 & 07/05/2019) with groundwater sampling undertaken on three occasions (05/02/2019, 11/02/2019 & 14/05/2019). Ground-gas sampling was undertaken on one occasion (14/05/2019).

Prior to the collection of groundwater samples the monitoring wells were developed by the removal of up to three well volumes of groundwater to remove fines from the drilling process and to settle the filter pack. The development was carried out using disposable bailers.

During the three phases of ground investigation, the combined groundwater and ground gas monitoring visits included an interface probe to measure the thickness of floating product above the water table, as well as groundwater level, and measurement of ground gases including carbon monoxide (CO), carbon dioxide (CO₂), hydrogen sulphide (H₂S), methane (CH₄) and oxygen (O₂). Atmospheric pressure readings and gas flow rates were also undertaken.

The groundwater and ground-gas monitoring visits also included the use of a photoionization detector (PID) to provide a semi-quantitative measure Volatile Organic Compounds (VOC), with the exception of visits undertaken on the 12/03/2019 & 25/03/2019.

The groundwater sampling undertaken on the 14/05/2019 also included monitoring of pH, redox, electric conductivity and dissolved oxygen.

3.4 Laboratory Testing

Geo-environmental and geotechnical laboratory testing was scheduled by Fairhurst on samples recovered from the exploratory holes.

3.5 Constraints to the assessment

The following constraints were encountered during the ground investigation:

- BHD encountered a concrete obstruction at the base of the hand dug pit (1.20m bgl) and therefore had to be terminated. BHD1 was drilled through TTA and was successfully progressed to 18.37m bgl.
- WSA, WSIA, WSC, WSE, WSG, WSH, WSIA, WSK & WSKA all had to be terminated due to refusal in the underlying ground conditions.
- HPA was terminated at 0.70m bgl due to the presence of rebar within the Made Ground. The foundations of HPB – HPC extended beyond 1.20m bgl and the depth of these formations could therefore not be determined.

4.0 GROUND CONDITIONS

The following section of this report provides a summary of the ground conditions encountered during the three phases of ground investigation as summarised in Section 3.0.

4.1 Geology

The interpretation of the stratigraphic units presented within this section has been derived from field observations and factual information provided in the Dunlem Factual Report (2019) and the previous Dunlem / CBRE ground investigations referenced in section 1.3. The CBRE (2015) and Dunlem (2017) information has therefore been compiled with the results of the recent ground investigation and referenced where appropriate.

A generalised cross section of the sub-surface ground conditions is provided in [Figure 3](#) (for clarity the trial pits and window samples have been omitted from the section).

Table 4-1 – Summary of ground conditions encountered

Lithology	Proven Base of Lithology Range (m bgl)	Proven Base of Lithology Range (m AOD)	Proven Thickness (m)	Exploratory Hole Encountered
Hardstanding (concrete)	0.10 – 040	39.79 – 41.57	0.10 – 0.40	BH1, BH2, BH4, BH4A, BH4B, WS1, WS2, WS2A, WS4-WS6, BH101, BH102, BH102A, TP103, WS101, WS103, WS103B, WS104, WS104A, BHA, BHB, BHD1, BHE, BHF, WSA, WSB, WSC, WSE, WSG, WSH, HPC, HPC, HPD, WSIA, WSIC, WSK, WSKA, TTA - TTD
Hardstanding (tarmacadam, block paving, red brick, ceramic tile and grout)	0.07 – 0.40	40.10 – 42.92	0.07 – 0.40	BH4, WS3, WS7 – WS9, BH101, BH102, BH102A, TP103, WS101, WS103, WS103B, WS104, WS104A, BHA, BHB, BHC, WSG, WSH, WSK, WSKA
Made Ground	0.40 – 3.10	38.04 – 42.00	0.20 – 2.90	All exploratory holes apart from TP101, WS106, WS106A, WSF & HPA
Taplow Gravel Member	0.80 – 4.70	36.00 – 41.70	0.10 – 4.10	BH1, BH4B, WS5, WS7, WS8, BH102A, TP102, TP103, WS103B, WS104A, WSG, WSIC
White Chalk Subgroup (Structureless)*	4.70 – 13.40	27.87 – 36.37	3.10 – 11.90	BH1, BH2, BH4B, WS1, WS2A, WS4, WS5-WS9, BH101, BH102A, TP102, TP103, WS102 – WS103, WS03B, WS104A, BHA – BHF, WSB, WSF, WSIC, HPB, TTA
White Chalk Subgroup (Structured)*	30 - 40	1.27 – 11.97	25.30 - 28.70	BHA – BHC, BHE - BHF

*Structured chalk was only obtained using core recovery during rotary drilling. It is possible that structured chalk may be present at shallower depths, however any structure would be destroyed from the cable percussive and windowless sampling drilling technique, and the recovered description would not be considered representative of in-situ conditions.

**Base of White Chalk Subgroup (structured) not proven in any exploratory hole. Proven to depth and elevation presented in table above.

4.2 *Made Ground*

On-site

All exploratory holes on-site encountered hardstanding as concrete/rebar/tarmacadam/block paving/red brick to proven depths of 42.92 – 39.79mAOD with an average thickness of approximately 0.22m across the site. The thickness of hardstanding in BH102, WS104, WSA, WSE, WSH, WSIA and WSK was not proven due to refusal, with the largest thickness of concrete noted in WSA (>0.70m). Concrete was encountered at variable depths throughout the exploratory holes (41.87 – 39.99mAOD) ; repeated 0.05m bands of concrete were noted within WSIA (0.20 – 0.65m & 0.60 – 0.65m bgl).. For full details of the obstructions encountered on-site refer to Section 4.4.

Made Ground was encountered below the hardstanding principally as gravelly sand/occasional sandy gravel with inclusions of flint, concrete, brick fragments, tile, chalk, sandstone and steel. A band of limestone gravel was encountered from 0.20 – 0.60m bgl within WSG, located directly north of the multi storey car park. “Visqueen” was logged within the base of WSK (0.80m bgl), located in the existing car park adjacent to the Iceland store.

Cohesive Made Ground was noted within TP102, BH4B, WS4, WS5, WS8, WS9, BHD1, WSF & TTA and was principally encountered as 0.30 – 1.21m thick bands between the granular Made Ground, with the exception of WS9, where a thickness of 2.50m is recorded. The cohesive Made Ground was typically recorded as sandy gravelly clay with inclusions of flint, concrete, brick fragments, tile, and chalk.

The Made Ground encountered across the three site investigations was encountered to proven depths of 42.00 – 38.04mAOD and was typically between 0.20 – 1.30m in thickness, with limited difference in spatial distribution and no particular trend across the site. However WS9, TTA, WSC & BHD1(drilled through TTA) encountered Made Ground of thicknesses between 2.15 – 2.90m, with the maximum thickness of Made Ground encountered in WS9. The thickness of Made Ground was not proven in WSC, located inside the former southern section of the Iceland Warehouse (southern/south-eastern section of the site). WSB was excavated approximately 20m north of WSC within the warehouse and encountered Made Ground to 1.00m bgl.

4.3 *Taplow Gravel Member*

The Taplow Gravel Member was encountered locally within the north-western (BH1, BH102A, WS103B, WSG, WSIC, TP103 & WS104A, north-eastern (BH4B & TP102) and south-eastern (WS5 & WS8) areas of the site to proven depths of 36.00 – 41.70mAOD. Elsewhere, where obstructions were not encountered, this strata was found to be absent and the Made Ground was underlain by the White Chalk Subgroup, described in further detail in the following section. The strata was typically 0.20 – 0.90m thick, with the exception of BH1, BH102A & WSG located in the central northern section of the site, where the thickness ranged between 1.60 – 4.10m. The thickness of the member was not proven within WSG (proven 1.60m thickness), located within the north-western section of the site, with the hole terminating at 2.03m bgl due to the density of the sub-surface soil. The strata generally comprised gravel and sand in varying proportions, with the gravel comprising angular to sub rounded fine to coarse flint. Sandy silty clay/sandy silt was also encountered within BH4B, WS104A and WSG located along the northern boundary of the site. Overall, the Taplow Gravel Member is shown to comprise both cohesive and granular material in varying proportions/thickness throughout the site. This should be taken into account during foundation design.

Given the BGS presents the Taplow Gravel Member across the site, with the exception of the south-eastern area, it is considered likely that this formation has been partially to wholly removed and replaced with Made Ground Deposits, associated with the historical development of the site.

4.4 White Chalk Subgroup

The White Chalk Subgroup was encountered in all exploratory hole locations where they could be advanced to a sufficient depth. Within the cable percussive/windowless sampling boreholes, this strata was principally logged as off white chalk, recovered as sandy/gravelly clay or silt, with the exceptions of BHB, BHC, BHE & BHF where the strata was recovered as silty sandy fine to coarse gravel from depths of 5.00 – 12.50m bgl. There is no clear pattern shown relating to the locations of Grade Dm and Grace Dc structureless chalk across the site.

It should be noted that any structure within the White Chalk Subgroup would likely be destroyed from the cable percussive/windowless sampling drilling technique and therefore the recovered description would not necessarily be considered representative of the in-situ conditions.

Structureless chalk was generally recorded at depths of between 36m AOD to 41.70m AOD across the site with structured chalk below these levels to the full depths of drilling (between 11.07m to 1.27m AOD).

In BHB a 1.45m thick band of Grade Dc structureless chalk was encountered at depths of between 26.84 – 25.39mAOD interbedded within the structured chalk. Rotary core loss occurred in BHA between 39.36 – 36.26mAOD and within BHC from 24.65 – 22.65mAOD and 15.65 – 14.65mAOD. This was also attributed to the presence of more weathered structureless chalk at these locations and the result of flint becoming stuck in the rotary drill bits. No other apparent voids were encountered within the boreholes.

For specific locations of each rotary borehole, [Figure 2 should be referenced](#). Overall, findings from the ground investigation show levels of the top of the chalk and the thickness of structureless chalk to be variable across the site, which is likely a result of the depositional environment of the overlying superficial deposits as well as the cable percussive and window sampling technique destroying the structured chalk. The grading of the structured chalk was found to range between C5 – C2. Grading was found to improve with depth in BHA & BHF, whereas in the remaining boreholes grading was found to either remain consistent or have no clear pattern with depth

A plot of rock quality designation against elevation is presented in [Figure 4](#). Values of RQD appear to show an increase with depth into the structured chalk, typically with slightly higher values in C4, C3 and C2 chalk rather than chalk prescribed as Grade C5-C3, albeit with a degree of scatter. The upper bound of RQD is shown to be 90% (Grade C4, BHE at 3.16mAOD). The variability in RQD reflects the varying core recovery throughout the depth of the rotary boreholes and may be attributed to the presence of flints.

4.5 Groundwater

During the three phases of ground investigation, groundwater was encountered within fifteen of the forty nine exploratory holes undertaken (BH1, BH2, BH4B, WS1, WS2A, WS4, BH101, BH102A, WS101, WS103, WS03B, BHC, BHDA, BHE & BHF) with no trends in the locations of the strikes noted. Groundwater strikes were encountered between 4.30m bgl (BHD1) and 6.50m bgl (BH101) and elevations of 34.53mOD (BH101) and 36.40mAOD (WS4) within the White Chalk Subgroup.

Following completion of each phase of ground investigation works, gas and groundwater monitoring rounds were undertaken, as summarised below:

- During the CBRE (2015) Ground Investigation, ground-gas and groundwater level monitoring was completed on four occasions (08/10/2015, 15/10/2015, 23/10/2015 & 16/11/2015) and groundwater sampling on two occasions (08/10/15 & 16/11/15).

- During the Fairhurst (2016) Ground Investigation, ground-gas and groundwater level monitoring was completed on four occasions (06/09/16, 12/09/16, 21/09/16 & 28/09/16) and groundwater sampling on one occasion (12/09/2016).
- During the Fairhurst (2019) Ground Investigation, ground-gas and groundwater level monitoring was completed on five occasions (05/02/2019, 11/02/2019, 12/03/2019, 25/03/2019 & 07/05/2019) with groundwater sampling undertaken on three occasions (05/02/2019, 11/02/2019 & 07/05/2019).

The results of the groundwater monitoring rounds are presented in Table 4-2 below. A plot of groundwater levels against time is shown in [Figure 5](#).

Table 4-2 – Summary of groundwater levels recorded during monitoring

Borehole		Groundwater Level m AOD (m bgl)		Stratum Response Zone
		Maximum	Minimum	
2015	WS1	36.38	36.16	MG / WHCK
	WS2A	36.37	36.14	MG / WHCK
	WS4B	36.46	36.05	MG / WHCK
	WS5	36.16	36.06	MG / TG / WHCK
	WS6	36.40	36.14	MG / WHCK
	WS8	35.97	35.92	MG / TG / WHCK
	WS9	36.45	36.24	MG/WHCK
	BH1	36.46	36.24	MG / TG / WHCK
	BH2	36.52	36.26	MG / TG / WHCK
	BH4B	36.00	35.89	MG / TG / WHCK
2016	BH101	36.16	35.90	WHCK
	BH102A	36.45	35.89	TG / WHCK
	WS101	36.43	36.22	WHCK
	WS103	36.40	36.13	MG / WHCK
	WS103B	36.56	36.15	WHCK
	WS106A	DRY	DRY	MG
2019	BHA	36.40	36.25	WHCK (Structured and Structureless)
	BHB	36.41	36.26	WHCK (Structureless)
	BHC	36.49	36.20	WHCK (Structured)
	BHD1	36.32	36.20	WHCK (Structureless)
	BHD1 (Shallow)	DRY	DRY	MG
	BHE	36.44	36.06	WHCK (Structureless)
	BHF	36.12	35.97	MG
	BHF (Shallow)	DRY	DRY	WHCK (Structureless)
	WSF*	DRY	DRY	WHCK (Structureless)
	WSIC*	-	-	WHCK (Structureless)

*At the time of reporting no monitoring has been undertaken within these boreholes.

The groundwater results of the Fairhurst (2019) largely corroborate with the results of the previous phases of site investigation. The groundwater levels recorded indicate a relatively stable groundwater table between 35.89 and 36.52mAOD within the structureless White Chalk Subgroup bedrock. Groundwater was also encountered at the base of the Taplow Gravel Member within BH102A during the Fairhurst (2016) Ground Investigation (strata base at 36m AOD), where this strata was encountered at its greatest thickness. It is considered likely that this member is in hydraulic connectivity with the underlying chalk given their aquifer status.

Based on these results it is considered that groundwater is flowing in a north-easterly direction across the site.

Monitoring results from the Fairhurst (2019) ground investigation are presented in the Dunelm Factual Report located in [Appendix B](#).

4.6 Visual and Olfactory Evidence of Soil and Groundwater Contamination

Made Ground was encountered in all exploratory hole locations where advanced beneath hardstanding, generally comprising anthropogenic inclusions of flint, concrete, brick fragments, tile, chalk, sandstone and steel. During the three phases of ground investigation, no visual or olfactory evidence of contamination was noted within the Made Ground or Taplow Gravel Member, with the exception of a faint hydrocarbon odour during the drilling noted in Made Ground in BH103 between 0.20 – 0.60m bgl during the Fairhurst (2016) ground investigation.

Visual and olfactory evidence of hydrocarbon contamination was noted within structureless chalk generally at depths of 3.50 – 6.00m bgl within the CBRE ground investigation (all exploratory holes with the exception of WS3, BH4, BH4B and WS2) and Fairhurst (2019) ground investigation (BHB-BHC, BHD1 & BHE-BHF), with deeper hydrocarbon contamination noted within the structured chalk in BHF (13.40m bgl) and structureless chalk in BHE (11.00m bgl). A sulphurous odour was noted within WS2A from 4.30 – 5.20m bgl during the CBRE Ground Investigation.

In addition to the above, visual and olfactory evidence of contamination were noted during monitoring across the three phases of the site investigation, these are detailed in Table 4-3 below.

Table 4-3 – Comments on contamination during groundwater sampling

Borehole	Steady PID range (ppm)	Peak PID range (ppm)	Comments
CBRE Ground Investigation (2015)			
BH1	N/A	N/A	Hydrocarbon odour and slight iridescent sheen noted on groundwater sample recovered from BH1 on 08.10.15. Faint hydrocarbon odour noted on 16.11.15
BH2	N/A	N/A	Faint sulphur odour apparent on 16.11.15
BH4B	N/A	N/A	
WS2A	N/A	N/A	
Fairhurst Ground Investigation (2016)			
BH101	0.0 – 0.3	0.0 – 1.0	-
WS101	0.2 – 1.0	1.0 – 2.4	Oily sheen noted on probe 12.09.16
WS103B	0.0 – 0.2	0.7 – 5.0	Oily sheen noted on probe 12.09.16
WS106A	0.0	0.0 – 4.0	-
BH1	0.1 – 35.0	1.0 – 45.0	Oily sheen noted on probe / no free product detected or visible. However, probe did feel greasy 12.09.16 No measurable free product detected. BH probe again greasy and hydrocarbon smell noted 21.09.16 Hydrocarbon smell noted. No measurable free product detected. BH probe again greasy 28.09.16
Fairhurst Ground Investigation (2019)			
BH1	ND	ND	Hydrocarbon odour/oil sheen/black colour noted 05.02.19

			Sulphurous odour noted 14.05.2019
BH2	ND	ND	
BH4B	ND	ND	Hydrocarbon odour/oil sheen/white/cream colour noted 05.02.19
BH101	ND	ND	Hydrocarbon odour/oil sheen/white/cream colour noted 05.02.19
BH102A	ND	ND	Hydrocarbon odour/oil sheen/dark grey colour noted 05.02.19
WS1	ND	ND	
WS2A	ND	ND	
WS6	ND	ND	Hydrocarbon odour/oil sheen/white/cream colour noted 05.02.19
WS9	ND	ND	
WS101	ND	ND	Sulphurous odour noted 14.05.2019
WS103B	ND	ND	Hydrocarbon odour/oil sheen/white/cream colour noted 05.02.19 Sulphurous odour noted 14.05.2019

4.7 Obstructions

Of all the exploratory hole locations undertaken during the CBRE and Dunelm ground investigations, approximately 31% of positions were terminated due to obstructions.

The presence of further obstructions not identified by the ground investigation cannot be discounted and should be anticipated during the development works.

A summary of the obstructions encountered during the three phases of ground investigation are presented in Table 4-4 below.

Table 4-4 – Summary of obstructions encountered during ground investigations

Borehole	Depth Terminated	Reason for termination
BH4	1.30	Concrete obstruction
BH4A	0.97	No reason provided, likely due to electric cable found in Made Ground
WS2	0.40	Dense/hard ground
WS3	0.60	Concrete obstruction
BH102	1.10	Possible old foundation
BH103	1.20	Possible old foundation
BH103A	1.00	Concrete obstruction
BH103B	0.50	Concrete obstruction
BH103C	0.80	Concrete obstruction
BH103D	0.34	Corer unable to advance through concrete
WS104	0.30	Concrete obstruction

BHD	1.30	Concrete obstruction
HPA	0.70	Concrete obstruction
WSA	0.80	Concrete obstruction
WSE	0.65	Concrete obstruction
WSH	0.85	Concrete obstruction
WSIA	0.65	Concrete obstruction
WSK	0.85	Concrete obstruction
WSKA	0.85	Concrete obstruction

BH103 (A-D) and BHD (drilled as part of the 2017 investigation) were unable to penetrate the concrete within the Iceland Delivery Yard. TTA – TTD were therefore excavated in the 2019 investigation to prove the thickness of concrete and identify any obstructions present. TTA – TTD encountered 0.25m of concrete with rebar, with concrete walls (likely originating from relic buildings relating to the sites historic development) identified within TTA & TTC at depths of 0.30 and 0.50m bgl, respectively. The dimensions of the concrete walls can be viewed within the exploratory hole logs presented in Appendix B. The thickness of Made Ground was not proven in WSC, located inside the former Iceland Warehouse. WSB was excavated approximately 20m north of WSC within the warehouse and encountered Made Ground to 1.00m bgl. Generally, numerous concrete obstructions were encountered across the site, at varying depths generally between GL – 0.80m bgl.

4.8 Foundations

A total of four inspection pits were excavated to inform design considerations regarding the existing wall foundations of the garage directly west of the site and the retaining wall of the double story car park bounding the southern and western section of the site. The locations of the excavations were as follows:

- *HPA*: Located directly west of the site, along the existing wall of a garage;
- *HPB*: Located on the south-western boundary of the site, formed by a brick built retaining wall;
- *HPC*: Located on the central southern section of the car park, along a brick built retaining wall;
- *HPD*: Located on the south-eastern section of the car park, along a brick built retaining wall.

HPA was excavated down the face of the wall, through Made Ground and encountering a concrete foundation at 0.70m bgl, where the hole was terminated due to the presence of large amounts of rebar. The edge of the concrete was not proven, but was noted to step out by at least 0.70m.

HPB was excavated down the face of the wall, through Made Ground and encountering a concrete foundation at 0.20m bgl. The concrete foundation was noted to be 0.40m in thickness. The base of the concrete foundation was not found, due to the depth being greater than 1.40m bgl.

HPC was excavated down the face of the wall, through Made Ground and encountering a concrete foundation at 0.38m bgl. The concrete foundation was noted to be 0.70m in thickness. The base of the foundation was noted found, as the depth of the pit could not be progressed beyond 1.20m bgl due the presence of services.

HPD was excavated down the face of the wall, through Made Ground and encountering a concrete foundation at 0.35m bgl. The concrete foundation was noted to be 0.50m, with the base of the foundation noted at 0.70m bgl (0.35m thickness).

Sections of the foundation exposures can be viewed in [Appendix B](#). It is important that the proposed detailed foundation solutions are designed to ensure that the proposed development will not impact surrounding walls and structures.

It is likely from the results of the trial pitting that the retaining walls are supported on shallow strip foundations and therefore any excavations in the vicinity (or indeed surcharging, for e.g. associated with construction of a working platform for piling) should be considered in relation to the potential impact on existing structures.

5.0 GEOTECHNICAL TESTING AND ENGINEERING PROPERTIES

The following section provides a summary of the geotechnical in-situ and laboratory testing results undertaken as part of the Fairhurst 2016 and 2019 ground investigations. No laboratory geotechnical testing was undertaken during the CBRE ground investigation. Where necessary, determination of characteristic parameters has been based on a cautious estimate of results derived from laboratory, published correlations and field tests, complemented with engineering judgement and consideration of the relevant limit state. The parameters are not considered to be absolute and should be referenced with the specific strata text in this section and reviewed when considering a specific area of the site.

The below figures should be referenced accordingly in relation to the field and laboratory testing results.

Figure 6 – UCS vs Elevation

Figure 7 – SPT vs Depth

Figure 8 – SPT vs Elevation

A summary of the tests is detailed in 5-1 below with respect to each geological unit encountered.

Table 5-1 – Summary of Geotechnical Testing Undertaken

Geotechnical Test	Made Ground	Taplow Gravel Member	White Chalk Subgroup (Structureless)	White Chalk Subgroup (Structured)
Standard Penetration Tests (SPT)	10	11	124	50
Moisture Content	1	1	3	0
Moisture Condition Value (MCV) at Natural Moisture Content (NMC)	1	0	0	0
Uniaxial Compressive Strength Tests (UCS)	0	0	0	24
Intact Dry Density (IDD) & Saturation Moisture Content (SMC)	0	0	0	24
Point Load Tests	0	0	0	41
Particle Size Distribution Tests	0	2	2	0
Dry density/moisture content relationship using 2.5 kg rammer	1	0	1	0
CBR	3	0	0	0

5.1 Made Ground

Made Ground testing was undertaken across the site to inform on material properties and composition for possible re-usability.

Earthworks Testing

1No. sample of granular Made Ground was subject to moisture condition value (MCV) determination at natural moisture content, taken from BHF (0.50m bgl). The results for BHF (0.50m bgl) recorded a MCV of 1.90 at a moisture content of 14.6%.

Based on the recorded MCV this sample is likely to be deemed acceptable for use in accordance with Specification for Highway Works (SHW) Series 600 with the MCV being above the typical lower limit of acceptability of 8.5% (Dennehy, Ground Engineering 1988).

A single compaction test was undertaken on 1No. sample of granular Made Ground recovered from BHC (0.40m bgl) using a 2.5kg rammer. The maximum dry density of the sample was found to be 2.08mg/m³ with an optimum moisture content of 9.2%. The optimum moisture content inferred is wetter than the natural moisture content within the Made Ground of 8.4% (BHC, 0.40m) and therefore

there may be a requirement for some wetting of samples to meet their optimum moisture content when considering re-use of the Made Ground.

California Bearing Ration (CBR) Tests

3No. samples of granular Made Ground were subject to CBR testing, taken from BHB (0.60m bgl), BHE (1.00m bgl) & BHF (1.00m bgl). The results are tabulated below:

Table 5-2 – Summary of CBR testing on Made Ground

Sample (m bgl)	CBR Values (%)				Moisture Content (%)
	2.5mm	5mm	Highest	Average	
BHB (0.60)	0.3	0.3	0.3	N/A	18.0
	0.4	0.5	0.5		15.1
BHE (1.00)	0.36	0.44	0.44	0.44	16.1
	0.36	0.43	0.43		16.5
BHF (1.00)*	0.2	0.3	0.3	N/A	15.3
	0.3	0.4	0.4		14.9

*Logged as Made Ground but described as chalk in the laboratory testing. Considered to be chalk with significant anthropogenic inclusions.

Unit weight

A typical bulk unit weight of 17-20 kN/m³ for the cohesive and granular Made Ground is suggested for design purposes based on the soil density testing results and in accordance with BS8002:2015.

Strength and Stiffness

10 No. Standard Penetration Tests (SPTs) were undertaken in boreholes in the granular and cohesive elements of the Made Ground.

SPT 'N' values relating to the granular material (8No.) ranged between 11 – 50, indicating medium dense to very dense material in accordance with BS EN ISO 14688-2. The extremely variable SPT values are considered attributable to the inherent inconsistency of the Made Ground and its generally uncontrolled deposition. In addition, some blow counts refused which suggest there may be localised areas of obstructions.

SPT 'N' values relating to the cohesive material (2No.) were found to range between 2-3. These values are representative of a soft cohesive material with a corresponding undrained shear strength expected to be <20.0kPa (Handbook of Geotechnical Investigation and Design Tables, 2007). The Made Ground is not considered to be a suitable founding stratum.

5.2 Taplow Gravel Member (TGM)

Granular TGM

Particle Size Distribution (PSD) Testing

A total of 2No. PSD tests were undertaken within the granular elements of the Taplow Gravel Member, taken from BH102A (1.70m bgl) and TP102 (0.70m bgl). The samples were logged as a gravelly sand and sandy gravel, respectively. Testing on the samples indicated the following compositions:

- Cobbles: min 0%, max 0%;
- Gravel: min 59%, max 73%;

- Sand: min 12%, max 24%;
- Fines (less than 63 micron diameter): min 3%, max 29%.

The above is representative of the predominantly gravelly nature of the Taplow Gravel Member on site typically varying between gravelly sands and sandy gravels with a varying proportion of fines present.

Unit Weight

A typical bulk unit weight of 18-20 kN/m³ is suggested for design purposes based on soil descriptions and in accordance with suggestions in BS8002:2015.

Strength and Stiffness

11No. SPTs were undertaken in boreholes in the TGM. SPT 'N' values within the granular material (6No.) were found to range from 24 – 50 indicating a dense to very dense material in accordance with BS EN ISO 14688-2:2004. There is no trend of increasing strength with depth based on the SPT plot.

An angle of shearing resistance of 36-38° is recommended based on BS8002:2015 and Peck, 1974. A drained Young's Modulus of 30.0MPa is proposed, adopting an average SPT value of 30 for these deposits. This is based on the correlation proposed by Stroud (1989) of $E_v = 1.0N$ (MPa).

Cohesive TGM

Moisture Content

1No. sample of the Taplow Gravel Member logged as granular, taken from WS104A (1.20m bgl) was subject to a moisture content determination. The results recorded a moisture content of 14%.

Strength and Stiffness

SPT N values relating to the cohesive material (5No.) were found to vary between 11 – 50. As detailed in Figures 7 and 8, SPT N values within the cohesive TGM are variable, reflecting the composition of the strata. The values are representative of a stiff to very stiff cohesive material with corresponding undrained shear strengths likely to range between 50 and >200kPa (Handbook of Geotechnical Investigation and Design Tables, 2007).

Based on the log descriptions and the Handbook of Geotechnical Investigation and Design Tables, 2007 (Table 7.9) an angle of shearing resistance of 20 – 25° is recommended for the cohesive soils of the TGM.

A Young's modulus is proposed for design based on the following relationships obtained from the ICE Manual of Geotechnical Engineering, 2012:

Undrained Young's modulus (short term conditions), $E_u = 330 \times c_u$

Drained Young's modulus (long term conditions), $E' = 200 \times c_u$

It should be noted that care should be taken in using linear stiffness values derived from relationships as they do not necessarily reflect the non-linear nature of soil stiffness. The actual stiffness will be strain dependent and non-linear and should be considered in detailed design of sensitive structures.

5.3 White Chalk Subgroup

Structureless Chalk

Earthworks

3No. samples of the structureless White Chalk Subgroup, taken from BH101 (2.00 & 8.00m bgl) and BHB (1.00m bgl) were subject to moisture content determination. The moisture content was found to vary between 21 – 30% within the structureless chalk.

1No. sample of structureless chalk, logged as slightly gravelly sandy silt was subject to dry density/moisture content relation light compaction using a 2.5kg rammer. The optimum moisture content of the sample was found to be 20% with a maximum dry density of 1.72Mg/m^3 . This indicates the chalk may require some drying out to be utilised as part of an earthworks strategy.

Particle Size Distribution (PSD)

2No. PSD were undertaken on samples recovered and logged as Grade Dm chalk within BH102A at 4.70m bgl and Grade Dc chalk within TP103 at 3.00m bgl. The composition of the chalk is detailed in Table 5-3 below:

Table 5-3 – Summary of PSD Testing

Sample (m bgl)	Cobble	Gravel	Sand	Fines (<0.063mm)
BH102A (4.70)	0	59	12	29
TP103 (3.00)	15	54	13	18

The sample taken from BH102A deviates from the borehole record and chalk grade classification, which recorded slightly sandy slightly gravelly SILT. The sample was taken on the boundary between the Made Ground (recorded as gravelly sand) and the upper chalk and it is therefore possible that some Made Ground was mixed in with the sample.

The sample taken from TP103 also deviates from the borehole record and chalk grade classification, which recorded gravelly SAND.

Strength and Stiffness

Standard Penetration Tests (SPT) were undertaken within the chalk in windowless sampling, cable percussive and rotary boreholes throughout the three phases of site investigation.

126No. SPTs were recorded within the structureless chalk, between depths of 1.00 – 19.45m bgl (41.58 – 21.86mAOD); presenting SPT N values ranging between 4 – 50.

The lowest values (N values of 4 – 5) were recorded within WSF at 1.20m bgl and BH1 at 7.00m bgl. The remaining SPT N values were found to range between 6 and 50. The lower range of these values (6 – 10) were found at variable depths within the boreholes (30.62 – 37.03mAOD). With references to Figures 7 – 8, SPT values within the structureless chalk are shown to broadly increase with depth.

CIRIA C574 suggests the following typical parameters for structureless chalk:

- Effective friction angle, $31^\circ \leq \phi' \leq 33^\circ$;
- Effective cohesion, 0 kPa;

For structureless chalk, the following strength and stiffness parameters are presented based on suggestions in CIRIA C574:

- Secant modulus E_s = 200 MN/m² (Grade Dc) (short term);
= 75 MN/m² (Grade Dc) (long term);
and
= 6 MN/m² (Grade Dm);
- $q_y = 250 \text{ kN/m}^2$ (Grade Dc)
- $E_y = 20 \text{ MN/m}^2$ (Grade Dc) Secant modulus $E_s = 200 \text{ MN/m}^2$;
- Yield stress $q_y = 250 \text{ kN/m}^2$;
- Yield modulus $E_y = 15 \text{ MN/m}^2$;
- Ultimate bearing capacity $q_u = 1.5 \text{ MN/m}^2$.

Structured Chalk

Moisture content

Moisture content determination was included as part of the UCS, and IDD and NMC testing undertaken on a range of structured chalk samples from BHA – BHC & BHE – BHF. The moisture content within the structured chalk was found to range between 21 – 28%.

Strength and Stiffness

50No. SPTs were recorded within structured chalk from depths of 4.85m to 40.0m bgl and ranged between 7 – 50. The lowest values of SPT N values of 7 were recorded within BHA at 6.00m bgl and BHE & BHF at 12.00m bgl. SPT's within the structured chalk generally increased in strength to 15.00m bgl, where they then refused (50 blows) with the exception of BHA1 at 18.00m bgl where an SPT N value of 14 was recorded.

With reference to the SPT-N plots, “structured” chalk refers to strata encountered through rotary drilling methods (BHA-BHC & BHE-BHF), where classification in accordance with engineering grades could be undertaken.

Burland and Lord (CIRIA R143, 1970) suggests that the axial intact modulus of chalk (E_{int}) may be estimated from the results of SPT carried out in relatively unweathered chalk as $N_{60} \times 50$. Using this relationship would suggest values of E_{int} within a range of 300 – 2150MN/m³ within the structured chalk.

CIRIA C574 suggests the following typical parameters for structured chalk:

- Effective friction angle, $34^\circ \leq \phi' \leq 39^\circ$,
- Effective cohesion, $0 \leq c' \leq 20$ kPa;

The above minimum and maximum values for structured chalk are recommended by CIRIA C574 as “worst credible” and “moderately conservative” parameters respectively.

For structured chalk, strength and stiffness parameters for medium density chalk proposed in CIRIA C574 comprise:

- Secant modulus $E_s = 300$ MN/m²;
- Yield stress $q_y = 400$ kN/m²;
- Yield modulus $E_y = 35$ MN/m²;
- Ultimate bearing capacity $q_u = 4.0$ MN/m²

For low density chalk, the following parameters are provided in CIRIA C574 as conservative values:

- Secant modulus $E_s = 200$ MN/m²;
- Yield stress $q_y = 250$ kN/m²;
- Yield modulus $E_y = 15$ MN/m²;
- Ultimate bearing capacity $q_u = 1.5$ MN/m².

The above parameters are provided for guidance and are not considered to be absolute and should be referenced within the specific strata text in this section and reviewed when considering a specific area of the site.

Laboratory Strength Testing

23No. structured chalk samples from BHA, BHB & BHE – BHF were scheduled for uniaxial compression strength testing (UCS) with 41No. samples also selected for point load tests. UCS correlated from point load testing was obtained using guidance from Tomlinson (2007) which gives a value of the UCS / Point Load multiplier of 18. A summary of the testing and appropriate density classes are detailed in Appendix D.

Axial points load tests are considered to be preferable for reliability in determining the strength of chalk and therefore these have been used for aiding in determination of geotechnical assessment. Results from tests undertaken within structured chalk present point load indices ranging from 0.07 – 0.45MPa, correlating to UCS values of 1.26 – 8.10MPa. The results of the UCS tests ranged between 0.90 – 3.30MPa. Generally, tested samples from the structured chalk were classified as extremely weak to weak

Saturated Moisture Content (SMC) and Intact Dry Density (IDD)

Tested samples from the structured chalk showed saturated moisture content readings ranging between 21 – 38% and intact dry density ranging between 1.48 – 1.73Mg/m³. Therefore, this stratum is generally considered to be indicative of low to medium density rock in accordance with CIRIA C574.

As the UCS test results are more indicative of low density chalk, it is recommended that the strength and stiffness parameters for low density chalk are used for foundation design.

5.4 Soil Chemistry

Throughout the three phases of site investigation, assessment of sulphate and pH was undertaken on soil and groundwater samples across a range of strata to determine the concrete design class for any proposed buried concrete structures. Details of test results per stratum are summarised in 5-4.

Table 5-4 – Summary of Sulphate Classification Testing

Stratum Medium	Number of tests undertaken	Water Soluble Sulphate (SO ₄) (mg/kg)	Soluble Range (mg/l)	pH Range	Design Classification	ACEC Class
Made Ground	21	36 – 1130		8.1 – 12.1	DS2	AC2
Taplow Gravel Member	7	33 – 74		8.4 – 10.0	DS1	AC1
White Chalk	16	6 - 84		8.0 – 11.3	DS1	AC1

5.5 Summary of Geotechnical Parameters

The geotechnical parameters presented in Table 5-5 are considered appropriate for design. The parameters are not considered to be absolute and should be referenced within the specific strata text in this section and reviewed when considering a specific area of the site.

Table 5-5 – Geotechnical Design Parameters

Material Type	Unit Weight ⁽¹⁾ (kN/m ³)	ϕ'_{peak} ⁽²⁾ (°)	Effective cohesion, c' (kN/m ²)	C_u (kN/m ²)	E_u (MN/m ²)	E' (MN/m ²)	DS class
Made Ground - Cohesive	17-20	23 to 25	-	10 – 15	-	-	DS2
Made Ground – Granular	17-20	28 to 30	-	-	-	-	DS2
Taplow Gravel Member – Cohesive	18-20	20 to 25	-	55 - 250	***See below Relationships		DS1
Taplow Gravel member – Granular	18-20	36 to 38	-	-	-	30	DS1
White Chalk Subgroup (structureless)*	18-20	31 to 33	0		Secant Modulus	6	DS1
White Chalk Subgroup (structured)*	18-20**	34 to 39	0 to 20		Secant Modulus	200	DS1

Notes

Given the inherent variability of Made Ground, conservatism should be used when applying the recommended design parameters.

All values are approximate and should be refined at detailed design stage.

Chalk design parameters derived based on typical design recommendations in CIRIA C574.

* See Section 5.3 for suggested design parameters regarding Chalk. Design should be carried out in accordance with recommendations in CIRIA C574.

*** E_u = 330 x c_u

*** E' = 200 x c_u

6.0 PRELIMINARY GEOTECHNICAL ASSESSMENT

6.1 *Proposed Development*

Development proposals for the site comprises the demolition of all existing buildings (including 3 retail units) and structures and the erection of new buildings ranging between lower ground & 4 storeys to lower ground & 11 storeys in height. The proposed development is understood to provide 427 (233x1, 182x2 & 12x3-bed) residential units (Class C3) and 1 flexible ground floor retail shop (Class A1) or restaurant and cafe (Class A3) unit, together with new public realm, landscaping, accesses, parking and associated works.

Foundation solutions are considered to include earthworks piling, with continuous flight auger (CFA) piling likely to be the most suitable piling technique for this site. Soft landscaping is proposed, concentrated in central, eastern and southern sections of the site. Proposed development plans are presented in [Appendix A](#).

6.2 *Preliminary Geotechnical Constraints and Considerations*

Geotechnical considerations inferred from the Fairhurst PRA and the ground investigations are presented. The below considerations are based on the proposed developments and are subject to review at detailed design stage (i.e. confirmation of engineering levels, structural layout, loading conditions etc.). The geotechnical considerations discussed do not supersede the considerations presented in section 2.6 of this report and these need to be considered holistically.

Presence of existing services

A utility survey was undertaken by Brunel Surveys Ltd in March 2016. The plans confirm the presence of an electrical substation adjacent to the northern boundary of the site, additionally, there are gas and drainage utilities crossing the site. The presence of existing services may require capping and or diversion associated with the development, which should be managed through the appropriate utility suppliers during the construction phase. The Principal Contractor should ensure that appropriate mitigation measures are put in place during the construction phase (i.e. during foundation excavation or advancement of piles).

Relic Foundations and Structures/Observations

Numerous obstructions were recorded during the three phases of the ground investigation, as detailed in Section 4.4. TTA – TTC were undertaken within the Iceland Delivery area to identify sub-surface obstructions in the north-eastern section of the site. Concrete walls were identified within TTA & TTC at depths of 0.30 and 0.50m bgl, respectively. The dimensions of the concrete walls can be viewed within the exploratory hole logs presented in [Appendix B](#).

Further below ground structures may remain associated with former/existing structures and in un-investigated areas of the site. Detailed design of the foundations will be required following determination of the final development layout and loading conditions of the structures, at which time a specialist piling contractor should be consulted. Additionally, it is recommended that the buried structures associated with existing buildings on site (e.g. foundations) and within influencing depth of the proposed development are removed as part of the demolition works. Where feasible, consideration should be given, in liaison with the Principal Contractor, to the re-use of former foundations/concrete obstructions as capping or fill to structures to reduce export/import costs. Re-use can only occur if appropriate methods are adopted which include crushing, appropriate testing (environmental and geotechnical) and screening in accordance with Series 600 of the Specification for Highways Works (SHW).

Variable Made Ground

Made Ground was encountered across the site at thicknesses of between 0.20 m and 2.90m. No trend was observed with respect to the vertical and lateral extent. The distribution is likely linked to the variable placement associated with the historic developments of the site. Given the variable nature of this formation, it is not considered to be a suitable founding stratum.

Variable Near Surface Deposits

The site investigations indicated the Taplow Gravel Member varies between a dense to very dense / medium sand/gravel and a medium to very high strength silty clay. Due to the presence and thickness variability, and based on the anticipated development engineering levels and loadings it is unlikely the Taplow Gravels would be considered a suitable foundation stratum.

Excavations and Drainage

Groundwater was encountered as strikes in the structureless White Chalk Subgroup at depths of between 4.30m bgl (BHD1) and 6.50m bgl (BH101) and elevations of 34.54mAOD (BH101) and 36.40mAOD (WS4). Groundwater monitoring indicates a relatively stable groundwater table between 35.89 and 36.52mAOD.

The chosen contractor should provide details on how they intend to ensure the safety and stability of both the excavations and neighbouring structures.

Soakaways are currently not considered to be feasible as part of the proposed development due to the proximity of structures and the inherent significant risk of pollution to the underlying chalk aquifer which should be avoided. BRE365 details that the risk of pollution to the quality of groundwater must be considered. It is recommended that drainage design is implemented so that water does not discharge through Made Ground and impact on the underlying groundwater. Furthermore, neither the Made Ground nor the Taplow Gravel Member is considered suitable for drainage given the inherent variability in composition.

Chalk Solution Features

Due to the chalk geology of the site, there is the potential for natural cavities, associated with dissolution, particularly where the ground model is altered by development. Rotary core loss occurred in BHA between 39.36 – 36.26mAOD and within BHC from 24.65 – 22.65mAOD and 15.65 – 14.65mAOD. This was also attributed to the presence of more weathered structureless chalk at these locations and the result of flint becoming stuck in the rotary drill bits. No other apparent voids were encountered within the boreholes.

No recorded mining cavities have been identified during the desk based researches undertaken by others, nor has any obvious evidence of such been identified in the ground investigations undertaken to date.

Despite no apparent evidence of solution features on site during the ground investigations, vigilance should be maintained throughout development, and particularly during piling operations for any variations to the anticipated and expected ground conditions. Any unexpected ground conditions should be reported to the geotechnical engineer.

Chemical Attack on Buried Concrete (Site Wide)

Based on the soil chemical concentrations the following concrete classifications are considered for each stratum and groundwater (in accordance with BRE Special Digest 1:2005, assuming mobile groundwater).

Table 6-1 – Summary of Concrete Aggressivity Classes

Material Type	Design Sulphate Class	ACEC Class
Made Ground	DS2	AC2
Taplow Gravel Member	DS1	AC1
White Chalk Subgroup	DS1	AC1

6.3 Preliminary Pile Design

In the absence of loading information, and based on the proposed heights of structures, low SPT “N” values at shallow depths and variable composition of superficial deposits, it is considered that the proposed buildings are likely to be supported on piled foundations.

It is considered likely that Continuous Flight Auger (CFA) piles would be the most suitable piling technique for this site. This suggestion does not however preclude the consideration of other pile types being used.

Preliminary pile capacities have been provided overleaf in Table 6-2, for vertically loaded single CFA pile. The provided capacities have been calculated in accordance with the methods detailed in CIRIA C574 (2002) for the chalk geology. Should alternative piling techniques be considered at detailed design stage then the provided preliminary capacities would need to be revised accordingly. The following assumptions have been made and should be considered and reviewed at detailed design stage:

The preliminary pile capacities are presented for 450 mm, 600 mm, 750 mm and 900 mm diameter piles with assumptions made and/or assessments undertaken as follows:

- All pile capacities have been calculated from 38 m AOD. No further excavations have been taken into account.
- The determination of pile capacity was assessed by determining the capacity of the both the shaft and base resistance;
- A CFA pile technique has been considered in the preliminary assessment;
- The working load of the piles was assessed assuming no working pile load testing –preliminary load testing would allow a greater capacity for a given depth, or shorter piles for a given load to be adopted; therefore, it is recommended that static load pile testing is undertaken to confirm capacities;
- Skin friction from the Made Ground and superficial deposits has been ignored, considering the variability of this formation;
- Within structured chalk, β is taken to be 0.45, and base resistance is calculated as 200 N (Figure 8.14 from CIRIA C574, Lord et al., 2002);
- For preliminary purposes, the unit base resistance has been limited to 10,000kPa in the chalk where corresponding SPT N values of 50 and/or refusal were recorded. This assumption has been supported by an established piling contractor with experience of pile design in chalk geology. However, this assumption may not be applicable at detailed design stage;
- A bulk FOS of 2.5 has been utilised for preliminary capacities in accordance with CIRIA C574;

Based on this, the following findings/recommendations are being made:

- It is recommended that piles are not terminated within the structureless Chalk (grade Dm and Dc);
- The preliminary capacities will need to be compared with appropriately factored permanent and variable loads;
- Diameters greater than those reported may be required for higher structures, this should be considered in consultation with a specialist piling contractor and structural engineer at detailed design stage. Should greater diameters be required then alternative piling techniques, such as conventional bored piling, may be utilised for which the preliminary pile capacities provided should be revised accordingly;

For simplicity, the design follows Steps 1 to 6 of the pile design guidance contained in Section 8.12.3 of CIRIA 574 (2002). As such, the limiting stress of the concrete used and settlements associated with the piles have been excluded from the design.

Table 6-2 – Preliminary Pile Design Parameters

Pile Toe Level (mAOD)	Approximate Pile Length (m)	450 mm Diameter (kN)	600 mm Diameter (kN)	750 mm Diameter (kN)	900 mm Diameter (kN)
26	15	639	1022	1489	2042
21	20	835	1283	1816	2434
16	25	1340	2069	2939	3952

Should the piles toe to a greater elevation than the deepest borehole (1.27mAOD, BHF), then further ground investigation may be required to confirm the ground conditions beneath the toe level.

6.4 Floor Slabs

The anticipated loads from the proposed structures would be required to be transferred to the underlying Chalk Formation and therefore suspended floor slabs are likely to be required. However if unsuitable materials were to be removed as part of, for example, cut and fill operations, ground bearing slabs could be considered bearing into or onto the chalk formations, subject to heave and settlement constraints.

6.5 Earthworks

An earthworks strategy for the site should be finalised as part of detailed design once finished floor levels and structural loadings are confirmed. The strategy should be designed to achieve as close to a 'zero balance' as possible, and to try to generate material suitable for re-use and minimise the geotechnically and / or environmentally unsuitable materials.

Materials should be tested to show that they are chemically suitable for re-use at their proposed locations and to ensure that there are no unacceptable risks to identified receptors, which should be outlined in a site specific earthworks specification.

On the basis of the laboratory testing carried out to date, it is considered that Made Ground (where shown to be free of contamination) and River Terrace Gravel should be suitable for re-use at the site and it is considered that the deposits are likely to be classified as general fill [(Classes 1A-1C (granular) and 2A-2C (cohesive))] as defined in the Specification for Highway Works (2007) for use below external slabs.

The underlying chalk is generally considered to be an appropriate earthwork material however it should be placed in accordance with a suitable site specific earthworks specification.

At this stage it is recommended that the speciation meets the requirements of Series 600 'Specification for Highways Works' incorporating the CIRIA C574 proposed amendments after Toombs and Snowden (1997). The site won chalk should be treated as a Class 3 material in accordance with Series 600 and the testing requirement should comply with the recommendations given in Table 6/1 of the document. It should be noted that chalk is very sensitive to increases in moisture content and therefore it is recommended that, where feasible, any earthworks are carried out in dry conditions only with best earthwork practices maintained at all times.

6.6 Retaining Walls

A number of gravity retaining walls are proposed across the site where level changes are required and embankments would not be appropriate. Relevant parameters for retaining wall design are presented in Table 5-5, Section 5-5.

Careful consideration should be given to the selection of appropriate material properties for the design of retaining structures. This should include but not be limited to the following factors:

- Groundwater conditions relative to the location of the proposed retaining wall;
- Variation in material properties across the site;
- Appropriate material properties for the type of retaining structure proposed;
- Appropriate active, passive and at rest earth pressures in accordance with current guidance.

6.7 External Pavement Design

Where Made Ground is encountered at road pavement formation levels, a California Bearing Ratio of <2.5% should be assumed and full road capping should be allowed for to mitigate total and differential settlements. This could be varied where natural chalk deposits are encountered during construction.

The above is subject to in situ testing during construction. For any areas of road to be adopted by the Local Authority (LA), consultation with the LA Highways Department will be required to agree the best design approach.

Any soft or loose layers encountered in otherwise competent formations should be removed and replaced with well compacted imported granular fill.

The engineering characteristics of any clayey and silty soils at shallow depth are particularly sensitive to changes in soil moisture content and will soften considerably when exposed to free water. It should therefore be prudent to programme pavement construction for the dryer summer months.

7.0 GEO-ENVIRONMENTAL TESTING AND GENERIC QUANTITATIVE RISK ASSESSMENT

7.1 General

Geo-environmental testing was undertaken as part of the three phases of ground investigation (2015, 2016 & 2019). The 2015 and 2016 results are reported in the previous reports (50BCD0132651/PI&II & 112990/R4, 2016), however for clarity they are included in the interpretation below. The geo-environmental testing undertaken as part of the 2019 ground investigation works was scheduled by Fairhurst and carried out by Dunelm within their accredited laboratories.

7.2 Summary of Soil Analytical Laboratory Testing Undertaken

Table 7-1 provides a summary of the chemical analysis completed on soil samples collected during the ground investigations.

Table 7-1 – Summary of Geo-environmental Testing (soil)

Geo-environmental Test	2015 No. Analysed	2016 No. Analysed	2019 No. Analysed
Metals (including Arsenic, Cadmium, Chromium (total), Chromium VI, Copper, Lead, Mercury, Nickel, Selenium and Zinc)	29	9	15
Hexavalent Chromium	5	-	19
Spectated PAH (US-EPA 16)	24	9	18
Total Petroleum Hydrocarbon (TPH) (Aliphatic and Aromatic Split using the Criteria Working Group Methodology), BTEX	33	11	18
Semi Volatile Organic Compound (SVOC)/ Volatile Organic Compound (VOC)	8/24	7	18
Phenols, Cyanide (Total) and Sulphide	5	-	-
Asbestos screen (quantification if required)	20	8	14
Soil Organic Matter (SOM) / Total Organic Carbon (TOC)	20	8	13
Polychlorinated biphenyl (PCB)	1	-	13
Sulphate as SO ₄	-	8	
Leachate testing for metals and PAHs	7	-	-

7.3 Assessment Criteria and Approach – Risks to Human Health

Human health receptors (site end users as residents and workers, as well as neighbouring land users), building structures and services (on and off-site) and Controlled Water receptors (Secondary A Aquifer (Taplow Gravel) and Principal Aquifer (Undifferentiated Chalk), present at or in the vicinity of the site were highlighted as potential receptors with respect to potential soil contamination at the site.

For the assessment of the soil analytical results the human health assessment criteria applied are generally the LQM/CIEH 'Suitable 4 Use Levels' (S4ULs) that have been developed in accordance with developments in UK human health risk assessment. For lead, the Category 4 Screening Level (C4SL) for the 'residential without consumption of home-grown produce' land-use was adopted.

The S4ULs are based on Health Criteria that represent minimal or tolerable levels of risks to health as described in the Environment Agency's SR2 guidance, ensuring that the resulting assessment criteria are 'suitable for use' under planning.

For each substance, S4ULs and C4SLs have been derived for six generic land uses (including the two Public Open Space land uses defined in S4UL guidance) and a range of Soil Organic Matter contents (organic contaminants only). All toxicological and physical-chemical data inputs used in the derivation of the S4ULs are presented and discussed in the publication.

Soil contaminant concentrations were compared against S4UL and the lead C4SL assessment criteria for the 'residential without plant uptake' land-use. The land-use and associated exposure parameters of the 'residential without plant uptake' land-use are defined in the C4SL guidance documents published by DEFRA.

Soil organic matter (SOM)¹ testing was undertaken on 41no. samples across the three phases of site investigation, with recorded values of between 5.7 – 0.2% (average value of 1.2%). Therefore, S4ULs have been applied on the bases of a 1% SOM as a conservative approach.

The most sensitive human health receptors on site are considered to be 0 to 6 year old child of the residential (without home grown produce) scenario and therefore results have been assessed against assessment criteria derived for this receptor. Should any future development plans vary from this end use, the contaminated land risk assessment should be revised.

Individual laboratory results for the Fairhurst (2019) ground investigation are presented in the Dunelm within Appendix B of this report whilst the 2015 and 2016 results are reported in the previous reports (50BCD0132651/PI&II & 112990/R4, 2016).

7.4 Assessment of Inorganic and Organic Soil Contamination – Risks To Human Health

Utilising the assessment criteria discussed above, the results of the supplementary geo-environmental soil laboratory analysis have been compared with the relevant assessment criteria, as summarised in Table 7-2.

Table 7-2 – Summary of Inorganic Testing

Test	Assessment Criteria (mg/kg)	2015 Contaminant Range (mg/kg)	2016 Contaminant Range (mg/kg)	2019 Contaminant Range (mg/kg)	No. Exceedances		
					2015	2016	2019
Arsenic	40	<0.31 – 24	0.9 – 16	6 – 44	0	0	0 (BH1/1.0 & BHA/2.0 m bgl on threshold)
Boron	11,000	<0.5 – 14	0.4 – 2.6	<0.4 – 8.2	0	0	0
Cadmium	85	<0.2 – 1.93	0.1 – 0.5	>0.1 - 1.3	0	0	0
Chromium III	910	1.73 – 27.5	2 – 14	<0.1 – 28	0	0	0
Chromium VI	6	<0.1 – 0.3	<1	<0.5	0	0	0
Copper	7,100	1.83 – 149	1.4 – 58	<0.5 – 63	0	0	0

¹ SOM = TOC/0.58

Lead	310	1.74 – 223	1.4 – 90	<0.5 – 800	0	0	2 (BHA/1.0 m & WSF/0.5 m bgl)
Mercury	15	<0.5 – 1.2	<0.05 – 0.42	<0.1 – 1.4	0	0	0
Selenium	430	<0.5 – 0.6	<0.5 – 0.6	<0.2 – 0.41	0	0	0
Zinc	40,000	16.08 - 171	6.9 – 57	<0.5 - 750	0	0	0
Cyanide (Total)	34	-	-	-	0	0	-

Low concentrations of inorganic contaminants were generally found across the three phases of the site investigation.

Elevated concentrations of lead against the C4ULs applied for a residential (without home grown produce) end use scenario were identified within BHA/1.0 m bgl and WSF/0.5 m bgl.

A suite of organic analysis was undertaken comprising Polycyclic Aromatic Hydrocarbons (PAHs) and Total Petroleum Hydrocarbons (TPH), the results of which are summarised in Table 7-3 below.

Table 7-3 – Summary of PAH Testing

Test	Assessment Criteria (mg/kg)	2015 Contaminant Range	2016 Contaminant Range	2019 Contaminant Range	No. Exceedances		
					2015	2016	2019
Naphthalene	2.3	<0.005 – 0.27	ND	<0.01 – 0.47	0	0	0
Acenaphthylene	2,900	<0.09 – 0.18	ND	<0.01 – 0.38	0	0	0
Acenaphthene	2,900	<0.09 – 0.22	ND	<0.01 – 0.36	0	0	0
Fluorene	2,800	<0.09 – 0.41	<0.10 – 0.40	<0.01 – 0.57	0	0	0
Phenanthrene	1,300	<0.09 – 3.67	<0.10 – 0.20	<0.01 – 4.0	0	0	0
Anthracene	31,000	<0.09 – 0.18	<0.10 – 0.10	<0.01 – 1.2	0	0	0
Fluoranthene	1,500	<0.09 – 6.65	<0.10 – 0.40	<0.01 – 6.1	0	0	0
Pyrene	3,700	<0.09 – 3.67	<0.10 – 0.40	<0.01 – 5.6	0	0	0
Benzo(a)anthracene	3.2	<0.09 – 2.36	ND	<0.01 – 3.2	0	0	0
Chrysene	30	<0.09 – 2.45	ND	<0.01 – 2.8	0	0	0
Benzo(b)fluoranthene	3.9	<0.09 – 2.95	ND	<0.01 – 4.0	0	0	1 (BHA/1.0 m bgl)
Benzo(k)fluoranthene	110	<0.09 – 1.03	ND	<0.01 – 1.2	0	0	0
Benzo(a)pyrene	3.2	<0.09 – 1.72	ND	<0.01 – 2.2	0	0	0
Indeno(1,2,3-c,d)pyrene	45	<0.09 – 1.79	ND	<0.01 – 2.6	0	0	0
Dibenzo(a,h)anthracene	0.31	<0.09 – 0.40	ND	<0.01 – 0.22	1 (WS1/0.40m bgl)	0	0
Benzo(g,h,i)perylene	360	<0.09 – 1.61	ND	<0.01 - 2.1	0	0	0

A suite of organic analysis was also undertaken, the results of this analysis is summarised in Table 7-4.

Marginally elevated concentrations of benzo(b)fluoranthene & dibenzo(a,h)anthracene against the S4ULs applied for a residential (without home grown produce) end use scenario were identified within BHA/1.0 m bgl and WS1/0.4 m bgl.

Table 7-4 – Summary of TPH Testing

Test	Assessment Criteria (mg/kg)	2015 Contaminant Range	2016 Contaminant Range	2019 Contaminant Range	No. Exceedances		
					2015	2016	2019
TPH (C5 – C6 aliphatic)	42	-	<0.01 – 0.12	ND	-	0	0
TPH (C6 – C8 aliphatic)	100	-	<0.01 – 0.47	ND		0	0
TPH (C7 – C8 aliphatic)	-	<0.2 – 0.4	-	-	0	-	-
TPH (C8 – C10 aliphatic)	27	<0.2 – 220	<0.01 – 0.46	<0.01 – 8.9	1 (BH1/4.50m bgl)	0	0
TPH (C10 – C12 aliphatic)	130	<4 - 1,240	<1.5 – 56	<0.01 – 28.0	1 (BH1/4.50m bgl)	0	0
TPH (C12 – C16 aliphatic)	1100	<4 – 4,310	<1.2 – 220	<0.01 – 71	0	0	0
TPH (C16 – C21 aliphatic)	65,000	<4 - 3970	<1.5 – 160	<0.01 – 61	0	0	0
TPH (C21 – C35 aliphatic)	65,000	<10.71 - 1100	<3.4 – 180	<0.01 – 330	0	0	0
TPH (C35 – C44 aliphatic)	65,000	-	-	<0.01 – 230	-	-	0
Total aliphatic (C5 – C35)	-	-	<10 – 470	-	-		
TPH (EC5 – EC7 aromatic)	370	ND	ND	ND	-	0	0
TPH (EC7 – EC8 aromatic)	860	ND	ND	ND	-	0	0
TPH (EC8 – EC10 aromatic)	47	ND	<0.01 – 0.31	<0.01 -8.6	-	0	0
TPH (EC10 – EC12 aromatic)	250	<4 – 350	<0.9 – 27	<0.01 – 6.0	2 (BH1/4.5 & WS4/4.8m bgl)	0	0
TPH (EC12 – EC16 aromatic)	1,800	<4 – 2,500	<0.5 – 150	<0.01 – 27.	2 (BH1/4.5 & WS4/4.8m bgl)	0	0
TPH (EC16 – EC21 aromatic)	1,900	<4 - 2921	<0.6 – 140	<0.01 – 34.	1 (BH1/4.50m bgl)	0	0
TPH (EC21 – EC35 aromatic)	1,900	<9.35 - 842	<1.4 – 120	<0.01 – 750.	0	0	0
TPH (EC35 – EC44 aromatic)	1100	-	-	<0.01 – 430.	-	0	0

Elevated concentrations of TPH CWG fractions against the S4ULs applied for a residential (without home grown produce) end use scenario were identified within borehole BH1. However, due to the depth its encountered (4.5m bgl), the elevated concentrations are unlikely to be accessible or to pose a risk to end users of the proposed development. The risks posing potential of the contaminants was assessed by monitoring and vapour risk assessments.

Semi-Volatile and Volatile Organic Compounds

A total of 49 No. SVOC and VOC tests were undertaken on a range of Made Ground, Taplow Gravel Member and structureless chalk spread across the site, the results of which can be seen in Table 7-5 below. Apart from a 1,2,4-trimethylbenzene concentration found in BH102A at a depth of 4.5 m bgl, no concentrations above the relevant assessment criteria have been identified.

Table 7-5 – Summary of VOC Testing

Test	Assessment Criteria (mg/kg)	2015 Contaminant Range	2016 Contaminant Range	2019 Contaminant Range	No. Exceedances		
					2015	2016	2019
m & p-Xylene	82	<0.011 – 0.182	ND	<0.20 – 0.52	0	0	0
o-Xylene	88	<0.011 – 0.187	<0.01 – 0.02	<0.20 – 0.24	0	0	0
Isopropylbenzene	40	<0.001 – 0.106	>0.01 – 0.10	ND	0	0	0
Tert-butylbenzene	-	<0.001 – 0.078	<0.01 – 0.02	ND	0	0	0
1,2,4-trimethylbenzene	0.41	<0.001 – 0.32	<0.01 – 0.44	ND	0	1 (BH102A / 4.50 m bgl)	0
1,2,3-trichlorobenzene	-	-	<0.01 – 0.01	ND	0	0	0
sec-butylbenzene	-	<0.001 – 0.25	<0.01 – 0.05	ND	0	0	0
n-butylbenzene	-	<0.001 – 0.55	<0.01 – 0.1	ND	0	0	0
Hexachlorobutadiene	-	<0.01 – 0.01	ND	ND	0	0	0
Trans 1,2-Dichloroethene	0.12	ND	ND	<0.20 – 0.23	0	0	1 (WSF/0.50 m bgl)
Ethylbenzene	83	<0.011 – 0.064	ND	ND	0	0	0
Toluene	130	ND	ND	<0.20 – 0.88	0	0	0
1,3,5-Trimethylbenzene	NG	<0.001 – 0.006	<0.01 – 0.02	<0.20 – 0.22	0	0	0
Tetrachloroethene	0.18	<0.003 – 0.18	ND	ND	0 (WS9/1.50 m bgl on threshold)	0	0
Trichloroethene	0.017	<0.001 – 0.299	ND	ND	1 (WS9/1.50 m bgl)	0	0

Elevated concentrations of 1,2,4-trimethylbenzene, Trans 1,2-Dichloroethene and trichloroethene against human health risk assessment criteria for the residential (without home grown produce) end use scenario were identified within BH102A/4.50 m bgl, WSF/0.50 m bgl and WS9/1.50 m bgl. However, prime risks of the contaminants are associated with the potential vapour pathway. The risks posing potential of the contaminants was assessed by monitoring and vapour risk assessments.

Table 7-6 – Summary of SVOC Testing

Test	Assessment Criteria (mg/kg)	2015 Contaminant Range	2016 Contaminant Range	2019 Contaminant Range	No. Exceedances		
					2015	2016	2019
Bis(2-ethylhexyl)phthalate	NG	ND	<0.01 – 0.2	ND	-	-	-
2-Nitroaniline	NG	ND	ND	<0.05 – 0.16	-	-	-
2,6-Dinitrotoluene	NG	ND	ND	<0.05 – 0.39	-	-	-
3-Nitroaniline	NG	ND	ND	<0.05 – 0.14	-	-	-
2,4-Dinitrotoluene	NG	ND	ND	<0.05 – 0.67	-	-	-
4-Nitroaniline	NG	ND	ND	<0.05 – 0.49	-	-	-
Pentachlorophenol	NG	ND	ND	<0.05 – 2.1	-	-	-
Carbazole	NG	ND	ND	<0.05 – 0.079	-	-	-
Di-N-Butyl Phthalate	NG	ND	ND	<0.05 – 3.0	-	-	-
Butylbenzyl Phthalate	NG	ND	ND	<0.05 – 2.0	-	-	-
Di-N-Octyl Phthalate	NG	ND	ND	<0.05 – 2.1	-	-	-

7.5 Asbestos Containing Materials (ACM) in Soils – Risks to Human Health

Asbestos was not visually identified in the exploratory holes throughout the three phases of site investigation, however, the presence of a 'tile' fragment was recorded in two exploratory holes (BH101 & TP101) during the earlier [Fairhurst (2016)] ground investigation. **Table 7-7** beneath identifies the exploratory hole comments, testing undertaken and results.

Table 7-7 – Asbestos observations and testing undertaken

Exploratory hole location	Log observations	Testing undertaken	Asbestos results	Remarks
BH101	Tile encountered between 0.25 – 0.7m bgl	0.5m	'Small bundle of chrysotile fibres' <0.001% w/w	
BH102	None recorded	0.3m	Not detected	
BH103	None recorded	0.5m	Not detected	
TP101	Tile encountered between 0.0 – 0.2 & 0.2 – 0.7m bgl	0.4m	Not detected	No environmental sample collected between 0.0 and 0.2m for testing.
TP102	Tile encountered between 0.3 – 0.6m bgl	0.4m	Not detected	
TP103	Tile encountered between 0.2 – 0.6m bgl	0.4m	'Small bundle of chrysotile fibres' <0.001% w/w	
WS101	Tile encountered between 0.2 – 0.5m bgl	0.3	Not detected	
WS103	None recorded	0.3m	Not detected	
WS103B	Tile encountered between 0.2 – 1.1m bgl	0.3m	Not detected	
WS104A	None recorded	0.4m	Not detected	
WS106 / WS106A	Tile encountered between 0.0 – 0.2 & 0.2 – 1.3 / 0.0 – 0.3 & 0.3 – 0.9m bgl	0.3m (WS106)	Not detected	Asbestos scheduled on only one sample as outside of the site boundary.

7.6 Controlled Waters Risk Assessment

The controlled waters risk assessment was undertaken through soil-leachate analysis and groundwater samples throughout the three phases of ground investigation. Testing was undertaken in current and historic serviceable boreholes based on a lateral site spread and within a range of geologies. Table 7-8 below provides a summary of the chemical analysis completed on the water and leachate samples collected at the site.

7.7 Summary of Groundwater and Leachate Analytical Laboratory Testing Undertaken

Table 7-8 – Summary of Geo-environmental Testing (groundwater)

Geo-environmental Test	2015 No. Analysed	2016 No. Analysed	2019 No. Analysed
Monitored natural attenuation (MNA) indicators / electron acceptors (i.e. Nitrate, manganese, Iron, sulphate)	-	-	11
Metals and inorganics suite (including Hardness, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn, Se, Cyanide (total) and pH)	10	11	8
TPH (CWG) incl. BTEX	10	11	11
Spectated PAH (USEPA 16)	10	11	19
Volatile Organic Compound	10	11	7
Semi Volatile Organic Compound	3	11	10

Table 7-8 – Summary of Geo-environmental Testing (leachate)

Geo-environmental Test	2015 No. Analysed	2016 No. Analysed	2019 No. Analysed
Metals and inorganics suite (including As, Cd, Cr, Cu, Pb, Hg, Ni, Zn & Se)	4	3	-
TPH (CWG) incl. BTEX	-	3	-
Spectated PAH (USEPA 16)	3	3	-

7.8 Assessment Criteria and Approach – Risks to Controlled Waters

The controlled waters risk assessment was conducted in accordance with the principles of EA 'Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination' 2006 (RTM) and on the 'prevent and limit' approach of the Water Framework Directive (2000/60/EC).

Based on the desk study and previous phase of assessment, the following potential Controlled Water receptors have been identified:

- The Principal Aquifer (Seaford & Newhaven Chalk Formation) below the site.

(Note: with groundwater to be below 4.5 – 5.5 meters below site levels, the Taplow Gravel Formation Secondary A aquifer is generally situated above the groundwater table).

With the Principal Aquifer being used for the supply of potable water, the following assessment criteria have been applied in order of preference:

- Drinking Water Standards (DWS), The Water Supply (Water Quality) Regulations 2001;
- EU Drinking Water Directive (Council Directive 98/83/EC, November 1998); and
- Water frameworks directive (2015 WFD Directions - Schedule 3 Part 3);
- World Health Organisation, Guidelines for Drinking Water Quality, edition 4, 2011.

Potential risks from petroleum hydrocarbons in the water environment has been assessed based on the petroleum products in drinking-water background document for the development of WHO guidelines for drinking water quality summarised in the CL:AIRE petroleum hydrocarbon in groundwater guidance².

The following section has been sub-divided to consider inorganic and organic determinands within the groundwater analysis suite and provides a Generic Quantitative Risk Assessment (GQRA) of the associated results based on comparison to the assessment criteria outlined above.

A screening sheet / summary of chemical results compared against the relevant water quality standards (WQS) is presented as part of Appendix E.

When compared to the above WQS, then, with respect to the test results from the most recent (2019) site investigation, the following exceedances are noted in recovered groundwater samples as detailed below.

Inorganics (groundwater)

Table 7-9 – Groundwater WQS Exceedances of Inorganic Determinands

Determinand	WQS Value (µg/l)	Max Conc. (µg/l)	Samples > WQS
Manganese	50	240	WS101 (100 µg/l), BHE (88 µg/l), BH101 (240 µg/l)
Iron	200	380	BHC (280 µg/l), BHB (260 µg/l), WS1 (330 µg/l), BHA (270 µg/l), WS101 (320 µg/l), WS103B (510 µg/l), BH1 (390 µg/l)

The determinands manganese and iron listed in Table 7 – 9 among others have been scheduled as known electron acceptors that are involved in the degradation of organic contaminants. The presence of exceedances of these determinands could be a side effect of biodegradation of organic contaminants taking place. [This is as under reducing conditions, where as part of the breakdown process of organic contaminants, certain bacteria reduce for example iron(III) to the more soluble [iron(II)] form.

At a small number of occasions, previous (2015 & 2016) site investigation phases also found marginally elevated concentration of heavy metals (i.e. chromium and zinc). However, these initially high levels are likely to be the result of insufficient standpipe development / purging, resulting in the presence of suspended solids that might have been responsible for these concentrations being elevated. As part of subsequent monitoring rounds, groundwater samples from monitoring standpipes would have gradually become clearer (i.e. containing lower concentrations of suspended solids), resulting in lower levels of heavy metal concentrations being found.

Based on the results, inorganic contaminant concentrations within the groundwater beneath the site are not considered to pose a significant risk to Controlled Waters or render the site unsuitable for the intended use.

² CL:AIRE. 2017. Petroleum Hydrocarbons in Groundwater. Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies. CL:AIRE. London.

Organic contaminants (groundwater)

Aliphatic and aromatic (TPH CWG) petroleum hydrocarbon bands

Table 7-10 – Groundwater WQS Exceedances of TPH CWG Petroleum Hydrocarbon Bands

Determinand	WQS Value (µg/l)	Max Conc. (µg/l)	Samples > WQS
<i>Aliphatic hydrocarbons</i>			
Aliphatic C8-C10	300	1,200 (5,500*)	WS101 (360 µg/l), BHE (1,200 µg/l), BH1 (5,500 µg/l)*
Aliphatic C10-C12	300	5,300 (35,000*)	WS103B (570 µg/l), BHD1 (1,700 µg/l), WS101 (3,600 µg/l), BHE (5,300 µg/l), BH1 (35,000 µg/l)*
Aliphatic C12-C16	300	15,000 (110,000*)	WS103B (2,500 µg/l), BHD1 (5,500 µg/l), WS101 (15,000 µg/l), BHE (15,000 µg/l), BH1 (110,000 µg/l)*
<i>Aromatic hydrocarbons</i>			
Aromatic EC10-EC12	90	580 (4,800*)	WS103B (250 µg/l), BHD1 (370 µg/l), WS101 (570 µg/l), BHE (580 µg/l), BH1 (4,800 µg/l)*
Aromatic EC12-EC16	90	4,300 (50,000*)	BHB (290 µg/l), WS103B (1,400 µg/l), BHD1 (2,200 µg/l), WS101 (2,700 µg/l), BHE (4,300 µg/l), BH1 (50,000 µg/l)*
Aromatic EC16-EC21	90	3,600 (27,000*)	WS103B (940 µg/l), BHD1 (2,100 µg/l), WS101 (3,600 µg/l), BHE (3,100 µg/l), BH1 (27,000 µg/l)*
Aromatic EC21-EC35	90	840 (4,900*)	BHB (840 µg/l), WS103B (130 µg/l), BHD1 (470 µg/l), WS101 (620 µg/l), BHE (550 µg/l), BH1 (4,900 µg/l)*

*Concentration found in BH1

Exceedances of WHO guideline values for TPH CWG fractions in drinking water summarised in Table 7 – 10 indicates a potential risk to controlled waters. However, these guideline values were generally determined based on either taste & odour or using the lowest water quality standard of substances that could be present in the respective hydrocarbon band³. The CL:AIRE petroleum hydrocarbon in groundwater guidance⁴ has made recommendations on the use of constituents of potential concern (CoPC) for respective TPH CWG fractions but also on their relative mobility in groundwater as summarised in Table 7 – 11.

The potential for the above concentrations of petroleum hydrocarbons fractions is therefore further discussed in combination with CoPC that can be found amongst polycyclic aromatic hydrocarbon (PAH), volatile (VOC) and semi-volatile organic compounds (SVOC). Of relevance for the assessment and selection of CoPC is also the fact that the nature of the contamination was identified as 'diesel'.

³ World Health Organization (WHO), 2008. Petroleum products in drinking-water. Background document for development of WHO guidelines for drinking water quality. WHO/SDE/WSH/05.08/123. World Health Organization, Geneva.

⁴ CL:AIRE. 2017. Petroleum Hydrocarbons in Groundwater. Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies. CL:AIRE. London.

Table 7-11 – CoPC and mobility ranking of petroleum hydrocarbons fractions

Determinand	CoPC	Overall relative mobility in groundwater
<i>Aliphatic hydrocarbons</i>		
Aliphatic C8-C10	n-octane, n-nonane	low
Aliphatic C10-C12		low
Aliphatic C12-C16		very low
<i>Aromatic hydrocarbons</i>		
Aromatic EC10-C12	naphthalene	moderate
Aromatic EC12-C16	2-methylnaphthalene, acenaphthylene, acenaphthene	moderate
Aromatic EC16-C21	fluorene, anthracene, phenanthrene, pyrene	low
Aromatic EC21-C35	benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[ghi]perylene, indeno[1,2,3cd]pyrene	very low

Polycyclic aromatic hydrocarbons (PAH) (groundwater)

As part of the most recent (2019) site investigation, concentrations of PAHs were invariably found below detection limits (<0.1 µg/l).

Previous and in particular the 2016 site investigation found these concentrations of PAHs to be significantly higher. However, these high levels are likely to be the result of insufficient standpipe development / purging, resulting in the presence of suspended solids that might have been responsible for these concentrations being elevated. As part of the 2019 site investigation, prior to the sampling from standpipes in new boreholes (i.e. BHA, BHB, BHC, BHD1, BHE & BHF) emphasis was given on the importance of borehole 'development' by means of 'purging'. (For protocols, documenting the procedure and findings made during the purging standpipes, reference is also being made the Dunelm factual report contained as Appendix B).

Other (non-PAH) semi-volatile (SVOC) and volatile organic compounds (VOC) in groundwater

Concentrations of non-PAH SVOC that during the recent (2019) site investigation have been found above detection limits and/or above water quality standards (WQS) are summarised in Table 7 – 12 below.

Table 7-12 – SVOC groundwater WQS Exceedances & concentrations above detection limits

Determinand	WQS Value (µg/l)	Max Conc. (µg/l)	Sample(s) > detection limit	Sample(s) > WQS
1,2,4-Trichlorobenzene	0.4	1.1	BHE (1.1 µg/l)	BHE (1.1 µg/l)
2,4-Dichlorophenol	4.2	2.1	BHE (2.1 µg/l)	-
2,4-Dimethylphenol	-	8.2	WS101 (2.0 µg/l), BHE (2.4 µg/l), BH1 (8.2 µg/l)	-
2,6-Dinitrotoluene	-	4.0	BHD1 (4.0 µg/l)	-
2-Chloronaphthalene	-	1.8	BH1 (1.8 µg/l)	-
2-Methyl-4,6-Dinitrophenol	-	130	BHE (130 µg/l), BHD1 (71 µg/l)	-
2-Methylnaphthalene	- (140)	33	BH1 (33 µg/l), WS103B (5.1 µg/l), BHE (1.7 µg/l)	-
2-Nitrophenol	-	18	BH1 (18 µg/l), BHE (8.5 µg/l), WS101 (2.0 µg/l), BHD1 (1.5 µg/l)	-
3-Nitroaniline	-	14	BHE (14 µg/l), BHD1 (71 µg/l)	-

4-Chloroaniline	-		BH101 (2 µg/l), WS2A (1.7 µg/l)	-
Bis-(2-Chloroethyl)Ether	-		BH1 (6.7 µg/l), WS101 (0.53 µg/l)	-
Bis(2-Chloroisopropyl) Ether	-		BHE (0.97 µg/l)	-
Hexachlorobutadiene	0.6		BH1 (38 µg/l)	BH1 (38 µg/l)
Hexachloroethane	-	180	BH1 (180 µg/l), BHD1 (30 µg/l), BHE (1.3 µg/l)	-
Isophorone	-	18	BH1 (18 µg/l), BHE (10 µg/l), BHD1 (1.7 µg/l)	-
Nitrobenzene	-	11	BHE (11 µg/l)	-
Phenol	7.7	4.9	BH1 (4.9 µg/l), WS101 (0.86 µg/l)	-

- No WQS available or no exceedance
- () No WQS available; however, a TDI_{oral} of 4 µg/kg/day⁵ in combination with a water consumption of 2 litres and a body weight of 70 kg⁶ would suggest a drinking water WQS of 140 µg/l.

Concentrations of acenaphthene and naphthalene of concentration of up to 19 µg/l and 3.4 µg/l respectively were found as part of the SVOC analysis. The latter is in excess of the 2015 WFD Directions - Schedule 3 Part 3 water frameworks directive WQS of 2 µg/l. However, these results are inconsistent with the results from the more site specific (and therefore more accurate) 'EPA 16 PAH' analysis undertaken, which indicated concentrations of all '16 PAH's' to below detection limits of <0.1 µg/l.

When compared to the above water quality standards, then, exceedances are associated with respective hexachlorobutadiene and 1,2,4-trichlorobenzene concentrations of 38 µg/l and 1.1 µg/l.

These concentrations compare to '2015 WFD Directions - Schedule 3 Part 3 water frameworks directive WQS' of 0.6 µg/l and 0.4 µg/l and were found in the respective monitoring locations BH1 and BHE. However, based on the following facts, the plausibility of the result is questionable:

- The analysis of the determinands hexachlorobutadiene and 1,2,4-trichlorobenzene was also being undertaken as part of the volatile organic compound (VOC) testing suite. In the case of hexachlorobutadiene, the same (BH1) sample was also analysed for hexachlorobutadiene as part of the VOC suite. However, testing as part of the VOC testing suite revealed a hexachlorobutadiene below the detection limit of <1 µg/l.
- The determinands hexachlorobutadiene and 1,2,4-trichlorobenzene were not found in any other groundwater samples taken from different locations across the site; although, in one instance, a sample taken from borehole BH101 at a depth of 0.5 m bgl as part of the Fairhurst 2016 site investigation revealed a hexachlorobutadiene concentrations of 0.01 mg/kg, just above the detection limit of <0.01 mg/kg.

In addition, with reference to the CL:AIRE petroleum hydrocarbon in groundwater guidance for diesel and domestic heating oil, the contaminant '2-methylnaphthalene' is a recommended 'constituent of potential concern' (CoPC). No WQS appears to be available for this contaminant. However, a TDI_{oral}

⁵ CL:AIRE. 2010. Soil Generic Assessment Criteria for Human Health Risk Assessment. January 2010. CL:AIRE. London.

⁶ Environment Agency. 2009. Human health toxicological assessment of contaminants in soil. Science Report – Final SC050021/SR2. Environment Agency. Bristol.

of 4 µg/kg/day⁷, in combination with a water consumption of 2 litres and a body weight of 70 kg⁸ would suggest a drinking water WQS of 140 µg/l. The maximum '2-methylnaphthalene' concentration of 33 µg/l that was found in BH1 would fall below this value; although, the 33 µg/l concentration would be approximately equal to a New Jersey WQS of 30 µg/l⁹. The difference between the 140 µg/l and the 30 µg/l value lies in the adoption of a factor of 0.2 for the 'relative source contribution from drinking water' adopted by the New Jersey WQS.

As part of the recent (2019) site investigation, a volatile organic compound (VOC) that was found above detection limits in one instance only was tetrachloroethene. This contaminant was found in WS1 at a concentration of 5.1 µg/l, a concentration below the WQS of 10 µg/l.

Inorganic and organic contaminants in leachate

Leachate testing was not undertaken as part of the recent (2019) site investigation. However, as part of the Fairhurst 2016 and the CBRE 2015 site investigations combined, a total of nine samples between depths of 0.3 and 1.5 meters below ground levels were taken. The summary of the test results is provided in the form of the below Table 7-13.

Table 7-13 – Summary of WQS standard exceedances

Test	WQS Value (mg/l)	2015 Contaminant Range	2016 Contaminant Range	No. Exceedances	
				2015	2016
Heavy metals					
Lead	10	<1 - 85	0.83 – 7.6	1 (WS5/0.7 m bgl)	-
Arsenic	10	<1 - 17	1.6 – 4.4	1 (WS9/1.5 m bgl)	-
Test	WQS Value (µg/l)				
Polycyclic aromatic hydrocarbons (PAH)					
Naphthalene	2	0.69 - 83	<0.01 - <0.01	2 (WS1/0.4 m bgl & WS3/0.5 m bgl)	-
Anthracene	0.1	0.83 - 12	<0.01 - <0.01	3 (WS1/0.4 m bgl, WS3/0.5 m bgl & WS9/0.3 m bgl)	-
Fluoranthene	0.0063	1.1 - 19	<0.01 - <0.01	3 (WS1/0.4 m bgl, WS3/0.5 m bgl & WS9/0.3 m bgl)	-
Benzo[a]pyrene	0.01	0.02 – 0.7	<0.01 - <0.01	3 (WS1/0.4 m bgl, WS3/0.5 m bgl & WS9/0.3 m bgl)	-
Benzo[b]fluoranthene	0.1	0.05 – 1.2	<0.01 - <0.01	3 (WS1/0.4 m bgl, WS3/0.5 m bgl & WS9/0.3 m bgl)	-
Benzo[k]fluoranthene		0.02 - 0.6	<0.01 - <0.01		
Indeno(1,2,3-c,d)Pyrene		0.02 - 0.6	<0.01 - <0.01		
Benzo[g,h,i]perylene		<0.01 – 0.5	<0.01 - <0.01		

In five samples taken from window sampling holes WS1, WS3, WS5 and WS9 from depths between depths of 0.3 and 1.5 m bgl, concentrations of heavy metal (i.e. lead and arsenic) and/or PAHs were found below their respective WQS adopted.

⁷ CL:AIRE. 2010. Soil Generic Assessment Criteria for Human Health Risk Assessment. January 2010. CL:AIRE. London.

⁸ Environment Agency. 2009. Human health toxicological assessment of contaminants in soil. Science Report – Final SC050021/SR2. Environment Agency. Bristol.

⁹ New Jersey Department of Environmental Protection. 2008. Ground Water Quality Standard for 2-methylnaphthalene [online] <https://www.state.nj.us/dep/wms/bears/docs/2-methylnaphthalene.pdf>

At the depths encountered, PAH contaminant concentrations in soil have generally been found at low concentrations. The absence of PAH in soil at these shallow depths renders the potential for leachable PAH to be a widespread problem across the site to be unlikely.

Concentrations of TPH CWG fractions found in leachate analysed as part of the Fairhurst 2016 site investigation were found at or close to detection limits. In fact, little evidence by means or observations and/or soil test results on the presence of petroleum hydrocarbons could be found in shallow soils. Elevated concentrations of petroleum hydrocarbons in soil were generally found at depths of approximately 4.5 m bgl.

Monitored natural attenuation indicators in groundwater

Electron acceptors, in order of preference for utilisation by microbes when breaking down organic contaminants, include oxygen, nitrate, manganese (IV), iron (III), sulphate and carbon dioxide. As part of the recent (2019) site investigation, these monitored natural attenuation (MNA) indicators have been analysed and can also be compared with redox measurements taken.

Monitoring found redox values within a range of approximately 140 and 360 mV, indicating degradation to generally occur under aerobic conditions¹⁰. Although, oxygen reduction rates are not prevalent to an extent, where 'reducing' conditions exist, in some areas oxygen depletion and can be observed and the depletion correlates to redox values. Some correlation between the oxygen depletion / reduced redox values and maximum concentrations of TPH CWG fractions can also be found, indicating the bulk of petroleum hydrocarbon contamination (see above Table 7 – 10) to be present in and around the area of BH1 but in and around north-eastern parts of the site. (*For the concentrations of aromatic EC12 – EC16 see also Figure 7 – 2 below*).

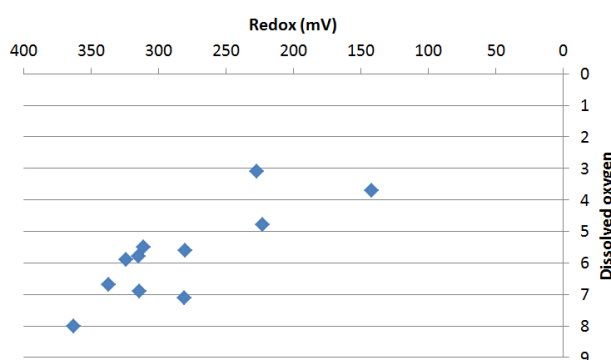


Figure 7-1 – Redox vs dissolved oxygen found as part of the most recent monitoring event

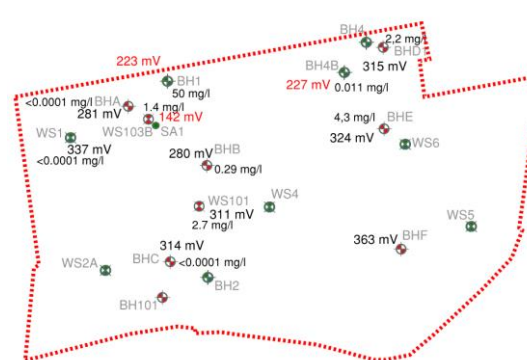


Figure 7-2 – Redox values

Discussion on risks to controlled waters

Groundwater contaminant data and observations have revealed elevated concentrations of petroleum hydrocarbons in groundwater.

Due to its 'moderate'¹¹ mobility and the extent to which concentrations have been found to exceed the respective WQS, the highest risk posing potential appears to be associated with petroleum hydrocarbon falling into the 'aromatic EC12-EC16' band.

¹⁰ Environment Agency. 2000. Guidance on the Assessment and Monitoring of Natural Attenuation of Contaminants in Groundwater. R7D Publication 95. Environment Agency.

¹¹ CL:AIRE. 2017. Petroleum Hydrocarbons in Groundwater. Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies. CL:AIRE. London.

However, guideline values for TPH CWG petroleum hydrocarbon fractions were generally determined on either taste & odour or using the lowest water quality standard of substances that could be present in the respective hydrocarbon band.

The CL:AIRE petroleum hydrocarbon in groundwater guidance has made recommendations on the use of constituents of potential concern (CoPC) for respective TPH CWG fractions. For the 'aromatic EC12-EC16' fraction, the CL:AIRE petroleum hydrocarbon in groundwater guidance recommends the use of 2-methylnaphthalene, acenaphthylene, acenaphthene as CoPC.

However, based on the data from the most recent (2019) monitoring events, neither these nor other contaminants of the SVOC suite were found to be significantly elevated. Notwithstanding this, additional compounds not covered by the SVOC suite are likely to be present. Therefore, especially the risk posing potential for the 50,000 µg/l concentration of the 'aromatic EC12-EC16' petroleum hydrocarbon fractions cannot be discounted.

However, data and information obtained from approximately thirty (30) exploratory holes advanced as part of three phases of ground investigations (see Figure 7 – 3) did not reveal petroleum hydrocarbon contamination to be present at shallow depths (<4.5 m bgl). Instead, petroleum hydrocarbon contamination was invariably observed at depths near the groundwater table or beyond. As such, the point of origin of the contamination having entered the groundwater Chalk principal aquifer could not be identified.

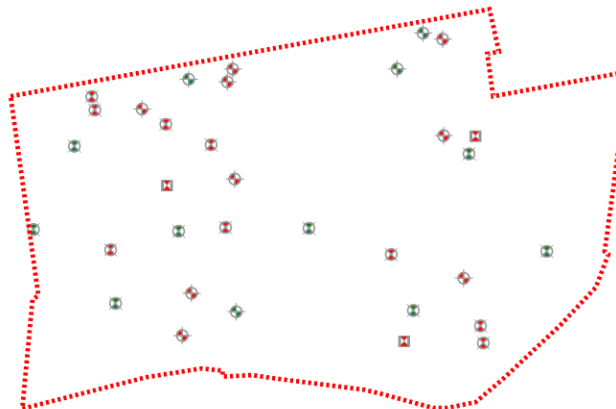


Figure 7-3: Exploratory holes advanced over three phases of site investigations

In addition, over the three site investigation phases, concentrations, including the 'aromatic EC12-EC16' fraction results have been extremely variable. In general as illustrated in Figure 7-4, concentrations of the 'aromatic EC12-EC16' fraction decreased. This is with the exception of concentration found in a sample from BH1. Here, the levels increased from a concentration near the WQS for this hydrocarbon fraction (90 µg/l) to the aforementioned value of 50,000 µg/l.

Whilst the exact cause is not certain, it is possible that the maximum concentrations and their variation is caused by hydrocarbon contamination with a free phase source element in the areas of BH1, WS101 and WS103B and possibly also BHE. The latter is a monitoring point that was installed as part of the recent (2019) site investigation. Here, the second highest concentration of the 'aromatic EC12-EC16' fraction (4,300 µg/l) was found.

However, the variability and spatial distribution of maximum concentrations would indicate the source terms to be present at diffuse locations across the site with preferential pathways and migratory patterns being associated with the groundwater flow direction but also the locations and orientation of fractures within the Chalk Principal aquifer underneath the site.

In addition, the composition of the petroleum hydrocarbons contamination with easily degradable petroleum hydrocarbon fractions largely being absent would suggest the source that was identified as 'weathered diesel' to be historic and possibly a result of on or off-site free product release that probably has occurred several decades ago.

Conclusions relating to the above are detailed in Section 8.0.

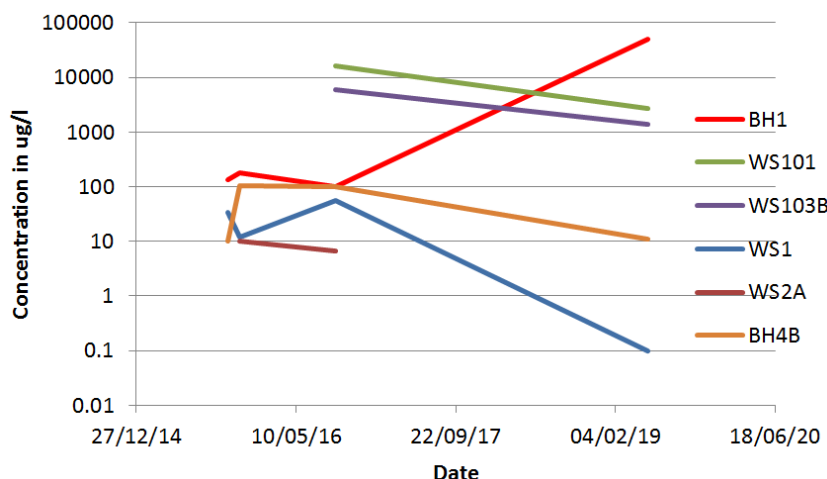


Figure 7-4: 'Aromatic EC12-EC16' fraction results over the three phases of site investigations

Outline DQRA for aromatic EC12 – EC16 fraction

Outline calculations to assess the potential distance for concentrations of the EC12 – EC16 fraction to migrate into hydraulic downgradient directions – *the range of directions of groundwater flow is assumed to range between north-north-easterly (NNE) and east-north-easterly (ENE) directions* – from the site are included as Appendix G.

The outline calculation indicate that concentrations of the EC12 – EC16 fraction would have the potential to result in exceedances of the respective 90 µg/l WHO guideline value for drinking water over 100 – 200 meter distances from the site.

Although, it should be mentioned the result is sensitive to parameters such as the initial concentration (2,000 µg/l), the hydraulic conductivity (3.25 m/d), the hydraulic gradient (1/1000) and in particular the half-life time (200 days) that was assumed.

Whilst this would be in excess of the 50 meters default compliance point distance for hazardous substances in accordance with the 'land contamination groundwater compliance points for quantitative risk assessments guidance', constituents of potential concern (CoPC) that would be typical for the nature of the contamination (diesel) have not been found elevated and no on-site entry point for the entry of contaminants into the groundwater has been identified.

Notwithstanding this, although the picture is not unambiguous, test results but also indicators (e.g. sulphur odours observed during sampling) noticed during monitoring suggest an area with higher concentrations around monitoring points BH1, WS103B and WS101.

7.9 Ground Gas & Vapour Risk Assessment

During the Fairhurst 2019 Ground Investigation, five rounds of gas monitoring were undertaken on the 05/02/2019, 11/02/2019, 12/03/2019, 25/03/2019 & 07/05/2019. The ground gas risk assessment has been undertaken in accordance with CIRIA C665 and BS8485:2015. The results are summarised in Table 7.14 below.

Table 7-14 – Results from the ground-gas and vapour monitoring

Borehole	Min Oxygen (% vol)	Max Carbon Dioxide (% vol)	Max Carbon Monoxide (ppm)	Max Methane (% vol)	Max Gas Flow (l/hr)	Max PID* (ppm)	CH ₄ BGVF (l/hr)	CO ₂ BGVF (l/hr)
BH1	15.1	2.3	<1	<0.1	<0.1	<1	<0.0001	<0.0023
BH2	9.9	2.0	<1	<0.1	0.1	<1	<0.0001	0.002
BH4B	14.1	2.7	1	<0.1	0.1	<1	<0.0001	0.0027
BH101	19.4	0.5	1	<0.1	0.1	<1	<0.0001	0.0005
BH102A	16.7	1.0	1	<0.1	0.1	<1	<0.0001	0.001
WS1	13.5	3.0	<1	<0.1	<0.1	<1	<0.0001	<0.003
WS2A	9.7	1.4	<1	<0.1	<0.1	<1	<0.0001	<0.0014
WS4	9.1	4.3	9	<0.1	<0.1	<1	<0.0001	<0.0043
WS5	13.0	2.1	<1	<0.1	<0.1	<1	<0.0001	<0.0021
WS6	13.7	3.2	1	<0.1	0.10	<1	<0.0001	0.0032
WS9	8.4	3.4	1	<0.1	<0.1	<1	<0.0001	<0.0034
WS101	18.3	2.3	3	<0.1	0.10	<1	<0.0001	0.0023
WS103	19.4	0.7	1	<0.1	<0.1	<1	<0.0001	<0.0007
WS103B	12.9	2.1	1	<0.1	<0.1	<1	<0.0001	<0.0021
WS106A	19.7	0.8	<1	<0.1	0.10	<1	<0.0001	0.0008
BHA	19.4	1.6	1	<0.1	0.10	<1	<0.0001	0.0016
BHB	19.7	1.0	1	<0.1	<0.1	<1	<0.0001	<0.001
BHC	20.1	0.5	1	<0.1	<0.1	<1	<0.0001	<0.0005
BHD1	9.5	5.4	2	<0.1	<0.1	<1	<0.0001	<0.0054
BHD1 (Shallow)	20.9	0.2	1	<0.1	<0.1	<1	<0.0001	<0.0002
BHE	14.7	1.5	5	<0.1	0.10	<1	<0.0001	0.0015
BHF	16.4	3.1	1	<0.1	0.10	<1	<0.0001	0.0031
BHF (Shallow)	14.8	2.4	2	<0.1	<0.1	<1	<0.0001	<0.0024
WSF	20.4	0.4	<1	<0.1	<0.1	<1	<0.0001	<0.0004

*Whilst during this site investigation PID results were invariably found below detection limits (<1 ppm), the site investigation completed in 2016 found steady PID results of to 35 ppm and 1 ppm in BH1 and WS101 respectively.

No methane above detection limits was noted in all the monitoring rounds.

Using the maximum carbon dioxide value (5.4%) with the maximum flow rate (0.1 l/hr) found in any of the monitoring points, a borehole gas volume (0.0054 l/hr) below the gas screening value for a Characteristic Situation 1 (CS1) of 0.07 l/hr is calculated.

Concentrations recorded are in agreement with the findings of the CBRE ground-gas assessment, which detected a maximum carbon dioxide concentration of 3.9% and maximum flow of 0.2 l/hr and no carbon monoxide, methane or hydrogen sulphide concentrations significantly above detection limits.

Made Ground of variable thickness was encountered across the site (0.20 – 2.90 m). This has been accounted for during the ground-gas monitoring, with the areas of greatest thickness of Made Ground (BHD1) appropriately monitored.

An isolated occurrence of elevated VOCs was recorded in BH1 during the Fairhurst 2016 Ground Investigation (steady concentration of 35 ppm). During the excavation of this location as part of the CBRE ground investigation, maximum PID concentrations recorded in this borehole were 133 ppm, and grey staining and a hydrocarbon odour was noted at the top of the water table, and is considered likely to be the source of elevated concentrations recorded within this borehole during monitoring. The

next highest 'steady result' for VOC was found in WS101. Here, during the Fairhurst 2016 Ground Investigation, a steady result of 1 ppm was found.

In order to aid in the identification of the nature and composition of potential volatiles, vapour samples were taken from BH1 and WS101 and were subjected to analysis. The vapour concentrations that were found have been assessed as detailed in Appendix F¹².

Given this, the low ground-gas concentrations recorded, the lack of any ground-gas source surrounding the site together with the potential risks from vapour that has been assessed low, protection measures to mitigate against the ingress of ground-gas or vapour into the proposed structures are not considered to be required.

7.10 Contamination in Soils – Risks to Drinking Water Supply Pipes

At shallow depths (i.e. maximum depths of drinking water supply pipes) organic contaminants have not been found at elevated concentrations. Therefore, based on current results upgraded drinking water supply pipe materials (such as barrier pipe) may not be required to protect any new drinking water supplies to be installed as part of the development.

However, at this stage, a detailed assessment of risks to water supply pipes has not been undertaken. It is recommended such an assessment is being completed, taking into account the proposed route of water supply pipes together with and advice from the water utility provider.

7.11 Contamination in Soils – Preliminary Waste Assessment

Based on the soil analysis undertaken to date, Made Ground materials from shallow depth, if generated as soil arisings and to be disposed off-site are likely to be classified as non-hazardous and possibly inert in areas.

If impacted by petroleum hydrocarbons, the classification of soil arisings from the depths of approximately 4.5 – 5.5 meters below ground levels (i.e. the depth near the groundwater table) is likely to be different. Here, depending on the concentrations of petroleum hydrocarbons, soil arisings destined to be disposed off-site may be classed as hazardous.

However, the waste classification assessment provided within this report is preliminary and indicative only. The Contractor will be required to undertake a full assessment for any waste arisings in accordance with waste regulations.

7.12 Risk to buried concrete/foundations

The potential for aggressive ground to attack buried concrete is required in the context of Part IIA and the Building Regulations. Concrete specified in accordance with BRE Special Digest 1 (2005) to mitigate these risks is provided in Table 6-2, Section 6.2 of this report.

¹² Groundwater contaminant concentrations have not been compared with generic assessment criteria (GAC) for the assessment of chronic health risks from the inhalation of vapours arising from groundwater (GACgwwap). The respective guidance document (1) states that where groundwater is present at a depth greater than 0.65 m, practitioners may seek to undertake further data collection and/or site-specific assessment, to better represent the actual depth of groundwater/perched water at the site. The assessment of risk from vapours was therefore undertaken using PID results and on the basis of test results of vapour samples analysed.

(1) SoBRA. 2017. Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater. Version 1.0. Society of Brownfield Risk Assessment (SoBRA).

8.0 CONCLUSIONS

8.1 *Ground and Groundwater Conditions*

Ground conditions across the three phases of ground investigation comprised hardstanding from ground level to 0.40m bgl to proven depths of 0.07 – 0.40m bgl overlying Made Ground to proven depths of 0.40 – 3.10m bgl. This was found to overlie the Taplow Gravel Member located within the north-western, north-eastern and south-eastern sections of the site to depths of 1.40 – 4.70m bgl. Soils of the white chalk subgroup were then encountered in exploratory hole locations where they could be advanced to sufficient depths. Structureless chalk was generally recorded at depths of between 36m AOD to 41.70m AOD across the site with structured chalk below these levels to the full depths of drilling to between 11.07m to 1.27m AOD.

The groundwater monitoring indicates a relatively stable groundwater table between 35.89 and 36.52m AOD within the White Chalk Subgroup bedrock.

8.2 *Geotechnical Assessment*

Taking consideration of the proposed development and the findings of the ground investigations, the following geotechnical considerations are noted:

- The engineering advice contained within the report should be reviewed once the final development proposals are confirmed.
- Foundations are recommended to be piled into structured chalk for the proposed structures across the site. Preliminary pile capacities have been presented however these should be refined further at detailed design stage, taking into consideration the proposed loads at each block and site specific ground conditions.
- For proposed piled foundations, a piling risk assessment is recommended due to the potential for localised soil contamination transferring to the chalk aquifer.
- An earthworks strategy, earthworks specification and likely material management plans will need to be prepared, including confirmation of the amount of structural fill below the proposed buildings.
- Numerous obstructions were recorded during the three phases of the ground investigation. Further below ground structures may remain associated with former structures and in un-investigated areas of the site. Detailed design of the foundations will be required following determination of the final engineering levels, development layout and loading conditions, at which time a specialist piling contractor should be consulted. Additionally, it is recommended that the buried structures associated with existing buildings on site (e.g. foundations) are removed as part of the demolition works.
- The anticipated loads from the proposed structures would be required to be transferred to the underlying Chalk Formation and therefore suspended floor slabs are likely to be required. However if unsuitable materials were to be removed as part of, for example, cut and fill operations, ground bearing slabs could be considered bearing into or onto the chalk formations, subject to heave and settlement constraints.
- Although no evidence of solution features were determined during the site investigations, the appointed contractor should be vigilant throughout development, and particularly during piling operations for any variations to anticipated ground conditions.
- Where Made Ground is encountered at road pavement formation levels, a California Bearing Ratio of <2.5% should be assumed and full road capping should be allowed for to mitigate total and differential settlements. This could be varied where natural chalk deposits are encountered during construction. It is recommended that in situ CBR or plate load testing is undertaken at formation level during construction to confirm the appropriateness of design CBR values.

8.3 Geo-Environmental Assessment

8.4 Human Health

Site users of the proposed development

Contaminants in the Made Ground

At shallow depths accessible to future site users, soil contaminant concentrations have not frequently been found elevated. Of the Made Ground / soil material accessible and/or likely to pose a risk to future site end users, on four occasions (i.e. lead concentrations at levels of 800 mg/kg and 380 mg/kg, a benzo(b)fluoranthene of 4 mg/kg and a dibenzo(a,h)anthracene of 0.4 mg/kg) concentrations been found exceeding human health risk assessment criteria for the residential without plant uptake land-use.

However, apart from the lead concentration of 800 mg/kg that was found in BHA, concentrations of exceedances are relatively marginal. In addition the area where the 800 mg/kg lead concentrations was found (BHA) will be under hardstanding and therefore inaccessible to future site end users.

For the areas of soft landscaping, the import of suitable topsoil is likely to be required. Given the fact that soil contaminant concentrations present at depths accessible to future site users have been found occasionally and only marginally exceeding their respective assessment criteria, the provision of suitable topsoil in areas of soft landscaping is likely to be sufficient to reduce the likelihood and/or exposure frequency of future site users to come in contact with Made Ground.

Ground Gas & vapour

The risk of bulk ground gases to human health and built development was considered to be 'very low'.

However, given PID readings that have been identified as part of the earlier (Fairhurst, 2016) site investigation, it was found prudent to obtain and analyse vapour samples. The samples were taken from locations (BH1 and WS101), where as part of the 2016 Fairhurst site investigations, the highest PID results at steady levels had been found (i.e. the only locations, where PID results at steady levels at or in excess of 1 ppm were found).

The analysis revealed relatively low concentrations of compounds responsible for the generation of vapour and on that basis risks from vapours are assessed low.

Construction Workers

During the earlier [Fairhurst (2016)] ground investigation, a 'tile' fragment was found in one exploratory hole (BH101) indicating the presence of asbestos. In the same (BH101) but also another exploratory hole (TP123) asbestos was qualitatively identified. However, further quantitative analysis revealed a concentrations below the detection limit (<0.001%).

On that basis and in the presence of concentrations of contaminants at shallow depths being at relatively low levels, the risk to construction workers is likely to be low. However, the information contained in this report should be passed onto the Principal Contractor during construction works who should consult with an asbestos specialist in respect to appropriate risk assessments and method statements during below ground works. Work should be carried out in accordance with the Control of Asbestos Regulations 2012.

8.5 Controlled Waters

Groundwater contaminant data and observations have revealed elevated concentrations of petroleum hydrocarbons in groundwater.

The highest risk appears to be associated with petroleum hydrocarbon falling into the 'aromatic EC12-EC16' band due to the concentrations present and the 'moderate' mobility of the contaminant.

Outline R&D P20 modelling (see Appendix G) suggest concentrations of the TPH CWG aromatic EC12-EC16 fraction have the potential to result in exceedances of the respective 90 µg/l 'WHO guideline value for drinking water quality' over a 100 - 200 meters distance from the site.

Whilst this would be in excess of the 50 metres default compliance point distance for hazardous substances in accordance with the 'land contamination groundwater compliance points for quantitative risk assessments guidance', constituents of potential concern (CoPC) for respective TPH CWG fractions (i.e. 2-methylnaphthalene, acenaphthylene, acenaphthene) have been assessed to be relatively low.

Data and information obtained from approximately thirty (30) exploratory holes advanced as part of three phases of ground investigations did not identify an on-site entry point of the contaminant to have entered the groundwater.

The spatial distribution and variability of maximum concentrations indicates the source term to be present at diffuse locations across the site, with preferential pathways and complex migratory patterns being associated with the groundwater flow direction but also the locations and orientation of fractures within the Chalk Principal aquifer underneath the site.

The composition of the petroleum hydrocarbons contamination with easily degradable petroleum hydrocarbon fractions largely being absent would suggest the source that was identified as 'diesel' to be historic and possibly a result of on or off-site free product release that probably occurred several decades ago.

8.6 Recommendations

On the basis of the above and taking into account the nature of the proposed development, the completion of a formal remediation strategy and validation report is not currently warranted.

However the following works are likely to be required:

Foundation works risk assessment

Although, the toxicity of these contaminants is likely to be lower than normally reflected by TPH CWG WQS exceedances - *this is due to the fact that concentrations of constituents of potential concern (CoPC) for respective hydrocarbon fractions are being assessed as low* – petroleum hydrocarbons in groundwater within the Chalk Principal aquifer are locally present at high concentrations.

As part of piling operations, a potential risk exists for contamination within the Chalk Principal aquifer to be mobilised. It is recommended that a foundations works risk assessment is undertaken and agreed with the regulator prior to any piling operation commencing.

The foundations works risk assessment will specify the piling methods that will be assessed as acceptable by the regulator. It is likely the foundations works risk assessment will have to include a groundwater monitoring programme with monitoring to be carried out at different stages, namely at pre, during and post the piling operations.

The monitoring is to include an update to the risk assessment to be completed on the basis of the results from two further groundwater monitoring rounds from existing monitoring points. The foundation works risk assessment with the update to the risk assessment is to be agreed with the regulator, prior to the piling works commencing.

Watching brief

A watching brief is recommended to commence as soon as the existing hardstanding, comprising of asphalt and footprints of existing buildings is removed with particular emphasis on soil conditions being inspected for any spots potentially being impacted by organic contaminants.

Leachate testing undertaken as part of the CBRE 2015 site investigation raises some concern over the leachability of PAH in areas of the proposed soft landscaping post the proposed development scenario. However, at these depths, PAH contaminant concentrations in soil have generally been found at low concentrations. The absence of PAH in soil at these shallow depths renders the potential for leachable PAH to be a widespread problem across the site as unlikely.

Notwithstanding this, due to the high leachability indicated by CBRE 2015 site investigation results, it is recommended that as part of the watching brief soil samples are being taken from shallow soils (≤ 1 m bgl) and are being analysed for concentrations of PAH in soil and leachate.

Soil Arisings Material Management

Based on the soil analysis undertaken to date, Made Ground materials from shallow depth (i.e. 0-3m), if generated as soil arisings and to be disposed off-site, are likely to be classified as non-hazardous and possibly inert in some areas.

However, this report does not purport to be a waste classification assessment, and the initial advice on the likely waste classification of soil arisings from the Made Ground, destined to be disposed off-site, is provided for indicative preliminary purposes only. Ultimately, it will be the earthworks contractor's responsibility to appropriately classify the material for disposal, using the contamination data presented to date, and as determined by Waste Acceptance Criteria testing during the works, as required by the receiving facility.

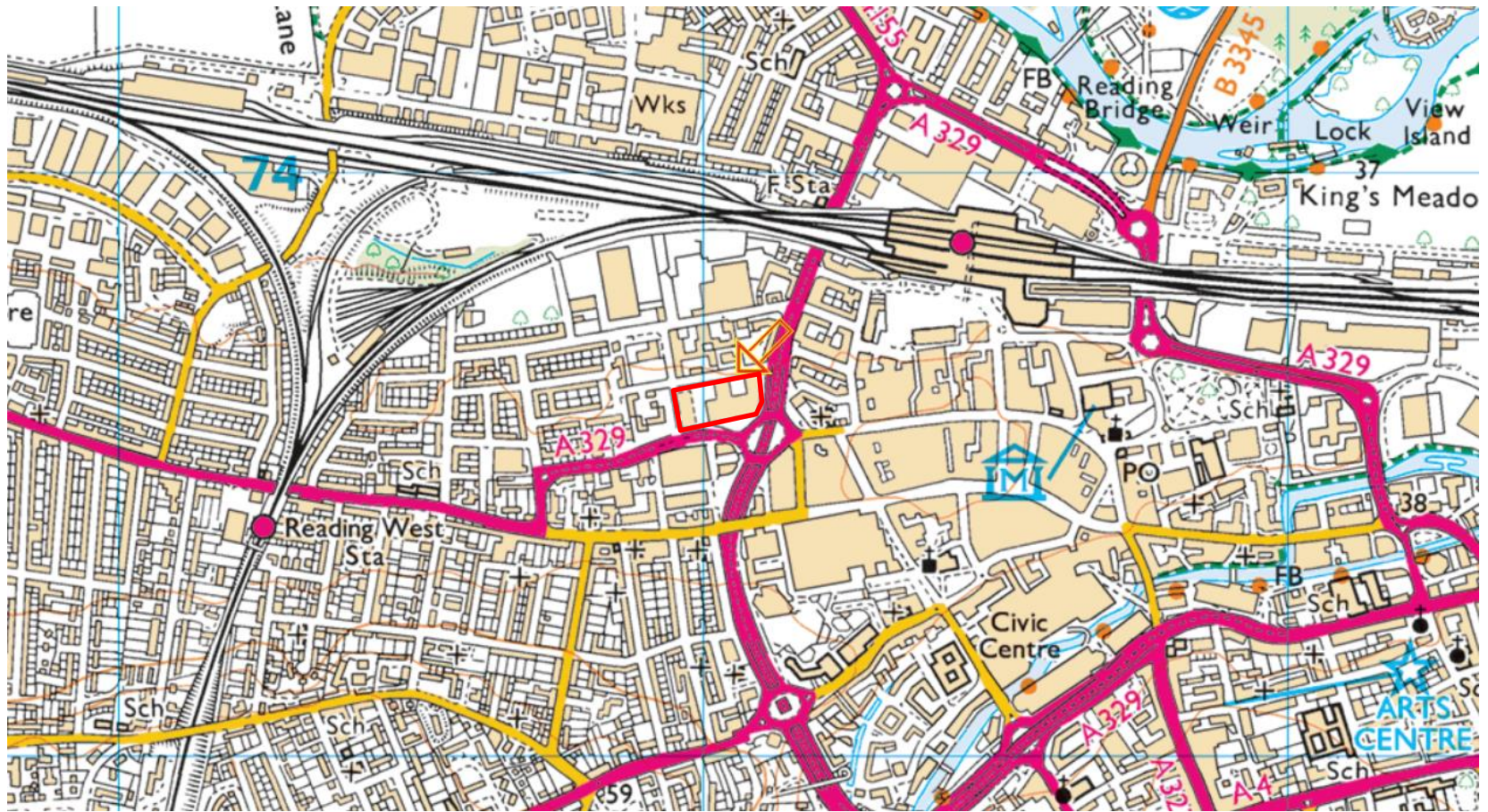
In addition, where soil re-use on site is considered as an option, then, 'The Definition of Waste: Development Industry Code of Practice' should also be considered and a material management plan (MMP) be prepared, with materials tracking records/plans produced to demonstrate movement from excavations to final placement of waste materials, which have been recovered for re-use as a product on site

Drinking Water Supply Pipes

At shallow depths (i.e. maximum depths of drinking water supply pipes) organic contaminants have not been found at elevated concentrations. Therefore, based on current results upgraded drinking water supply pipe materials (such as barrier pipe) may not be required to protect any new drinking water supplies to be installed as part of the development.

A detailed assessment of risks to water supply pipes should be undertaken once the proposed route of water supply pipes together is known and following advice from the water utility provider.

FIGURE 1 – SITE LOCATION PLAN



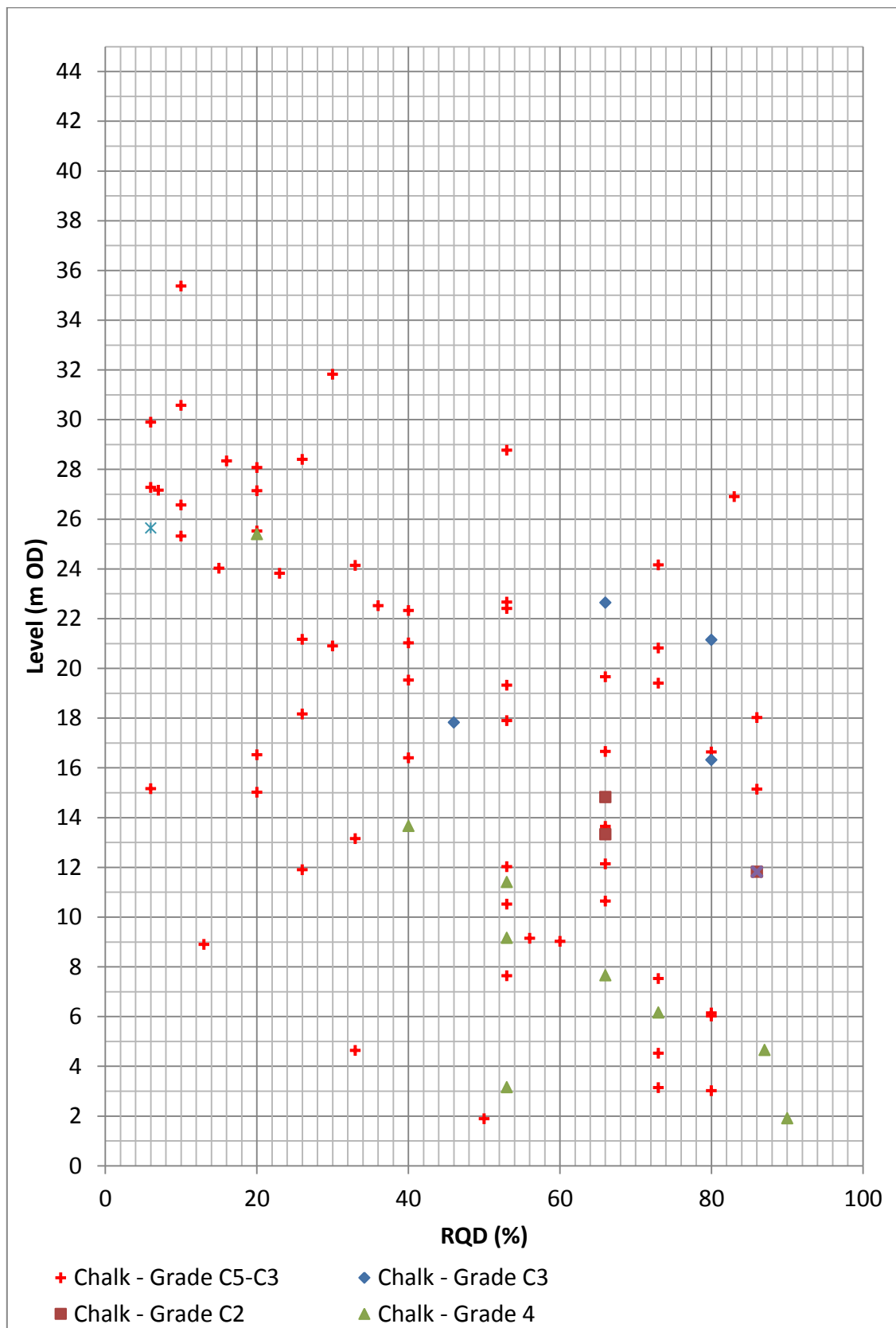
— Approximate Site Boundary

FAIRHURST Weldale Street Reading	Site Location Plan (Not to Scale)		
	Ground Investigation Report		
Date: 26/04/19	Initials: HB	Figure: 1	

FIGURE 2 – EXPLORATORY HOLE LOCATION PLAN

FIGURE 3 – GEOLOGICAL CROSS SECTION

FIGURE 4 – RQD VS LEVEL (WHITE CHALK SUBGROUP)



FIGURES 5 – GROUNDWATER MONITORING LEVELS VS TIME

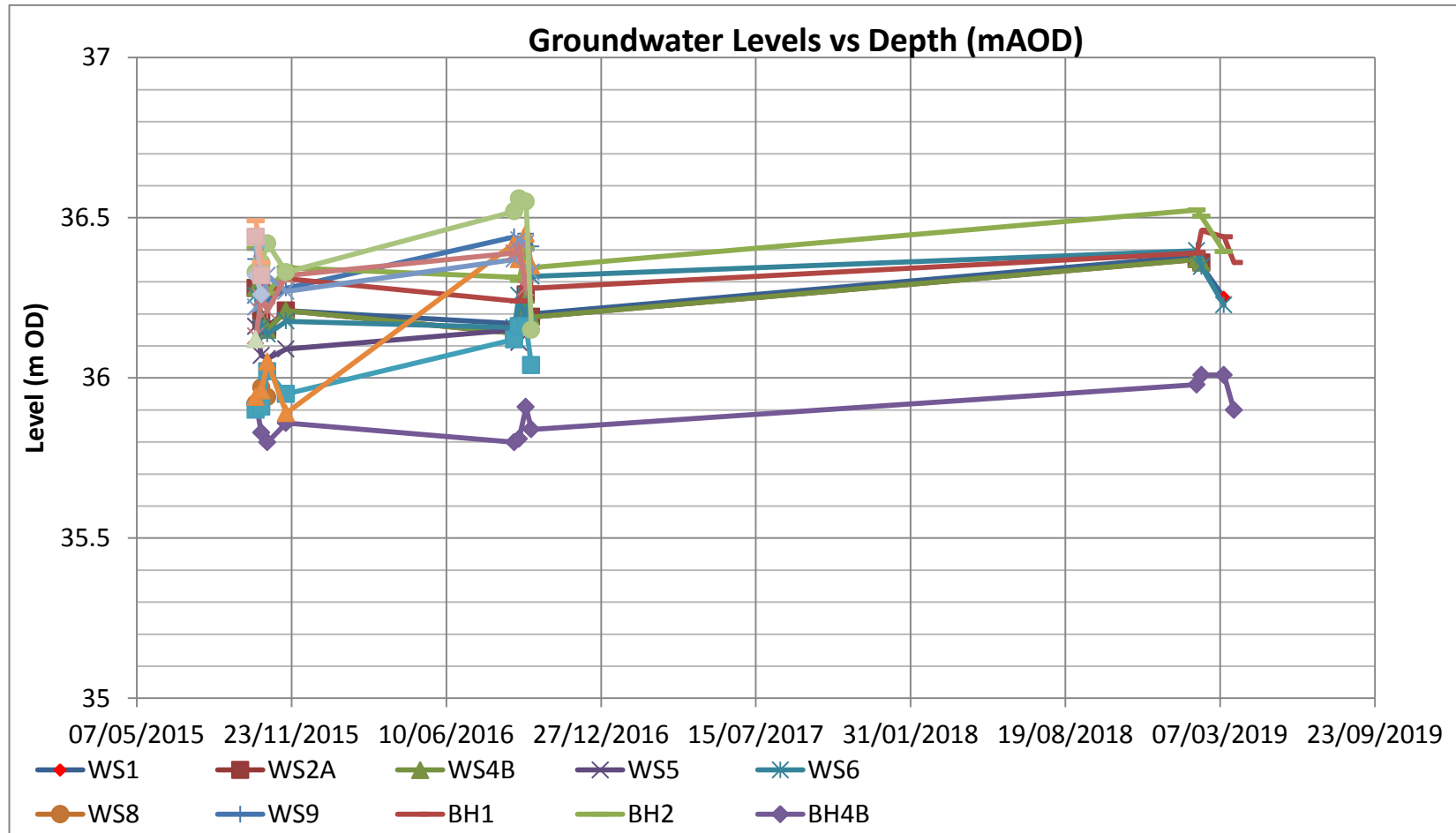


FIGURE 6 – UCS VS ELEVATION (WHITE CHALK SUBGROUP)

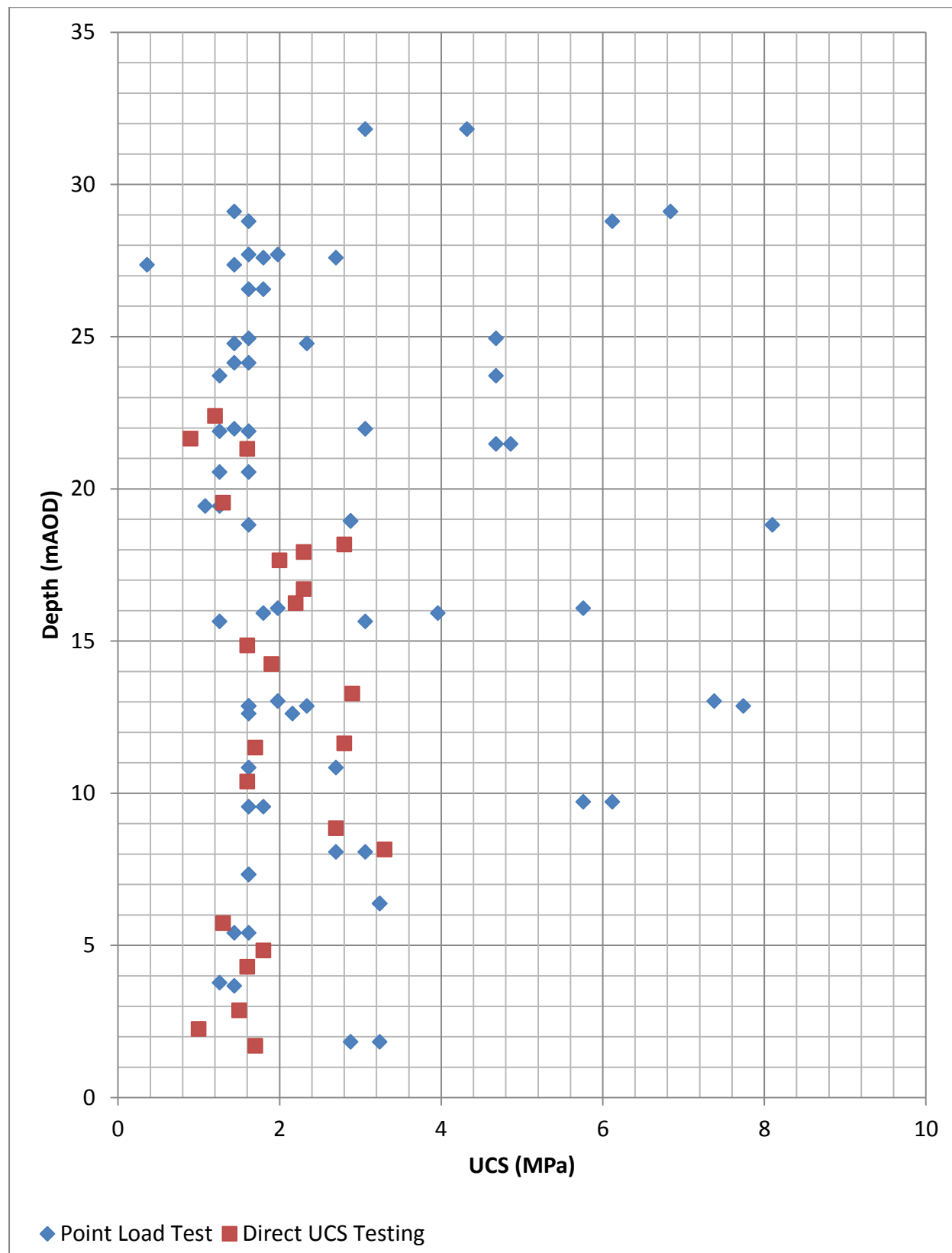


FIGURE 7 – SPT VS DEPTH

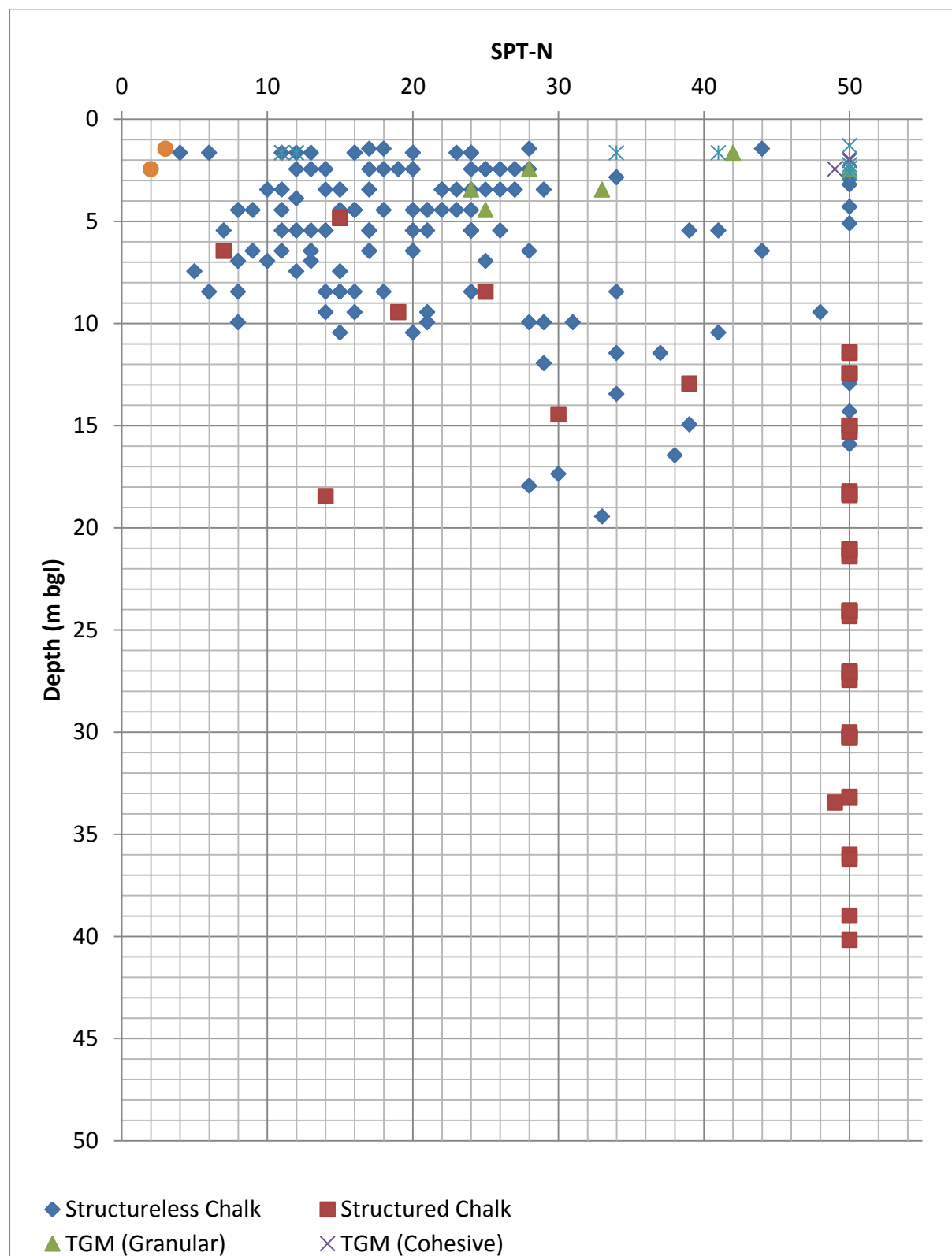
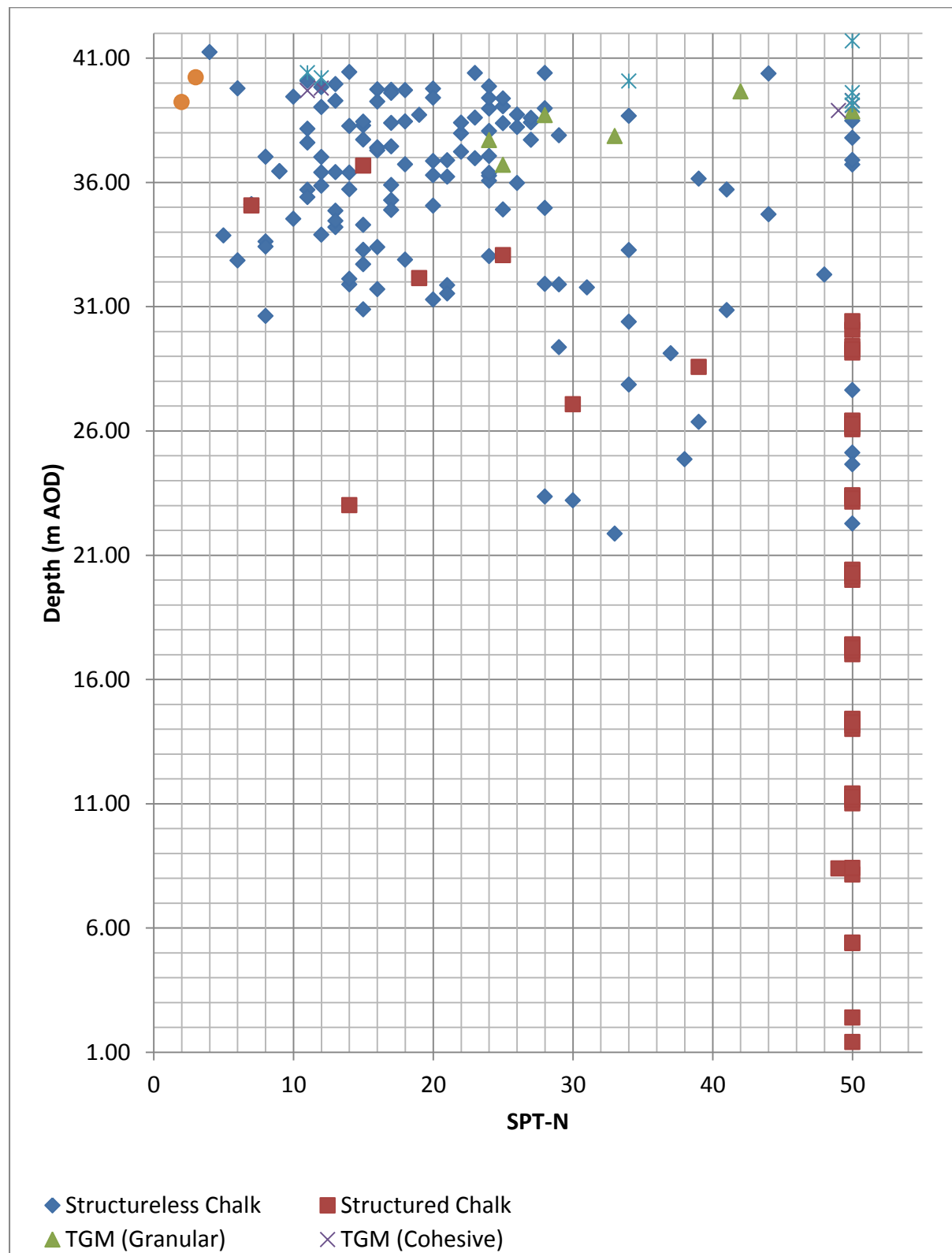


FIGURE 8 – SPT VS ELEVATION

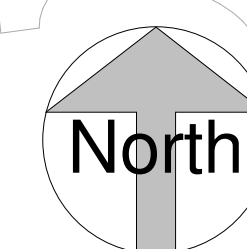
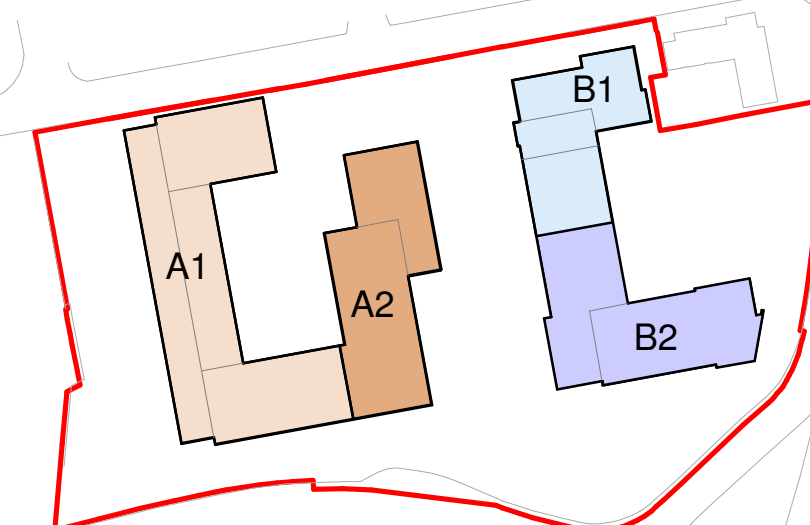


APPENDIX A – PROPOSED DEVELOPMENT PLANS

This drawing may be scaled for the purposes of Planning Applications, Land Registry and for Legal plans where the scale bar is used, and where it verifies that the drawing is an original or an accurate copy. It may not be scaled for construction purposes.

Always refer to figured dimensions. All dimensions are to be checked on site. Discrepancies and/or ambiguities between this drawing and information given elsewhere must be reported immediately to this office for clarification before proceeding. All drawings are to be read in conjunction with the specification and all work to be carried out in accordance with latest British Standards / Codes of Practice.

Building Location Key



Buildings this side of the line have been measured from Weldale Street)

Buildings this side of the line have been measured from Chatham Street)

 Building Entrances

Storey Height Key

Storey heights for each block are taken from the nearest road



C	22/06/17	DB	Revised elevations and massing following comments from RBC	JC
B	30/05/17	JC	Minor amendments based on comments from D.SE panel review	MAS
A	17/02/17	GC	ISSUED FOR PLANNING	JC
Rev.	Date	Init	Notes	Check

Client

Drawing Originator

AWW inspired
environments

London - 7 Birchlin Lane, London, EC3N 9EW 020 7160 6000
Bristol - Revengate House, Bristol, BS1 6LS 0117 523 2535
Plymouth - Elset Quay House, Plymouth, PL4 0HN 01752 261 262

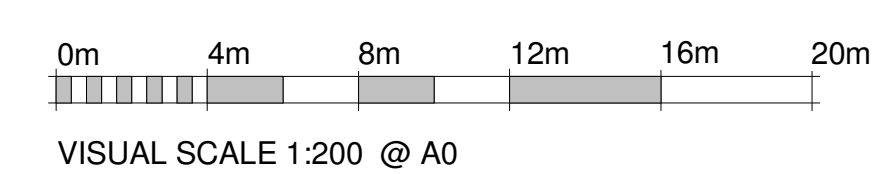
RIBA Chartered Practice www.ww-sik.com

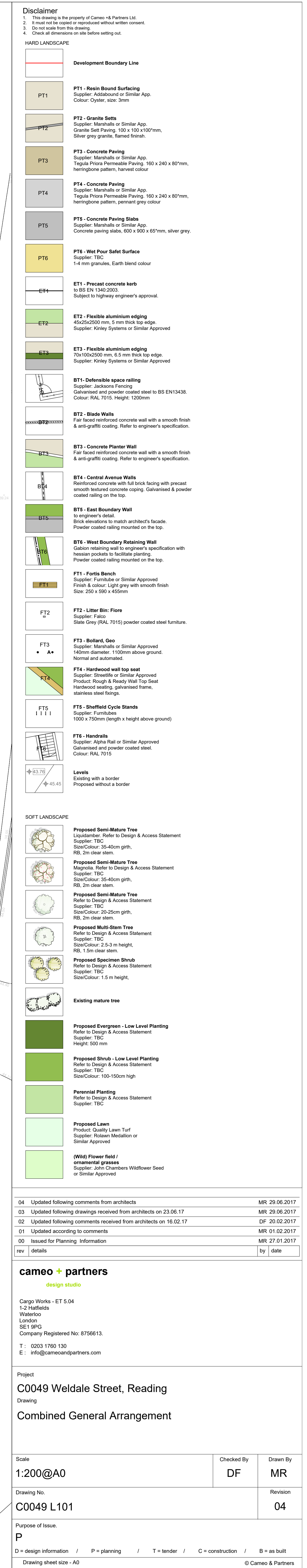
Project Title
Weldale Street, Reading
Site Coordinated

Drawing Title
Building Storey Height Diagram

Scale	Sheet	Drawn	Checked	Date
1:200	A0	JC	BS	20/02/2011

Status	Project No.	
PRELIMINARY	3622	
Drawing Reference	Drawing No.	Revision
	0224	C





APPENDIX B – DUNELM FACTUAL REPORT (JUNE 2019)

APPENDIX B – DUNELM FACTUAL REPORT (JUNE 2019)

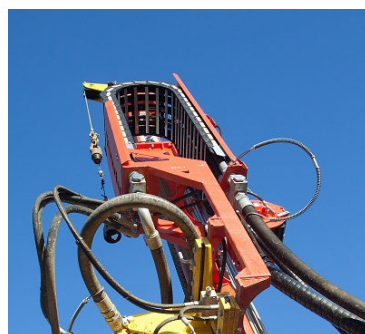
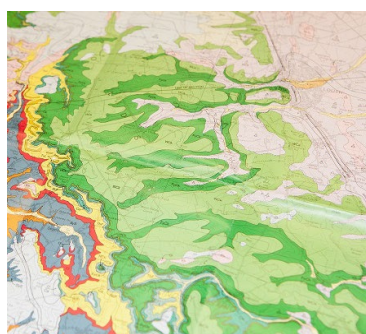


CONTRACT NO: D9298

**FACTUAL REPORT ON SITE INVESTIGATION FOR LAND AT
WELDALE STREET, READING**

PREPARED FOR:

ROPEMAKER PROPERTIES LTD



● FOUNDATION HOUSE ● ST. JOHN'S ROAD ● MEADOWFIELD ● DURHAM ● DH7 8TZ
● TEL: 0191 378 3151 ● FAX: 0191 378 3157



Contract No.	D9298
Job Name	WELDALE STREET, READING

REPORT REVISIONS

Revision No.	Issue Date	Details
D9298/00	08.04.2019	Draft report for approval
D9298/01	06.06.2019	Draft report now including further monitoring and chemical testing

VERIFICATION

Revision No.	Issue Date		Written By	Checked By	Verified By
D9298/00	08.04.2019	Initials	SH	BC	AIL
		Signature			

Revision No.	Issue Date		Written By	Checked By	Verified By
D9298/01	06.06.2019	Initials	SH	BC	AIL
		Signature			

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APPENDIX B	EXPLORATORY HOLE RECORDS
APPENDIX C	PHOTOGRAPHS
APPENDIX D	GEOTECHNICAL LABORATORY RESULTS
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APPENDIX F	GAS AND GROUNDWATER MONITORING RESULTS
APPENDIX G	DUNELM NOTES ON LIMITATIONS

1.0 INTRODUCTION

1.1 SCOPE OF WORKS

Dunelm Geotechnical and Environmental Ltd (Dunelm) were commissioned by Fairhurst acting on behalf of Ropemaker Properties Ltd (Ropemaker), to carry out a site investigation of land at Weldale Street, Reading.

The objectives of the investigation were as follows:

- To determine the typical nature, thickness and engineering parameters of the made ground and natural strata.
- To determine the nature and extent of potential contamination within the site.
- To recover samples of made ground and natural strata for chemical and geotechnical laboratory testing.
- To recover samples of groundwater from the boreholes for laboratory testing.
- To record gas concentrations and gas flows within the boreholes.

Fieldwork was undertaken generally as specified in the contract documents provided by Fairhurst. The fieldwork was carried out between 11th February and 1st April 2019.

Following the completion of the fieldwork selected soil and rock samples were submitted for a range of geotechnical and chemical testing.

This report presents the factual information obtained during the investigation; interpretation of this data was outside the remit of this report. The factual data is reported separately in AGS format Version 4.

1.2 GENERAL

Guidance contained in the following Standards has been followed during the investigation work as appropriate: BS5930:2015, BS10175:2011+A2:2017; BS1377:2016; BS EN ISO 14688:2004 + A2:2018, BS EN ISO 14689:2003 and CIRIA C574 Engineering in Chalk guidance.

The information contained in this report is limited to the site boundary, as indicated on the site plan shown in Appendix A, and the areas accessible during the ground investigation.

This report is for the exclusive use of Ropemaker and their agents. No third party may rely upon, or reproduce, the contents of this report without the written approval of Dunelm.

This report is based on the data obtained from the exploratory holes and from the subsequent tests carried out. There is always a possibility of variation in the ground conditions between boreholes. Responsibility cannot be accepted for conditions not revealed by the investigation. Any diagram or opinion of the possible configuration of the findings is conjectural and given for guidance only, and confirmation of intermediate ground conditions should be considered if deemed necessary. Dunelm's Notes on Limitations are included in Appendix G.

2.0 SITE LOCATION & FEATURES

The site is located 0.5 km from Reading town centre. The approximate centre of the site is at National Grid Reference 471020 173610.

A site location plan is presented as Drawing No. D9298/01 in Appendix A to this report.

The site comprises disused warehouses and associated parking, positioned on Weldale Street. The site is immediately bound to the north by Weldale Street with a trading estate beyond. To the south

there is an area of open landscaped ground with the A329 (Chatham Street) beyond which turns to the north to form the eastern site boundary (Caversham Road). To the west of the site there is residential housing. A residential block of flats occupies the area adjacent to the north east of the site.

3.0 FIELDWORK

3.1 INTRODUCTION

The fieldwork comprised the following:

Number	Exploratory Hole Label	Method
1	BHA	Rotary Core Drilling using Geobore-S
1	BHA1	Rotary Open Hole Drilling
4	BHB, BHC, BHE, BHF	Cable Percussive Boring with Rotary Core Drilling Follow on using Geobore-S
2	BHD, BHD1	Cable Percussive Boring
2	HPA, HPB	Hand Excavated Trial Pits
6	HPC, HPD, TTA, TTb, TTC, TTD,	Machine Excavated Trial Pits
11	WSA, WSB, WSC, WSE, WSF, WSG, WSH, WSIA, WSIC, WSK, WSKA	Windowless Sampling

The exploratory holes were completed as planned, except for BHD and WSE which were terminated early due to concrete obstruction and TTD which was terminated early due to a suspected service. On completion all exploratory positions were backfilled immediately in accordance with instructions from Fairhurst.

3.2 EXPLORATORY HOLE LOCATIONS

The locations of each of the above exploratory holes were recorded by survey following the completion of the works. The locations are shown on Drawing No. D9298/02 in Appendix A.

The ground elevations and co-ordinates of each of the exploratory holes determined from the survey are shown on the exploratory hole records.

3.3 STRATA DESCRIPTIONS

Descriptions of the strata encountered in each of the exploratory holes are presented on the exploratory hole record sheets in Appendix B to this report. Strata descriptions are based on an examination of the strata, together with consideration of the in-situ testing results and laboratory test data.

Strata descriptions have been completed in accordance with BS5930:2015, BS EN ISO 14688:2004 + A1:2013, BS EN ISO 14689:2003 and CIRIA C574 Engineering in Chalk guidance as appropriate.

3.4 SAMPLING

Samples were recovered during the investigation works in general accordance with the contract specification.

Samples of soil for chemical analysis were placed into suitable containers as specified by the chemical testing laboratory. Samples of soil for geotechnical testing were recovered in accordance with the principles of BS1377-1:2016.

Samples of made ground were scanned immediately after placement in the container using a Photo Ionisation Detector (PID) to check for the presence of volatile organic compounds. The results are shown at the relevant depths of the borehole logs in Appendix B.

3.5 IN-SITU TESTING

In-situ Standard Penetration Tests (SPTs) were carried out in the cable percussion and mini-rig boreholes at a frequency in general accordance with the contract specification.

SPT tests were carried out in accordance with BS EN ISO 22476-3 2005 + A1 2011 in order to determine the relative density of the granular soils and an indication of the undrained shear strength of cohesive soils. The results of these tests are shown as 'N' values on the exploratory hole records, with the blow counts for each increment shown in brackets.

3.6 MONITORING WELLS

On completion of drilling, monitoring wells were installed in selected boreholes to enable subsequent gas and groundwater monitoring. The construction of the wells was as specified during the works by Fairhurst. Details of the installations are shown on the exploratory hole records and summarised in Table B1 in Appendix B.

Each well consisted of a lower slotted section of 50mm diameter HDPE standpipe surrounded by single size non-calcareous gravel, with an upper section of plain HDPE pipe surrounded by a bentonite cement seal.

Each of the wells was fitted with a suitable bung and gas tap to allow for gas and groundwater monitoring, and a protective steel cover to prevent damage to the installation.

Boreholes not fitted with a monitoring installation were backfilled in general accordance with the specification or subsequent instruction from Fairhurst.

4.0 LABORATORY TESTING

4.1 GEOTECHNICAL

Geotechnical laboratory testing, as scheduled by Fairhurst, was carried out on selected samples in accordance with techniques in BS 1377:1990. The testing was undertaken by a UKAS accredited laboratory and the results are presented in Appendix D.

4.2 CHEMICAL

Samples as scheduled by Fairhurst were tested for a range of contaminants by an MCERTS accredited laboratory. The results of these tests are presented in Appendix E.

5.0 GAS & GROUNDWATER MEASUREMENTS

5.1 INTRODUCTION

Prior to intrusive fieldwork being carried out, gas and groundwater measurements were taken in monitoring wells previous installed by Dunelm and other contractors, this work was carried out on 5th, 11th February and 8th, 14th May 2019. The results are presented in Appendix F.

Following the completion of the investigation work on site, a Dunelm technician made a series of visits to the site in order to carry out measurements of gas and groundwater within the monitoring wells described above. The number and frequency of these visits were specified by Fairhurst.

The site monitoring was completed on 18th April 2019. The monitoring results are presented in Appendix F.

5.2 GAS MONITORING PROCEDURE

Each of the gas monitoring wells was monitored to record the concentration of methane, carbon dioxide, carbon monoxide, oxygen and hydrogen sulphide using an infra-red gas analyser. The borehole flow rate, atmospheric and differential pressure was also measured using a suitable instrument.

Gas monitoring was undertaken in accordance with current guidance.

5.3 GROUNDWATER MONITORING PROCEDURE

Measurements of groundwater level (in metres below ground level) were recorded in each borehole using a standard dipmeter.

5.4 GROUNDWATER SAMPLING PROCEDURE

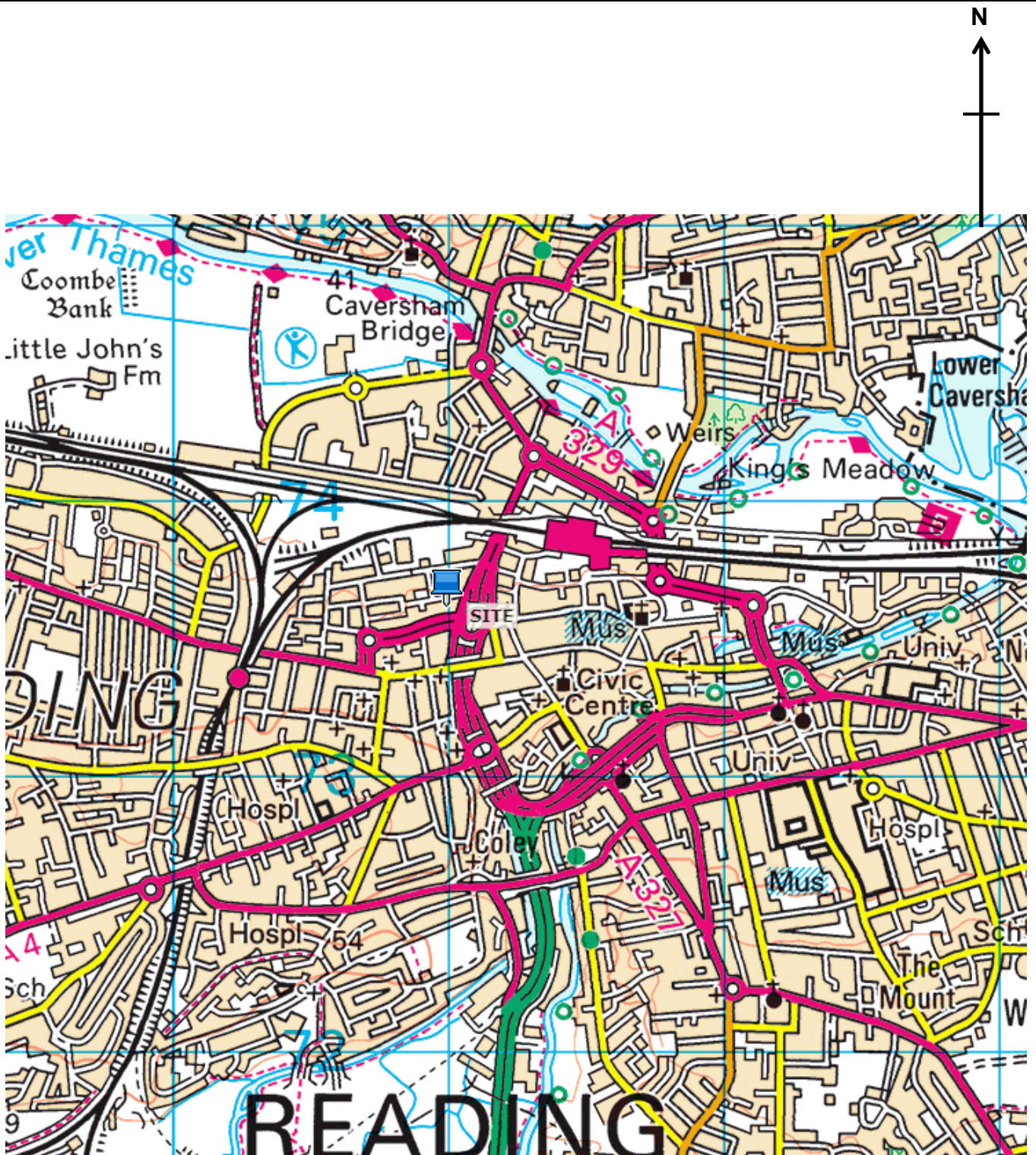
Prior to groundwater sampling being commenced, each monitoring well was developed by purging. This work was completed on 11th February, 5th May and 14th May 2019.

Samples of groundwater were recovered on 5th and 11th February 2019 using a bailer and despatched to an appropriate laboratory for testing. The results of these tests are presented in Appendix E.

APPENDIX A

Drawings





Ordnance Survey © Crown copyright 2012 All rights reserved. Licence number 100048410.

	Contract: Weldale Street, Reading			Contract No: D9298
	Client: Ropemaker Properties Ltd			
TEL: 0191 378 3151 FAX: 0191 378 3157	Drawing Title: Site Location Plan			
Drawing No: D9298/01	Date: April 2019	Scale: NTS	Status: Final	Drawn by: SH

Project Id: D9298
Project Title: Weldale Street, Reading
Client: Ropemaker Properties Ltd.

Title: Exploratory Hole Location Plan
Scale: 1:1000
Drawing No: D9298/02



- Legend Key
- Locations By Type - Empty
 - ⊗ Locations By Type - CP
 - ⊕ Locations By Type - CP+RC
 - ⊖ Locations By Type - RC
 - ⊙ Locations By Type - RO
 - ⊗ Locations By Type - TP
 - ⊕ Locations By Type - WS



APPENDIX B

Exploratory Hole Records



INFORMATION GENERALLY RELATING TO ALL EXPLORATORY HOLE RECORDS

GENERAL

Borehole/Trial Pit No

The exploratory hole identity number used throughout the report.

Site

The ground investigation project name.

Client

Client's name responsible for funding the ground investigation project.

Ground Level and Location

The precise ground level in meters above Ordnance Datum at the exploratory hole location from which the reduced level for each stratigraphic boundary is calculated. The exploratory hole position is given as either national grid-coordinates or local grid as specified.

ABBREVIATIONS

Samples

B	Bulk disturbed sample generally representative of the soil type for cohesive and fine granular soils.
D	Small disturbed tub sample normally taken at intermediate depth between other sampling or testing operations. The sample is stored in an airtight container.
BRE	Sample taken for electrochemical testing
ES	Sample of potentially contaminated materials.
C	Core sample.
SB	Bulk disturbed sample subsampled from a liner sample
SD	Small disturbed tub sample subsampled from a liner sample.
U	100mm diameter undisturbed thick walled sample (OS-TK/W)
UT	100mm diameter undisturbed thin walled sample (OS-T/W)
UF	An attempted but failed 100mm undisturbed sample.
W	Water sample.

In-situ Testing

CBR	California Bearing Ratio mould sample or test.
SPT	Standard Penetration Test (SPT) using the split barrel sampler (shoe). The corresponding 'N' value is given in the test result column.

Rock Quality and Core Recovery

TCR	Total core recovery - The length of the recovered core expressed as a percentage of the length of core run.
SCR	Solid Core Recovery - The sum length of all core pieces (measured along the centre of the core), expressed as a percentage of the length core run.

- RQD** Rock Quality Designation- The sum length of all core pieces that are 100mm or longer (measured along the centre of the core), expressed as a percentage of the length of core run.
- FI** Fracture Index- The number of fractures per 1000mm length of solid core.
- NI** Non-intact- The material recovered in a non-intact state.
- NR** No recovery from the core run.
- AZCL** Assessed Zone of Core Loss.

COBBLE CONTENT

Low <10%, medium 10 – 20%, high >20%

Exploratory Hole Log Legend

BOREHOLE LEGEND:

TOPSOIL



MADE GROUND



CLAY



SAND



SILT



GRAVEL



PEAT



MUDSTONE



SILTSTONE



SANDSTONE



LIMESTONE



CHALK



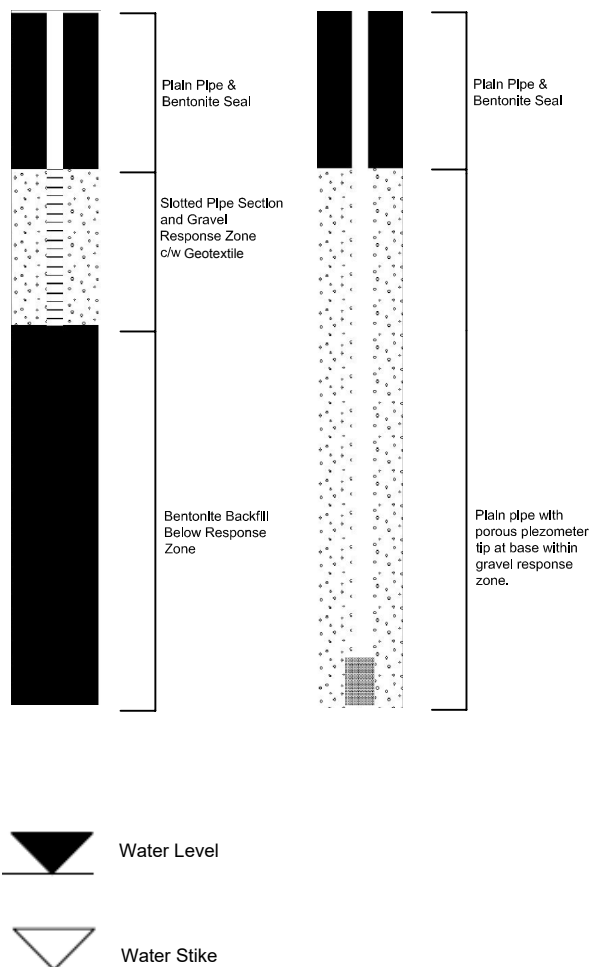
COAL



BENTONITE



MONITORING INSTALLATION LEGEND:



NB Where strata consists of material of more than one soil or rock type the legends are appropriately combined.



Dunelm Geotechnical & Environmental Ltd
Foundation House, St John's Road, Meadowfield
Durham, DH78TZ
Tel: 0191 378 3151
Fax: 0191 378 3157
e-mail: admin@dunelm.co.uk
web: www.dunelm.co.uk

Unit 25 Stella Gill Industrial Estate
Pelton Fell
Chester-le-Street
DH2 2RG

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

SPT Hammer Ref: W1
Test Date: 30/01/2019
Report Date: 30/01/2019
File Name: W1.spt
Test Operator: BP

Instrumented Rod Data

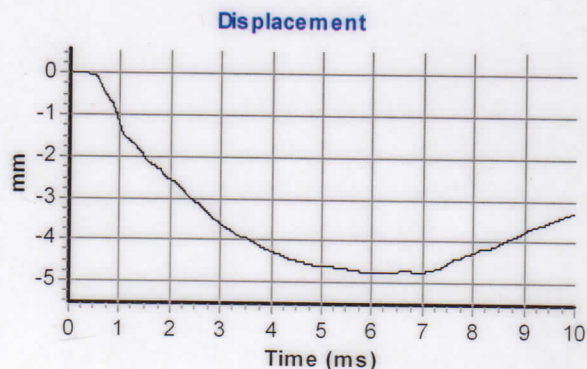
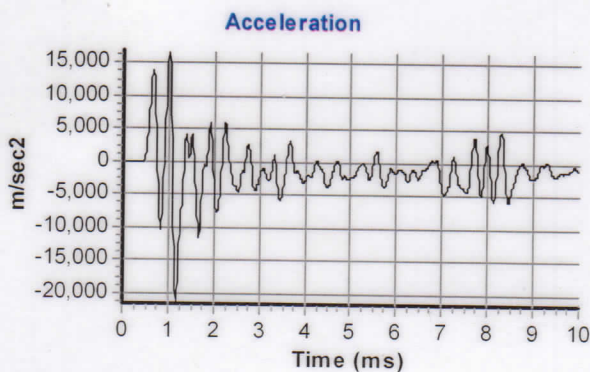
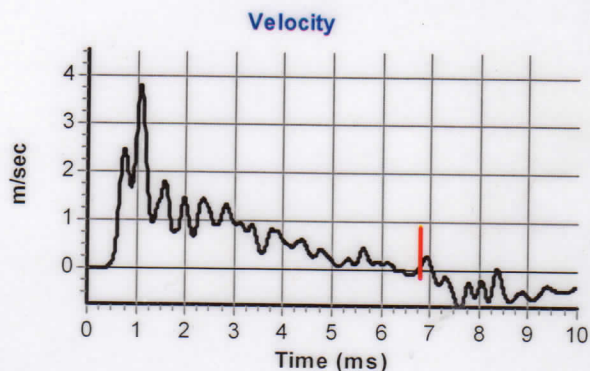
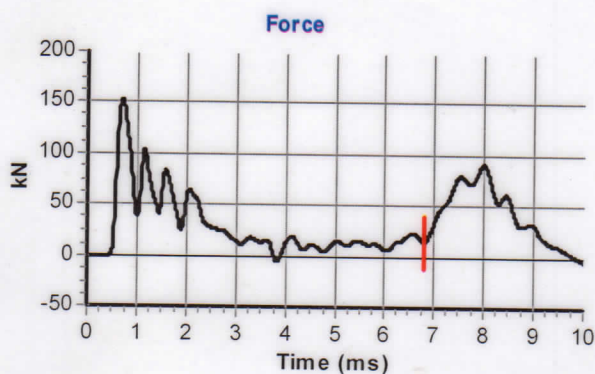
Diameter d_r (mm): 67
Wall Thickness t_r (mm): 8.7
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 6469
Accelerometer No.2: 11938

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 14.1

Comments / Location

Welltherm Drilling hammer.
Mass and drop supplied by client.



Calculations

Area of Rod A (mm^2): 1593
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 244

Energy Ratio E_r (%): **52**

Signed: Brian Proctor
Title: Technician

The recommended calibration interval is 12 months

Drillers Initials: PS

SPT Calibration Report



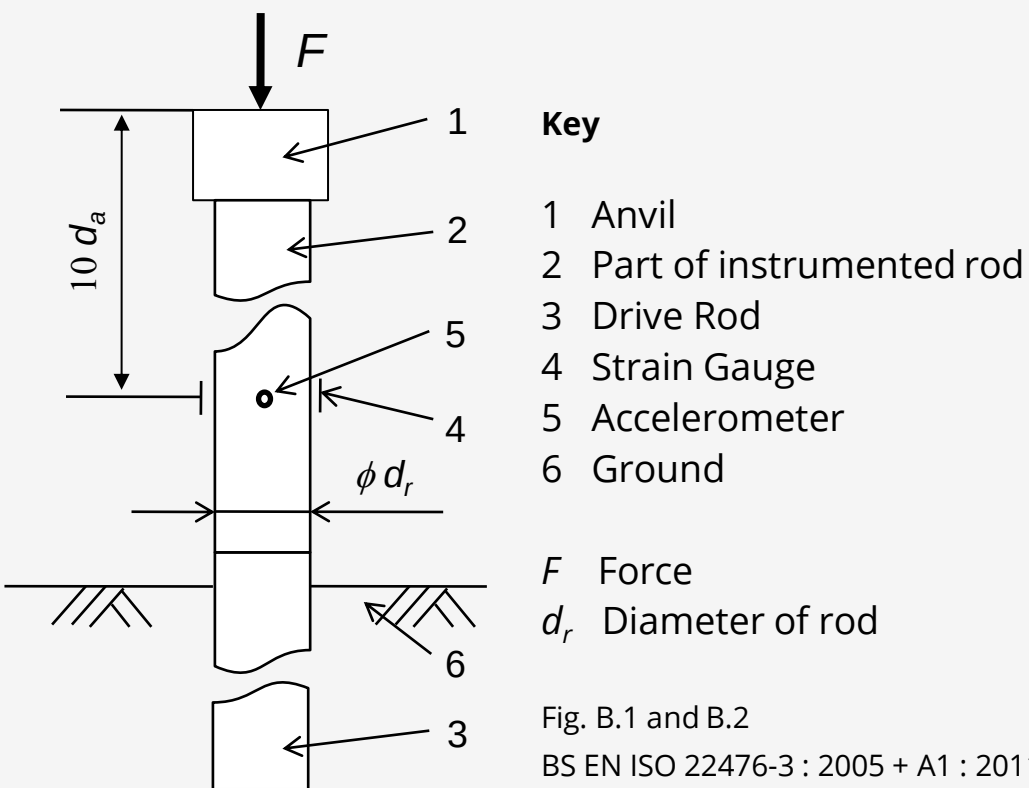
Hammer Energy Measurement Report

Type of Hammer SPT HAMMER
Client DRILLTECHNICS
Test No EQU2167

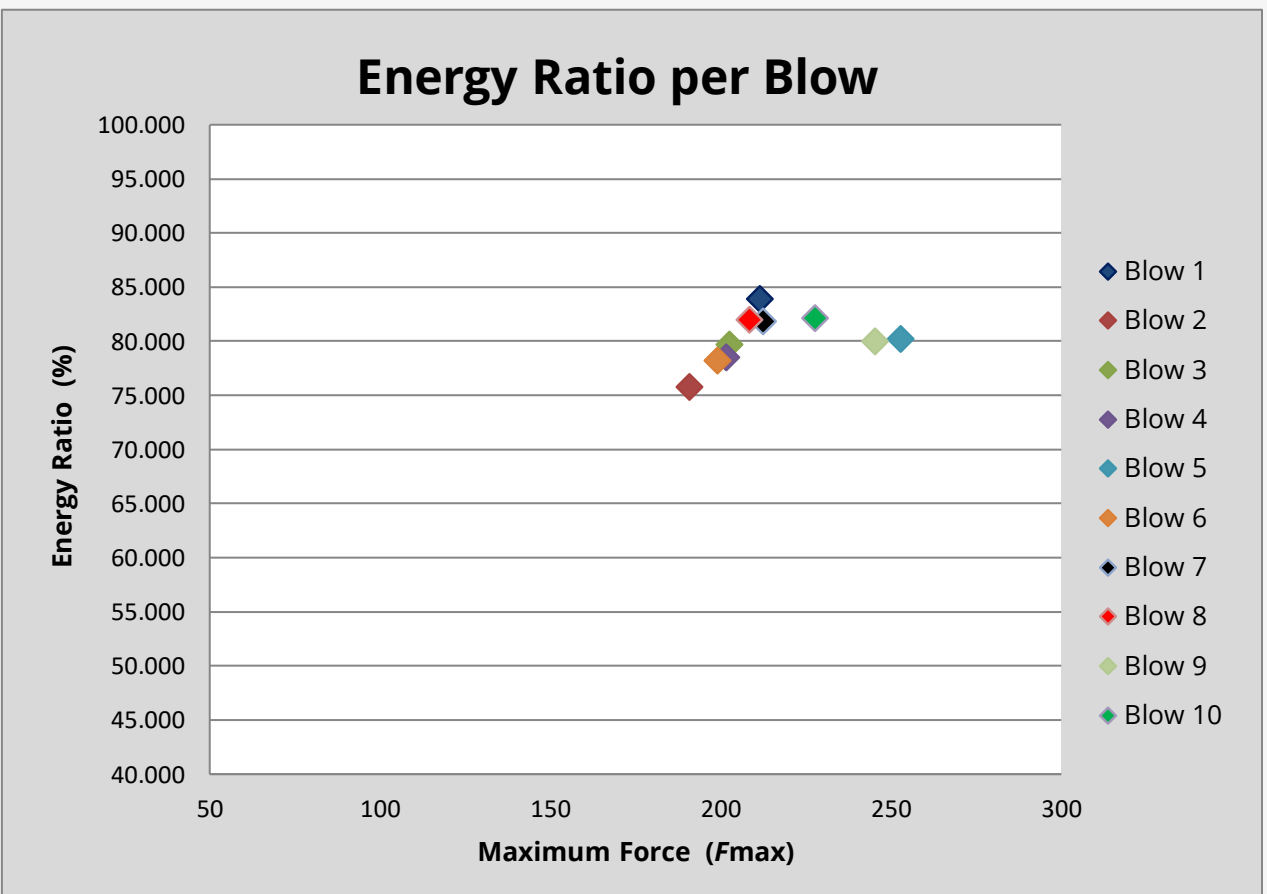
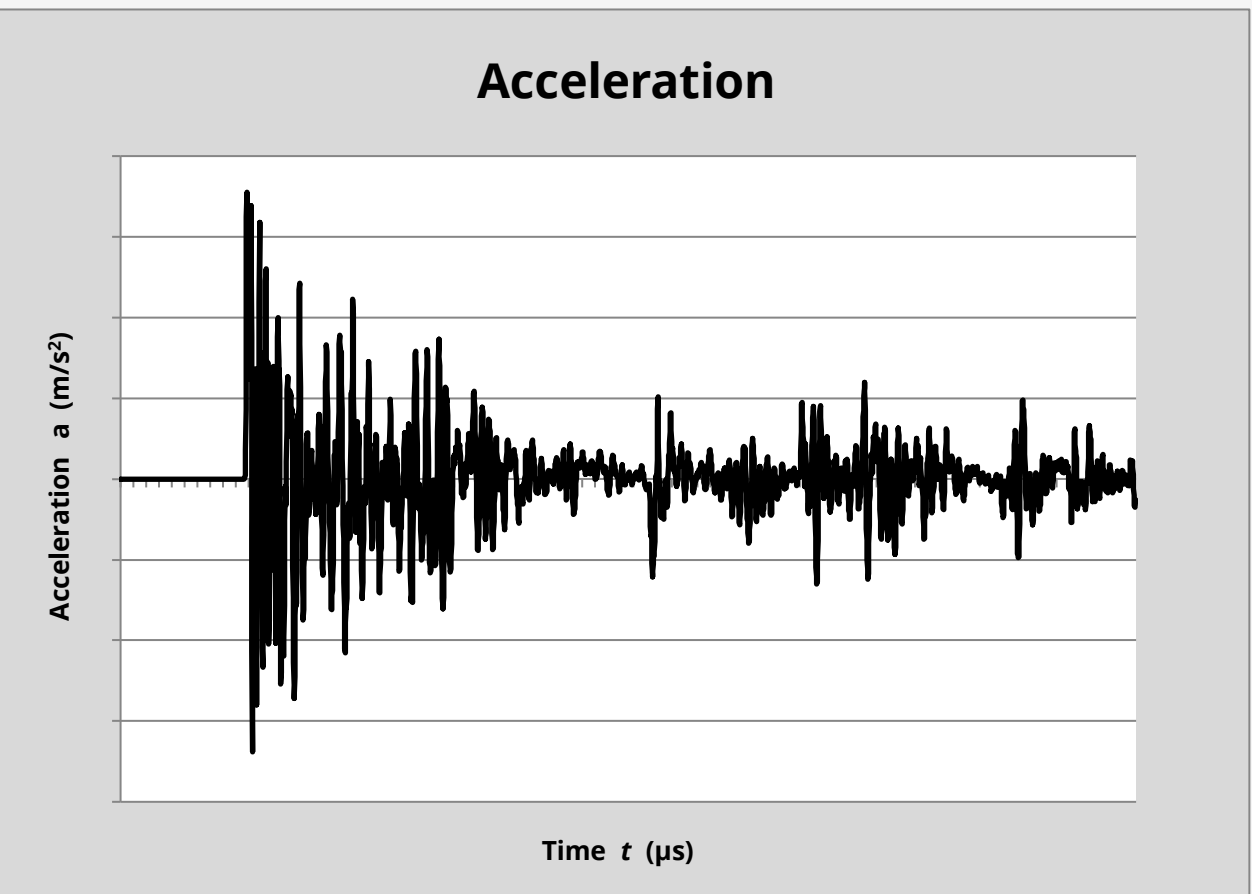
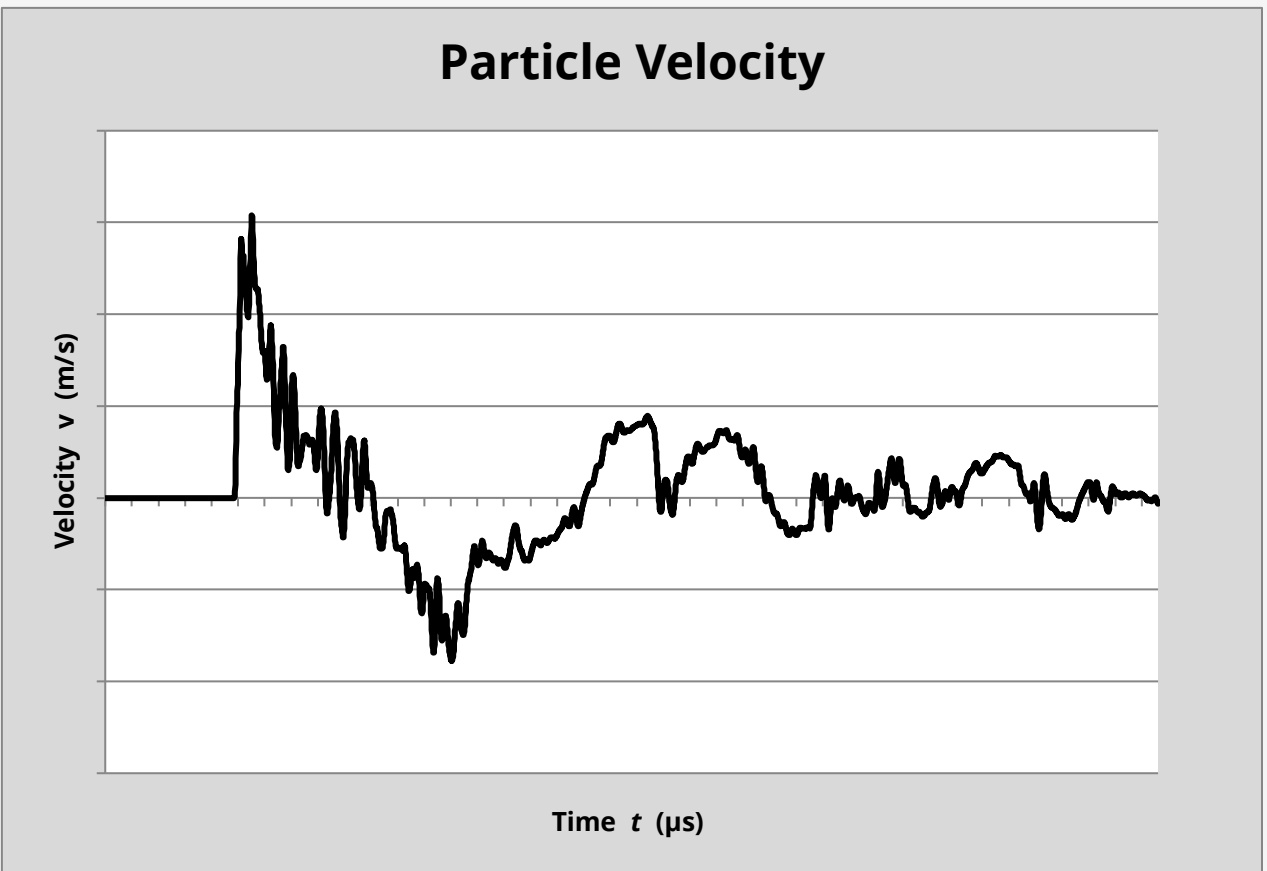
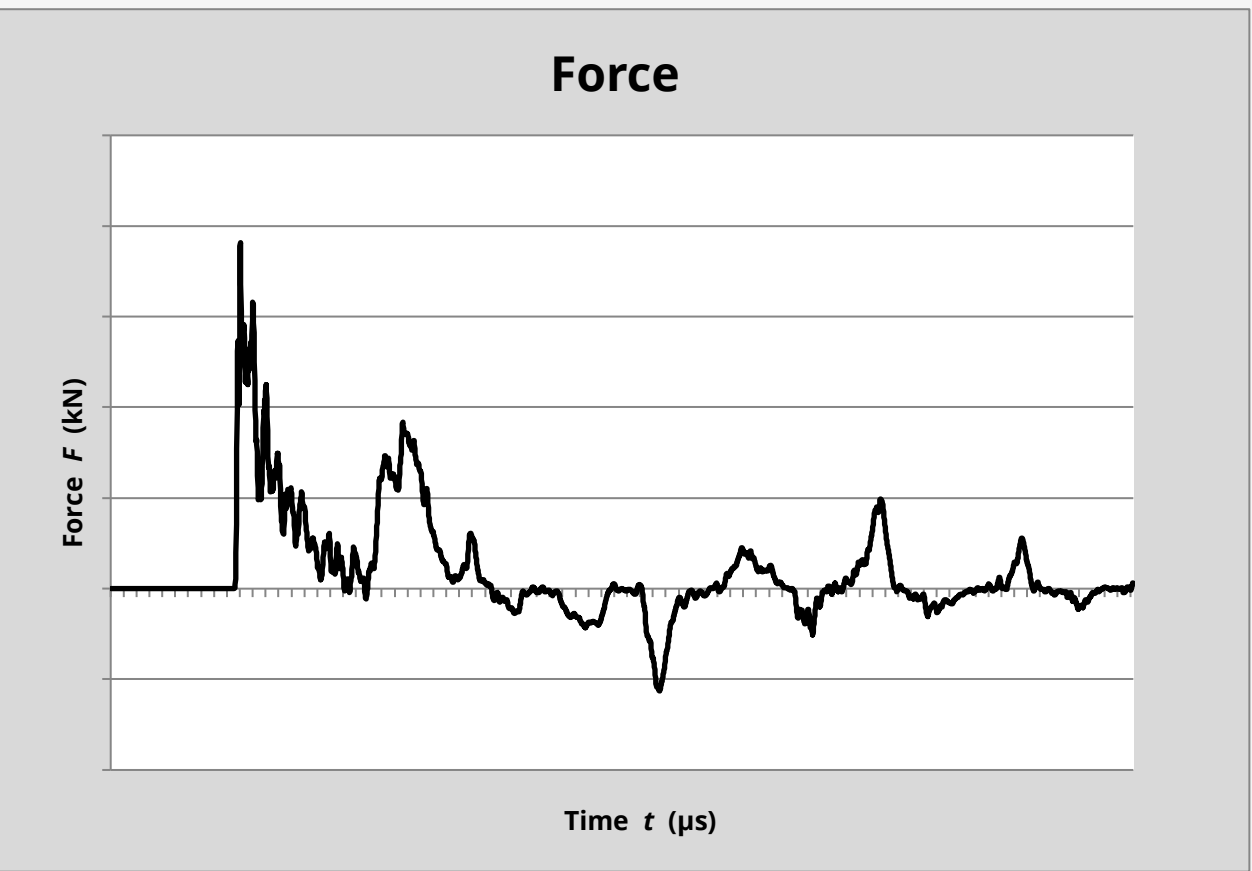
Test Depth (m) 8.20
Mass of hammer $m = 63.5\text{kg}$
Falling height $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter $d_r = 0.052\text{ m}$
Length of instrumented rod 0.558 m
Area $A = 11.61\text{ cm}^2$
Modulus $E_a = 206843\text{ MPa}$



DATE OF TEST	VALID UNTIL	HAMMER ID
07/11/2018	07/11/2019	DT2167



Observations:

1.

$E_{\text{meas}} = 0.378\text{ kN-m}$
 $E_{\text{theor}} = 0.473\text{ kN-m}$

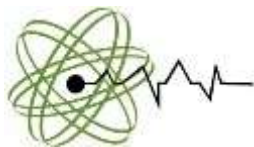
Energy Ratio = $\frac{E_{\text{meas}}}{E_{\text{theor}}}$

79.93%

EQUIPE GROUP
© Copyright 2018

Equipe SPT Analyzer Operators: KS

Prepared by:  Checked by:  Date: 16/11/2018



SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Borehole Calibration & Testing Ltd
Unit 8
Orton Enterprise Centre
Orton Southgate
Peterborough
PE2 6XU

SPT Hammer Ref: 302
 Test Date: 04/01/2019
 Report Date: 04/01/2019
 File Name: 302.spt
 Test Operator: CR

Instrumented Rod Data

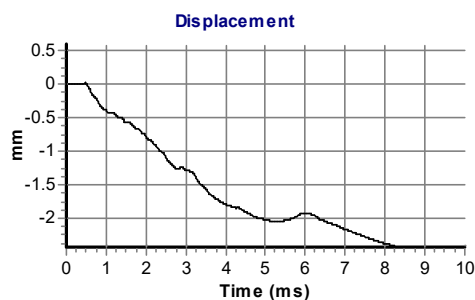
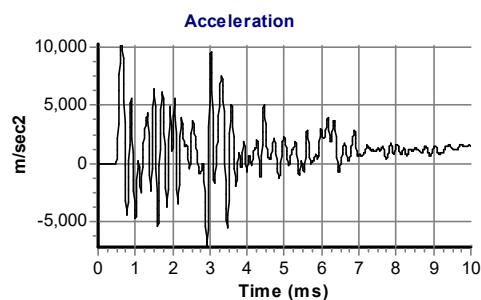
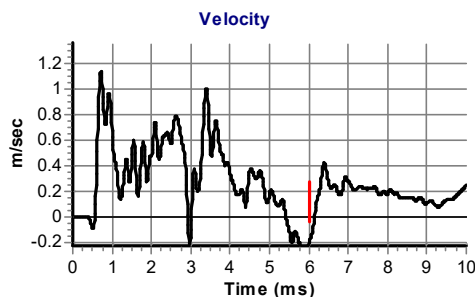
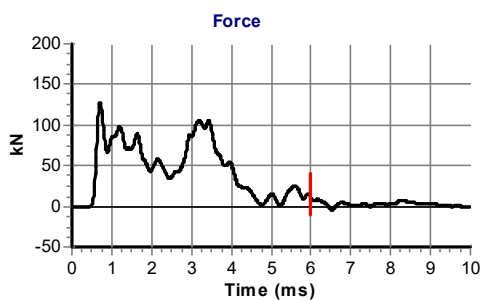
Diameter d_r (mm): 54
 Wall Thickness t_r (mm): 6.3
 Assumed Modulus E_a (GPa): 208
 Accelerometer No.1: 11941
 Accelerometer No.2: 11942

SPT Hammer Information

Hammer Mass m (kg): 63.5
 Falling Height h (mm): 760
 SPT String Length L (m): 10.0

Comments / Location

Recommended calibration interval is 6 months



Calculations

Area of Rod A (mm²): 944
 Theoretical Energy E_{theor} (J): 473
 Measured Energy E_{meas} (J): 285

Energy Ratio E_r (%):

60

CR

Signed: CR

Title: Operator



Contract:	Weldale Street, Reading	Contract No:	D9298
Client:	Ropemaker Properties Ltd.		
Drawing:	Instrumentation summary		

Table No.	B1	Date:	08/04/2019		

BH No.	Instrument Type	Instrument Dia. (mm)	Response Zone		Surface Protection
			Top (m)	Base (m)	
BHA	SP	50	2.00	30.00	Flush Cover
BHB	SP	50	2.00	12.00	Flush Cover
BHC	SP	50	13.50	32.00	Flush Cover
BHD1	SP	50	4.00	12.50	Flush Cover
BHE	SP	50	16.00	40.00	Flush Cover
BHF	SP	50	2.50	16.00	Flush Cover
BHF	SP	50	0.50	1.50	Flush Cover
WSF	SP	50	1.50	4.00	Flush cover
WSIC	SP	50	1.00	6.00	Flush Cover



Contract: Weldale Street, Reading	Contract No: D9298
Client: Ropemaker Properties Ltd	

TEL: 0191 378 3151
FAX: 0191 378 3157

Table Title:
Installation Summary Table

Table No: B1	Date: April 2019	Scale: NA	Status: Final	Drawn by: SH
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**Borehole
BHA**

Site: Weldale Street, Reading

GL (m AOD)	Scale 1:50
41.07	
Easting:	Northing:
470975.00	173634.20

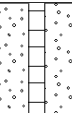
Sheet 1 of 3

Dates:	11/02/2019 - 13/02/2019
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Continued on next sheet

										Continued on next sheet							
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks					
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)						
								200	1.60	200	1.60						
										146	30.00						
Log last updated 06/06/2019																	

				BOREHOLE RECORD										Borehole BHA				
Contract No: D9298					Site: Weldale Street, Reading										GL (m AOD) 41.07 Easting: 470975.00 Scale 1:50 Northing: 173634.20			
Client: Ropemaker Properties Ltd.										Driller: JH		Logged By: AH		Sheet 2 of 3				
Method: Rotary Core Drilling using Geobore-S										Checked By: BC		Dates: 11/02/2019 - 13/02/2019						
SAMPLE DETAILS							(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill						
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI												
SPT (S)	11.00 - 11.42 11.00 - 12.00	N=50+ (4,11/17, 10,14,9 for 50mm)	60	40	10	NI	11 (1.60) Dry	Weak locally very weak medium density white CHALK. Fractures are generally extremely closely to very closely spaced, subhorizontal, planar, infilled with silt. (Grade C5-C3) Occasional gravel and cobble sized rinded flints. <u>10.55-10.80m: Subvertical fracture planar, smooth and clean.</u>										
						20												
						NI												
						AZC L												
SPT (S)	12.00 - 12.50		60	10	0	NI	12	<u>12.05-12.30m: Subvertical fracture planar, smooth and clean</u>										
						25												
						22												
						AZC L												
SPT (S)	12.50 - 12.95 12.50 - 13.50	N=39 (4,3/7,8,1 2,12)	60	50	0	NI	13	12/02/2019 1700 (1.60) 13/02/2019 0800 (1.60) (1.60) Dry										
						40												
						10												
						AZC L												
SPT (S)	13.50 - 14.00		0	0	0	NI	14	<u>At 13.50m: Driller noted flints</u>										
						12												
						20												
						AZC L												
SPT (S)	14.00 - 14.45 14.00 - 15.00	N=20 (4,4/3,6,6 ,5)	90	20	10	NI	15	<u>14.45m-14.50m: Subvertical fracture planar smooth and clean</u>										
						20												
						30												
						AZC L												
SPT (S)	15.00 - 15.18 15.00 - 16.50	N=50+ (8,17/50 for 35mm)	86	20	10	NI	16	<u>15.55m-15.07m: Subvertical fracture undulose, smooth and clean</u>	(13.30)									
						12												
						40												
						AZC L												
SPT (S)	16.50 - 18.00		66	43	23	NI	17	<u>17.30m-17.50m: Subvertical fracture planar smooth and clean</u>										
						8												
						18												
						AZC L												
SPT (S)	18.00 - 19.50		90	70	40	NI	18	<u>18.40m-18.70m: Subvertical fracture planar, smooth and clean</u> <u>18.60m-18.70m: Subvertical fracture planar smooth infilled up to 10mm with gravel size fragments</u>										
						8												
						19												
						NI												
SPT (S)	19.50 - 21.00					NI	20											
						4												
						NI												
						NI												
Continued on next sheet																		
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks						
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)							
								200	1.60	200	1.60							
										146	30.00							
Log last updated 06/06/2019																		

				BOREHOLE RECORD										Borehole BHA			
Contract No: D9298				Site: Weldale Street, Reading										GL (m AOD) 41.07 Easting: 470975.00 Scale 1:50 Northing: 173634.20			
Client: Ropemaker Properties Ltd.										Driller: JH		Logged By: AH		Sheet 3 of 3			
Method: Rotary Core Drilling using Geobore-S										Checked By: BC		Dates: 11/02/2019 - 13/02/2019					
SAMPLE DETAILS							(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill					
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI											
ES	21.00 - 22.50			100	80	73	21	Weak locally very weak medium density white CHALK. Fractures are generally extremely closely to very closely spaced, subhorizontal, planar, infilled with silt. (Grade C5-C3) Occasional gravel and cobble sized rinded flints.		19.07							
				7	21.00m-21.10m: Subvertical fracture planar, smooth and clean												
	22.50 - 24.00			86	66	53	22	21.55m-21.65m: Subvertical fracture, planar, smooth and clean									
				AZC L	Medium strong, medium to high density white CHALK fractures are closely spaced, subhorizontal, planar and smooth. (Grade C3)												
	24.00 - 25.50			86	86	86	23										
				8													
	25.50 - 27.00			90	70	66	24										
				A...	8												
	27.00 - 28.50			93	73	66	25	25.00m-25.15m: Subvertical fracture, planar, smooth and clean									
				12	NI												
28.50 - 30.00	100	70	66	26	Weak to medium strong high density white CHALK. Fractures are closely to medium spaced, subhorizontal, planar smooth, locally with orange staining. (Grade C2)												
	4	NI															
29.00	100	86	86	27													
	5	NI															
30.00				28													
	15	NI															
3013/02/2019 1700 (1.60) 5.80							End of Borehole at 30.00 m										
Ground Water (m)							Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks			
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	1. Hand dug inspection pit to 1.20m. 2. No groundwater encountered.					
								200	1.60	200	1.60						
										146	30.00						
Log last updated 06/06/2019																	



**Borehole
BHA1**

Site: Weldale Street, Reading

GL (m AOD)	Scale 1:50
41.01	
Easting:	Northing:
471063.50	173654.40

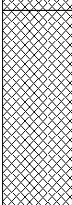
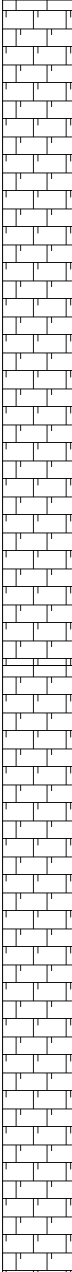
Driller: JH

Logged By: AH

Sheet 1 of 3

Checked By: BC

Dates:	20/02/2019 - 21/02/2019
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SAMPLE DETAILS							(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI						
							1.20 - 30.00 100 % Air	MADE GROUND: Macadam.	(0.15)	40.86		
								MADE GROUND: Grey concrete.	0.15			
								MADE GROUND: Dark red brown silty, sandy gravel. Gravel is angular to subrounded, fine to coarse of brick and concrete.	(0.15) 0.30			
								1		(1.30)		
								2		1.60	39.41	
3												
4		(4.40)										
5												
6		6.00	35.01									
7												
8												
9												
10												

Continued on next sheet

Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
								200	6.00	200	6.00	
										175	18.00	
										146	30.00	
Log last updated 06/06/2019												

				BOREHOLE RECORD										Borehole BHA1				
Contract No: D9298					Site: Weldale Street, Reading										GL (m AOD) 41.01 Easting: 471063.50 Scale 1:50 Northing: 173654.40			
Client: Ropemaker Properties Ltd.										Driller: JH		Logged By: AH		Sheet 2 of 3				
Method: Rotary Open Hole Drilling										Checked By: BC		Dates: 20/02/2019 - 21/02/2019						
SAMPLE DETAILS							(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill						
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI												
							(18.00) Dry	White CHALK with occasional flint gravel. (Strong hydrocarbon odour) (Identified from flush returns)	(12.00)									
								11										
								12										
								13										
								14										
								15										
								16										
								17										
								18										
								19										
20																		
SPT (S)	18.00 - 18.45	N=14 (1,1/2,3,4 ,5)						White CHALK. (Identified from flush returns)	18.00	23.01								
Continued on next sheet																		
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks						
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)							
								200	6.00	200	6.00							
										175	18.00		1. Hand dug inspection pit to 1.20m. 2. No groundwater encountered.					
										146	30.00							
Log last updated 06/06/2019																		

 		BOREHOLE RECORD				Borehole BHB						
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.39		Scale 1:50				
						Easting: 471004.30		Northing: 173618.20				
Client: Ropemaker Properties Ltd.				Driller: PS/JH		Logged By: AH		Sheet 1 of 4				
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S				Checked By: BC		Dates:		13/02/2019 - 19/02/2019				
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill		
Type	Depth From-To (m)	Insitu Testing										
B ES	0.20 - 0.50 0.20	PID: 0ppmv	1	MADE GROUND: Macadam.	(0.15)	41.24						
PID	0.50			MADE GROUND: Dark grey concrete.	0.15							
B ES	0.60 - 1.00 0.60			MADE GROUND: Dark reddish brown, gravelly sand with low cobble content. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of brick, concrete, steel and rare chalk. Cobbles are subangular of brick and concrete.	(0.15) 0.30							
B ES	1.00 - 1.50 1.00				(0.70)							
PID	1.00	PID: 1ppmv	(1.20) Dry	Structureless CHALK composed of white slightly gravelly, sandy SILT. Gravel is angular, fine to coarse, very weak, medium density white chalk with occasional angular medium to coarse gravel of flint. (Grade Dm).	1.00	40.39						
D	1.20	N=16 (6,4/4,4,4,4)										
SPT (S)	1.20 - 1.65	PID: 0ppmv										
PID	1.60											
D U PID	2.00 2.00 - 2.45 2.20	59 blows PID: 2ppmv	2									
D	2.45											
D SPT (S)	3.00 3.00 - 3.45	N=17 (2,2/5,4,4,4)	3 (2.50) Dry									
D U	4.00 4.00 - 4.45	56 blows	4									
D B ES	4.45 4.50 - 5.50 4.50			4.50-6.00m: Blue contamination with strong hydrocarbon odour.								
D SPT (S)	5.00 5.00 - 5.45	N=14 (2,2/2,3,4,5)	5 (2.50) Dry		(8.00)							
D	6.00		6									
B UF	6.50 - 8.00 6.50 - 6.95	165 blows	7									
D SPT (S)	8.00 8.00 - 8.45	N=16 (1,2/4,3,4,5)	8 (8.00) Dry									
D ES	8.50 8.50											
D	9.00											
D SPT (S)	9.50 9.50 - 9.95	N=29 (2,3/6,7,7,9)	9 (9.50) 6.50	Structureless CHALK composed of slightly sandy, silty angular fine to coarse gravel. Gravel is very weak to weak, medium density, white chalk with occasional angular coarse gravel of flint. Matrix is white with occasional light brown staining. (Grade Dc).	9.00	32.39						
D	10.00		10									
Continued on next sheet												
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks 1. Hand dug inspection pit to 1.20m. 2. No groundwater encountered.
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
5.30	2.50	5.20	20					250	2.00	250	0.00	
								200	12.60	200	12.60	
										146	40.00	
Log last updated 06/06/2019												

 		BOREHOLE RECORD				Borehole BHB						
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.39 Easting: 471004.30 Northing: 173618.20 Scale 1:50						
Client: Ropemaker Properties Ltd.				Driller: PS/JH	Logged By: AH	Sheet 2 of 4						
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S				Checked By: BC		Dates: 13/02/2019 - 19/02/2019						
SAMPLE DETAILS				(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill			
Type	Depth From-To (m)	Insitu Testing										
D SPT (S)	11.00 11.00 - 11.45	N=34 (7,5/6,7,10,11)				11 (11.00) 9.20						
D	12.00					12						
SPT (S)	12.60 - 13.50		100	88	16	12	13		28.79			
	13.50 - 15.00					NI			(1.95)			
						5	14					
			93	40	20	NI						
						12						
						NI			26.84			
	15.00 - 15.28 15.00 - 16.50	N=50+ (6,19 for 13mm/17,18,15 for 40mm)				AZC L	15 (15.00) Dry		(1.45)			
			73	33	6	40						
						20	16		25.39			
	16.50 - 18.00					A...			(1.30)			
SPT (S)	18.00 - 18.22 18.00 - 19.50	N=50+ (7,13/50 for 70mm)				AZC L	18 (18.00) Dry					
						NI						
			83	53	46		19		24.09			
						6						
	19.50 - 21.00						20					
TCR% SCR% ROD% FI				Continued on next sheet								
Ground Water (m)				Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks	
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)		Depth (m)
5.30	2.50	5.20	20					250	2.00	250		0.00
								200	12.60	200		12.60
										146	40.00	
Log last updated 06/06/2019												

				BOREHOLE RECORD						Borehole BHB					
Contract No: D9298				Site: Weldale Street, Reading						GL (m AOD) 41.39 Easting: 471004.30 Scale 1:50 Northing: 173618.20					
Client: Ropemaker Properties Ltd.								Driller: PS/JH		Logged By: AH		Sheet 3 of 4			
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S								Checked By: BC		Dates: 13/02/2019 - 19/02/2019					
SAMPLE DETAILS								(Casing) Groundwater		STRATA RECORD Description		Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI									
SPT (S)	21.00 - 21.08 21.00 - 22.50 22.50 - 24.00	N=50+ (9,16 for 0mm/50 for 0mm)	100	93	80		20	(21.00) Dry	Strong high density white CHALK. Fractures are very closely to closely spaced, subhorizontal, planar, smooth with silt infill. Occasional gravel and cobble sized rinded flints. (Grade C3).	(6.20)					
							8								
			93	80	66		22								
							NI								
SPT (S)	24.00 - 24.12 24.00 - 25.50 25.50 - 27.00	N=50+ (11,14/50 for 30mm)					A...	2414/02/2019 1700 (12.60) 5.80 18/02/2019 0800 (12.60) 4.80 (24.00) Dry	Weak, locally very weak medium density white CHALK. Fractures are closely spaced, subhorizontal planar, smooth with silt infill. (Grade C5-C3) Occasional gravel and cobble sized rinded flints.	23.50	17.89				
			93	86	80		4								
							20								
			100	93	80		25								
SPT (S)	27.00 - 27.35 27.00 - 28.50 28.50 - 30.00	N=50+ (11,11/14, 16,20 for 50mm)						(27.00) Dry							
							8								
			100	93	86		26								
							NI								
			93	86	66		3								
							NI								
							5								
			100	93	66		12								
							NI								
							29								
							30								
							A...								
Continued on next sheet															
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks			
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)				
5.30	2.50	5.20	20					250 200	2.00 12.60	250 200 146	0.00 12.60 40.00				
Log last updated 06/06/2019															



**Borehole
BHB**

Site: Weldale Street, Reading

GL (m AOD)	Scale 1:50
41.39	
Easting:	Northing:
471004.30	173618.20

Driller: PS/JH
Checked By: BC

Sheet 4 of 4

Dates: 13/02/2019 - 19/02/2019

Groundwater
(casing)

Depth
(m)Level
(m AOD)

Legend

Well/
Backfill

SPT (S)	30.00 - 30.22 30.00 - 31.50	N=50+ (9,16/50 for 70mm)						
SPT (S)	31.50 - 33.00	N=50+ (9,16/50 for 70mm)	93	76	66	12	31	
						NI		
						12		
						NI		
			100	70	56	12	32	
						40		
SPT (S)	33.00 - 33.45 33.00 - 34.50	N=49 (9,9/12,1 4,9,14)				3		
						NI		
						5		
						NI		
			100	73	53			
SPT (S)	34.50 - 36.00	N=50+ (25 for 10mm/50 for 0mm)						
			100	93	80			
						8		
SPT (S)	36.00 - 36.01 36.00 - 37.50	N=50+ (25 for 10mm/50 for 0mm)						
			100	86	33			
SPT (S)	37.50 - 39.00	N=50+ (25 for 10mm/50 for 0mm)						
			100	86	73	4	38	
						NI		
SPT (S)	39.00 - 39.00 39.00 - 40.00	N=50+ (25 for 0mm/50 for 0mm)						
						3	39	
			100	70	50	NI		
						3		

Weak, locally very weak medium density white CHALK. Fractures are closely spaced, subhorizontal planar, smooth with silt infill. (Grade C5-C3) Occasional gravel and cobble sized rimmed flints.

$$= (16.50)$$

1.39

End of Borehole at 40.00 m

Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
5.30	2.50	5.20	20					250	2.00	250	0.00	
								200	12.60	200	12.60	
										146	40.00	
Log last updated 06/06/2019												

				BOREHOLE RECORD						Borehole BHC														
Contract No: D9298				Site: Weldale Street, Reading						GL (m AOD) 41.15 Easting: 470995.90 Scale 1:50 Northing: 173580.30														
Client: Ropemaker Properties Ltd.								Driller: PS/JH		Logged By: AH		Sheet 2 of 4												
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S								Checked By: BC		Dates: 19/02/2019 - 23/02/2019														
SAMPLE DETAILS																								
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI	(Casing) Groundwater	STRATA RECORD Description				Depth (m)	Level (m AOD)	Legend	Well/ Backfill									
SPT (S)	10.50 - 12.00	N=50+ (6,9/12,1 2,14,12 for 70mm)				30	(12.00) Dry	Weak locally very weak medium density white CHALK. Fractures are closely spaced, subhorizontal, planar smooth with silt infill. (Grade C5-C3) Occasional gravel sized rinded flints. <u>10.05m-10.50m: Subvertical fracture stepped smooth with silt infill</u>				(6.80)												
						AZC L		11																
			73	20	6	NI																		
						20																		
						NI		12																
	12.00 - 12.44							AZC L	1521/02/2019 1700 (6.00) 5.60 22/02/2019 0800 (6.00) 5.60 (15.00) Dry	Very weak, low density white CHALK. Fractures are very closely to closely spaced subhorizontal, planar smooth with silt infill. (Grade C4)						15.00	26.15							
	12.00 - 13.50							NI		9														
			63	33	26	NI		10																
						20		13																
						NI																		
13.50 - 15.00					8		<u>12.94m-13.05m: Subvertical fracture undulating smooth with silt infill</u>																	
					NI	14																		
	100	73	0	40																				
					8																			
SPT (S)	15.00 - 15.32	N=50+ (3,7/14,1 7,34)					1521/02/2019 1700 (6.00) 5.60 22/02/2019 0800 (6.00) 5.60 (15.00) Dry	Very weak, low density white CHALK. Fractures are very closely to closely spaced subhorizontal, planar smooth with silt infill. (Grade C4)				15.00	26.15											
	15.00 - 16.50							AZC L	15															
						NI		16																
			63	33	20	5																		
						NI		17																
	16.50 - 18.00							20		Zone of low recovery. Core loss presumed to be more weathered material. Recovered core compromises GRAVEL size fragments of white chalk. Driller records very soft chalk.						16.50	24.65							
								NI	18															
								AZC L	19															
			20	0	0																			
								NI	20															
18.00 - 18.33	N=50+ (4,8/15,2 0,15 for 30mm)					1521/02/2019 1700 (6.00) 5.60 22/02/2019 0800 (6.00) 5.60 (15.00) Dry	Weak locally very weak, medium density white CHALK. Fractures are closely spaced, subhorizontal, planar smooth with silt infill (Grade C5-C3) Occasional gravel sized rinded flints. <u>18.95m-19.20m: Subvertical fracture planar smooth and clean.</u>				18.50	22.65												
18.00 - 19.50							AZC L	21																
							NI	22																
		66	53	83																				
							NI	23																
19.50 - 21.00							5																	
							NI	24																
							5																	
							20																	
Continued on next sheet																								
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks												
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	1. Hand dug inspection pit to 1.20m.												
5.30	2.00	5.10	20					250	1.50	250	1.50													
								200	5.60	200	5.60													
										146	33.00													
Log last updated 06/06/2019																								



**Borehole
BHC**

Site: Weldale Street, Reading

GL (m AOD)	Scale 1:50
41.15	
Easting:	Northing:
470995.90	173580.30

Logged By: AH

Sheet 3 of 4

Checked By: BC

Dates:	19/02/2019 - 23/02/2019
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**(Casing)
Groundwater**

Depth
(m)Level
(m AOD)

Legend

Well/
Backfill

SPT (S)		N=50+ (9,11/11,1 5,16,8 for 15mm)	F	C	L	NI	21	(21.00) Dry
21.00 - 21.39	21.00 - 22.50					5		
			73	60	53	NI		
						AZC L		
			43	33	30	NI		
						3		
	22.50 - 24.00					NI 12		
			100	86	73	5		
						NI		
SPT (S)	24.00 - 24.33	N=50+ (6,12/15, 21,14 for 30mm)				11		
	24.00 - 25.50					AZC L		
						NI		
			73	63	53	8		
	25.50 - 27.00					AZC L		
			33	30	0	NI		
						12		
SPT (S)	27.00 - 27.40	N=50+ (7,9/13,1 4,16,7 for 30mm)				NI		
	27.00 - 27.50		40	0	0	AZC L		(27.00) Dry
	27.50 - 28.50							
			90	90	40	12		
	28.50 - 30.00					A 12		
						NI		
						12		
			93	73	33	NI		
						8		
								3022/02/2019 1700 (5.60) 5.10

Weak locally very weak, medium density white CHALK.
Fractures are closely spaced, subhorizontal, planar smooth
with silt infill (Grade C5-C3) Occasional gravel sized rinded
flints.

24.70m-24.90m: Subvertical fracture planar, smooth with silt infill.

Zone of low recovery. Core loss presumed to be more weathered material. Recovered core compromises GRAVEL size fragments of white chalk. Driller reports very soft chalk.

Weak locally very weak, medium density white CHALK. Fractures are closely spaced, subhorizontal, planar smooth with silt infill (Grade C5-C3). Occasional gravel sized rimmed flints.

28.00m-28.15m: Subvertical fracture planar smooth and clean.

Continued on next sheet

Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter	
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)
5.30	2.00	5.10	20					250	1.50	250	1.50
								200	5.60	200	5.60
										146	33.00
Log last updated 06/06/2019											

General Remarks	
1. Hand dug inspection pit to 1.20m.	

Log last updated 06/06/2019



Borehole
BHC

Site: Weldale Street, Reading

GL (m AOD)	Scale 1:50
41.15	
Easting:	Northing:
470995.90	173580.30

Logged By: AH

Sheet 4 of 4

Checked By: BC

Dates:	19/02/2019 - 23/02/2019
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STRATA RECORD

Description

STRATA RECORD							Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI	(Casing) Groundwater	Description		
SPT (S)	30.00 - 30.28 30.00 - 31.50	N=50+ (4,14/12, 38 for 60mm)	46	12	0	AZC L NI 13	23/02/2019 0800 (5.60) 5.10	Weak locally very weak, medium density white CHALK. Fractures are closely spaced, subhorizontal, planar smooth with silt infill (Grade C5-C3). Occasional gravel sized rinded flints.		
	31.50 - 33.00		25	46	26	AZC L NI 12 NI 12 NI 12	3323/02/2019 1700 (8.00) 5.16 (33.00) Dry	End of Borehole at 33.00 m		
SPT (S)	33.00 - 33.17	N=50+ (9,16/50 for 20mm)								

Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
5.30	2.00	5.10	20					250	1.50	250	1.50	
								200	5.60	200	5.60	
										146	33.00	
Log last updated 06/06/2019												



**Borehole
BHD**

GL (m AOD)	Scale 1:50
40.57	
Easting:	Northing:
471055.40	173647.70

Sheet 1 of 1

Dates:	14/02/2019
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Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
								250	1.30	250	1.30	1. Hand dug inspection pit to 1.20m. 2. No groundwater encountered. 3. Borehole terminated due to concrete obstruction.
Log last updated 06/06/2019												

				BOREHOLE RECORD				Borehole BHD1				
Contract No: D9298				Site: Weldale Street, Reading				GL (m AOD) 40.44		Scale 1:50		
								Easting: 471063.49		Northing: 173654.38		
Client: Ropemaker Properties Ltd.						Driller: PS		Logged By: AH		Sheet 1 of 2		
Method: Cable Percussive Boring						Checked By: BC		Dates: 27/02/2019 - 28/02/2019				
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill		
Type	Depth From-To (m)	Insitu Testing										
					MADE GROUND: Grey concrete with rebar.	(0.25)						
					MADE GROUND: Reddish brown slightly silty, gravelly sand with low cobble content. Sand is fine to coarse. Gravel is angular, fine to coarse of brick, flint, concrete and chalk. Cobble are of angular of bricks and concrete.	0.25	40.19					
					MADE GROUND: Soft brown slightly sandy, slightly gravelly clay with low to medium cobble content. Gravel is angular, fine to coarse of brick, flint, concrete and chalk. Cobbles are angular of brick and coarse.	(0.55)						
				1	MADE GROUND: Dark brown slightly silty, gravelly sand. Sand is fine to coarse. Occasional thin bands of clay noted. Gravel is angular, fine to coarse of brick, concrete, metal and flint.	0.80	39.64					
					MADE GROUND: Red brown slightly silty, gravelly sand with low to medium cobble content. Sand is fine to coarse. Gravel is angular, fine to coarse of brick, flint, concrete and chalk. Cobbles are angular of brick and concrete.	(0.50)						
					Structureless CHALK composed of gravelly sandy silt. Gravel is angular fine to coarse very weak low to medium density white chalk. (Grade Dc)	1.30	39.14					
				2		(0.50)	38.64					
						1.80						
						(0.60)						
						2.40	38.04					
				3								
B ES PID	3.50 - 4.00 3.50 3.50	PID: 10.10ppmv										
B U	4.00 - 4.45 4.00 - 4.45	18 blows		4								
D ES SPT (S) PID	5.00 5.00 5.00 - 5.45 5.00	N=7 (7.4/3,1,2,1) PID: 5.00ppmv		5	(5.00) Dry							
D	6.00			6								
D SPT (S)	6.50 6.50 - 6.95	N=8 (2,2/2,3,2,1)			(6.50) 5.00							
D ES PID	7.00 7.00 7.00	PID: 0.00ppmv		7								
D SPT (S)	8.00 8.00 - 8.45	N=14 (1,4/4,4,3,3)		8	(8.00) 5.00							
D	9.00			9								
D SPT (S)	9.50 9.50 - 9.88	N=8 (5,4/1,1,2,4)			(9.50) 5.50							
D	10.00			10								
					Continued on next sheet							
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
4.30	4.00	4.13	20					200	4.00	200	4.00	
								150	11.00	150	18.37	
Log last updated 06/06/2019												



Borehole BHD1

Site: Weldale Street, Reading

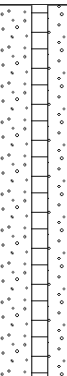
GL (m AOD)	Scale 1:50
40.44	
Easting:	Northing:
471063.49	173654.38

Logged By: AH

Sheet 2 of 2

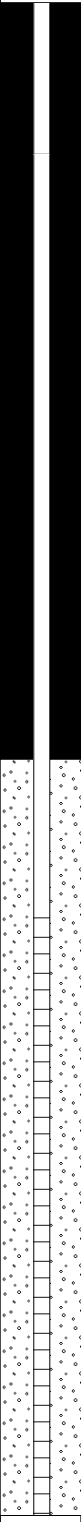
Checked By: BC

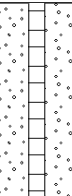
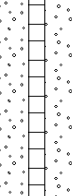
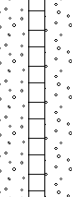
Dates:	27/02/2019 - 28/02/2019
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SAMPLE DETAILS			(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	Insitu Testing						
ES PID	10.00 10.00	PID: 10.00ppmv		Structureless CHALK composed of gravelly sandy silt. Gravel is angular fine to coarse very weak low to medium density white chalk. (Grade Dc)	(15.97)			
D SPT (S)	11.00 11.00 - 11.45	N=37 (4,6/8,10,10,9)	11 (11.00) 7.50 27/02/2019 1700 (11.00) 7.50 28/02/2019 0800 (11.00) 4.00					
D	12.00		12					
SPT (S)	12.50 - 12.93	N=50+ (2,10/10,15,16,9 for 55mm)	(12.00) Dry					
D	13.00		13					
D SPT (S)	14.00 14.00 - 14.30	N=50+ (5,8/9,41 for 70mm)	14					
D	15.00		15					
D SPT (S)	15.50 15.50 - 15.92	N=50+ (3,7/10,17,19,4 for 40mm)						
D	16.00		16					
D SPT (S)	17.00 17.00 - 17.37	N=50+ (7,8/11,19,20 for 70mm)	17 (17.00) Dry					
D SPT (S)	18.00 18.00 - 18.30	N=50+ (6,10/12,19,19 for 70mm)	18 (18.00) Dry					
			28/02/2019 1700 (11.00)					
			19					
			20					
			End of Borehole at 18.37 m	18.37	22.07			

Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
4.30	4.00	4.13	20					200	4.00	200	4.00	
								150	11.00	150	18.37	
Log last updated 06/06/2019												

 		BOREHOLE RECORD				Borehole BHE						
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.41 Easting: 471067.70 Northing: 173611.90 Scale 1:50						
Client: Ropemaker Properties Ltd.				Driller: PS/JH	Logged By: AH	Sheet 1 of 5						
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S				Checked By: BC		Dates: 18/02/2019 - 28/02/2019						
SAMPLE DETAILS				(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill			
Type	Depth From-To (m)	Insitu Testing										
B ES B ES PID	0.25 - 0.50 0.25 0.50 - 1.00 0.50 0.50	PID: 0ppmv	1 (1.00) Dry	MADE GROUND: Dark grey concrete.	(0.25) 0.25	41.16						
B ES PID D SPT (S) B D ES PID D U	1.00 - 1.50 1.00 1.20 1.20 - 1.65 1.50 - 2.00 1.50 1.50 1.50 2.00 2.00 - 2.45	PID: 1ppmv N=12 (1,2/3,3,3,3)		MADE GROUND: Dark reddish brown silty, very gravelly fine to coarse sand. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of brick, concrete and steel with rare chalk. Cobbles and/or boulders of brick and concrete.	(1.25) 1.50							
D	2.45		2	Structureless CHALK composed of white gravelly, silty clay. Gravel is very weak medium density white chalk with occasional angular fine to coarse gravel of flint. (Grade Dm)	39.91							
D SPT (S)	3.00 3.00 - 3.45	N=27 (2,4/3,4,8,12)										
ES PID	3.50 3.50	PID: 4ppmv	3 (2.50) Dry		(4.00)							
D U	4.00 4.00 - 4.45	93 blows										
D	4.45 - 4.50		4									
D SPT (S)	5.00 5.00 - 5.45	N=13 (5,5/3,4,3,3)										
ES PID	5.50 5.50	PID: 5ppmv	5 (3.50) Dry	Structureless CHALK composed of slightly sandy, silty angular fine to coarse gravel. Gravel is very weak medium density, white chalk with occasional angular coarse gravels of flint. Matrix is white with occasional brown staining. (Strong hydrocarbon odour.) (Grade DC)	5.50	35.91						
B D	6.00 - 6.50 6.00											
D SPT (S)	6.50 6.50 - 6.95	N=25 (4,4/6,5,6,8)	6 (3.50) 3.90									
D ES PID	7.00 7.00 7.00	PID: 7ppmv										
D SPT (S)	8.00 8.00 - 8.45	N=8 (2,2/2,1,2,3)	7 (3.50) 5.90									
D	9.00											
D SPT (S)	9.50 9.50 - 9.95	N=28 (4,5/7,7,6,8)	8 (3.50) 5.50		(5.80)							
D	10.00											
				Continued on next sheet								
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
6.10	3.50	5.95	20		0.00	1.00	01:30	250	2.00	250	2.00	
								200	3.50	200	11.45	
										146	40.00	
Log last updated 06/06/2019												

 		BOREHOLE RECORD				Borehole BHE						
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.41		Scale 1:50				
						Easting: 471067.70		Northing: 173611.90				
Client: Ropemaker Properties Ltd.				Driller: PS/JH		Logged By: AH		Sheet 2 of 5				
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S				Checked By: BC		Dates: 18/02/2019 - 28/02/2019						
SAMPLE DETAILS				(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill			
Type	Depth From-To (m)	Insitu Testing										
ES PID	10.00 10.00	PID: 10ppmv			Structureless CHALK composed of slightly sandy, silty angular fine to coarse gravel. Gravel is very weak medium density, white chalk with occasional angular coarse gravels of flint. Matrix is white with occasional brown staining. (Strong hydrocarbon odour.) (Grade DC) Extremely weak low density white CHALK. Fractures are very closely to closely spaced, subhorizontal planar smooth with silt infill. (Grade C5-C3). 12.55m-12.70m: Subvertical fracture planar, smooth and clean 12.90m: Subvertical fracture planar smooth and clean 14.00m-14.05m: Subvertical fracture planar smooth and clean Very weak to weak medium density white CHALK. Fractures are closely to very closely spaced subhorizontal, planar, smooth and clean. (Grade C5-C3). 15.55m-16.50m: Subvertical fracture planar smooth and clean.	11.30	30.11					
D SPT (S)	11.00 11.00 - 11.41 11.00 - 12.00	N=36 (5,10/9,9, 8,10)	70	0						0	AZC L	11
SPT (S)	12.00 - 12.45 12.00 - 13.50	N=13 (1,2/2,4,2 .5)	86	60						0	NI	12
											A...	
											NI	
	13.50 - 15.00		100	33						13	NI	13
											5	
											NI	
SPT (S)	15.00 - 15.45 15.00 - 16.50	N=45 (4,4/7,10, 14,14)	86	33						0	AZC L	14
											NI	
											NI	
	16.50 - 18.00		100	100						7	NI	15
											25	
											NI	
SPT (S)	18.00 - 18.22 18.00 - 19.50	N=50+ (4,21/50 for 70mm)	86	73						73	A...	16
											NI	
											NI	
	19.50 - 21.00										6	17
							18					
							19					
							20					
TCR%SCR%ROD%FI				Continued on next sheet								
Ground Water (m)				Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks 1. Hand dug inspection pit to 1.20m.	
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)		Depth (m)
6.10	3.50	5.95	20		0.00	1.00	01:30	250	2.00	250		2.00
								200	3.50	200		11.45
										146		40.00
Log last updated 06/06/2019												

 		BOREHOLE RECORD				Borehole BHE											
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.41		Scale 1:50									
						Easting: 471067.70		Northing: 173611.90									
Client: Ropemaker Properties Ltd.				Driller: PS/JH		Logged By: AH		Sheet 3 of 5									
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S				Checked By: BC		Dates: 18/02/2019 - 28/02/2019											
SAMPLE DETAILS																	
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI	(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill					
SPT (S)	21.00 - 21.33 21.00 - 22.50	N=50+ (7,10/12, 22,16 for 30mm)	100	53	53	NI		Very weak to weak medium density white CHALK. Fractures are closely to very closely spaced subhorizontal, planar, smooth and clean. (Grade C5-C3). 20.55m-20.65m: Subvertical fracture planar smooth and clean.	(11.60)								
													AZC L	21			
													NI				
													30				
													5				
													NI	22			
													5				
													NI				
													9	23			
													100	93	66	NI	
SPT (C)	24.00 - 24.38 24.00 - 25.50	N=50+ (7,8/10,2 1,17,2 for 10mm)	80	40	26	AZC L											
													NI				
													5				
													NI	22			
													5				
													NI				
													9	23			
													100	93	66	NI	
													7				
													SPT (C)	27.00 - 27.37 27.00 - 28.50	N=50+ (9,12/17, 19,14 for 70mm)	93	73
8	28																
NI																	
27/02/2019 1700 (2.00) 6.20																	
28/02/2019 0800 (2.00) 6.20																	
28.60m-28.70m: Subvertical fracture, planar, smooth and clean																	
12	29																
NI																	
12																	
NI																	
100	80	53	NI														
	28.50 - 31.50																
													6	30			
Continued on next sheet																	
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks					
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	1. Hand dug inspection pit to 1.20m.					
6.10	3.50	5.95	20		0.00	1.00	01:30	250	2.00	250	2.00						
								200	3.50	200	11.45						
										146	40.00						
Log last updated 06/06/2019																	



**Borehole
BHE**

Site: Weldale Street, Reading

Scale 1:50

Northing:

Northing:
173611.90

Logged By: AH

Sheet 4 of 5

Checked By: BC

Dates: 18/02/2019 - 28/02/2019

STRATA RECORD

Description

Well/
Backfill

End of Borehole at 40.18 m

40.18

~~1.23~~

General Remarks	
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Log last updated 06/06/2019

				BOREHOLE RECORD										Borehole BHE												
Contract No: D9298					Site: Weldale Street, Reading										GL (m AOD) 41.41 Easting: 471067.70 Scale 1:50 Northing: 173611.90											
Client: Ropemaker Properties Ltd.										Driller: PS/JH		Logged By: AH		Sheet 5 of 5												
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S										Checked By: BC		Dates: 18/02/2019 - 28/02/2019														
SAMPLE DETAILS										STRATA RECORD										Depth (m)				Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)		N (cu)	TCR %	SCR %	RQD %	FI	(Casing) Groundwater	Description										Depth (m)	Level (m AOD)	Legend	Well/ Backfill				
SPT (S)	40.00 - 40.09		N=50+ (25 for 70mm/50 for 20mm)					28/02/2019 1700 (40.00) Dry																		
								41																		
								42																		
								43																		
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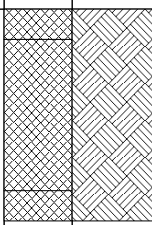
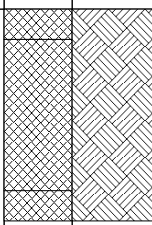
 		BOREHOLE RECORD				Borehole BHF						
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.27 Easting: 471070.60 Northing: 173596.10 Scale 1:50						
Client: Ropemaker Properties Ltd.				Driller: PS/JH	Logged By: AH	Sheet 1 of 5						
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S				Checked By: BC		Dates: 14/02/2019 - 26/02/2019						
SAMPLE DETAILS				(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill			
Type	Depth From-To (m)	Insitu Testing										
B ES B ES PID	0.25 - 0.50 0.25 0.50 - 1.00 0.50 0.50	PID: 0ppmv	14/02/2019 1700 (0.00) Dry	MADE GROUND: Dark grey concrete.	(0.25) 0.25	41.02						
B ES PID D SPT (S)	1.00 - 1.50 1.00 1.00 1.20 1.20 - 1.65	PID: 1ppmv N=34 (7,14/10,9,8,7)	115/02/2019 0800 (0.00) Dry (1.00) Dry	MADE GROUND: Dark red brown slightly silty, gravelly sand. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of brick, concrete, steel and rare chalk. Cobbles and/or boulders of brick and concrete.	(1.25) 1.50	39.77						
B D ES PID D U PID	1.50 - 2.00 1.50 1.50 1.50 2.00 2.00 - 2.45 2.20	PID: 0ppmv 82 blows PID: 2ppmv	2	Structureless CHALK composed of white slightly gravelly, slightly sandy silty clay. Gravel is angular, fine to coarse of very weak medium density white chalk with occasional angular, medium to coarse gravels of flint noted. (Grade Dm).								
D SPT (S)	2.45 - 2.50 3.00 3.00 - 3.45	N=14 (2,3/2,4,5)	3 (2.00) Dry									
D U	4.00 4.00 - 4.45	93 blows	4									
D ES PID	4.45 - 4.50 4.50 4.50	PID: 1ppmv		4.50m: Strong hydrocarbon odour noted from 4.50m.	(6.50)							
D SPT (S)	5.00 5.00 - 5.45	N=24 (3,4/4,5,6,9)	5									
ES PID	5.40 5.40	PID: 5ppmv										
D	6.00		6									
B UF	6.50 - 7.00 6.50 - 6.95	159 blows	15/02/2019 1700 (2.00) Dry 18/02/2019 0800 (2.00) Dry									
D ES PID	7.00 7.00 7.00	PID: 0ppmv	7									
B D SPT (S)	8.00 - 9.00 8.00 8.00 - 8.41	N=34 (3,6/6,8,9,11)	8 (8.00) 6.83	Structureless CHALK composed of slightly sandy, silty angular, coarse gravel. Gravel is angular, fine to coarse of very weak medium density white chalk with occasional angular coarse gravels of flint noted. Matrix is white with occasional brown staining. (Grade Dc).	8.00	33.27						
D	9.00		9									
D SPT (S)	9.50 9.50 - 9.95	N=31 (4,5/7,7,8,9)	(9.50) 6.71									
D	10.00		10		(4.00)							
Continued on next sheet												
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
6.50	6.50	6.15	20		1.20	1.30	00:50	250	1.00	250	1.50	
								200	11.00	200	11.00	
										146	40.18	
Log last updated 06/06/2019												

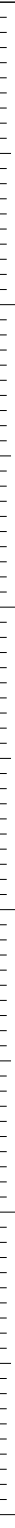
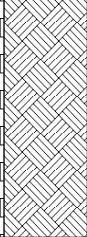
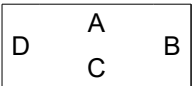
 		BOREHOLE RECORD				Borehole BHF								
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.27		Scale 1:50						
						Easting: 471070.60		Northing: 173596.10						
Client: Ropemaker Properties Ltd.					Driller: PS/JH		Logged By: AH		Sheet 2 of 5					
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S					Checked By: BC		Dates: 14/02/2019 - 26/02/2019							
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description		Depth (m)	Level (m AOD)	Legend	Well/ Backfill			
Type	Depth From-To (m)	Insitu Testing												
ES PID	10.00 10.00	PID: 10ppmv			11 (11.00) 7.19	Structureless CHALK composed of slightly sandy, silty angular, coarse gravel. Gravel is angular, fine to coarse of very weak medium density white chalk with occasional angular coarse gravels of flint noted. Matrix is white with occasional brown staining. (Grade Dc).								
D SPT (S)	11.00 11.00 - 11.42	N=50+ (12,13/13,14,13,10 for 45mm)												
SPT (S)	12.00 - 12.45 12.00 - 13.00	N=7 (1,1/2,2,2,1)	73	6	6	AZC L	13	Structureless CHALK composed of white sandy angular, fine to coarse gravel of low to medium density extremely weak chalk and occasional flint. (Strong hydrocarbon odour). (Grade Dc).		12.00	29.27			
	13.00 - 15.00													
SPT (S)	15.00 - 15.16 15.00 - 16.50	N=50+ (6,19/50 for 10mm)	93	80	6	12	16	Very weak to weak medium density white CHALK. Fractures are very closely to closely spaced subhorizontal, planar, smooth and clean. Occasional gravel and cobble sized rinded flints. (Grade C5-C33). 14.10-14.20m: Subvertical fracture planar, smooth and clean.		13.40	27.87			
	16.50 - 18.00													
SPT (S)	18.00 - 18.34 18.00 - 19.50	N=50+ (4,8/10,2,1,19 for 35mm)	46	13	15	AZC L	19	Continued on next sheet						
	19.50 - 21.00													
TCR%SCR%ROQ%FI														
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks 1. Hand dug inspection pit to 1.20m.		
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)			
6.50	6.50	6.15	20		1.20	1.30	00:50	250	1.00	250	1.50			
								200	11.00	200	11.00			
Log last updated 06/06/2019														

				BOREHOLE RECORD						Borehole BHF					
Contract No: D9298				Site: Weldale Street, Reading						GL (m AOD) 41.27 Easting: 471070.60 Scale 1:50 Northing: 173596.10					
Client: Ropemaker Properties Ltd.								Driller: PS/JH		Logged By: AH		Sheet 3 of 5			
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S								Checked By: BC		Dates: 14/02/2019 - 26/02/2019					
SAMPLE DETAILS								(Casing) Groundwater		STRATA RECORD Description		Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI									
SPT (S)	21.00 - 21.20 21.00 - 22.50	N=50+ (12,13/50 for 55mm)	100	36	36	40	21	Very weak to weak medium density white CHALK. Fractures are very closely to closely spaced subhorizontal, planar, smooth and clean. Occasional gravel and cobble sized rinded flints. (Grade C5-C33).							
							5								
							NI								
							22								
							20								
							5								
							NI								
							6								
							23								
							22.50 - 24.00								
SPT (S)	24.00 - 24.22 24.00 - 25.50	N=50+ (9,16/50 for 65mm)	100	73	40	20	21.70-21.85m: Subvertical fracture, planar, smooth, with silt infill.								
							5								
							NI								
							22								
							20								
							5								
							NI								
							6								
							23								
							22.50 - 24.00								
SPT (S)	24.00 - 24.22 24.00 - 25.50	N=50+ (9,16/50 for 65mm)	93	60	40	8	22.85m: Subvertical fracture, planar smooth with silt infill.								
							NI								
							23								
							20								
							5								
							NI								
							6								
							24								
							24.00 - 25.50								
							SPT (S)					25.50 - 27.00	N=50+ (10,15/50 for 70mm)	100	86
NI															
25															
3															
26															
NI															
5															
27															
25.50 - 27.00															
SPT (S)	27.00 - 27.22 27.00 - 28.50	N=50+ (10,15/50 for 70mm)	100	66	20	5		27.55-27.65m: Subvertical fracture, planar, smooth, clean with orange staining.							
							NI								
							26								
							5								
							27								
							NI								
							20								
							28								
							27.00 - 28.50								
							SPT (S)					28.50 - 30.00	93	80	66
NI															
29															
12															
28															
NI															
4															
27															
28.50 - 30.00															
3025/02/2019 1700 (2:00) 5:20															
Continued on next sheet															
Ground Water (m)				Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks				
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	1. Hand dug inspection pit to 1.20m.			
6.50	6.50	6.15	20		1.20	1.30	00:50	250	1.00	250	1.50				
								200	11.00	200	11.00				
									146	40.18					
Log last updated 06/06/2019															

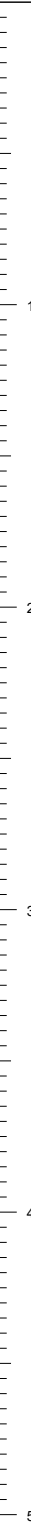
				BOREHOLE RECORD										Borehole BHF																			
Contract No: D9298					Site: Weldale Street, Reading										GL (m AOD) 41.27 Easting: 471070.60 Scale 1:50 Northing: 173596.10																		
Client: Ropemaker Properties Ltd.										Driller: PS/JH		Logged By: AH		Sheet 4 of 5																			
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S										Checked By: BC		Dates: 14/02/2019 - 26/02/2019																					
SAMPLE DETAILS										STRATA RECORD										Depth (m)				Level (m AOD)		Legend		Well/Backfill					
Type		Depth From-To (m)		N (cu)		TCR %		SCR %		RQD %		FI		(Casing) Groundwater		Description										Depth (m)		Level (m AOD)		Legend		Well/Backfill	
SPT (S)		30.00 - 30.24 30.00 - 31.50		N=50+ (4,10/19, 31 for 15mm)		100		93		53		5		26/02/2019 0800 (2.00) 5.40		Very weak to weak medium density white CHALK. Fractures are very closely to closely spaced subhorizontal, planar, smooth and clean. Occasional gravel and cobble sized rinded flints. (Grade C5-C33). 30.80-30.90m: Subvertical fracture, planar, smooth and clean. 30.95-31.00m: Subvertical fracture planar, smooth and clean.																	
		31.50 - 33.00										31																					
												32																					
												33																					
SPT (S)		33.00 - 33.22 33.00 - 34.50		N=50+ (9,16/50 for 70mm)		93		66		60		8																					
		34.50 - 36.00										34				34.20-34.40m: Subvertical fracture, planar, smooth and clean.																	
												35																					
												36																					
SPT (S)		36.00 - 36.21 36.00 - 37.50		N=50+ (10,15/50 for 60mm)		100		93		80		20																					
		37.50 - 39.00										37																					
												38				37.65-37.88m: Subvertical fracture planar, smooth and clean.																	
		39.00 - 40.18										39																					
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				BOREHOLE RECORD										Borehole BHF									
Contract No: D9298					Site: Weldale Street, Reading										GL (m AOD) 41.27 Easting: 471070.60 Scale 1:50 Northing: 173596.10								
Client: Ropemaker Properties Ltd.										Driller: PS/JH		Logged By: AH		Sheet 5 of 5									
Method: Cable Percussive Boring with Rotary Core Drilling Follow On using Geobore-S										Checked By: BC		Dates: 14/02/2019 - 26/02/2019											
SAMPLE DETAILS										STRATA RECORD													
Type	Depth From-To (m)	N (cu)	TCR %	SCR %	RQD %	FI	(Casing) Groundwater	Description						Depth (m)	Level (m AOD)	Legend	Well/ Backfill						
SPT (S)	40.00 - 40.18	N=50+ (11,14/50 for 30mm)					26/02/2019 1700 (2.00) 5.30																
							41																
							42																
							43																
							44																
							45																
							46																
							47																
							48																
							49																
							50																
Ground Water (m)										Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks						
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	1. Hand dug inspection pit to 1.20m.											
6.50	6.50	6.15	20		1.20	1.30	00:50	250	1.00	250	1.50												
								200	11.00	200	11.00												
										146	40.18												
Log last updated 06/06/2019																							

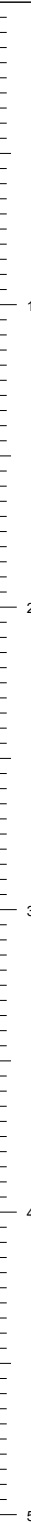
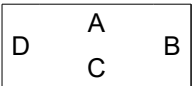
			TRIAL PIT RECORD			TP No. HPA			
Contract No.: D9298			Site: Weldale Street, Reading			GL (m AOD) 42.04 Easting: 470946.70 Scale 1:25 Northing: 173616.20			
Client: Ropemaker Properties Ltd.					Logged By: ASH		Sheet 1 of 1		
Method: Hand Excavated Trial Pit					Checked By: BC		Dates: 25/02/2019		
SAMPLE DETAILS			Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD) PID (ppm)	Legend	Backfill	
Type	Depth From-To (m)	Insitu Testing							
D ES PID	0.10 0.10 0.10	PID: 0.00ppmv		MADE GROUND: Dark brown slightly silty, slightly gravelly, sandy topsoil. Sand is fine to coarse. Gravel is angular, fine to coarse of brick, concrete, metal and flint.	(0.10) 0.10	41.94			
B D ES PID	0.50 0.50 0.50 0.50	PID: 377.10ppmv		MADE GROUND: Dark brown slightly silty, gravelly sand with low cobble content. Sand is fine to coarse. Gravel is angular, fine to coarse of brick, flint, concrete and chalk. Cobbles are angular of brick and concrete. <u>0.50m: Rebar 20mm</u>	(0.50) 0.60 (0.10) 0.70	41.44 41.34			
B D ES PID	1.00 1.00 1.00 1.00	PID: 0.00ppmv		MADE GROUND: Grey concrete. End of Trial Pit at 0.70 m					
Remarks				Ground Water (m)		Excavation Details		Orientation	
1. Pit formed to locate wall. 2. No groundwater encountered. 3. Hand pit terminated at 0.70m due to concrete obstruction.				Depth	Strike	Remarks		D A C B 100°	
				Dimensions: 0.50m x 0.70m					
				Stability: Unstable from 0.10m					
				Weather: Sunny					
						Remarks: Hand Excavated Trial Pit			

			TRIAL PIT RECORD			TP No. HPB		
Contract No.: D9298			Site: Weldale Street, Reading			GL (m AOD) 40.66 Easting: 470967.50 Scale 1:25 Northing: 173573.80		
Client: Ropemaker Properties Ltd.					Logged By: AH		Sheet 1 of 1	
Method: Hand Excavated Trial Pit					Checked By: BC		Dates: 25/02/2019	
SAMPLE DETAILS			Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD) PID (ppm)	Legend	Backfill
Type	Depth From-To (m)	Insitu Testing						
D ES PID	0.30 0.30 0.30	PID: 0.00ppmv		MADE GROUND: Dark grey concrete.	(0.20)	40.46 40.26		
	B D ES PID			1.00 1.00 1.00 1.00	MADE GROUND: Dark brown slightly silty, sandy gravel. Sand is fine to coarse. Gravel is angular, fine to coarse of limestone.			
				Structureless CHALK composed of slightly sandy, gravelly SILT. Gravel is angular, fine to coarse of extremely weak to weak low density white chalk. Matrix is white with occasional brown staining. (Grade Dc)	(0.80)			
				End of Trial Pit at 1.20 m	1.20	39.46		
Remarks				Ground Water (m)	Excavation Details		Orientation	
1. No groundwater encountered.				Depth Strike	Remarks	Dimensions: 0.70m x 0.50m		
						Stability: Stable		
						Weather: Sunny		
						Remarks: Hand Excavated Trial Pit		

70°

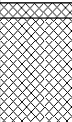
			TRIAL PIT RECORD			TP No. HPD				
Contract No.: D9298			Site: Weldale Street, Reading			GL (m AOD) 41.02 Easting: 470989.30 Scale 1:25 Northing: 173574.80				
Client: Ropemaker Properties Ltd.					Logged By: AH		Sheet 1 of 1			
Method: Machine Excavated Trial Pit					Checked By: BC		Dates: 20/02/2019			
SAMPLE DETAILS			Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD) PID (ppm)	Legend	Backfill		
Type	Depth From-To (m)	Insitu Testing								
B D ES PID	0.50	PID: 1.10ppmv		MADE GROUND: Grey concrete with rebar.	(0.20)	40.82				
	0.50			MADE GROUND: Red brown sandy gravel. Sand is fine to coarse. Gravel is angular to subangular, fine to coarse of limestone.	0.20					
	0.50			MADE GROUND: White silty sandy gravel. Sand is fine to coarse. Gravel is angular, fine to coarse of very weak high density white chalk and concrete.	(0.30)					
	0.50			End of Trial Pit at 0.90 m	0.50	40.52				
					(0.40)	40.12				
					0.90					
Remarks					Ground Water (m)		Excavation Details		Orientation	
1. No groundwater encountered.					Depth Strike	Remarks	Dimensions: 0.90m x 3.50m			
							Stability: Unstable			
							Weather: Sunny			
							Remarks: Machine Excavated Trial Pit			
							DACB 70°			

			TRIAL PIT RECORD			TP No. TTA			
Contract No.: D9298			Site: Weldale Street, Reading			GL (m AOD) 40.55 Easting: 471063.30 Scale 1:25 Northing: 173653.20			
Client: Ropemaker Properties Ltd.					Logged By: AH		Sheet 1 of 1		
Method: Machine Excavated Trial Pit					Checked By: BC		Dates: 19/02/2019		
SAMPLE DETAILS			Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD) PID (ppm)	Legend	Backfill	
Type	Depth From-To (m)	Insitu Testing							
B D ES PID	0.50 0.50 0.50 0.50	PID: 1.50ppmv	1	MADE GROUND: Grey concrete with rebar.	(0.25)	40.30			
	MADE GROUND: Reddish brown slightly silty, gravelly sand with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of brick, flint, concrete and chalk. Cobbles are of angular brick and concrete.			0.25 (0.55)					
	MADE GROUND: Soft brown slightly gravelly, sandy clay with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of brick, concrete, chalk and flint. Cobbles are angular of brick and concrete.			0.80 (0.50)					
B D ES PID	1.00 1.00 1.00 1.00	PID: 0.10ppmv	2	MADE GROUND: Dark brown slightly silty, gravelly sand. Sand is fine to coarse,. Gravel is fine to coarse, angular to subangular of brick, concrete, metal and flint. Pockets of clay noted throughout. <i>At 1.50m to 1.70m, 300mmx300mm boulder of concrete.</i>	1.30 (0.50)	39.25			
	MADE GROUND: Reddish brown slightly silty, gravelly sand with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of brick, flint, concrete and chalk. Cobbles are angular of bricks and concrete.			1.80 (0.60)					
B D ES PID	1.50 1.50 1.50 1.50	PID: 0.60ppmv	3	Structureless CHALK composed of uncompacted gravelly sandy silt. Gravel is very weak low to medium density white chalk.	2.40 (0.90)	38.75			
	End of Trial Pit at 3.30 m			3.30	37.25				
B D ES PID	2.00 2.00 2.00 2.00	PID: 0.00ppmv	4						
B D ES PID	3.00 3.00 3.00 3.00	PID: 0.00ppmv	5						
Remarks				Ground Water (m)		Excavation Details		Orientation	
1. No groundwater encountered.				Depth Strike	Remarks	Dimensions: 0.90m x 4.00m		D A C B 55°	
						Stability: Unstable from 1.00m			
						Weather: Sunny			
						Remarks: Machine Excavated Trial Pit			

			TRIAL PIT RECORD			TP No. TTB			
Contract No.: D9298			Site: Weldale Street, Reading			GL (m AOD) 40.69 Easting: 471065.60 Scale 1:25 Northing: 173650.50			
Client: Ropemaker Properties Ltd.				Logged By: AH		Sheet 1 of 1			
Method: Machine Excavated Trial Pit				Checked By: BC		Dates: 20/02/2019			
SAMPLE DETAILS			Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD) PID (ppm)	Legend	Backfill	
Type	Depth From-To (m)	Insitu Testing							
B D ES PID	0.50	PID: 0.00ppmv		MADE GROUND: Grey concrete with rebar.	(0.25)	40.44			
	0.50			MADE GROUND: Reddish brown slightly silty, gravelly sand with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of brick, flint, concrete and chalk. Cobbles are of angular brick and concrete.	0.25				
	0.50				(0.65)				
	0.50			End of Trial Pit at 0.90 m	0.90	39.79			
Remarks				Ground Water (m)		Excavation Details		Orientation	
1. No groundwater encountered.				Depth Strike	Remarks	Dimensions: 0.90m x 3.00m			
						Stability: Unstable			
						Weather: Sunny			
						Remarks: Machine Excavated Trial Pit			



Remarks	Ground Water (m)		Excavation Details	Orientation
1.No groundwater encountered. 2. Trial pit terminated at 0.90m due to suspected service.	Depth Strike	Remarks	Dimensions: 0.90m x 2.30m	D A B C 70°
			Stability: Unstable	
			Weather: Sunny	
			Remarks: Machine Excavated Trial Pit	

				BOREHOLE RECORD				Borehole WSA					
Contract No: D9298					Site: Weldale Street, Reading					GL (m AOD) 41.53 Scale 1:50 Easting: 471034.53 Northing: 173642.58			
Client: Ropemaker Properties Ltd.					Driller: SR		Logged By: PF		Sheet 1 of 1				
Method: Windowless Sampling					Checked By: BC				Dates: 02/04/2019				
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description		Depth (m)	Level (m AOD)	Legend	Well/ Backfill		
Type	Depth From-To (m)	Insitu Testing											
D ES ES	0.50		1	MADE GROUND: Ceramic tile and grout. MADE GROUND: Concrete.		(0.10) 0.10	41.43						
	0.50 0.50			MADE GROUND: Concrete.		0.80 0.80 (0.00)	40.73 40.73						
			2										
			3										
			4										
			5										
			6										
			7										
			8										
			9										
			10										
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks 1. No groundwater encountered. 2. Borehole terminated at 0.80m due to concrete obstruction.	
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)		
Log last updated 06/06/2019													



Borehole
WSB

Site: Weldale Street, Reading

GL (m AOD)	Scale 1:50
41.60	
Easting:	Northing:
471044.00	173614.90

Logged By: AH

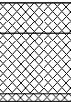
Sheet 1 of 1

Checked By: BC

Dates:	25/02/2019
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Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
										98	1.00	
										88	2.00	
										78	5.11	
Log last updated 06/06/2019												

				BOREHOLE RECORD				Borehole WSC				
Contract No: D9298				Site: Weldale Street, Reading				GL (m AOD) 41.61		Scale 1:50		
								Easting: 471047.50		Northing: 173588.70		
Client: Ropemaker Properties Ltd.						Driller: SR		Logged By: AH		Sheet 1 of 1		
Method: Windowless Sampling						Checked By: BC		Dates: 25/02/2019				
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description		Depth (m)	Level (m AOD)	Legend	Well/ Backfill	
Type	Depth From-To (m)	Insitu Testing										
D ES PID B D ES PID	0.30 0.30 0.30 0.50 0.50 0.50 0.50	PID: 0ppmv		1	MADE GROUND: Grey concrete.		(0.22)	41.39				
					MADE GROUND: Dark brown silty gravelly, fine to coarse sand. Gravel is angular, fine to coarse of brick, flint and concrete		0.22 (0.18) 0.40					
					MADE GROUND: Light brown silty, gravelly fine to coarse sand. Gravel is angular, fine to coarse of flint.		(0.90)					
B D SPT (S)	1.20 - 2.00 1.20 - 1.65 1.20 - 1.65	N=11 (2,2/2,3,3,3)		2	MADE GROUND: Dark brown silty, gravelly fine to coarse sand. Gravel is angular, fine to coarse of flint.		1.30	40.31				
							(1.15)					
D SPT (S)	2.00 - 2.45 2.00 - 2.42	N=50+ (2,4/9,14,16,11 for 50mm)		25/02/2019 1700 (0.00) (2.50) Dry	End of Borehole at 2.45 m		2.45	39.16				
SPT (S)	2.50 - 2.62	N=50+ (25 for 50mm/50 for 70mm)										
				3								
				4								
				5								
				6								
				7								
				8								
				9								
				10								
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
										98	2.00	
										88	2.62	
Log last updated 06/06/2019												

 		BOREHOLE RECORD				Borehole WSE						
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.16		Scale 1:50				
						Easting: 471067.60		Northing: 173637.30				
Client: Ropemaker Properties Ltd.				Driller: SR		Logged By: AH		Sheet 1 of 1				
Method: Windowless Sampling				Checked By: BC		Dates: 25/02/2019						
SAMPLE DETAILS			(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill				
Type	Depth From-To (m)	Insitu Testing										
B D ES PID	0.40	PID: 0ppmv	25/02/2019 1700 (0.00)	MADE GROUND: Grey concrete.	(0.20)	40.96						
	0.40			MADE GROUND: Dark brown silty, gravelly fine to coarse sand. Gravel is angular, fine to coarse of brick, flint and concrete	0.20							
	0.40			MADE GROUND: Concrete and rebar.	(0.40)							
	0.40			End of Borehole at 0.65 m	0.60 (0.05) 0.65							
			1									
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									
Ground Water (m)					Chiselling / Hard Strata		Casing Depths		Hole Diameter		General Remarks 1. No groundwater encountered. 2. Borehole terminated due to concrete obstruction.	
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)		Depth (m)
Log last updated 06/06/2019												

 		BOREHOLE RECORD				Borehole WSF						
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 42.44		Scale 1:50				
						Easting: 470948.00		Northing: 173612.20				
Client: Ropemaker Properties Ltd.				Driller: SR		Logged By: AH		Sheet 1 of 1				
Method: Windowless Sampling				Checked By: BC		Dates: 25/02/2019						
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill		
Type	Depth From-To (m)	Insitu Testing										
D ES PID	0.10 0.10 0.10	PID: 35ppmv		1	MADE GROUND: Dark brown silty, slightly gravelly sand. Sand is fine to coarse. Gravel is angular, fine to coarse of brick, tarmac, concrete and glass.	(0.10) 0.10	42.34					
B D ES PID	0.50 0.50 0.50 0.50	PID: 0ppmv			MADE GROUND: Dark brown slightly silty, gravelly sand. Sand is fine to coarse. Gravel is angular, fine to coarse of brick, flint and concrete	(0.50) 0.60	41.84					
B D ES PID	1.00 1.00 1.00 1.00	PID: 135ppmv			MADE GROUND: Soft dark brown slightly sandy, gravelly clay. Sand is fine to coarse. Gravel is angular, fine to coarse of flint and brick.	(0.60) 1.20	41.24					
B D ES PID	1.20 - 1.50 1.20 1.20 - 1.50 1.20 - 1.50	N=4 (1,1/1,1,1,1)			Structureless CHALK composed of slightly sandy, slightly gravelly SILT. Gravel is extremely weak to weak low density white chalk. Matrix is white with occasional brown staining.	(1.90) 3.10	39.34					
SPT (S) PID	1.20 - 1.65 1.20	PID: 1ppmv										
B D ES PID	1.70 - 2.00 1.70 - 2.00 1.70 - 2.00 1.70	PID: 100ppmv			2.70m-3.10m: Very high density white chalk with yellow staining	(3.35) 6.45	35.99					
SPT (S) D D D	2.00 - 2.45 2.00 - 2.45 2.50 - 2.70 2.90 - 3.00	N=14 (2,4/2,3,4,5)										
D D SPT (S)	3.00 - 3.45 3.00 - 3.45 3.00 - 3.45	N=10 (3,3/2,3,2,3)			Structureless CHALK composed of sandy gravelly silt. Gravel is extremely weak to weak low density white chalk. Matrix is white with occasional brown staining.	6.45	35.99					
D	3.50 - 3.70											
D D SPT (S)	3.90 - 4.00 4.00 - 4.45 4.00 - 4.45	N=15 (3,3/2,3,4,6)			4							
D D	4.50 - 4.70 4.70 - 5.00											
D SPT (S)	5.00 - 5.45 5.00 - 5.45	N=17 (4,3/3,4,4,6)		5								
D	5.50 - 6.00											
D SPT (S)	6.00 - 6.45 6.00 - 6.45	N=9 (3,3/2,2,2,3)		6								
					25/02/2019 1700 (0.00)	End of Borehole at 6.45 m						
					7							
					8							
					9							
					10							
Ground Water (m)					Chiselling / Hard Strata		Casing Depths		Hole Diameter		General Remarks	
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)		Depth (m)
										98		2.00
										88		3.00
										78	6.45	1. Hand dug inspection pit to 1.20m. 2. No groundwater encountered.
Log last updated 06/06/2019												



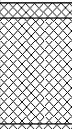
**Borehole
WSG**

GL (m AOD)	Scale 1:50
40.99	
Easting:	Northing:
470968.80	173634.80

Sheet 1 of 1

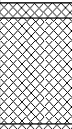
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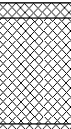
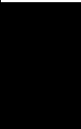
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
												1. Hand dug inspection pit to 1.20m. 2. No groundwater encountered.
Log last updated 06/06/2019												

				BOREHOLE RECORD				Borehole WSH				
Contract No: D9298					Site: Weldale Street, Reading				GL (m AOD) 41.07 Easting: 470987.96 Scale 1:50 Northing: 173593.60			
Client: Ropemaker Properties Ltd.					Driller: SR		Logged By: PF		Sheet 1 of 1			
Method: Windowless Sampling					Checked By: BC				Dates: 02/04/2019			
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description		Depth (m)	Level (m AOD)	Legend	Well/ Backfill	
Type	Depth From-To (m)	Insitu Testing										
D ES	0.50 0.50		1	MADE GROUND: Macadam.		(0.10)	40.97					
				MADE GROUND: Dark greyish brown slightly silty, sandy gravel. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone. limestone and concrete.		0.10						
				MADE GROUND: Concrete.		(0.70)						
				End of Borehole at 0.85 m		0.80 (0.05) 0.85	40.27 40.22					
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks 1. No groundwater encountered. 2. Borehole terminated at 0.85m due to concrete obstruction.
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
Log last updated 06/06/2019												

				BOREHOLE RECORD				Borehole WSIA				
Contract No: D9298		Site: Weldale Street, Reading				GL (m AOD) 41.02		Scale 1:50				
						Easting: 470986.00		Northing: 173617.00				
Client: Ropemaker Properties Ltd.				Driller: SR		Logged By: PF		Sheet 1 of 1				
Method: Windowless Sampling				Checked By: BC		Dates: 02/04/2019						
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill		
Type	Depth From-To (m)	Insitu Testing										
				1	MADE GROUND: Concrete. MADE GROUND: Dark greyish brown slightly silty, sandy gravel. Gravel is subangular to subrounded, fine to coarse of sandstone and limestone. MADE GROUND: Concrete. MADE GROUND: Orange brown slightly silty, gravelly sand . Gravel is rounded to subangular, fine to coarse of sandstone rinded flint and chalk. MADE GROUND: Concrete. End of Borehole at 0.65 m	(0.10) 0.10 (0.15) 0.25 (0.10) 0.35 (0.20) 0.55 (0.10) 0.65	40.92 40.77 40.67 40.47 40.37					
				2								
				3								
				4								
				5								
				6								
				7								
				8								
				9								
				10								
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks 1. No groundwater encountered. 2. Borehole terminated at 0.65m due to concrete obstruction.
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
Log last updated 06/06/2019												

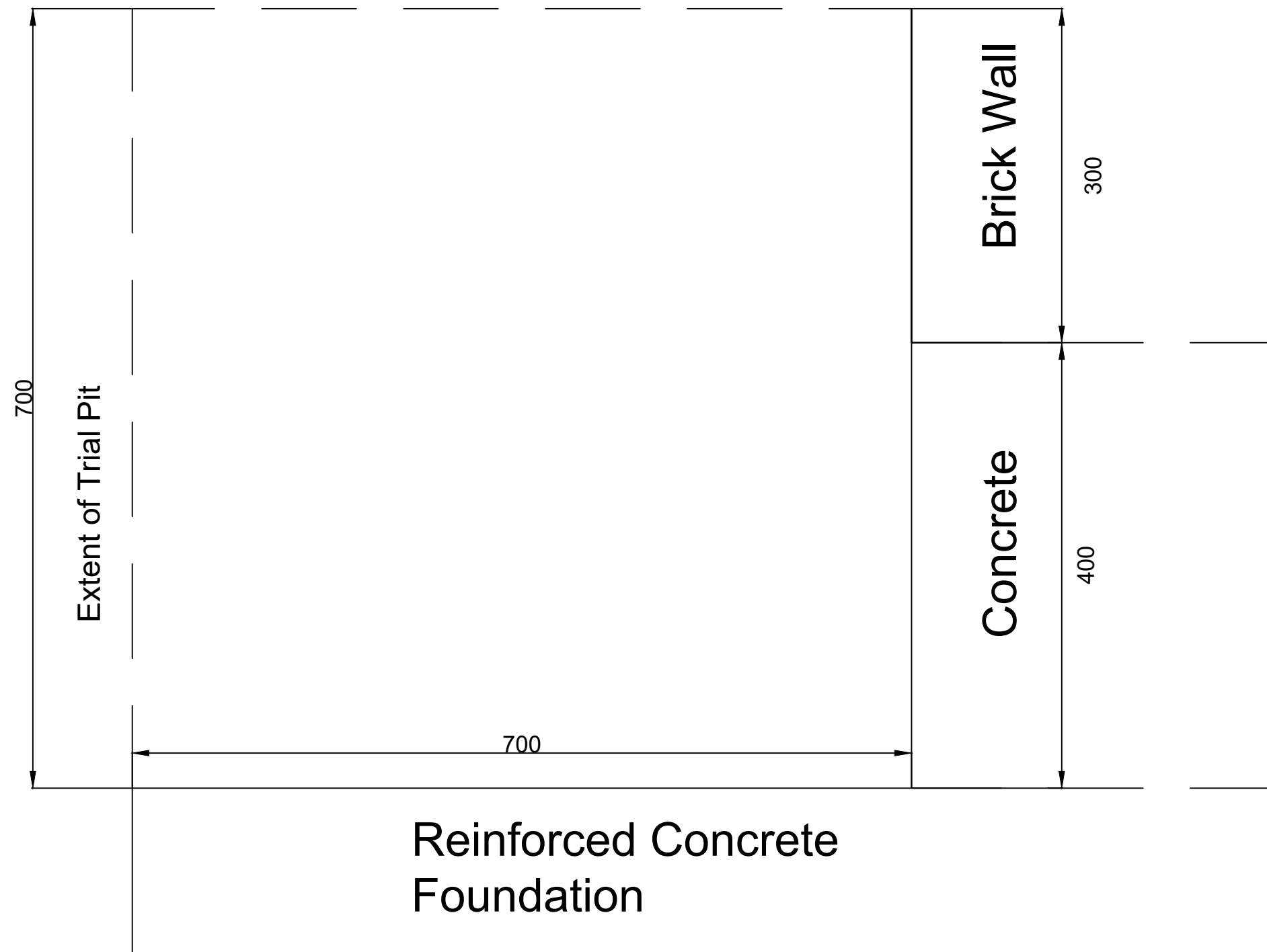
				BOREHOLE RECORD				Borehole WSIC				
Contract No: D9298				Site: Weldale Street, Reading				GL (m AOD) 40.89		Scale 1:50		
								Easting: 470977.33		Northing: 173613.53		
Client: Ropemaker Properties Ltd.						Driller: SR		Logged By: PF		Sheet 1 of 1		
Method: Windowless Sampling						Checked By: BC		Dates: 02/04/2019				
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill		
Type	Depth From-To (m)	Insitu Testing										
D ES	0.50 0.50				MADE GROUND: Concrete. MADE GROUND: Dark greyish brown slightly silty, sandy gravel. Gravel is subangular to subrounded, fine to coarse of sandstone and limestone and concrete. MADE GROUND: Concrete. MADE GROUND: Orange brown slightly silty, gravelly sand . Gravel is rounded to subrounded and subangular of chert, sandstone, flint and chalk.	(0.10) 0.10 (0.15) 0.25 (0.10) 0.35 (0.75)	40.79 40.64 40.54					
D ES D D SPT (S)	1.00 1.00 1.10 1.20 - 1.65 1.20 - 1.65	N=16 (4,4/5,4,3,4)		1 (1.20) Dry	Brown slightly silty, gravelly SAND. Gravel is subangular to subrounded, fine to coarse of, flint and chalk. Cobbles and/or boulders of black flint noted.	1.10 (0.10) 1.20	39.79 39.69					
D SPT (S)	1.65 - 2.00 2.00 - 2.45 2.00 - 2.45	N=18 (3,3/4,4,5,5)		2 (2.00) Dry	Structureless CHALK composed of slightly gravelly, slightly sandy silt . Gravel is angular, fine to coarse, weak becoming medium strong with depth low density, creamy white chalk.							
D	2.50 - 3.00				2.50-3.00m: With Rined flint subangular cobble							
D	3.00 - 3.45			3								
D SPT (S)	3.50 - 4.00 3.50 - 3.88	N=12 (8,4/3,3,3,3)		(3.50) Dry								
D SPT (S)	4.00 - 4.45 4.00 - 4.45	N=9 (1,3/3,2,2,2)		4 (5.00) Dry		(5.25)						
D	4.59 - 5.00											
D	5.00 - 5.45			5								
D	5.50 - 6.00				5.10-5.50m: Mottled grey.							
D SPT (S)	6.00 - 6.45 6.00 - 6.45	N=13 (1,2/2,2,4,5)		6 (6.00) Dry								
					02/04/2019 1700 (0.00)		6.45	34.44				
					End of Borehole at 6.45 m							
					7							
					8							
					9							
					10							
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
5.20												
Log last updated 06/06/2019												

				BOREHOLE RECORD				Borehole WSK				
Contract No: D9298					Site: Weldale Street, Reading				GL (m AOD) 41.43 Scale 1:50 Easting: 471015.61 Northing: 173621.38			
Client: Ropemaker Properties Ltd.					Driller: SR		Logged By: PF		Sheet 1 of 1			
Method: Windowless Sampling					Checked By: BC				Dates: 02/04/2019			
SAMPLE DETAILS					(Casing) Groundwater	STRATA RECORD Description		Depth (m)	Level (m AOD)	Legend	Well/ Backfill	
Type	Depth From-To (m)	Insitu Testing										
D ES	0.50 0.50		1	MADE GROUND: Macadam.		(0.10)	41.33					
				MADE GROUND: Dark greyish brown slightly silty, sandy gravel. Gravel is subangular to subrounded, fine to coarse of sandstone and limestone.		0.10						
				MADE GROUND: Concrete.		(0.70)						
				End of Borehole at 0.85 m		0.80 (0.05) 0.85	40.63 40.58					
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks 1. No groundwater encountered. 2. Borehole terminated at 0.85m due to concrete obstruction.
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
Log last updated 06/06/2019												

				BOREHOLE RECORD				Borehole WSKA								
Contract No: D9298					Site: Weldale Street, Reading					GL (m AOD) 41.30 Easting: 471015.00 Scale 1:50 Northing: 173622.00						
Client: Ropemaker Properties Ltd.					Driller: SR		Logged By: PF		Sheet 1 of 1							
Method: Windowless Sampling					Checked By: BC				Dates: 02/04/2019							
SAMPLE DETAILS					STRATA RECORD Description				Depth (m)		Level (m AOD)		Legend		Well/ Backfill	
Type	Depth From-To (m)		Insitu Testing													
D ES	0.50 0.50				1	MADE GROUND: Ceramic tile and grout. MADE GROUND: Concrete.		(0.10) 0.10	41.20							
						MADE GROUND: Concrete. 0.80m: Plastic Sheetting		(0.70)								
					2	End of Borehole at 0.85 m		0.80 (0.05) 0.85	40.50 40.45							
						3										
					4											
						5										
					6											
						7										
					8											
						9										
					10											
Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks				
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)					
												1. No groundwater encountered. 2. Borehole terminated at 0.80m due to concrete obstruction.				
Log last updated 06/06/2019																

Ground Level

HPA



Unable to locate edge of concrete foundation due to large amounts of rebar present



Dunelm Geotechnical & Environmental Ltd
Foundation House, St John's Road, Meadowfield
Durham, DH78TZ
Tel: 0191 378 3151
Fax: 0191 378 3157
e-mail: admin@dunelm.co.uk
web: www.dunelm.co.uk

NOT TO SCALE: Contractor to check all dimensions on site before commencement of any works. No dimensions to be scaled from this drawing.
© Copyright Reserved

All measurements are in mm

CLIENT:

Ropemaker Properties Ltd

PROJECT TITLE:

Weldale Street, Reading

DRAWING TITLE:

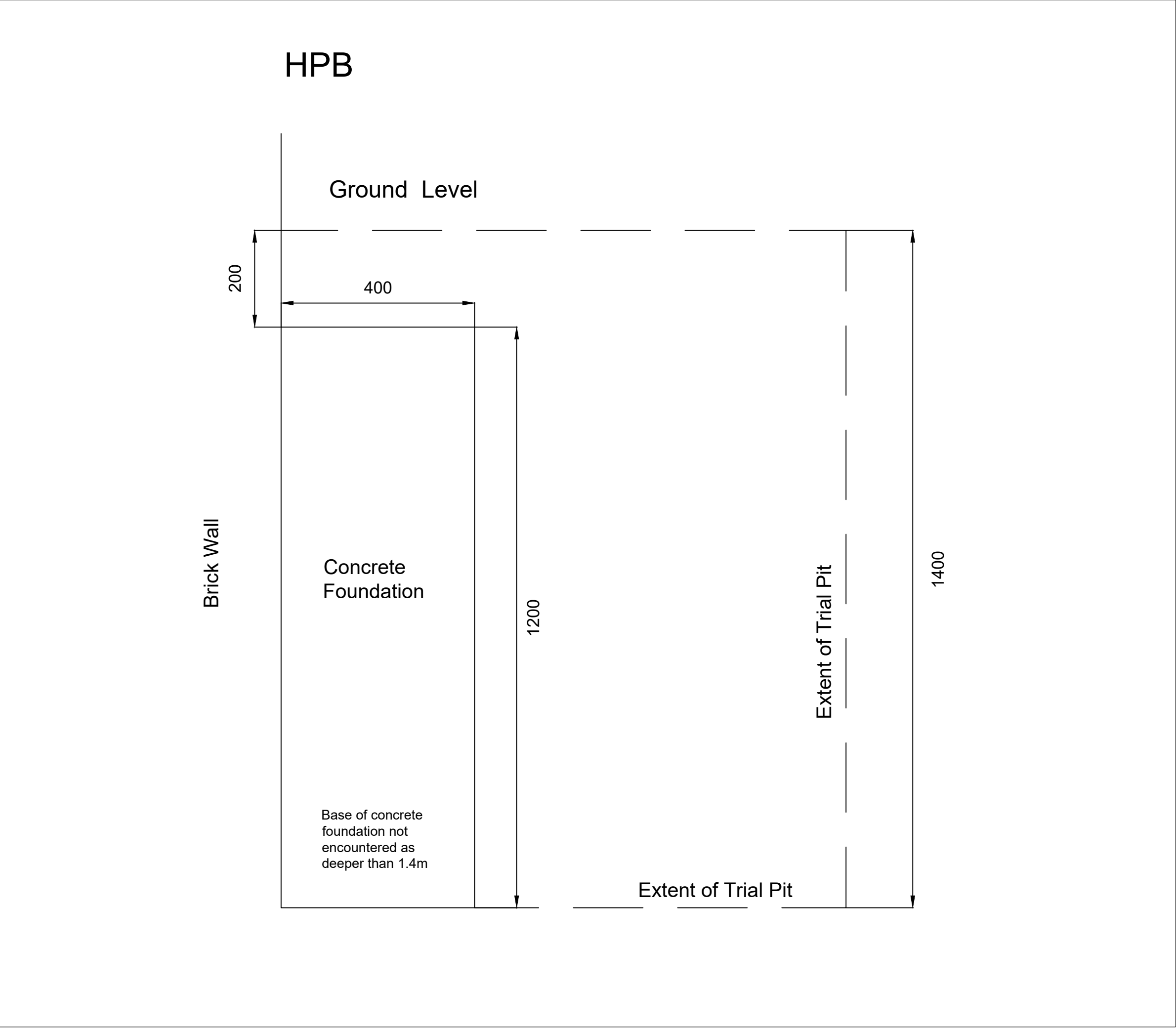
HPA Foundation Sketch

DRAWING NUMBER:

D9298/ HPA

DATE:

April 2019



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Durham, DH78TZ
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PROJECT TITLE:

Weldale Street, Reading

DRAWING TITLE:

HPB Foundation Sketch

DRAWING NUMBER:

D9298/ HPB

DATE:

April 2019



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CLIENT:

Ropemaker Properties Ltd

PROJECT TITLE:

Weldale Street, Reading

DRAWING TITLE:

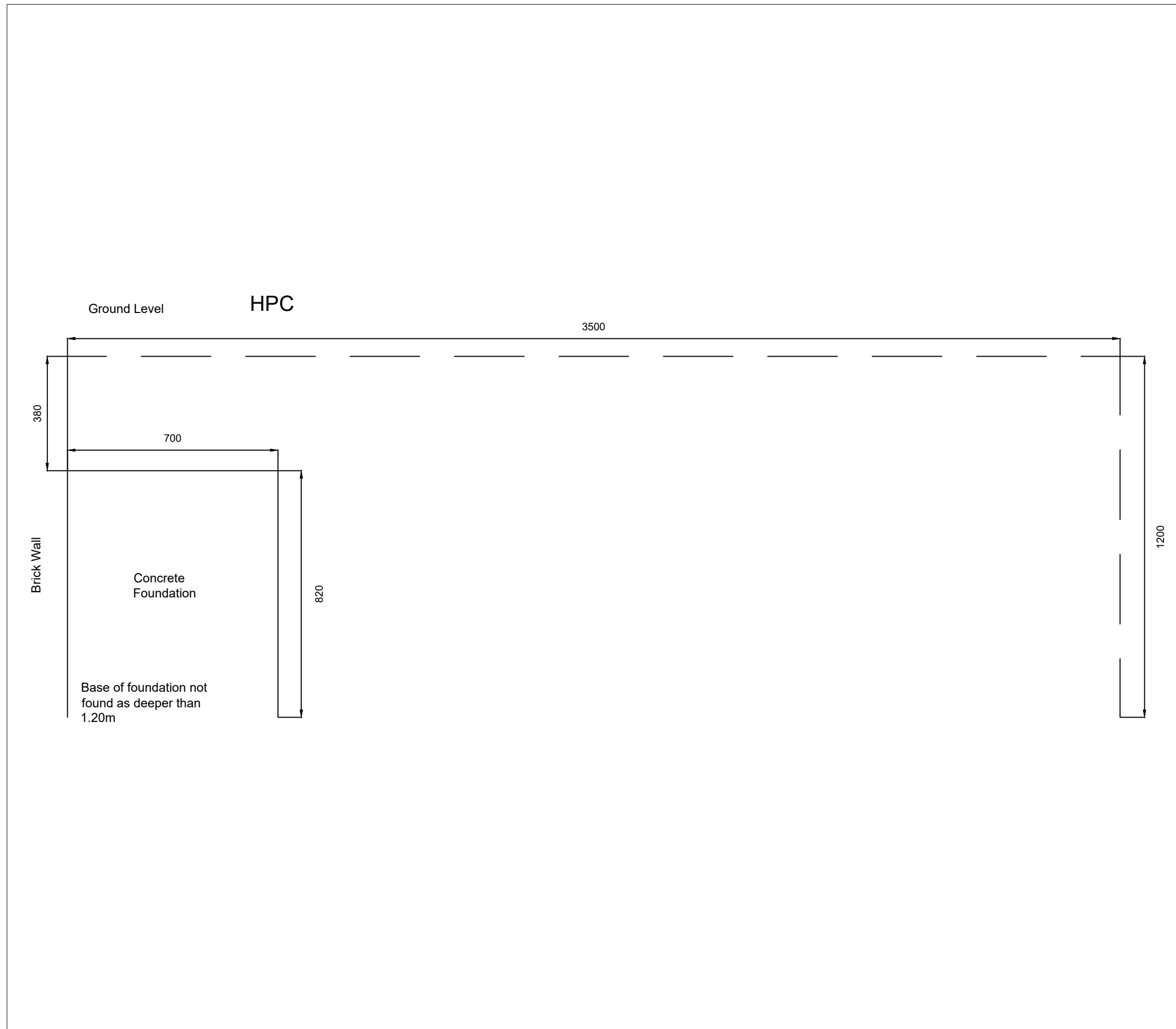
HPC Foundation Sketch

DRAWING NUMBER:

D9298/ HPC

DATE:

April 2019





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Foundation House, St John's Road, Meadowfield
Durham, DH78TZ
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CLIENT:

Ropemaker Properties Ltd

PROJECT TITLE:

Weldale Street, Reading

DRAWING TITLE:

HPD Foundation Sketch

DRAWING NUMBER:

D9298/ HPD

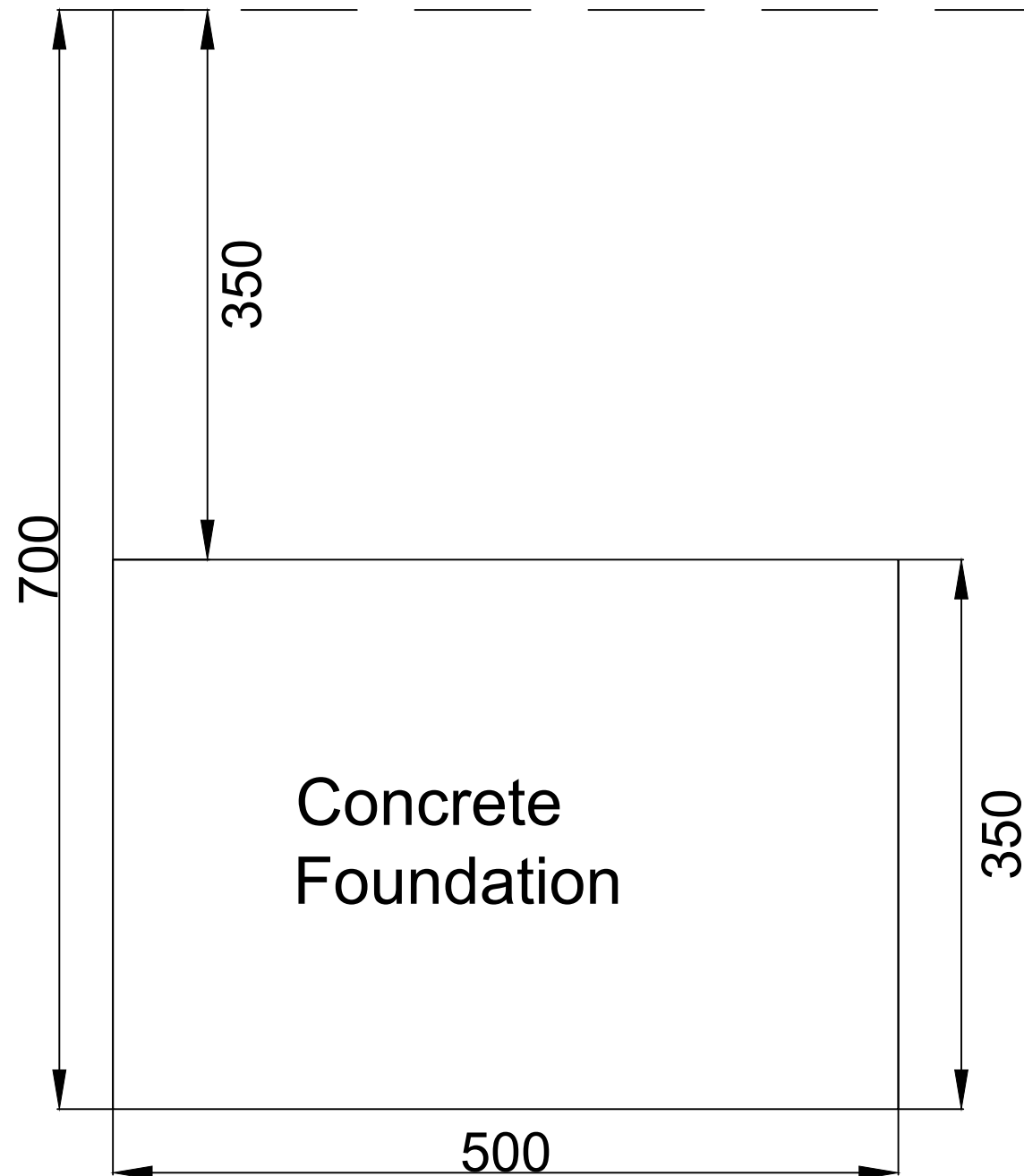
DATE:

April 2019

Ground Level

HPD

Brick Wall



APPENDIX C

Photographs



Photographs



D9298 BHA 1.60-5.40m



D9298 BHA 6.00-8.00m

Photographs



D9298 BHA 8.00-10.00m



D9298 BHA 10.00-12.00m

Photographs

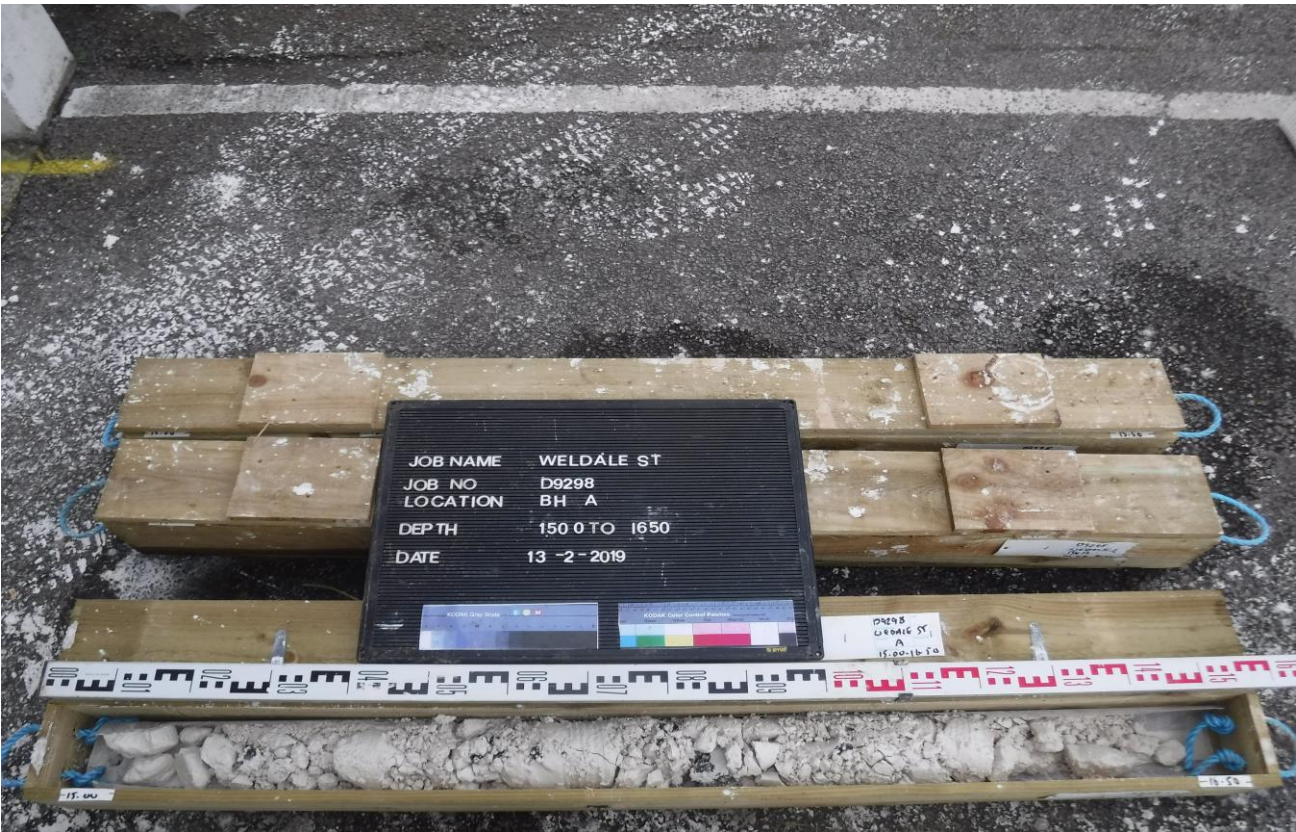


D9298 BHA 12.00-13.50m



D9298 BHA 13.50-15.00m

Photographs



D9298 BHA 15.00-16.50m



D9298 BHA 16.50-18.00m

Photographs



D9298 BHA 18.00-19.50m



D9298 BHA 19.50-21.00m

	Project	Weldale Street, Reading	Plate 5
	Project No.	D9298	
	Carried out for	Ropemaker Properties Ltd	

Photographs



D9298 BHA 21.00-22.50m



D9298 BHA 22.50-24.00m

Photographs



D9298 BHA 24.00-25.50m



D9298 BHA 25.50-27.00m

Photographs



D9298 BHA 27.00-28.50m



D9298 BHA 28.50-30.00m

 DUNELM GEOTECHNICAL & ENVIRONMENTAL	Project	Weldale Street, Reading	Plate 8
	Project No.	D9298	
	Carried out for	Ropemaker Properties Ltd	

Photographs



D9298 BHB 12.60-13.50m



D9298 BHB 13.50-15.00m

Photographs



D9298 BHB 15.00-16.50m



D9298 BHB 16.50-18.00m

Photographs



D9298 BHB 18.00-19.50m



D9298 BHB 19.50-21.00m

Photographs



D9298 BHB 21.00-22.50m



D9298 BHB 22.50-24.00m

Photographs



D9298 BHB 25.50-27.00m



D9298 BHB 27.00-28.50m

Photographs



D9298 BHB 28.50-30.00m



D9298 BHB 30.00-31.50m

Photographs

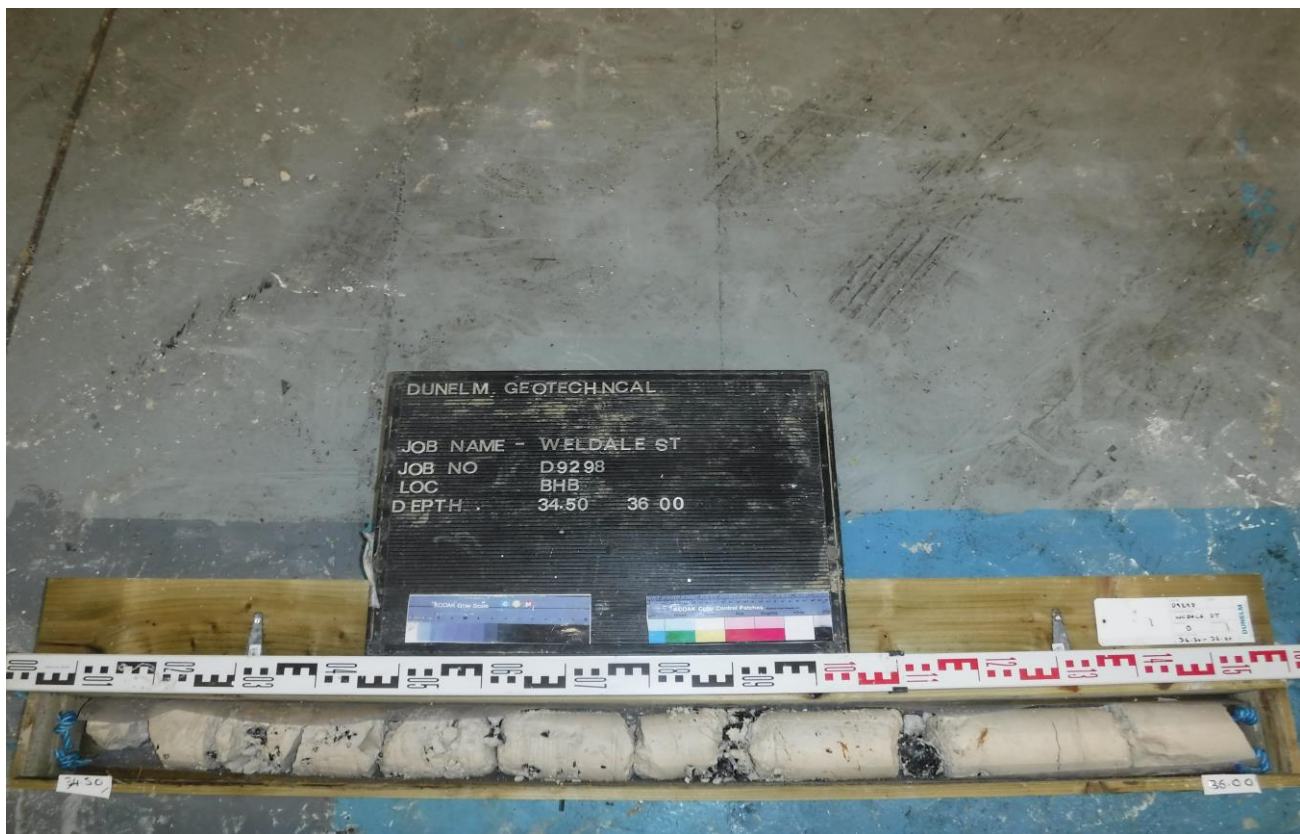


D9298 BHB 31.50-33.00m



D9298 BHB 33.00-34.50m

Photographs



D9298 BHB 34.50-36.00m



D9298 BHB 36.00-37.50m

Photographs

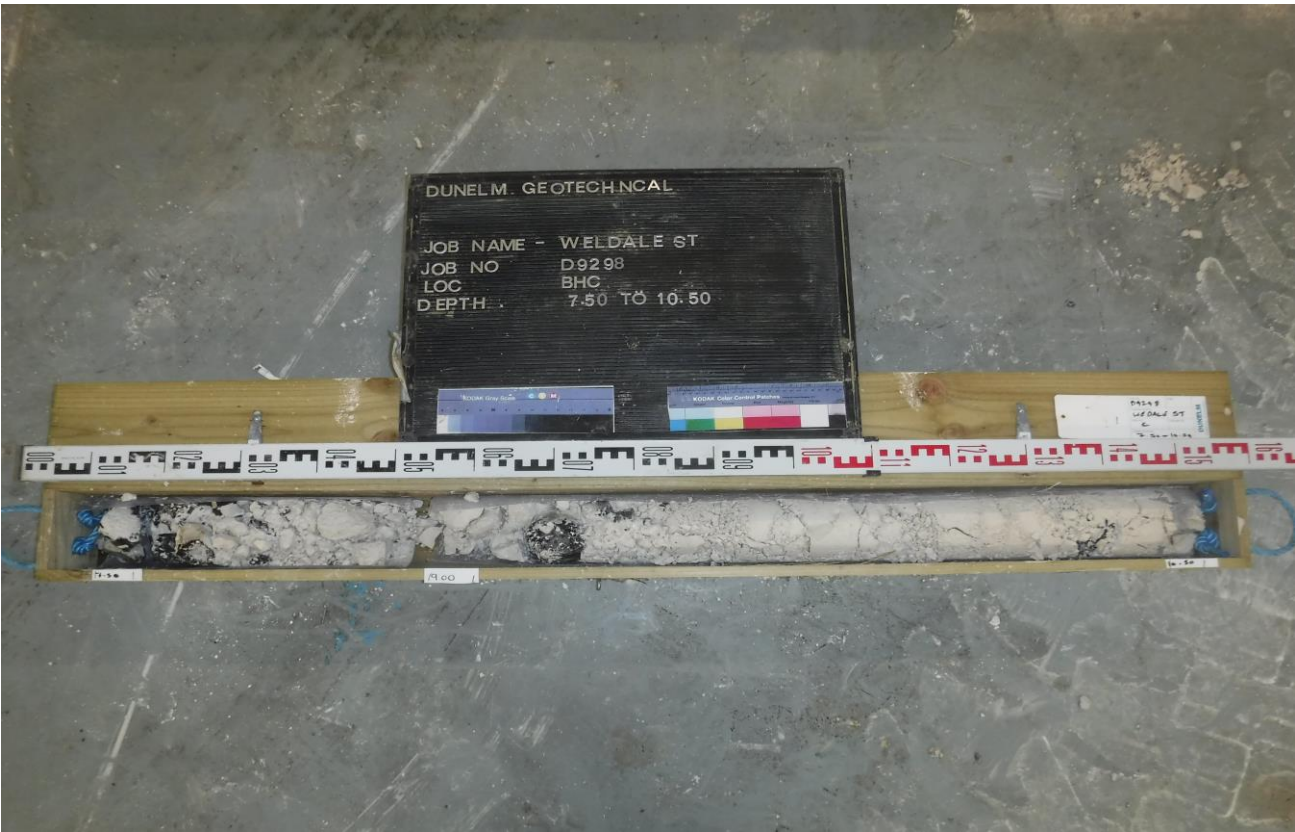


D9298 BHB 37.50-39.00m



D9298 BHB 39.00-40.00m

Photographs



D9298 BHC 7.50-10.50m



D9298 BHC 10.50-12.00m

Photographs



D9298 BHC 12.00-13.50m

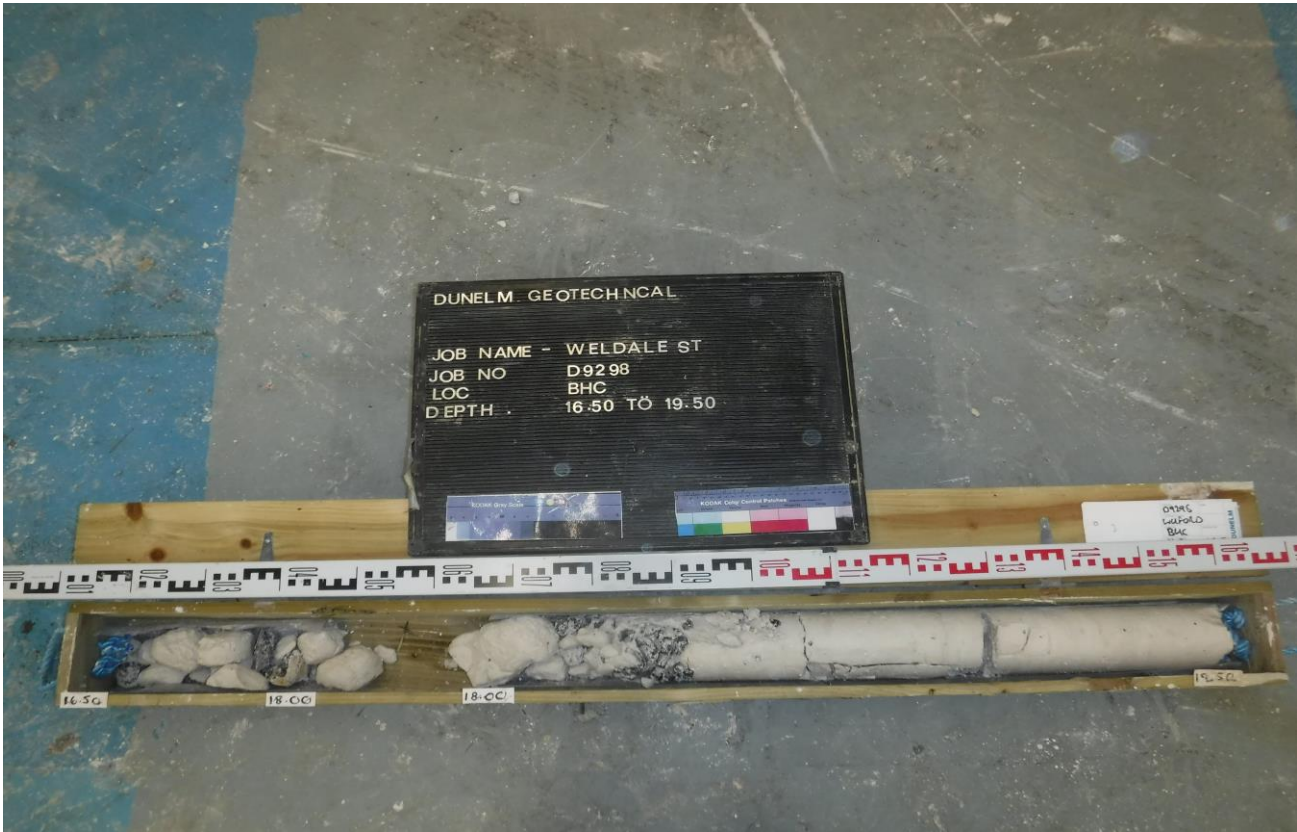


D9298 BHC 13.50-15.00m

Photographs



D9298 BHC 15.00-16.50m



D9298 BHC 16.50-19.50m

Photographs



D9298 BHC 19.50-21.00m

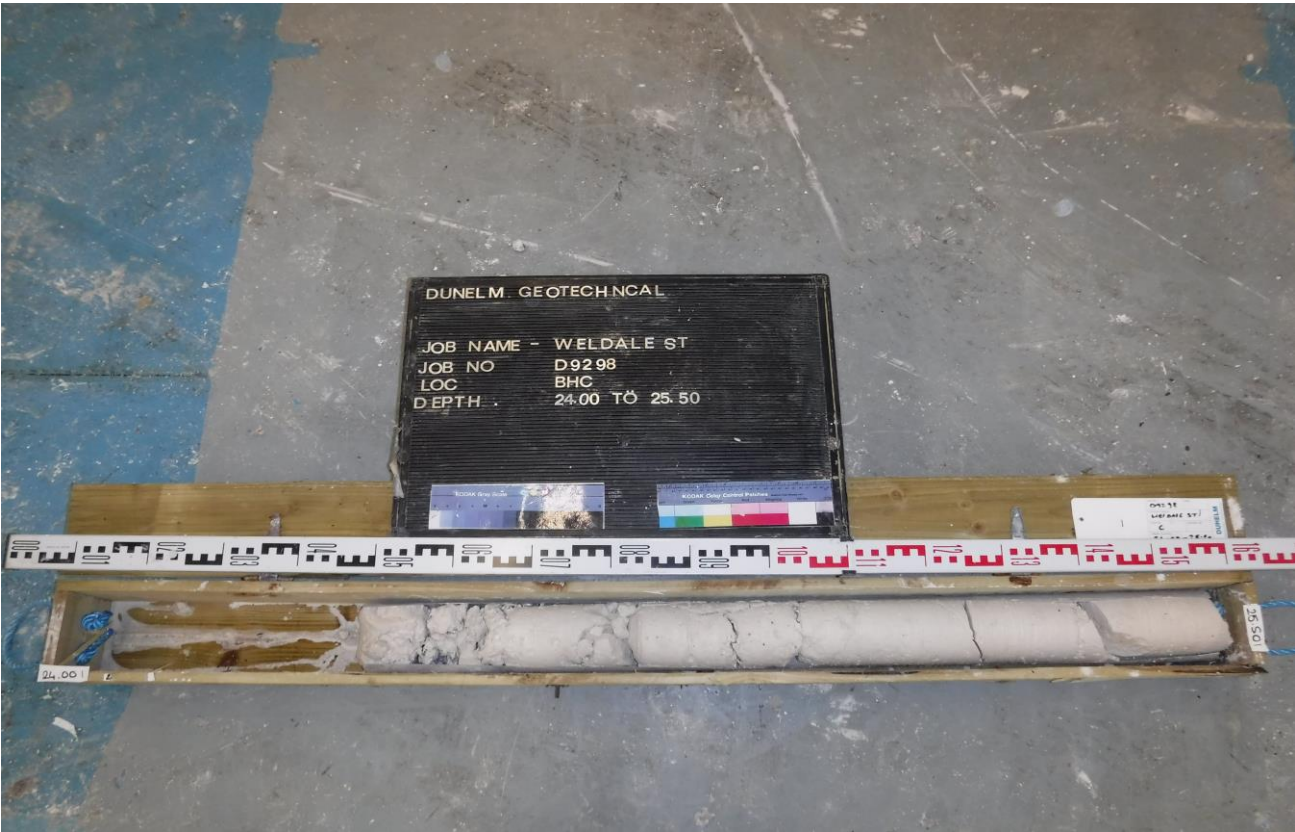


D9298 BHC 21.00-22.50m

Photographs



D9298 BHC 22.50-24.00m



D9298 BHC 24.00-25.50m

Photographs

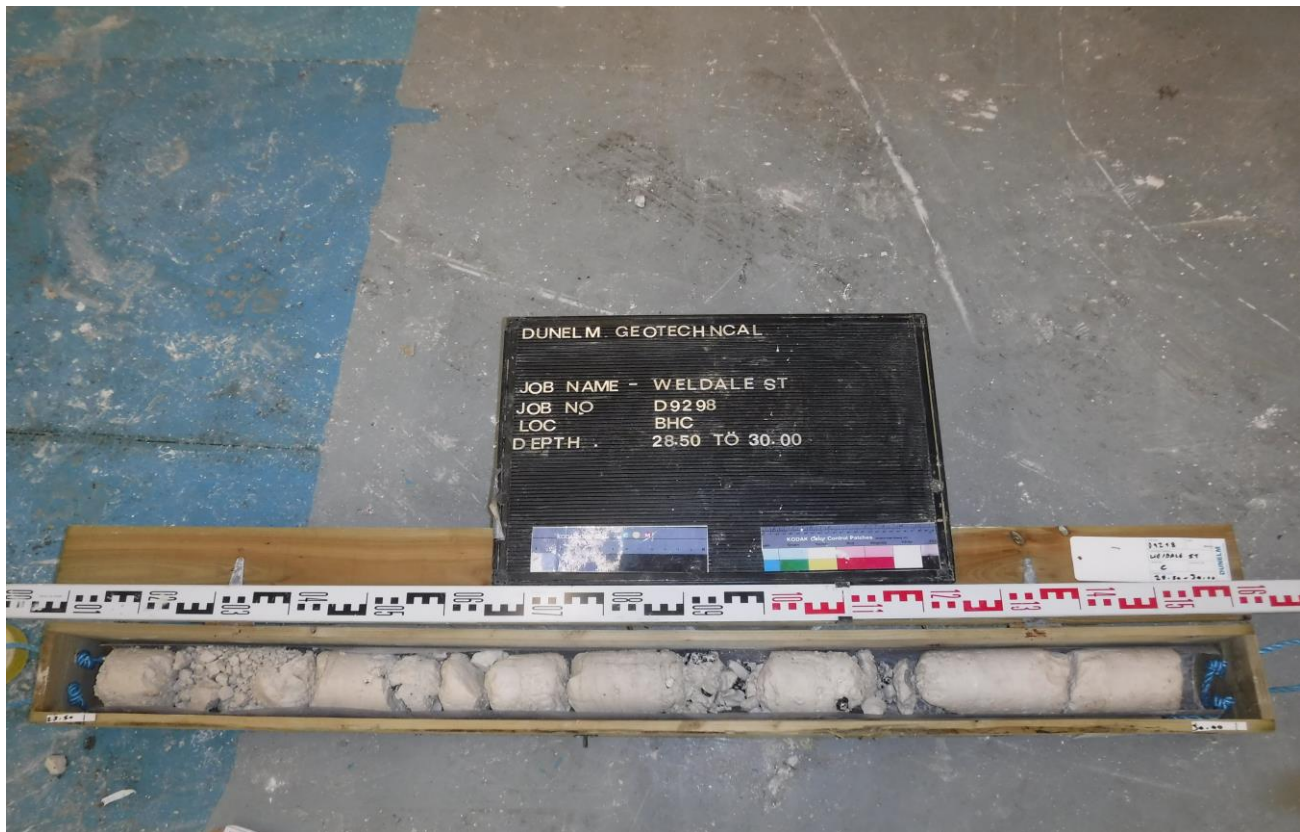


D9298 BHC 25.50-27.00m



D9298 BHC 27.00-28.50m

Photographs



D9298 BHC 28.50-30.00m



D9298 BHC 30.00-33.00m

Photographs



D9298 BHE 11.00-12.00m



D9298 BHE 12.00-13.50m

Photographs

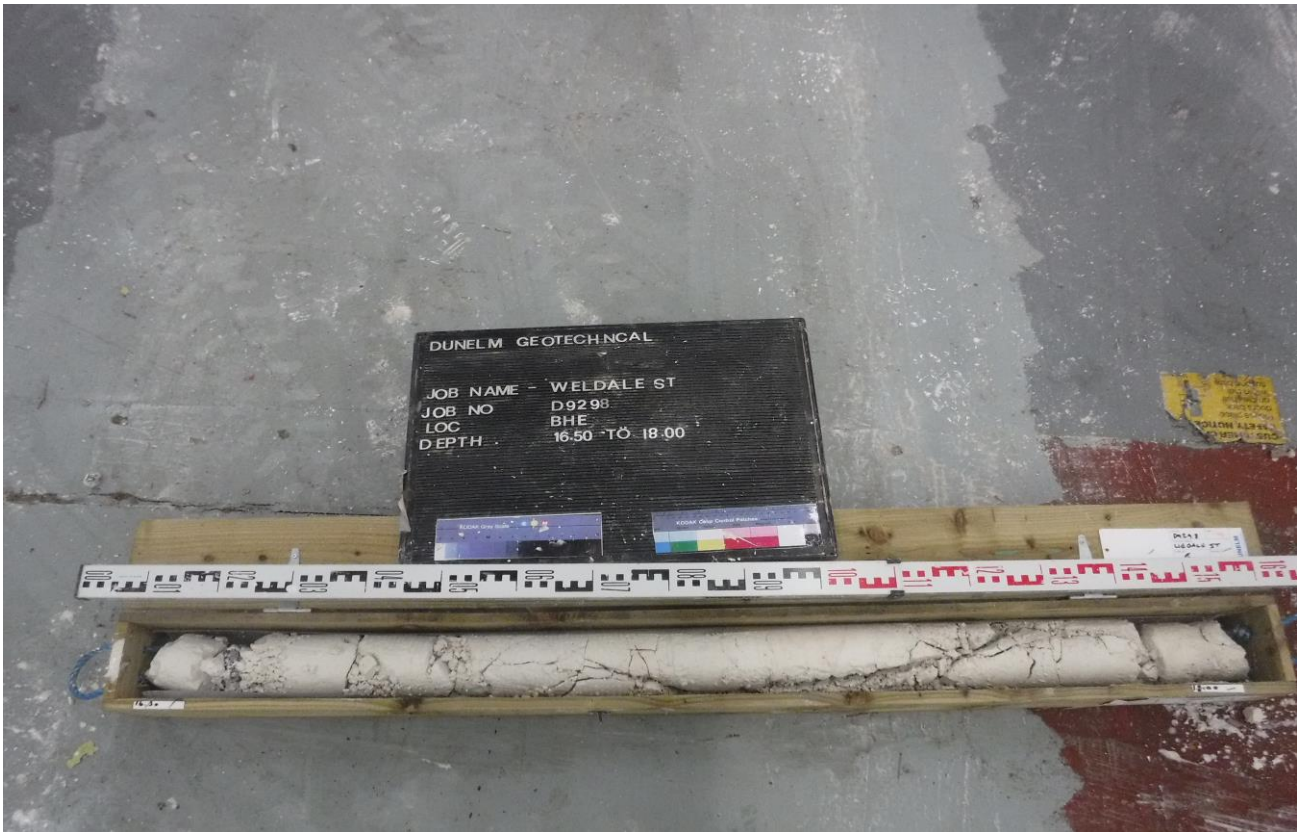


D9298 BHE 13.50-15.00m



D9298 BHE 15.00-16.50m

Photographs

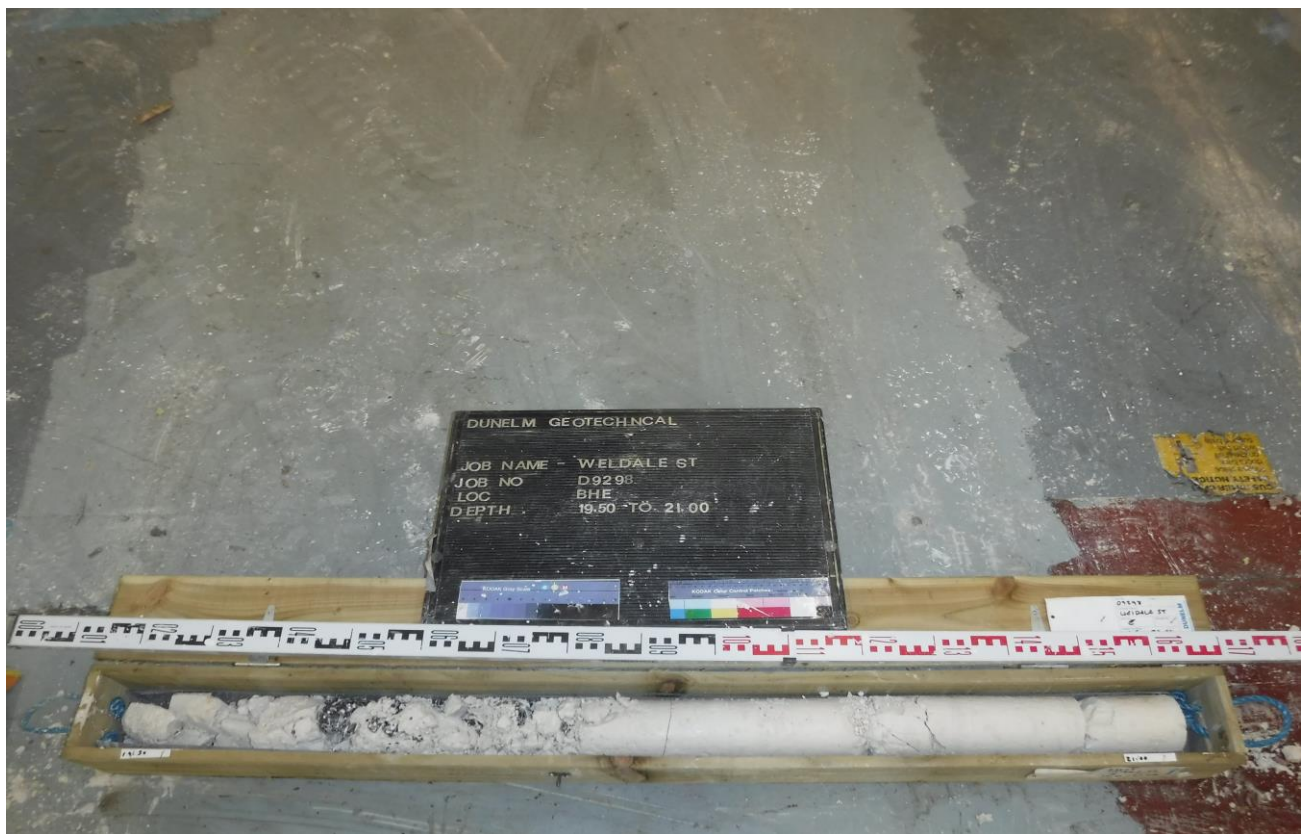


D9298 BHE 16.50-18.00m

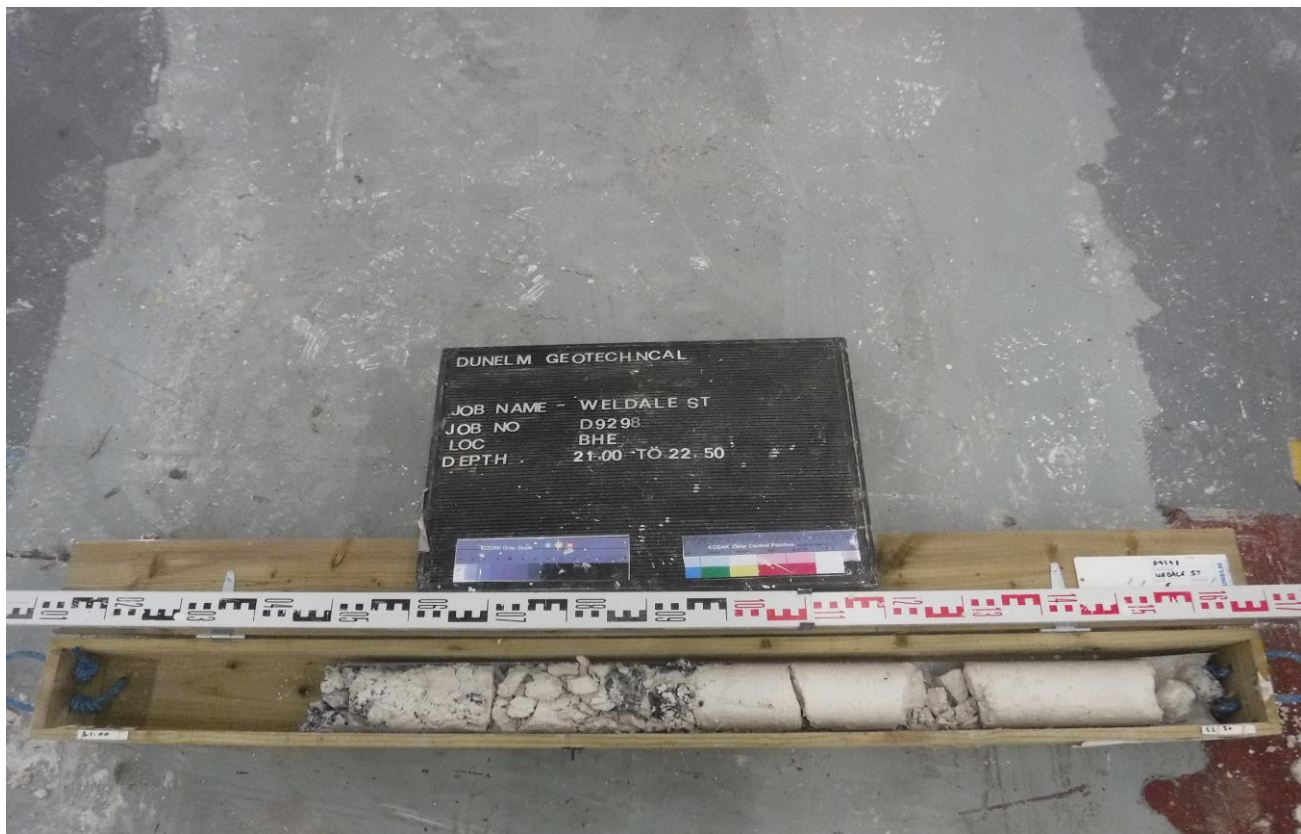


D9298 BHE 18.00-19.50m

Photographs



D9298 BHE 19.50-21.00m



D9298 BHE 21.00-22.50m

Photographs



D9298 BHE 22.50-24.00m



D9298 BHE 24.00-25.50m

Photographs



D9298 BHE 25.50-27.00m

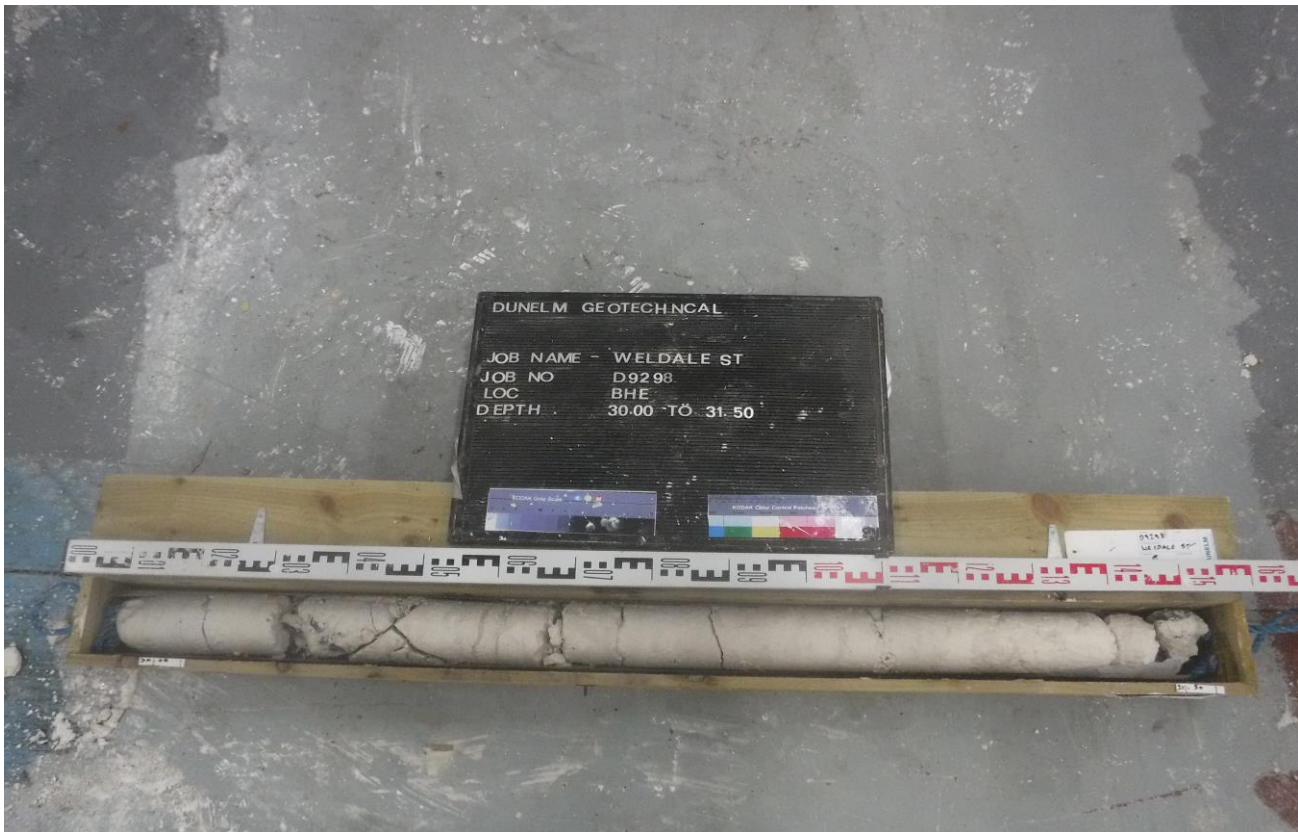


D9298 BHE 27.00-28.50m

Photographs



D9298 BHE 28.50-30.00m



D9298 BHE 30.00-31.50m

Photographs

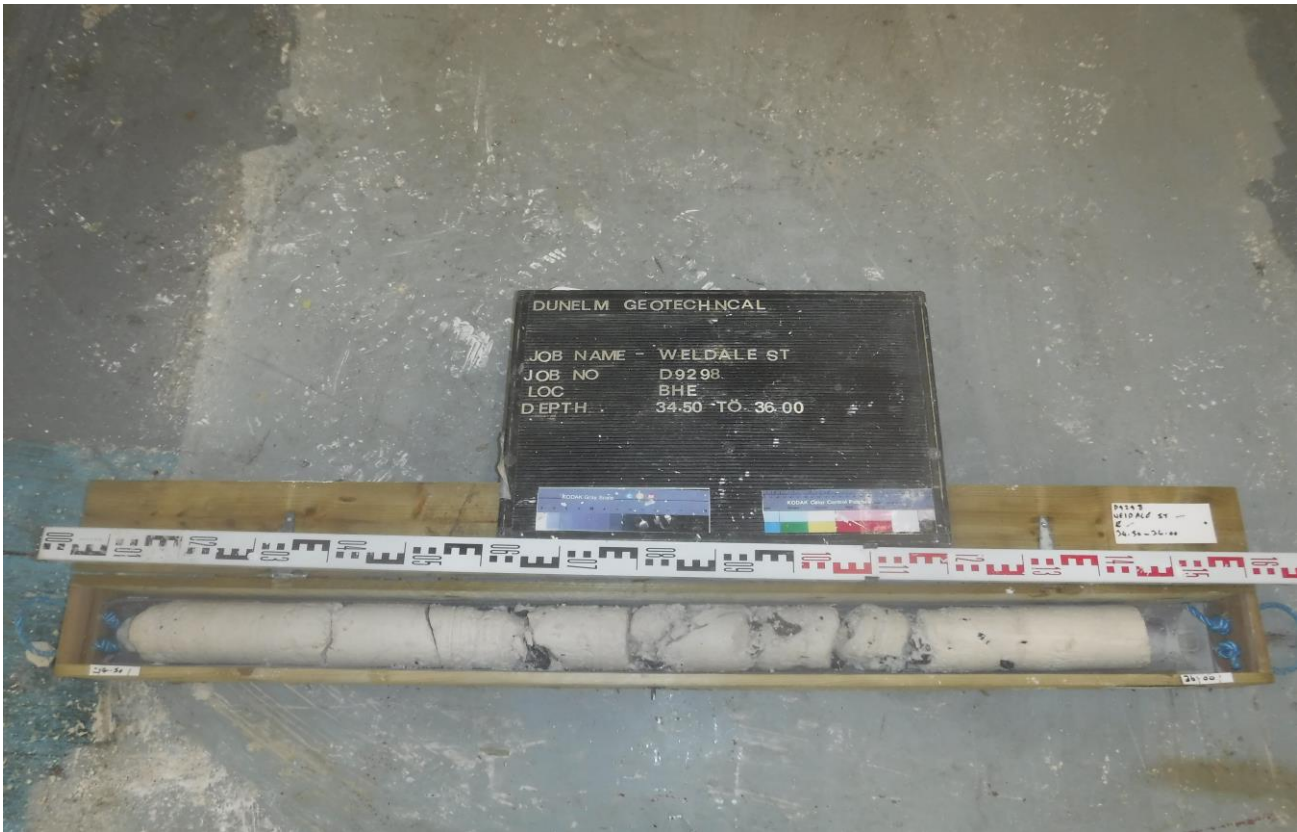


D9298 BHE 31.50-33.00m



D9298 BHE 33.00-34.50m

Photographs

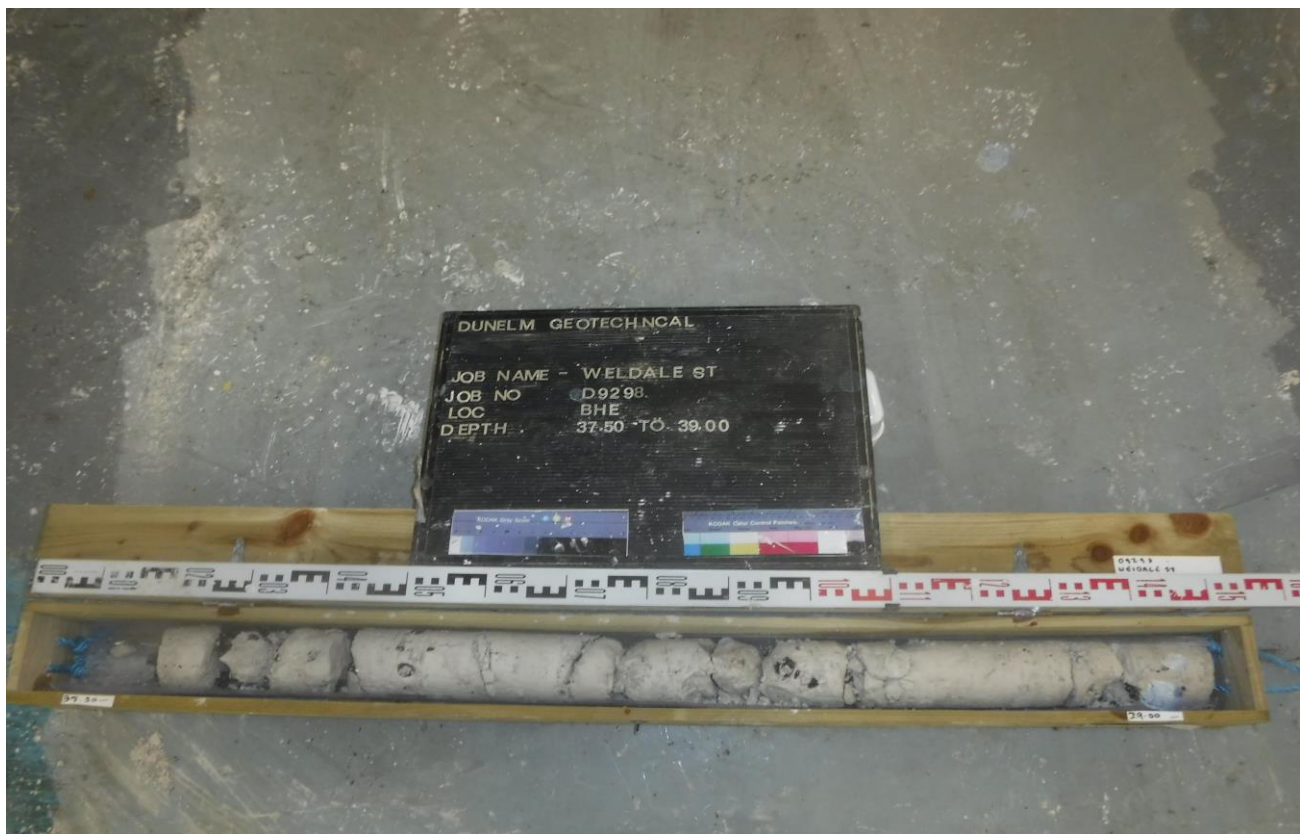


D9298 BHE 34.50-36.00m



D9298 BHE 36.00-37.50m

Photographs

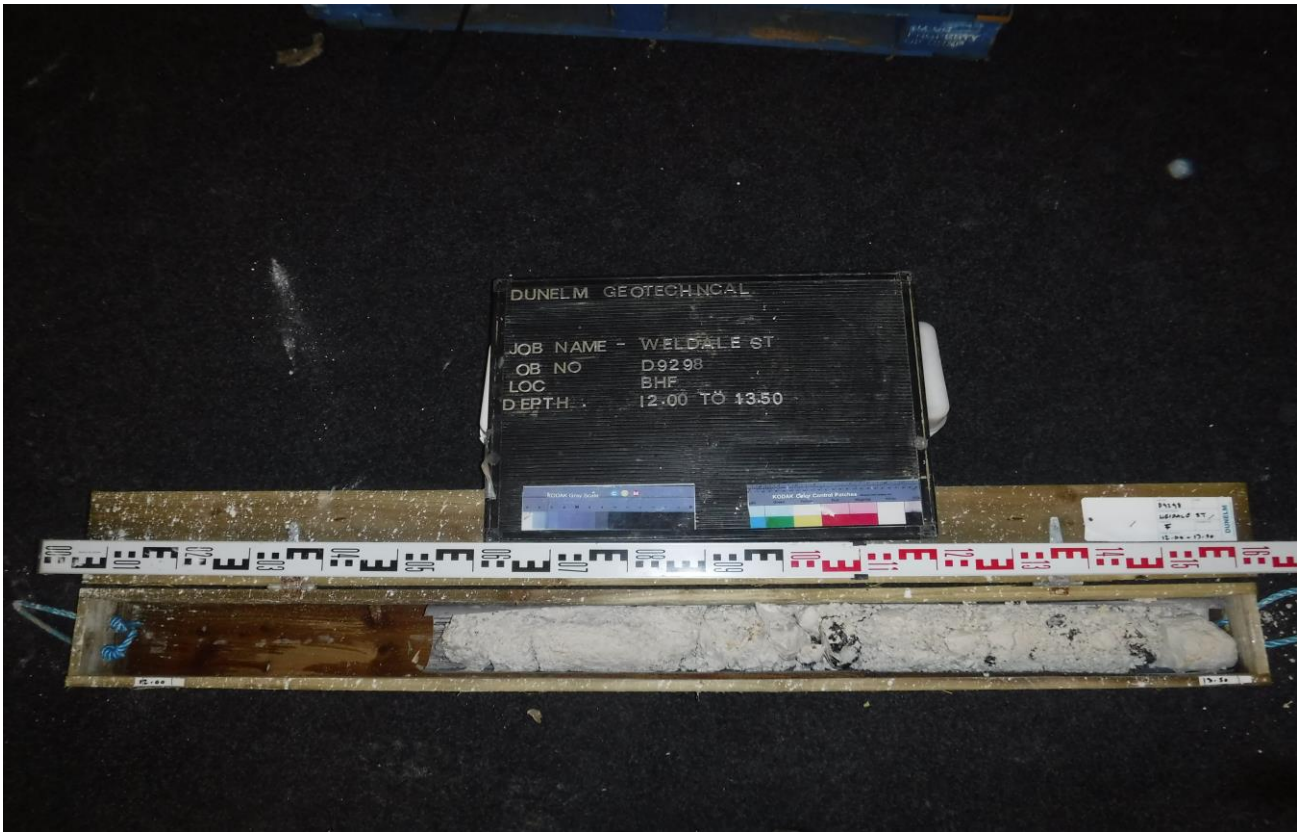


D9298 BHE 37.50-39.00m



D9298 BHE 39.00-40.00m

Photographs

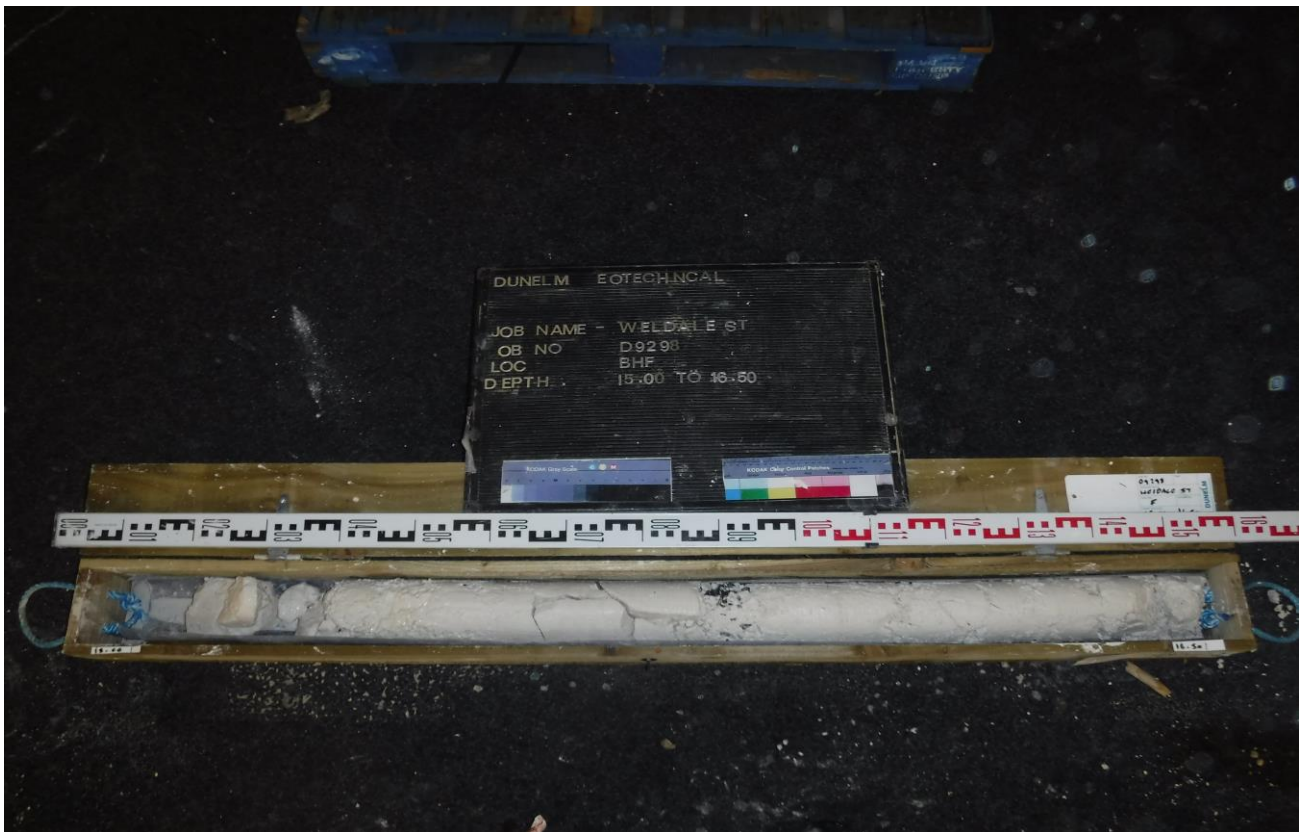


D9298 BHF 12.00-13.50m



D9298 BHF 13.50-15.00m

Photographs



D9298 BHF 15.00-16.50m



D9298 BHF 16.50-18.00m

Photographs



D9298 BHF 18.00-19.50m

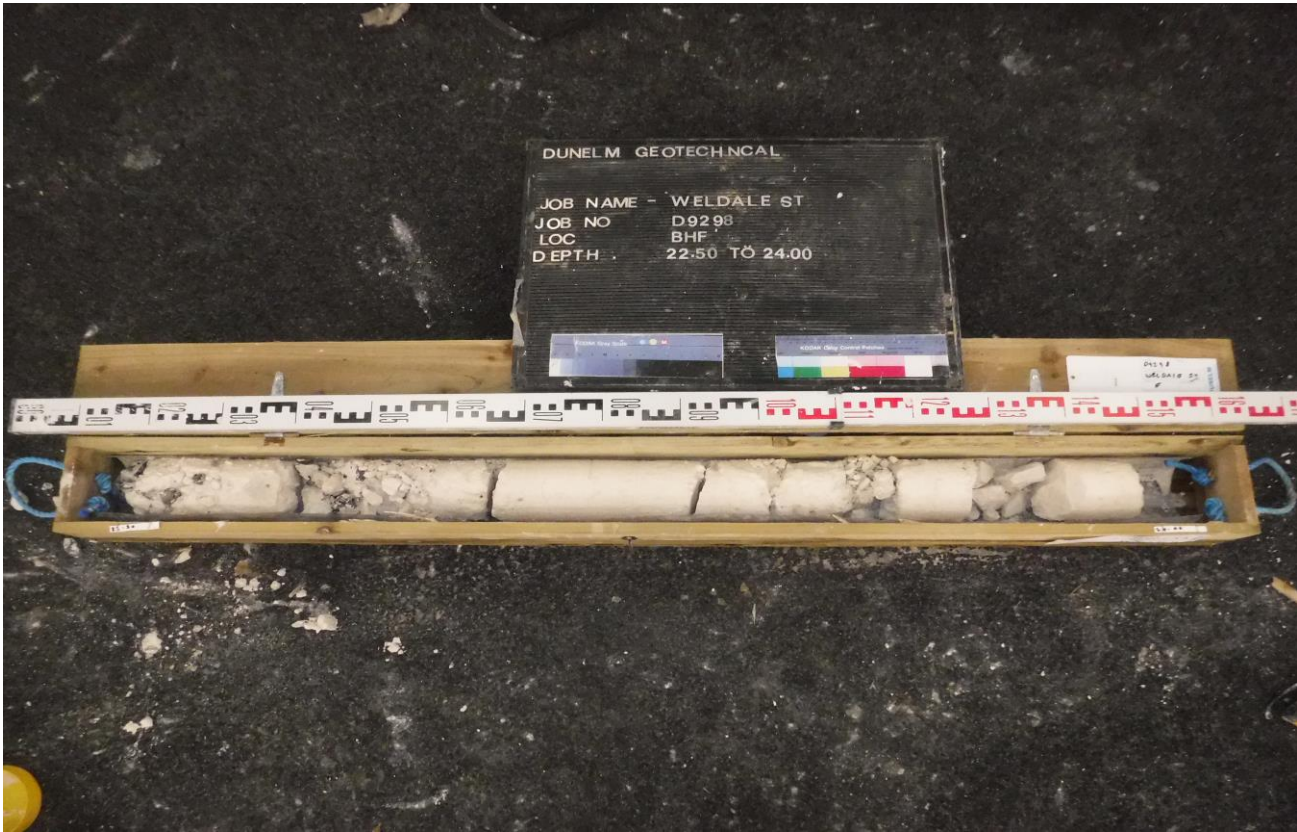


D9298 BHF 19.50-21.00m

Photographs



D9298 BHF 21.00-22.50m



D9298 BHF 22.50-24.00m

Photographs



D9298 BHF 24.00-25.50m



D9298 BHF 25.50-27.00m

Photographs

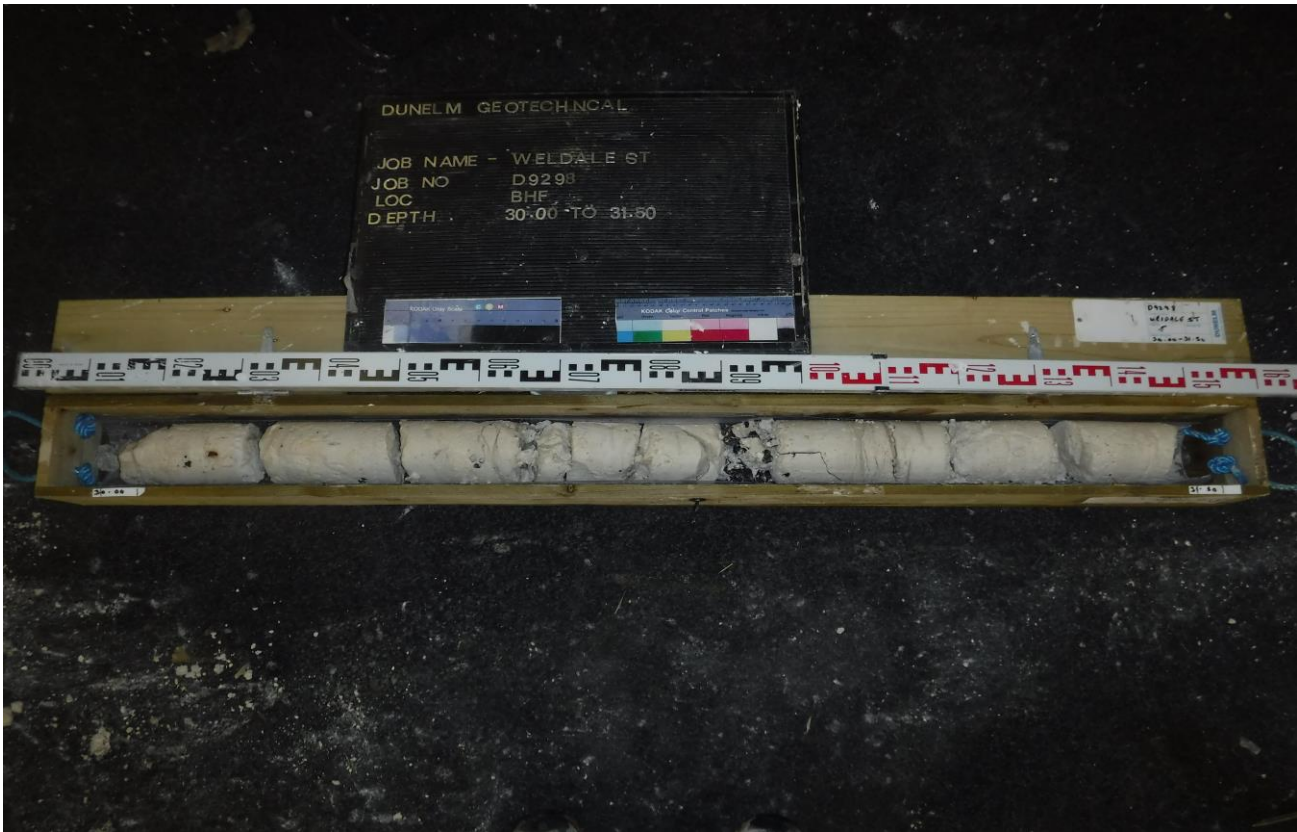


D9298 BHF 27.00-28.50m



D9298 BHF 28.50-30.00m

Photographs



D9298 BHF 30.00-31.50m



D9298 BHF 31.50-33.00m

Photographs

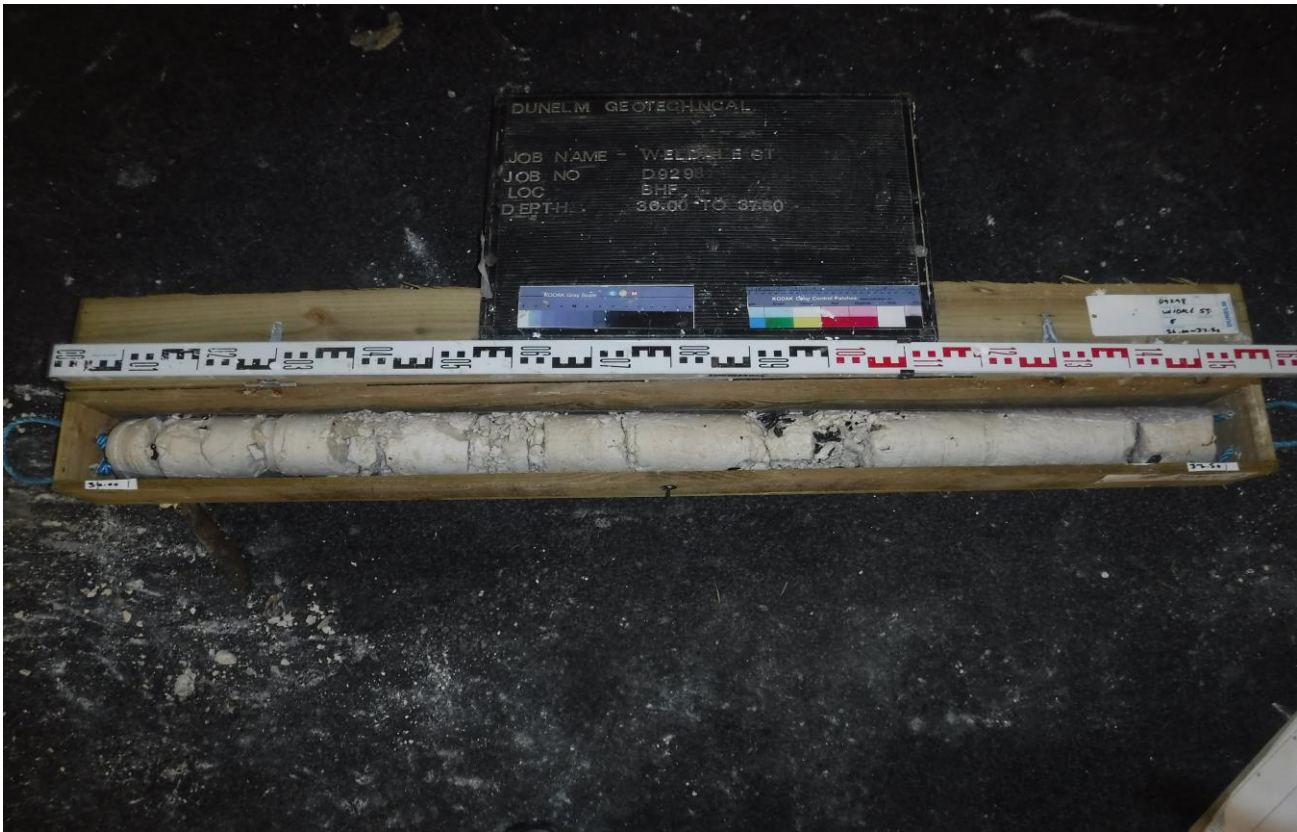


D9298 BHF 33.00-34.50m



D9298 BHF 34.50-36.00m

Photographs



D9298 BHF 36.00-37.50m



D9298 BHF 37.50-39.00m

Photographs



D9298 BHF 39.00-40.00m

Photographs



D9298 HPA 0.00-0.70m (1)



D9298 HPA 0.00-0.70m (2)

Photographs



D9298 HPB 0.00-1.20m (1)



D9298 HPB 0.00-1.20m (2)

Photographs



D9298 HPC 0.00-1.20m (0)



D9298 HPC 0.00-1.20m (1)

Photographs



D9298 HPC 0.00-1.20m (2)



D9298 HPC 0.00-1.20m (3)

Photographs



D9298 HPD 0.00-1.20m (1)



D9298 HPD 0.00-1.20m (2)

Photographs



D9298 HPD 0.00-1.20m (3)



D9298 HPD 0.00-1.20m (4)

Photographs



D9298 HPD 0.00-1.20m (5)



D9298 HPD 0.00-1.20m (6)

Photographs



D9298 TTA 0.00-3.40m (1)



D9298 TTA 0.00-3.40m (2)

Photographs



D9298 TTA 0.00-3.40m (3)



D9298 TTC 0.00-0.90m (2)

Photographs



D9298 TTD 0.00-0.70m (1)



D9298 TTD 0.00-0.70m (2)

Photographs



D9298 TTD 0.00-0.70m (3)

APPENDIX D

Geotechnical Laboratory Results



Laboratory Report Front Sheet

Site name

Job number

Weldale Road, Reading

D9298

Solmek

12-16 Yarm Road,
Stockton on Tees,
TS18 3NA

01642 607083

lab@solmek.com



7607

Client details:

Reference: D9298
Name: Dunelm
Address: Foundation House,
St John's Road,
Meadowfield,
County Durham,
DH7 8TZ

Telephone: 0191 3783151
Email: bcarvey@dunelm.co.uk

FAO: B. Carvey

Date commenced: 19/03/2019

Date reported: 03/04/2019

Observations and interpretations are outside of the UKAS Accreditation

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

Solmek are not UKAS Accredited for the following tests; Density by Linear Measurement, Particle Density by Gas Jar, Point Load, Triaxial UU Multi Specimen, Triaxial UU Multistage and California Bearing Ratio.

Samples will be held at the laboratory for a period of 4 weeks after the report date. After the all samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Signature:

Approved Signatories:

- ☐ K Watkin (Lab Manager)
- ☒ U Mazhar (Assistant Lab Manager)
- ☐ I Nicholson (Technical Manager)

Summary of Classification Tests

Solmek
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Weldale Road, Reading	D9298

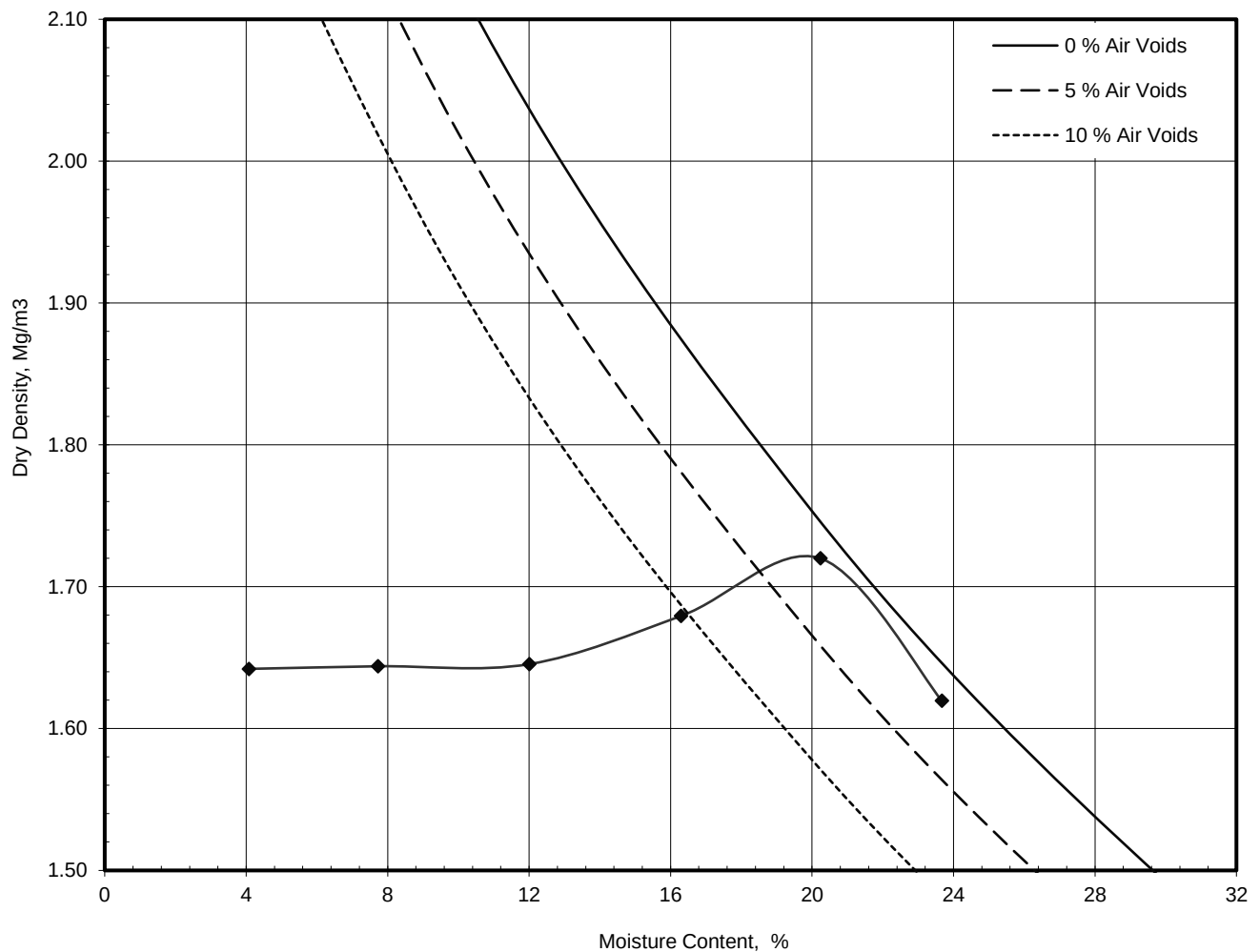
[illegible]

All tests found in Solmek UKAS Schedule of Accreditation are tested to standard unless otherwise indicated

Key	Description	Category	BS Test Code
w	Moisture content		BS 1377:1990 Part 2 Clause 3.2
wa	Equivalent moisture content passing 425µm sieve		BS 1377:1990 Part 2 Clause 3.2
wL	Liquid limit	-s	BS 1377:1990 Part 2 Clause 4.4
	Single point	-f	BS 1377:1990 Part 2 Clause 4.3
	Four point		
wP	Plastic limit		BS 1377:1990 Part 2 Clause 5.2
Pa	Percentage passing 425um sieve		
Pr	Percentage retained 425um sieve		
IP	Plasticity index		BS 1377:1990 Part 2 Clause 5.4
IL	Liquidity index		BS 1377:1990 Part 2 Clause 5.4
	Suffix indicating test is "Not UKAS Accredited"	*	

Approved by	UM
Approval date	03/04/2019 14:35
Date report generated	03/04/2019 14:44
Report Number	SLMK_19011038

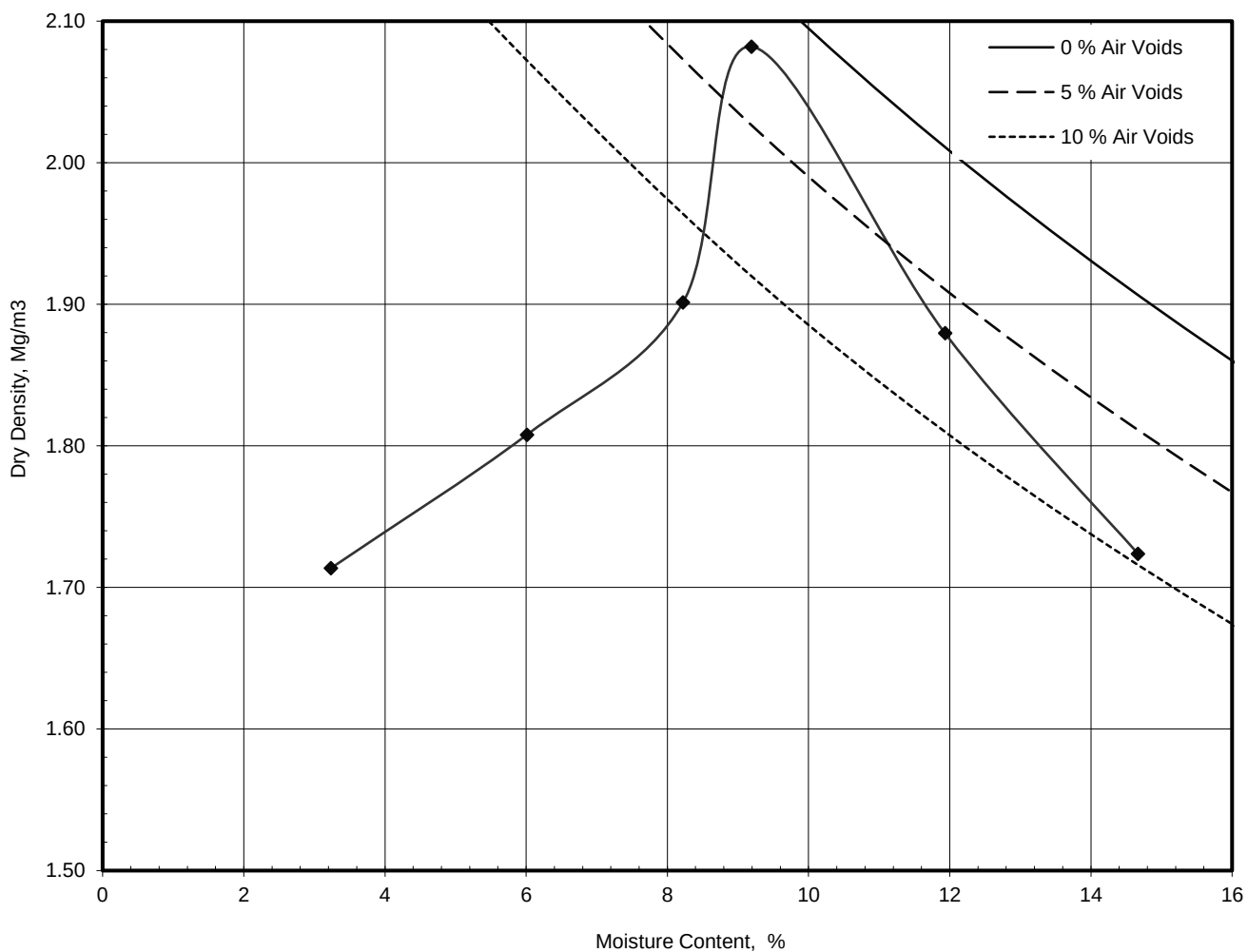
	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D9298
				Borehole / Pit No	BHB
Site Name	Weldale Road, Reading			Sample No	
Soil Description	White, soft to firm, gravelly, CLAY (Chalk).			Depth	1.00 m
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	SLMK2019032114
Compaction Test Reference/No.					



Mould Type	1 LITRE	
Samples Used	Single sample tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	4
Particle Density - Assumed	Mg/m³	2.70
Natural Moisture Content	%	21
Maximum Dry Density	Mg/m³	1.72
Optimum Moisture Content	%	20

Operator	Checked	Approved	Remarks	Fig
M.Southgate	UM	UM	Natural MC = 20.5%	Sheet 1 of 1

	Dry Density / Moisture Content Relationship Light Compaction			Job Ref	D9298
				Borehole / Pit No	BHC
Site Name	Weldale Road, Reading			Sample No	
Soil Description	Brown, clayey, gravelly, SAND.			Depth	0.40 m
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Keylab ID	SLMK2019032125
Compaction Test Reference/No.					



Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	10
Particle Density - Assumed	Mg/m³	2.65
Natural Moisture Content	%	8.4
Maximum Dry Density	Mg/m³	2.08
Optimum Moisture Content	%	9.2

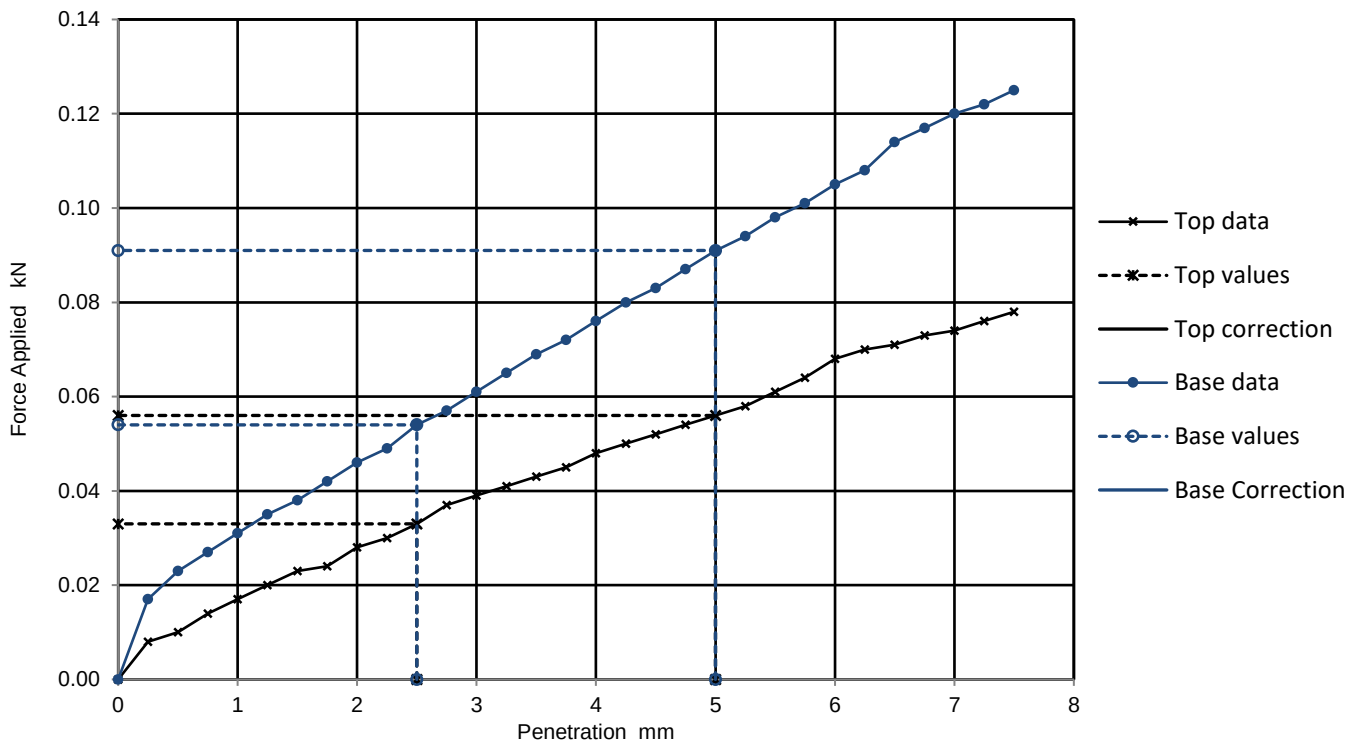
Operator	Checked	Approved	Remarks Natural MC = 9%	Fig Sheet 1 of 1
M.Southgate	UM	UM		

	California Bearing Ratio (CBR)			Job Ref	D9298
				Borehole/Pit No.	BHB
Site Name	Weldale Road, Reading			Sample No.	
Soil Description				Depth m	0.60
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown, slightly sandy, gravelly, CLAY.			KeyLAB ID	SLMK2019032113
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking	days
				Time to surface	days
				Amount of swell recorded	mm
Material retained on 20mm sieve removed	14	%		Dry density after soaking	Mg/m3
Initial Specimen details	Bulk density	2.18	Mg/m3	Surcharge applied	2.28 kg
	Dry density	1.87	Mg/m3		1 kPa
	Moisture content	16.4	%		

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
TOP	0.3	0.3	0.3	
BASE	0.4	0.5	0.5	

Moisture Content %
18.0
15.1

General remarks

Test specific remarks

Approved

		UM
--	--	----

Fig No.

1

Sheet No

1

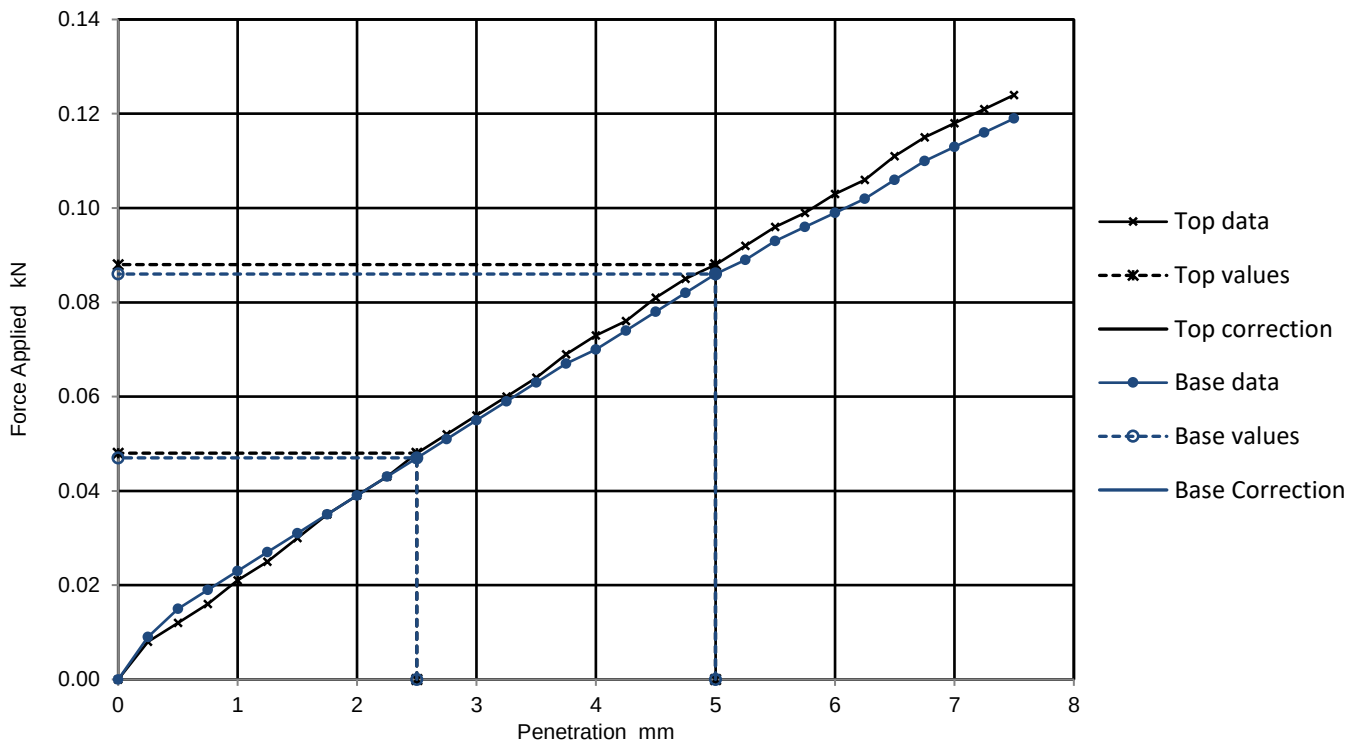
Lab Sheet Reference :

	California Bearing Ratio (CBR)			Job Ref	D9298
				Borehole/Pit No.	BHE
Site Name	Weldale Road, Reading			Sample No.	
Soil Description				Depth m	1.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	soft, cream/white, gravelly, chalky CLAY			KeyLAB ID	SLMK201904120
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking	days
				Time to surface	days
				Amount of swell recorded	mm
Material retained on 20mm sieve removed	3	%		Dry density after soaking	Mg/m ³
Initial Specimen details	Bulk density	2.16	Mg/m ³	Surcharge applied	2.28 kg
	Dry density	1.80	Mg/m ³		1 kPa
	Moisture content	19.7	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP		0.36	0.44	0.44	0.44	16.1
BASE		0.36	0.43	0.43		16.5

General remarks

Test specific remarks

Approved

		KW
--	--	----

Fig No.

1

Sheet No

1

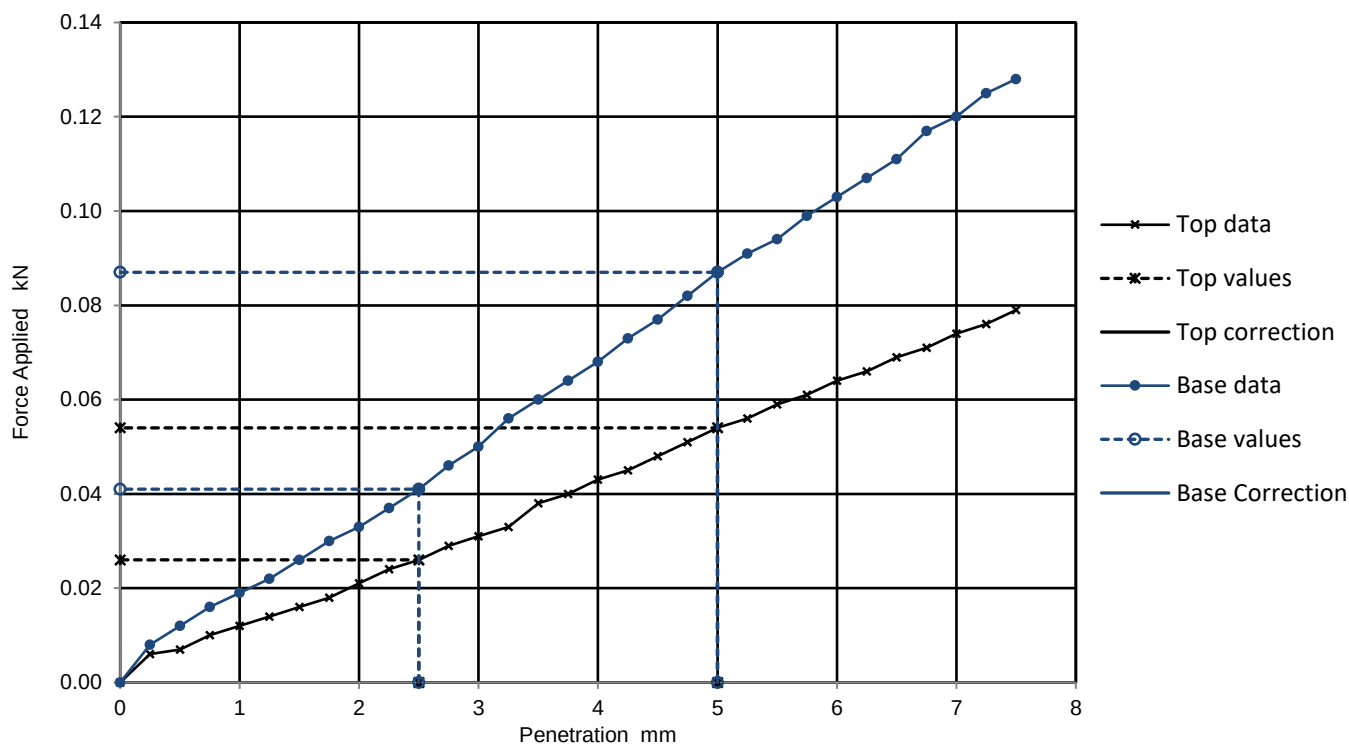
Lab Sheet Reference :

	California Bearing Ratio (CBR)			Job Ref	D9298
				Borehole/Pit No.	BHF
Site Name	Weldale Road, Reading			Sample No.	
Soil Description				Depth m	1.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Cream, gravelly, CLAY (Chalk).			KeyLAB ID	SLMK2019032152
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED		Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer		Period of soaking	days	
			Time to surface	days	
			Amount of swell recorded	mm	
Material retained on 20mm sieve removed	5	%	Dry density after soaking	Mg/m3	
Initial Specimen details	Bulk density	2.20 Mg/m3	Surcharge applied	2.28 kg	
	Dry density	1.95 Mg/m3		1 kPa	
	Moisture content	12.8 %			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP		0.2	0.3	0.3		15.3
BASE		0.3	0.4	0.4		14.9

General remarks	Test specific remarks	Approved
		UM

Fig No.	1
Sheet No	2

Lab Sheet Reference :

[illegible]

Summary of Rock Point Load Tests		Solmek 12-16 Yarm Road, Stockton on Tees, TS18 3NA 01642 607083 lab@solmek.com	
Site name	Job number		
Weldale Road, Reading	D9298		

Hole	Sample			Specimen		Rock type and test condition	Test Type		Failure validity	Dimensions			Is MPa	Is(50) MPa	Remarks
	Depth m	Ref	Type	Depth m	Ref		Type	Dir.		W mm	D mm	D' mm			
BHA	9.26		C	9.29	1	As received	D	L	Valid	191	101		0.12	0.17	
BHA	9.26		C	9.26	2	As received	A	P	Valid	101	85		0.17	0.24	
BHA	13.38		C	13.38	1	As received	D	L	Valid	102	101		0.06	0.09	
BHA	13.38		C	13.38	2	As received	A	P	Valid	101	59		0.08	0.11	
BHA	16.93		C	16.93	1	As received	D	L	Invalid	111	100				IVT
BHA	16.93		C	16.93	2	As received	A	P	Invalid		100				IVT
BHA	19.60		C	19.60	1	As received	D	L	Valid	109	102		0.06	0.08	
BHA	19.60		C	19.60	2	As received	A	P	Valid	102	77		0.06	0.09	
BHA	21.64		C	21.64	1	As received	D	L	Valid	113	96		0.20	0.27	
BHA	21.64		C	21.64	2	As received	A	P	Valid	96	83		0.19	0.26	
BHA	25.00		C	25.00	1	As received	I	U	Valid	93	102		0.05	0.07	
BHA	25.00		C	25.00	2	As received	I	U	Invalid						Axial Not Possible, Irregular Lump
BHA	28.21		C	28.21	1	As received	D	L	Valid	111	102		0.06	0.08	
BHA	28.21		C	28.21	2	As received	A	P	Valid	102	90		0.11	0.15	
BHB	12.60		C	12.60	1	As received	D	L	Valid	209	104		0.23	0.32	
BHB	12.60		C	12.60	2	As received	A	P	Valid	104	104		0.09	0.13	
BHB	17.68		C	17.68	1	As received	D	L	Valid	95	100		0.06	0.09	
BHB	17.68		C	17.68	2	As received	A	P	Valid	100	71		0.07	0.09	
BHB	19.50		C	19.50	1	As received	D	L	Valid	191	100		0.25	0.34	
BHB	19.50		C	19.50	2	As received	A	P	Valid	100	102		0.05	0.07	

Test not currently within the scope of Solmek's UKAS accreditation schedule

Column	Key	Description
Test Type	A	Axial
	B	Block
	D	Diametral
	I	Irregular lump
Test Direction	L	Parallel to planes of weakness
	P	Perpendicular to planes of weakness
	U	Unknown
Dimensions	W	Width
	D	Platen separation at start of test
	D'	Platen separation at sample failure
	IS	Point Load Index
	Is(50)	Corrected Point Load Index to equivalent 50 mm diameter

Approved by	<i>K. J. J. J.</i>
Approval date	25/03/2019 11:09
Date report generated	03/04/2019 14:44
Report Number	SLMK_19011039

Summary of Rock Point Load Tests		Solmek 12-16 Yarm Road, Stockton on Tees, TS18 3NA 01642 607083 lab@solmek.com	
Site name	Job number		
Weldale Road, Reading	D9298		

Hole	Sample			Specimen		Rock type and test condition	Test Type		Failure validity	Dimensions			Is MPa	Is(50) MPa	Remarks
	Depth m	Ref	Type	Depth m	Ref		Type	Dir.		W mm	D mm	D' mm			
BHB	22.58		C	22.58	1	As received	D	L	Valid	149	100		0.19	0.26	
BHB	22.58		C	22.58	2	As received	A	P	Valid	100	105		0.05	0.07	
BHB	25.75		C	25.75	1	As received	D	L	Valid	139	99		0.06	0.09	
BHB	25.75		C	25.75	2	As received	A	P	Valid	99	74		0.33	0.45	
BHB	28.53		C	28.53	1	As received	D	L	Valid	193	100		0.06	0.09	
BHB	28.53		C	28.53	2	As received	A	P	Valid	100	100		0.05	0.07	
BHB	30.55		C	30.55	1	As received	D	L	Valid	105	99		0.13	0.17	
BHB	30.55		C	30.55	2	As received	A	P	Valid	99	79		0.31	0.43	
BHB	33.32		C	33.32	1	As received	D	L	Valid	185	100		0.06	0.09	
BHB	33.32		C	33.32	2	As received	A	P	Valid	100	95		0.10	0.15	
BHB	35.02		C	35.02	1	As received	D	L	Valid	168	99		0.06	0.09	
BHB	35.02		C	35.02	2	As received	A	P	Valid	99	92		0.11	0.15	
BHB	37.62		C	37.62	1	As received	D	L	Valid	134	100		0.12	0.17	
BHB	37.62		C	37.62	2	As received	A	P	Valid	100	75		0.13	0.18	
BHC	14.60		C	14.60	1	As received	D	L	Valid	173	97		0.13	0.18	
BHC	14.60		C	14.60	2	As received	A	P	Valid	97	97		0.05	0.07	
BHC	16.38		C	16.38	1	As received	D	L	Valid	95	102		0.06	0.08	
BHC	16.38		C	16.38	2	As received	A	P	Valid	102	62		0.08	0.10	
BHC	19.18		C	19.18	1	As received	D	L	Valid	336	99		0.06	0.09	
BHC	19.18		C	19.18	2	As received	A	P	Valid	99	117		0.09	0.13	

Test not currently within the scope of Solmek's UKAS accreditation schedule

Column	Key	Description
Test Type	A	Axial
	B	Block
	D	Diametral
	I	Irregular lump
Test Direction	L	Parallel to planes of weakness
	P	Perpendicular to planes of weakness
	U	Unknown
Dimensions	W	Width
	D	Platen separation at start of test
	D'	Platen separation at sample failure
	IS	Point Load Index
	Is(50)	Corrected Point Load Index to equivalent 50 mm diameter

Approved by	<i>K. J. J. J.</i>
Approval date	25/03/2019 11:09
Date report generated	03/04/2019 14:44
Report Number	SLMK_19011040

Summary of Rock Point Load Tests		Solmek 12-16 Yarm Road, Stockton on Tees, TS18 3NA 01642 607083 lab@solmek.com	
Site name	Job number		
Weldale Road, Reading	D9298		

Hole	Sample			Specimen		Rock type and test condition	Test Type		Failure validity	Dimensions			Is MPa	Is(50) MPa	Remarks
	Depth m	Ref	Type	Depth m	Ref		Type	Dir.		W mm	D mm	D' mm			
BHC	28.13		C	28.13	1	As received	D	L	Valid	173	102		0.06	0.08	
BHC	28.13		C	28.13	2	As received	A	P	Valid	102	77		0.13	0.17	
BHC	31.60		C	31.60	1	As received	D	L	Valid	93	101		0.06	0.08	
BHC	31.60		C	31.60	2	As received	A	P	Valid	101	61		0.32	0.41	
BHE	12.30		C	12.30	1	As received	D	L	Valid	87	84		0.09	0.11	
BHE	12.30		C	12.30	2	As received	A	P	Invalid						IVT
BHE	13.82		C	13.82	1	As received	D	L	Valid	112	100		0.06	0.09	
BHE	13.82		C	13.82	2	As received	A	P	Valid	100	64		0.08	0.10	
BHE	20.86		C	20.86	1	As received	D	L	Invalid	136	101				IVT
BHE	20.86		C	20.86	2	As received	A	P	Invalid						IVT
BHE	25.50		C	25.50	1	As received	D	L	Valid	180	102		0.06	0.08	
BHE	25.50		C	25.50	2	As received	A	P	Valid	102	116		0.25	0.38	
BHE	28.80		C	28.80	1	As received	D	L	Valid	139	93		0.07	0.10	
BHE	28.80		C	28.80	2	As received	A	P	Valid	93	104		0.10	0.15	
BHE	31.70		C	31.70	1	As received	D	L	Valid	133	100		0.06	0.09	
BHE	31.70		C	31.70	2	As received	A	P	Valid	100	100		0.05	0.07	
BHE	34.08		C	34.08	1	As received	D	L	Valid	121	85		0.17	0.22	
BHE	34.08		C	34.08	2	As received	A	P	Valid	86	74		0.08	0.10	
BHE	36.00		C	36.00	1	As received	D	L	Valid	100	96		0.07	0.09	
BHE	36.00		C	36.00	2	As received	A	P	Valid	96	56		0.09	0.12	

Test not currently within the scope of Solmek's UKAS accreditation schedule

Column	Key	Description
Test Type	A	Axial
	B	Block
	D	Diametral
	I	Irregular lump
Test Direction	L	Parallel to planes of weakness
	P	Perpendicular to planes of weakness
	U	Unknown
Dimensions	W	Width
	D	Platen separation at start of test
	D'	Platen separation at sample failure
	IS	Point Load Index
	Is(50)	Corrected Point Load Index to equivalent 50 mm diameter

Approved by	<i>K. J. J. J.</i>
Approval date	25/03/2019 11:09
Date report generated	03/04/2019 14:44
Report Number	SLMK_19011041

Summary of Rock Point Load Tests		Solmek 12-16 Yarm Road, Stockton on Tees, TS18 3NA 01642 607083 lab@solmek.com	
Site name	Job number		
Weldale Road, Reading	D9298		

Hole	Sample			Specimen		Rock type and test condition	Test Type		Failure validity	Dimensions			Is MPa	Is(50) MPa	Remarks
	Depth m	Ref	Type	Depth m	Ref		Type	Dir.		W mm	D mm	D' mm			
BHE	39.58		C	39.58	1	As received	D	L	Valid	139	101		0.25	0.34	
BHE	39.58		C	39.58	2	As received	A	P	Valid	101	111		0.22	0.32	
BHF	13.91		C	13.91	1	As received	D	L	Valid	123	99		0.06	0.09	
BHF	13.91		C	13.91	2	As received	A	P	Valid	98	80		0.06	0.09	
BHF	16.33		C	16.33	1	As received	D	L	Valid	68	102		0.06	0.08	
BHF	16.33		C	16.33	2	As received	A	P	Invalid						Irregular Lump Axial Not Possible
BHF	22.33		C	22.33	1	As received	D	L	Valid	161	96		0.07	0.09	
BHF	22.33		C	22.33	2	As received	A	P	Valid	96	90		0.11	0.16	
BHF	23.55		C	23.55	1	As received	D	L	Invalid	110	103				IVT
BHF	23.55		C	23.55	2	As received	A	P	Invalid						IVT
BHF	25.60		C	25.60	1	As received	D	L	Valid	84	98		0.13	0.18	
BHF	25.60		C	25.60	2	As received	A	P	Invalid						Irregular Lump
BHF	31.08		C	31.08	1	As received	D	L	Valid	86	101		0.06	0.08	
BHF	31.08		C	31.08	2	As received	A	P	Valid	101	714		0.01	0.02	
BHF	32.74		C	32.74	1	As received	D	L	Valid	99	77		0.21	0.26	
BHF	32.74		C	32.74	2	As received	A	P	Invalid						IVT
BHF	35.84		C	35.84	1	As received	D	L	Valid	165	98		0.07	0.09	
BHF	35.84		C	35.84	2	As received	A	P	Valid	98	88		0.11	0.16	
BHF	37.60		C	37.60	1	As received	D	L	Valid	158	99		0.25	0.35	
BHF	37.60		C	37.60	2	As received	A	P	Valid	99	89		0.11	0.16	

Test not currently within the scope of Solmek's UKAS accreditation schedule

Column	Key	Description
Test Type	A	Axial
	B	Block
	D	Diametral
	I	Irregular lump
Test Direction	L	Parallel to planes of weakness
	P	Perpendicular to planes of weakness
	U	Unknown
Dimensions	W	Width
	D	Platen separation at start of test
	D'	Platen separation at sample failure
	IS	Point Load Index
	Is(50)	Corrected Point Load Index to equivalent 50 mm diameter

Approved by	<i>K. J. J. J.</i>
Approval date	25/03/2019 11:10
Date report generated	03/04/2019 14:44
Report Number	SLMK_19011042



LABORATORY REPORT



4043

Contract Number: PSL19/1866

Report Date: 02 April 2019
Client's Reference: D9298/1
Client Name: Dunelm/Solmek
12 Yarm Road
Stockton-on-Tees
TS18 3NA

For the attention of: Kathryn Watkin

Contract Title: Weldale Road, Reading
Date Received: 21/3/2019
Date Commenced: 21/3/2019
Date Completed: 2/4/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
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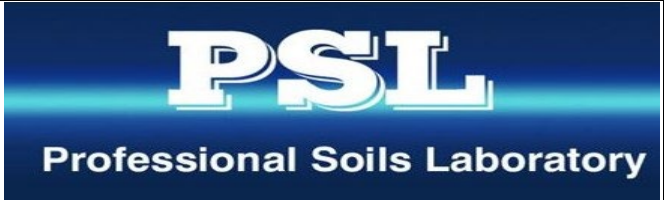
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SUMMARY OF CHALK TESTS

(BS1377 : PART 2 & 4 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content %	Saturated MC %	Dry Density Mg/m ³	Passing 10mm Sieve %	Chalk Crushing Value CCV	Remarks
BHB		C	21.85	22.10	25	21	1.73			
BHB		C	27.15	27.49	27	27	1.56			
BHB		C	32.54	32.90	22	21	1.72			
BHB		C	36.56	36.75	21	22	1.70			
BHB		C	39.14	39.44	23	24	1.65			
BHC		C	19.50	19.80	26	27	1.56			
BHC		C	23.23	23.60	26	27	1.55			
BHC		C	24.91	25.15	26	27	1.56			
BHC		C	29.65	29.85	26	28	1.54			
BHA		C	18.68	18.90	25	30	1.48			
BHA		C	22.90	23.19	26	28	1.55			
BHA		C	26.22	26.49	24	26	1.59			
BHA		C	29.44	29.63	23	27	1.56			

* CCV testing is not UKAS accredited

		Weldale Road, Reading		Contract No:
				PSL19/1866
				Client Ref:
				D9298

DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

Hole Number	Sample Number	Sample Type	Top Depth (m)	Base Depth (m)	Sample Diameter (mm)	Sample Length (mm)	Height Ratio	Initial Mass (g)	Bulk Density (Mg/m)	Moisture Content (%)	Dry Density (Mg/m)	Load Failure (kN)	UCS (MPa)	Failure Mode	Date Tested	Remarks
BHB		C	21.85	22.10	100	137	1.4	2204	2.05	25	1.64	10.5	1.3	Brittle	25/03/19	
BHB		C	27.15	27.49	100	187	1.9	2974	2.02	27	1.60	15.3	1.9	Brittle	25/03/19	
BHB		C	32.54	32.90	100	168	1.7	2735	2.07	22	1.69	20.9	2.7	Brittle	25/03/19	
BHB		C	36.56	36.75	100	144	1.4	2242	1.98	21	1.64	14.1	1.8	Brittle	25/03/19	
BHB		C	39.14	39.44	100	151	1.5	2264	1.91	23	1.55	8.2	1.0	Brittle	25/03/19	
BHC		C	19.50	19.80	100	148	1.5	2328	2.00	26	1.59	7.1	0.9	Brittle	25/03/19	
BHC		C	23.23	23.60	100	206	2.1	3295	2.04	26	1.62	17.8	2.3	Brittle	25/03/19	
BHC		C	24.91	25.15	100	175	1.8	2872	2.09	26	1.66	17.2	2.2	Brittle	25/03/19	
BHC		C	29.65	29.85	100	127	1.3	1977	1.98	26	1.58	13.5	1.7	Brittle	25/03/19	
BHA		C	18.68	18.90	100	156	1.6	2477	2.02	25	1.61	9.4	1.2	Brittle	25/03/19	
BHA		C	22.90	23.19	100	170	1.7	2683	2.01	26	1.60	21.9	2.8	Brittle	25/03/19	
BHA		C	26.22	26.49	100	185	1.9	2899	1.99	24	1.60	12.2	1.6	Brittle	25/03/19	
BHA		C	29.44	29.63	100	142	1.4	2267	2.03	23	1.65	21.9	2.8	Brittle	25/03/19	



Weldale Road, Reading

Contract No:

PSL19/1866

Client Ref:

D9298



Certificate of Analysis

Certificate Number 19-05626

29-Mar-19

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

Our Reference 19-05626

Client Reference PSL19/1866

Order No (not supplied)

Contract Title Weldale Road, Reading

Description 2 Soil samples.

Date Received 26-Mar-19

Date Started 26-Mar-19

Date Completed 29-Mar-19

Test Procedures Identified by prefix DETSn (details on request).

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

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis Soil Samples

Our Ref 19-05626

Client Ref PSL19/1866

Contract Title Weldale Road, Reading

Lab No	1479392	1479393
Sample ID	BHB	BHA
Depth	39.14-39.44	29.44-29.63
Other ID		
Sample Type	C	C
Sampling Date	n/s	n/s
Sampling Time	n/s	n/s

Test	Method	LOD	Units
Inorganics			
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%
		0.04	0.03

Information in Support of the Analytical Results

Our Ref 19-05626
 Client Ref PSL19/1866
 Contract Weldale Road, Reading

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1479392	BHB 39.14-39.44 SOIL		PT 500ml	Sample date not supplied, Total Sulphate ICP (730 days)	
1479393	BHA 29.44-29.63 SOIL		PT 500ml	Sample date not supplied, Total Sulphate ICP (730 days)	

Key: P-Plastic T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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



LABORATORY REPORT



4043

Contract Number: PSL19/1867

Report Date: 04 April 2019
Client's Reference: 112990
Client Name: Dunelm/Solmek
12 Yarm Road
Stockton-on-Tees
TS18 3NA

For the attention of: Kathryn Watkin

Contract Title: Weldale Road, Reading
Date Received: 21/3/2019
Date Commenced: 21/3/2019
Date Completed: 4/4/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)


S Eyre
(Senior Technician)

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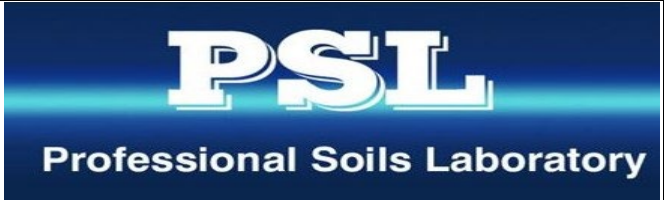
Page 1 of

SUMMARY OF CHALK TESTS

(BS1377 : PART 2 & 4 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content %	Saturated MC %	Dry Density Mg/m ³	Passing 10mm Sieve %	Chalk Crushing Value CCV	Remarks
BHE		C	16.68	16.80	27	30	1.49			
BHE		C	23.76	24.00	24	28	1.55			
BHE		C	31.03	31.35	24	29	1.52			
BHE		C	35.68	26.00	28	26	1.59			
BHE		C	38.55	38.81	25	27	1.56			
BHF		C	19.96	20.22	27	28	1.54			
BHF		C	24.57	24.84	25	27	1.56			
BHF		C	28.00	28.30	26	27	1.56			
BHF		C	33.12	33.28	23	26	1.59			
BHF		C	36.98	37.35	24	28	1.54			
BHF		C	39.57	39.78	25	26	1.58			

* CCV testing is not UKAS accredited

		Weldale Road, Reading		Contract No:
				PSL19/1867
				Client Ref:
				D9298

DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

Hole Number	Sample Number	Sample Type	Top Depth (m)	Base Depth (m)	Sample Diameter (mm)	Sample Length (mm)	Height Ratio	Initial Mass (g)	Bulk Density (Mg/m)	Moisture Content (%)	Dry Density (Mg/m)	Load Failure (kN)	UCS (MPa)	Failure Mode	Date Tested	Remarks
BHE		C	23.76	24.00	100	181	1.8	2805	1.97	24	1.59	15.9	2.0	Brittle	01/04/19	
BHE		C	31.03	31.35	100	147	1.5	2257	1.95	24	1.57	12.5	1.6	Brittle	01/04/19	
BHE		C	35.68	26.00	100	152	1.5	2366	1.98	28	1.55	10.1	1.3	Brittle	01/04/19	
BHE		C	38.55	38.81	100	172	1.7	2667	1.97	25	1.58	11.6	1.5	Brittle	01/04/19	
BHF		C	19.96	20.22	100	181	1.8	2829	1.99	27	1.57	12.3	1.6	Brittle	01/04/19	
BHF		C	24.57	24.84	100	187	1.9	2929	1.99	25	1.60	18.0	2.3	Brittle	01/04/19	
BHF		C	28.00	28.30	100	194	1.9	3046	2.00	26	1.58	22.5	2.9	Brittle	01/04/19	
BHF		C	33.12	33.28	100	129	1.3	2009	1.98	23	1.61	26.1	3.3	Brittle	01/04/19	
BHF		C	36.98	37.35	100	156	1.6	2392	1.95	24	1.58	12.4	1.6	Brittle	01/04/19	
BHF		C	39.57	39.78	100	147	1.5	2308	2.00	25	1.61	13.1	1.7	Brittle	01/04/19	

	Weldale Road, Reading	Contract No:
		PSL19/1867
		Client Ref:
		D9298

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

[illegible]

***Note** All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



Weldale Road, Reading

Contract No:

PSL19/1867

Client Ref:

D9298

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

[illegible]

***Note** All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Weldale Road, Reading

Contract No:

PSL19/1867

Client Ref:

D9298



Certificate of Analysis

Certificate Number 19-05637-1

29-Mar-19

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

Our Reference 19-05637-1

Client Reference PSL19/1867

Order No (not supplied)

Contract Title Weldale Road, Reading

Description One Soil sample.

Date Received 26-Mar-19

Date Started 26-Mar-19

Date Completed 29-Mar-19

Test Procedures Identified by prefix DETSn (details on request).

Notes This report supersedes 19-05637, amendments.

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

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 19-05637-1

Client Ref PSL19/1867

Contract Title Weldale Road, Reading

Lab No	1479428
Sample ID	BHF
Depth	19.96-20.22
Other ID	
Sample Type	C
Sampling Date	n/s
Sampling Time	n/s

Test	Method	LOD	Units
Inorganics			
Sulphate as SO ₄ , Total	DETSC 2321#	100	mg/l 300

Information in Support of the Analytical Results

Our Ref 19-05637-1
 Client Ref PSL19/1867
 Contract Weldale Road, Reading

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1479428	BHF 19.96-20.22 SOIL		PT 500ml	Sample date not supplied, Total Sulphate ICP (730 days)	

Key: P-Plastic T-Tub

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

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :- Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



Certificate of Analysis

Certificate Number 19-05637-2

29-Apr-19

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

Our Reference 19-05637-2

Client Reference PSL19/1867

Order No (not supplied)

Contract Title Weldale Road, Reading

Description One Soil sample.

Date Received 26-Mar-19

Date Started 26-Mar-19

Date Completed 29-Apr-19

Test Procedures Identified by prefix DETSn (details on request).

Notes This report supersedes 19-05637-1, extra testing.

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

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 19-05637-2

Client Ref PSL19/1867

Contract Title Weldale Road, Reading

Lab No	1479428
Sample ID	BHF
Depth	19.96-20.22
Other ID	
Sample Type	C
Sampling Date	n/s
Sampling Time	n/s

Test	Method	LOD	Units	
Inorganics				
pH	DETSC 2008#			9.1
Sulphate Aqueous Extract as SO ₄	DETSC 2076#	10	mg/l	26
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.03

Information in Support of the Analytical Results

Our Ref 19-05637-2
 Client Ref PSL19/1867
 Contract Weldale Road, Reading

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1479428	BHF 19.96-20.22 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphate ICP (730 days), pH + Conductivity (7 days)	
Key: P-Plastic T-Tub DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.					

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :- Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months
--



2183

Final Report

Report No.: 19-10051-1

Initial Date of Issue: 27-Mar-2019

Client Solmek Ltd

Client Address: 12 Yarm Road ☐
Stockton-on-Tees ☐
TS18 3NA

Contact(s): Kathryn Watkin ☐
Office

Project 112990/D9298 - Weldale Road,
Reading

Quotation No.: Q18-14308 **Date Received:** 22-Mar-2019

Order No.: **Date Instructed:** 22-Mar-2019

No. of Samples: 3

Turnaround (Wkdays): 7 **Results Due:** 01-Apr-2019

Date Approved: 27-Mar-2019

Approved By:



Details: Martin Dyer, Laboratory Manager ☐

Project: 112990/D9298 - Weldale Road, Reading

Client: Solmek Ltd	Chemtest Job No.:				19-10051	19-10051	19-10051
Quotation No.: Q18-14308	Chemtest Sample ID.:				797848	797849	797850
	Sample Location:				BHB	BHC	BHA
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.20	5.00	16.93
	Bottom Depth (m):						17.04
Determinand	Accred.	SOP	Units	LOD			
Moisture	N	2030	%	0.020	19	21	21
pH (2.5:1)	N	2010		N/A	[A] 8.7	[A] 9.2	[A] 8.9
Sulphate (2:1 Water Soluble) as SO ₄	U	2120	mg/l	10.000	< 10	< 10	< 10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
797848			BHB		A	Plastic Tub 500g
797849			BHC		A	Plastic Tub 500g
797850			BHA		A	Plastic Tub 500g

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



2183

Final Report

Report No.: 19-10069-1

Initial Date of Issue: 27-Mar-2019

Client Solmek Ltd

Client Address: 12 Yarm Road ☐
Stockton-on-Tees ☐
TS18 3NA

Contact(s): Kathryn Watkin ☐
Office

Project D9298 Weldale Road, Reading

Quotation No.: Q18-14308 **Date Received:** 22-Mar-2019

Order No.: **Date Instructed:** 22-Mar-2019

No. of Samples: 4

Turnaround (Wkdays): 7 **Results Due:** 01-Apr-2019

Date Approved: 27-Mar-2019

Approved By:



Details: Martin Dyer, Laboratory Manager ☐

Project: D9298 Weldale Road, Reading

Client: Solmek Ltd	Chemtest Job No.:				19-10069	19-10069	19-10069	19-10069
Quotation No.: Q18-14308	Chemtest Sample ID.:				797885	797886	797887	797888
	Sample Location:				BHD1	BHE	BHE	BHF
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				3.50	10.0	25.50	37.60
	Bottom Depth (m):						27.00	37.75
Determinand	Accred.	SOP	Units	LOD				
Moisture	N	2030	%	0.020	22	17	21	18
pH (2.5:1)	N	2010		N/A	[A] 8.7	[A] 8.8	[A] 8.9	[A] 9.0
Sulphate (2:1 Water Soluble) as SO ₄	U	2120	mg/l	10.000	20	< 10	< 10	< 10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
797885			BHD1		A	Plastic Tub 500g
797886			BHE		A	Plastic Tub 500g
797887			BHE		A	Plastic Tub 500g
797888			BHF		A	Plastic Tub 500g

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com

Site Name: Weldale Street, Reading		Job Number: D9298	
Hole:	Depth (M):	Type:	Description:
BHB	2.00-2.45	U100	Structureless CHALK composed of sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is extremely weak to weak, low to medium density white chalk. Matrix is white with occasional orange staining. (Grade DM).

Photo:



Described By: AH	Checked By: BC
Date: 07.03.2019	Date: 10.04.2019

Site Name: Weldale Street, Reading		Job Number: D9298	
Hole:	Depth (M):	Type:	Description:
BHB	4.00-4.45	U100	Structureless CHALK composed of sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is extremely weak to weak, low to medium density white chalk. Matrix is white with occasional orange staining. (Grade DM).

Photo:



Described By: AH	Checked By: BC
Date: 07.03.2019	Date: 10.04.2019

Site Name: Weldale Street, Reading		Job Number: D9298	
Hole:	Depth (M):	Type:	Description:
BHC	2.00-2.45	U100	Structureless CHALK composed of sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is extremely weak to weak, low to medium density white chalk. Matrix is white with occasional orange staining. (Grade DM).

Photo:



Described By: AH	Checked By: BC
Date: 07.03.2019	Date: 10.04.2019

Site Name: Weldale Street, Reading		Job Number: D9298	
Hole:	Depth (M):	Type:	Description:
BHC	4.00-4.45	U100	Structureless CHALK composed of sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is extremely weak to weak, low to medium density white chalk. Matrix is white with occasional orange staining. (Grade DM).

Photo:



Described By: AH	Checked By: BC
Date: 07.03.2019	Date: 10.04.2019

Site Name: Weldale Street, Reading		Job Number: D9298	
Hole:	Depth (M):	Type:	Description:
BHE	2.00-2.45	U100	Structureless CHALK composed of sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is extremely weak to weak, low to medium density white chalk. Matrix is white with occasional orange staining. (Grade DM).

Photo:



Described By: AH	Checked By: BC
Date: 07.03.2019	Date: 10.04.2019

Site Name: Weldale Street, Reading		Job Number: D9298	
Hole:	Depth (M):	Type:	Description:
BHE	4.00-4.45	U100	Structureless CHALK composed of sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is extremely weak to weak, low to medium density white chalk. Matrix is white with occasional orange staining. (Grade DM).

Photo:



Described By: AH	Checked By: CB
Date: 07.03.2019	Date: 10.04.2019

Site Name: Weldale Street, Reading		Job Number: D9298	
Hole:	Depth (M):	Type:	Description:
BHF	2.00-2.45	U100	Structureless CHALK composed of sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is extremely weak to weak, low to medium density white chalk. Matrix is white with occasional orange staining. (Grade DM).

Photo:



Described By: AH	Checked By: BC
Date: 07.03.2019	Date: 10.04.2019

Site Name: Weldale Street, Reading		Job Number: D9298	
Hole:	Depth (M):	Type:	Description:
BHF	4.00-4.45	U100	Structureless CHALK composed of sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is extremely weak to weak, low to medium density white chalk. Matrix is white with occasional orange staining. (Grade DM).

Photo:



Described By: AH	Checked By: BC
Date: 07.03.2019	Date: 10.04.2019

APPENDIX E

Chemical Laboratory Results





2183

Amended Report

Report No.:	19-04556-2		
Initial Date of Issue:		Date of Re-Issue:	19-Feb-2019
Client	Dunelm Geotechnical and Environmental		
Client Address:	Foundation House St Johns Road Meadowfield County Durham DH78TZ		
Contact(s):	Stacey Hornsby		
Project	D9298		
Quotation No.:		Date Received:	07-Feb-2019
Order No.:	16525/D9298/SH	Date Instructed:	08-Feb-2019
No. of Samples:	8		
Turnaround (Wkdays):	10	Results Due:	21-Feb-2019
Date Approved:	19-Feb-2019		
Approved By:			
			
Details:	Robert Monk, Technical Manager		

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-04556	19-04556	19-04556
Quotation No.:	Chemtest Sample ID.:				769809	769810	769812
	Sample Location:				WS101	WS6	WS103B
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				05-Feb-2019	05-Feb-2019	05-Feb-2019
Determinand	Accred.	SOP	Units	LOD			
pH	U	1010		N/A	7.9	8.0	8.1
Sulphate	U	1220	mg/l	1.0	18	12	18
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Arsenic (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Boron (Dissolved)	U	1450	µg/l	20	< 20	< 20	< 20
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1.0	1.4	6.7	1.5
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Zinc (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Total TPH >C6-C40	U	1670	µg/l	10	11000	11000	< 10
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0		
Chloromethane	U	1760	µg/l	1.0	< 1.0		
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0		
Bromomethane	U	1760	µg/l	5.0	< 5.0		
Chloroethane	U	1760	µg/l	2.0	< 2.0		
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0		
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0		
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0		
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0		
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0		

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-04556	19-04556	19-04556
Quotation No.:	Chemtest Sample ID.:				769809	769810	769812
	Sample Location:				WS101	WS6	WS103B
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				05-Feb-2019	05-Feb-2019	05-Feb-2019
Determinand	Accred.	SOP	Units	LOD			
Bromochloromethane	U	1760	µg/l	5.0	< 5.0		
Trichloromethane	U	1760	µg/l	1.0	< 1.0		
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0		
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0		
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0		
Benzene	U	1760	µg/l	1.0	< 1.0		
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0		
Trichloroethene	N	1760	µg/l	1.0	< 1.0		
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0		
Dibromomethane	U	1760	µg/l	10	< 10		
Bromodichloromethane	U	1760	µg/l	5.0	< 5.0		
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10		
Toluene	U	1760	µg/l	1.0	< 1.0		
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10		
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10		
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0		
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0		
Dibromochloromethane	U	1760	µg/l	10	< 10		
1,2-Dibromoethane	U	1760	µg/l	5.0	< 5.0		
Chlorobenzene	N	1760	µg/l	1.0	< 1.0		
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0		
Ethylbenzene	U	1760	µg/l	1.0	< 1.0		
m & p-Xylene	U	1760	µg/l	1.0	< 1.0		
o-Xylene	U	1760	µg/l	1.0	< 1.0		
Styrene	U	1760	µg/l	1.0	< 1.0		
Tribromomethane	U	1760	µg/l	1.0	< 1.0		
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0		
Bromobenzene	U	1760	µg/l	1.0	< 1.0		
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50		
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0		
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0		
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0		
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0		
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0		
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0		
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0		
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0		
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0		
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0		
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0		

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-04556	19-04556	19-04556
Quotation No.:	Chemtest Sample ID.:				769809	769810	769812
	Sample Location:				WS101	WS6	WS103B
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				05-Feb-2019	05-Feb-2019	05-Feb-2019
Determinand	Accred.	SOP	Units	LOD			
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0		
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50		
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0		
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0		
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0		
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0		
N-Nitrosodimethylamine	N	1790	µg/l	0.50	< 0.50		
Phenol	N	1790	µg/l	0.50	< 0.50		
2-Chlorophenol	N	1790	µg/l	0.50	< 0.50		
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.50	< 0.50		
1,3-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50		
1,4-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50		
1,2-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50		
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.50	< 0.50		
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.50	< 0.50		
Hexachloroethane	N	1790	µg/l	0.50	< 0.50		
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.50	< 0.50		
4-Methylphenol	N	1790	µg/l	0.50	< 0.50		
Nitrobenzene	N	1790	µg/l	0.50	< 0.50		
Isophorone	N	1790	µg/l	0.50	< 0.50		
2-Nitrophenol	N	1790	µg/l	0.50	< 0.50		
2,4-Dimethylphenol	N	1790	µg/l	0.50	< 0.50		
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.50	< 0.50		
2,4-Dichlorophenol	N	1790	µg/l	0.50	< 0.50		
1,2,4-Trichlorobenzene	N	1790	µg/l	0.50	< 0.50		
Naphthalene	N	1790	µg/l	0.50	< 0.50		
4-Chloroaniline	N	1790	µg/l	0.50	< 0.50		
Hexachlorobutadiene	N	1790	µg/l	0.50	< 0.50		
4-Chloro-3-Methylphenol	N	1790	µg/l	0.50	< 0.50		
2-Methylnaphthalene	N	1790	µg/l	0.50	< 0.50		
Hexachlorocyclopentadiene	N	1790	µg/l	0.50	< 0.50		
2,4,6-Trichlorophenol	N	1790	µg/l	0.50	< 0.50		
2,4,5-Trichlorophenol	N	1790	µg/l	0.50	< 0.50		
2-Chloronaphthalene	N	1790	µg/l	0.50	< 0.50		
2-Nitroaniline	N	1790	µg/l	0.50	< 0.50		
Acenaphthylene	N	1790	µg/l	0.50	< 0.50		
Dimethylphthalate	N	1790	µg/l	0.50	< 0.50		
2,6-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50		
Acenaphthene	N	1790	µg/l	0.50	< 0.50		
3-Nitroaniline	N	1790	µg/l	0.50	< 0.50		

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-04556	19-04556	19-04556
Quotation No.:	Chemtest Sample ID.:				769809	769810	769812
	Sample Location:				WS101	WS6	WS103B
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				05-Feb-2019	05-Feb-2019	05-Feb-2019
Determinand	Accred.	SOP	Units	LOD			
Dibenzofuran	N	1790	µg/l	0.50	< 0.50		
4-Chlorophenylphenylether	N	1790	µg/l	0.50	< 0.50		
2,4-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50		
Fluorene	N	1790	µg/l	0.50	< 0.50		
Diethyl Phthalate	N	1790	µg/l	0.50	< 0.50		
4-Nitroaniline	N	1790	µg/l	0.50	< 0.50		
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.50	< 0.50		
Azobenzene	N	1790	µg/l	0.50	< 0.50		
4-Bromophenylphenyl Ether	N	1790	µg/l	0.50	< 0.50		
Hexachlorobenzene	N	1790	µg/l	0.50	< 0.50		
Pentachlorophenol	N	1790	µg/l	0.50	< 0.50		
Phenanthrene	N	1790	µg/l	0.50	< 0.50		
Anthracene	N	1790	µg/l	0.50	< 0.50		
Carbazole	N	1790	µg/l	0.50	< 0.50		
Di-N-Butyl Phthalate	N	1790	µg/l	0.50	< 0.50		
Fluoranthene	N	1790	µg/l	0.50	< 0.50		
Pyrene	N	1790	µg/l	0.50	< 0.50		
Butylbenzyl Phthalate	N	1790	µg/l	0.50	< 0.50		
Benzo[a]anthracene	N	1790	µg/l	0.50	< 0.50		
Chrysene	N	1790	µg/l	0.50	< 0.50		
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.50	< 0.50		
Di-N-Octyl Phthalate	N	1790	µg/l	0.50	< 0.50		
Benzo[b]fluoranthene	N	1790	µg/l	0.50	< 0.50		
Benzo[k]fluoranthene	N	1790	µg/l	0.50	< 0.50		
Benzo[a]pyrene	N	1790	µg/l	0.50	< 0.50		
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.50	< 0.50		
Dibenz(a,h)Anthracene	N	1790	µg/l	0.50	< 0.50		
Benzo[g,h,i]perylene	N	1790	µg/l	0.50	< 0.50		
4-Nitrophenol	N	1790	µg/l	0.50	< 0.50		
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



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Amended Report

Report No.:	19-05396-3		
Initial Date of Issue:	22-Feb-2019	Date of Re-Issue:	05-Mar-2019
Client	Dunelm Geotechnical and Environmental		
Client Address:	Foundation House St Johns Road Meadowfield County Durham DH78TZ		
Contact(s):	Ben Carvey		
Project	D9298 - Weldale Street, Reading		
Quotation No.:		Date Received:	14-Feb-2019
Order No.:		Date Instructed:	15-Feb-2019
No. of Samples:	5		
Turnaround (Wkdays):	11	Results Due:	01-Mar-2019
Date Approved:	28-Feb-2019		
Approved By:			
Details:	Glynn Harvey, Laboratory Manager		

Results - Water (TPH)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05396	19-05396	19-05396	19-05396	19-05396
	Chemtest Sample ID.:				774253	774256	774257	774259	774260
	Sample Location:				BH4B	WS1	WS2A	BH2	BH101
	Sample Type:				WATER	WATER	WATER	WATER	WATER
	Date Sampled:				11-Feb-2019	11-Feb-2019	11-Feb-2019	11-Feb-2019	11-Feb-2019
Determinand	Accred.	SOP	Units	LOD					
Total TPH >C6-C40	U	1670	µg/l	10	290	1100	210	< 10	< 10

Results - Water (Metals)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05396	19-05396	19-05396	19-05396	19-05396
Quotation No.:	Chemtest Sample ID.:				774253	774256	774257	774259	774260
	Sample Location:				BH4B	WS1	WS2A	BH2	BH101
	Sample Type:				WATER	WATER	WATER	WATER	WATER
	Date Sampled:				11-Feb-2019	11-Feb-2019	11-Feb-2019	11-Feb-2019	11-Feb-2019
Determinand	Accred.	SOP	Units	LOD					
Arsenic (Dissolved)	U	1450	µg/l	1.0	1.4	2.0	2.6	2.7	3.5
Boron (Dissolved)	U	1450	µg/l	20	220	300	370	500	460
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	3.4	5.4	14
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	2.2	3.6	13
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1.0	1.2	6.3	5.5	2.1	1.2
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Water (PAHs)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:					19-05396	19-05396	19-05396	19-05396	19-05396
Quotation No.:	Chemtest Sample ID.:					774253	774256	774257	774259	774260
	Sample Location:					BH4B	WS1	WS2A	BH2	BH101
	Sample Type:					WATER	WATER	WATER	WATER	WATER
	Date Sampled:					11-Feb-2019	11-Feb-2019	11-Feb-2019	11-Feb-2019	11-Feb-2019
Determinand	Accred.	SOP	Units	LOD						
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Results - Water (VOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05396		
Quotation No.:	Chemtest Sample ID.:		774256		
	Sample Location:		WS1		
	Sample Type:		WATER		
	Date Sampled:		11-Feb-2019		
Determinand	Accred.	SOP	Units	LOD	
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0
Bromomethane	U	1760	µg/l	5.0	< 5.0
Chloroethane	U	1760	µg/l	2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5.0	< 5.0
Trichloromethane	U	1760	µg/l	1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10
Bromodichloromethane	U	1760	µg/l	5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	5.1
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10
1,2-Dibromoethane	U	1760	µg/l	5.0	< 5.0
Chlorobenzene	N	1760	µg/l	1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05396		
Quotation No.:	Chemtest Sample ID.:		774256		
	Sample Location:		WS1		
	Sample Type:		WATER		
	Date Sampled:		11-Feb-2019		
Determinand	Accred.	SOP	Units	LOD	
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05396		
Quotation No.:	Chemtest Sample ID.:		774256		
	Sample Location:		WS1		
	Sample Type:		WATER		
	Date Sampled:		11-Feb-2019		
Determinand	Accred.	SOP	Units	LOD	
N-Nitrosodimethylamine	N	1790	µg/l	0.50	< 0.50
Phenol	N	1790	µg/l	0.50	< 0.50
2-Chlorophenol	N	1790	µg/l	0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.50	< 0.50
1,3-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
1,4-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
1,2-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.50	< 0.50
Hexachloroethane	N	1790	µg/l	0.50	< 0.50
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.50	< 0.50
4-Methylphenol	N	1790	µg/l	0.50	< 0.50
Nitrobenzene	N	1790	µg/l	0.50	< 0.50
Isophorone	N	1790	µg/l	0.50	< 0.50
2-Nitrophenol	N	1790	µg/l	0.50	< 0.50
2,4-Dimethylphenol	N	1790	µg/l	0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.50	< 0.50
2,4-Dichlorophenol	N	1790	µg/l	0.50	< 0.50
1,2,4-Trichlorobenzene	N	1790	µg/l	0.50	< 0.50
Naphthalene	N	1790	µg/l	0.50	< 0.50
4-Chloroaniline	N	1790	µg/l	0.50	< 0.50
Hexachlorobutadiene	N	1790	µg/l	0.50	< 0.50
4-Chloro-3-Methylphenol	N	1790	µg/l	0.50	< 0.50
2-Methylnaphthalene	N	1790	µg/l	0.50	< 0.50
Hexachlorocyclopentadiene	N	1790	µg/l	0.50	< 0.50
2,4,6-Trichlorophenol	N	1790	µg/l	0.50	< 0.50
2,4,5-Trichlorophenol	N	1790	µg/l	0.50	< 0.50
2-Chloronaphthalene	N	1790	µg/l	0.50	< 0.50
2-Nitroaniline	N	1790	µg/l	0.50	< 0.50
Acenaphthylene	N	1790	µg/l	0.50	< 0.50
Dimethylphthalate	N	1790	µg/l	0.50	< 0.50
2,6-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50
Acenaphthene	N	1790	µg/l	0.50	< 0.50
3-Nitroaniline	N	1790	µg/l	0.50	< 0.50
Dibenzofuran	N	1790	µg/l	0.50	< 0.50
4-Chlorophenylphenylether	N	1790	µg/l	0.50	< 0.50
2,4-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50
Fluorene	N	1790	µg/l	0.50	< 0.50
Diethyl Phthalate	N	1790	µg/l	0.50	< 0.50
4-Nitroaniline	N	1790	µg/l	0.50	< 0.50

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05396		
Quotation No.:	Chemtest Sample ID.:		774256		
	Sample Location:		WS1		
	Sample Type:		WATER		
	Date Sampled:		11-Feb-2019		
Determinand	Accred.	SOP	Units	LOD	
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.50	< 0.50
Azobenzene	N	1790	µg/l	0.50	< 0.50
4-Bromophenylphenyl Ether	N	1790	µg/l	0.50	< 0.50
Hexachlorobenzene	N	1790	µg/l	0.50	< 0.50
Pentachlorophenol	N	1790	µg/l	0.50	< 0.50
Phenanthrene	N	1790	µg/l	0.50	< 0.50
Anthracene	N	1790	µg/l	0.50	< 0.50
Carbazole	N	1790	µg/l	0.50	< 0.50
Di-N-Butyl Phthalate	N	1790	µg/l	0.50	< 0.50
Fluoranthene	N	1790	µg/l	0.50	< 0.50
Pyrene	N	1790	µg/l	0.50	< 0.50
Butylbenzyl Phthalate	N	1790	µg/l	0.50	< 0.50
Benzo[a]anthracene	N	1790	µg/l	0.50	< 0.50
Chrysene	N	1790	µg/l	0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.50	< 0.50
Di-N-Octyl Phthalate	N	1790	µg/l	0.50	< 0.50
Benzo[b]fluoranthene	N	1790	µg/l	0.50	< 0.50
Benzo[k]fluoranthene	N	1790	µg/l	0.50	< 0.50
Benzo[a]pyrene	N	1790	µg/l	0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.50	< 0.50
Dibenz(a,h)Anthracene	N	1790	µg/l	0.50	< 0.50
Benzo[g,h,i]perylene	N	1790	µg/l	0.50	< 0.50
4-Nitrophenol	N	1790	µg/l	0.50	< 0.50

Results - Water (Other)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05396	19-05396	19-05396	19-05396	19-05396
Quotation No.:	Chemtest Sample ID.:				774253	774256	774257	774259	774260
	Sample Location:				BH4B	WS1	WS2A	BH2	BH101
	Sample Type:				WATER	WATER	WATER	WATER	WATER
	Date Sampled:				11-Feb-2019	11-Feb-2019	11-Feb-2019	11-Feb-2019	11-Feb-2019
Determinand	Accred.	SOP	Units	LOD					
pH	U	1010		N/A	8.0	8.0	8.0	8.2	8.2
Sulphate	U	1220	mg/l	1.0	53	85	96	64	59
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Total Hardness as CaCO ₃	U	1270	mg/l	15	400	440	520	480	240
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l ⁻¹ CaCO ₃ equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



2183

Final Report

Report No.: 19-05481-1

Initial Date of Issue: 28-Feb-2019

Client Dunelm Geotechnical and Environmental

Client Address: Foundation House
St Johns Road
Meadowfield
County Durham
DH78TZ

Contact(s): Ben Carvey

Project D9298 - Weldale Street, Reading

Quotation No.:

Order No.:

No. of Samples: 1

Turnaround (Wkdays): 5

Date Approved: 28-Feb-2019

Date Received: 14-Feb-2019

Date Instructed: 15-Feb-2019

Results Due: 25-Feb-2019

Approved By:



Details: Robert Monk, Technical Manager

Results - Soil (Asbestos)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	5.2
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	17
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	100
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	120
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	34
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	210
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	250
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	370

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Arsenic	U	2450	mg/kg	1.0	40
Cadmium	U	2450	mg/kg	0.10	1.2
Copper	U	2450	mg/kg	0.50	63
Mercury	U	2450	mg/kg	0.10	0.86
Lead	U	2450	mg/kg	0.50	800
Selenium	U	2450	mg/kg	0.20	0.41
Zinc	U	2450	mg/kg	0.50	750

Results - Soil (PAH)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Naphthalene	U	2700	mg/kg	0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	1.4
Anthracene	U	2700	mg/kg	0.10	0.46
Fluoranthene	U	2700	mg/kg	0.10	2.7
Pyrene	U	2700	mg/kg	0.10	2.6
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.5
Chrysene	U	2700	mg/kg	0.10	1.6
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	4.0
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.95
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.5
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	2.6
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	1.8
Total Of 16 PAH's	U	2700	mg/kg	2.0	21

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0
Chloromethane	U	2760	µg/kg	1.0	< 1.0
Vinyl Chloride	U	2760	µg/kg	1.0	< 1.0
Bromomethane	U	2760	µg/kg	20	< 20
Chloroethane	U	2760	µg/kg	2.0	< 2.0
Trichlorofluoromethane	U	2760	µg/kg	1.0	< 1.0
1,1-Dichloroethene	U	2760	µg/kg	1.0	< 1.0
Trans 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0
1,1-Dichloroethane	U	2760	µg/kg	1.0	< 1.0
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0
Trichloromethane	U	2760	µg/kg	1.0	< 1.0
1,1,1-Trichloroethane	U	2760	µg/kg	1.0	< 1.0
Tetrachloromethane	U	2760	µg/kg	1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0
Benzene	U	2760	µg/kg	1.0	< 1.0
1,2-Dichloroethane	U	2760	µg/kg	2.0	< 2.0
Trichloroethene	N	2760	µg/kg	1.0	< 1.0
1,2-Dichloropropane	U	2760	µg/kg	1.0	< 1.0
Dibromomethane	U	2760	µg/kg	1.0	< 1.0
Bromodichloromethane	U	2760	µg/kg	5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
Toluene	U	2760	µg/kg	1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
1,1,2-Trichloroethane	U	2760	µg/kg	10	< 10
Tetrachloroethene	U	2760	µg/kg	1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10	< 10
1,2-Dibromoethane	U	2760	µg/kg	5.0	< 5.0
Chlorobenzene	U	2760	µg/kg	1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0	< 2.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0
Styrene	U	2760	µg/kg	1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1.0	< 1.0
Isopropylbenzene	U	2760	µg/kg	1.0	< 1.0
Bromobenzene	U	2760	µg/kg	1.0	< 1.0

Results - Soil (Phenols)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0
2-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0
1,3-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0
1,4-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0
1,2-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
N-Nitrosodimethylamine	U	2790	mg/kg	0.50	< 0.50
Phenol	U	2790	mg/kg	0.50	< 0.50
2-Chlorophenol	U	2790	mg/kg	0.50	< 0.50
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50	< 0.50
1,3-Dichlorobenzene	U	2790	mg/kg	0.50	< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50
1,2-Dichlorobenzene	U	2790	mg/kg	0.50	< 0.50
2-Methylphenol	U	2790	mg/kg	0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50	< 0.50
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50	< 0.50
4-Methylphenol	U	2790	mg/kg	0.50	< 0.50
Nitrobenzene	U	2790	mg/kg	0.50	< 0.50
Isophorone	U	2790	mg/kg	0.50	< 0.50
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50	< 0.50
2,4-Dichlorophenol	U	2790	mg/kg	0.50	< 0.50
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50	< 0.50
Naphthalene	U	2790	mg/kg	0.50	< 0.50
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50
Hexachlorobutadiene	U	2790	mg/kg	0.50	< 0.50
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50	< 0.50
2-Methylnaphthalene	U	2790	mg/kg	0.50	< 0.50
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	< 0.50
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50	< 0.50
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50	< 0.50
2-Chloronaphthalene	U	2790	mg/kg	0.50	< 0.50
2-Nitroaniline	U	2790	mg/kg	0.50	< 0.50
Acenaphthylene	U	2790	mg/kg	0.50	< 0.50
Dimethylphthalate	U	2790	mg/kg	0.50	< 0.50
2,6-Dinitrotoluene	U	2790	mg/kg	0.50	< 0.50
Acenaphthene	U	2790	mg/kg	0.50	< 0.50
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50
Dibenzofuran	U	2790	mg/kg	0.50	< 0.50
4-Chlorophenylphenylether	U	2790	mg/kg	0.50	< 0.50
2,4-Dinitrotoluene	U	2790	mg/kg	0.50	< 0.50

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Fluorene	U	2790	mg/kg	0.50	< 0.50
Diethyl Phthalate	U	2790	mg/kg	0.50	< 0.50
4-Nitroaniline	U	2790	mg/kg	0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50
Azobenzene	U	2790	mg/kg	0.50	< 0.50
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50	< 0.50
Hexachlorobenzene	U	2790	mg/kg	0.50	< 0.50
Pentachlorophenol	N	2790	mg/kg	0.50	< 0.50
Phenanthrene	U	2790	mg/kg	0.50	1.3
Anthracene	U	2790	mg/kg	0.50	0.61
Carbazole	U	2790	mg/kg	0.50	< 0.50
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50	< 0.50
Fluoranthene	U	2790	mg/kg	0.50	2.9
Pyrene	U	2790	mg/kg	0.50	2.3
Butylbenzyl Phthalate	U	2790	mg/kg	0.50	< 0.50
Benzo[a]anthracene	U	2790	mg/kg	0.50	1.7
Chrysene	U	2790	mg/kg	0.50	1.7
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50	< 0.50
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50	< 0.50
Benzo[b]fluoranthene	U	2790	mg/kg	0.50	2.5
Benzo[k]fluoranthene	U	2790	mg/kg	0.50	0.69
Benzo[a]pyrene	U	2790	mg/kg	0.50	1.7
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50	1.0
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50	< 0.50
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50	1.1

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05481		
Quotation No.:	Chemtest Sample ID.:		774823		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		1.00		
	Date Sampled:		12-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Moisture	N	2030	%	0.020	17
pH	U	2010		N/A	8.1
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40
Total Sulphur	U	2175	%	0.010	0.30
Sulphate (Acid Soluble)	U	2430	%	0.010	0.98
Chromium (Trivalent)	N	2490	mg/kg	1.0	28
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.7
PCB 28	U	2815	mg/kg	0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010
PCB 118	U	2815	mg/kg	0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010
PCB 138	U	2815	mg/kg	0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10	< 0.10

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



2183

Amended Report

Report No.:	19-05692-4		
Initial Date of Issue:	01-Mar-2019	Date of Re-Issue:	05-Apr-2019
Client	Dunelm Geotechnical and Environmental		
Client Address:	Foundation House□ St Johns Road□ Meadowfield□ County Durham□ DH78TZ		
Contact(s):	Stacey Hornsby		
Project	D9298 - Weldale Street, Reading		
Quotation No.:		Date Received:	15-Feb-2019
Order No.:	16525/D9298/SH	Date Instructed:	15-Feb-2019
No. of Samples:	4		
Turnaround (Wkdays):	36	Results Due:	05-Apr-2019
Date Approved:	05-Apr-2019		
Approved By:			
Details:	Robert Monk, Technical Manager□		

Results - Soil (Asbestos)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919
	Sample Location:				BHA	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50
	Bottom Depth (m):						5.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-

Results - Soil (TPH)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919	775920
	Sample Location:				BHA	BHB	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50	8.50
	Bottom Depth (m):						5.00	9.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD				
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010		< 0.010	< 0.010	< 0.010
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0			
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010		< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0			
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10		< 0.10	12	8.5
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0			
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10		< 0.10	43	19
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0			
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10		< 0.10	100	40
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0			
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10		< 0.10	79	27
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0			
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10		< 0.10	24	38
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0			
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0			
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0		< 1.0	260	130
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0			
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010		< 0.010	< 0.010	< 0.010
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0			
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010		< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0			
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0			
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10		< 0.10	15	< 0.10
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0			
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10		< 0.10	48	2.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0			
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10		< 0.10	15	2.3
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0			
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10		< 0.10	2.2	5.6
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0			
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0			
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0		< 1.0	80	9.9
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0			
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10			

Results - Soil (TPH)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:	19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:	775915	775917	775919	775920
	Sample Location:	BHA	BHB	BHB	BHB
	Sample Type:	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):	2.20	0.60	4.50	8.50
	Bottom Depth (m):			5.00	9.00
	Date Sampled:	13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:	DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD	
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	
				< 2.0	340
					140

Results - Soil (Metals)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919
	Sample Location:				BHA	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50
	Bottom Depth (m):						5.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Arsenic	U	2450	mg/kg	1.0	44	26	16
Cadmium	U	2450	mg/kg	0.10	0.28	< 0.10	0.46
Copper	U	2450	mg/kg	0.50	2.3	39	1.6
Mercury	U	2450	mg/kg	0.10	< 0.10	0.16	< 0.10
Lead	U	2450	mg/kg	0.50	4.3	82	< 0.50
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20
Zinc	U	2450	mg/kg	0.50	17	42	12

Results - Soil (PAH)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919
	Sample Location:				BHA	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50
	Bottom Depth (m):						5.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Naphthalene	N	2700	mg/kg	0.010		< 0.010	
Naphthalene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Acenaphthylene	N	2700	mg/kg	0.010		< 0.010	
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Acenaphthene	N	2700	mg/kg	0.010		< 0.010	
Acenaphthene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Fluorene	N	2700	mg/kg	0.010		< 0.010	
Fluorene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Phenanthrene	N	2700	mg/kg	0.010		< 0.010	
Phenanthrene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Anthracene	N	2700	mg/kg	0.010		< 0.010	
Anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Fluoranthene	N	2700	mg/kg	0.010		0.16	
Fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Pyrene	N	2700	mg/kg	0.010		0.22	
Pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Benzo[a]anthracene	N	2700	mg/kg	0.010		< 0.010	
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Chrysene	N	2700	mg/kg	0.010		< 0.010	
Chrysene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Benzo[b]fluoranthene	N	2700	mg/kg	0.010		< 0.010	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Benzo[k]fluoranthene	N	2700	mg/kg	0.010		< 0.010	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Benzo[a]pyrene	N	2700	mg/kg	0.010		< 0.010	
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010		< 0.010	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010		< 0.010	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010		< 0.010	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10		< 0.10
Total Of 16 PAH's	N	2700	mg/kg	0.20		0.38	
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0		< 2.0

Results - Soil (Phenols)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919	775920
	Sample Location:				BHA	BHB	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50	8.50
	Bottom Depth (m):						5.00	9.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD				
Dichlorodifluoromethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0			
Chloromethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Chloromethane	U	2760	µg/kg	1.0	< 1.0			
Vinyl Chloride	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Vinyl Chloride	U	2760	µg/kg	1.0	< 1.0			
Bromomethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Bromomethane	U	2760	µg/kg	20	< 20			
Chloroethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Chloroethane	U	2760	µg/kg	2.0	< 2.0			
Trichlorofluoromethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Trichlorofluoromethane	U	2760	µg/kg	1.0	< 1.0			
1,1-Dichloroethene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,1-Dichloroethene	U	2760	µg/kg	1.0	< 1.0			
Trans 1,2-Dichloroethene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Trans 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0			
1,1-Dichloroethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,1-Dichloroethane	U	2760	µg/kg	1.0	< 1.0			
cis 1,2-Dichloroethene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0			
Bromochloromethane	N	2760	µg/kg	0.50		< 0.50	< 0.50	< 0.50
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0			
Trichloromethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Trichloromethane	U	2760	µg/kg	1.0	< 1.0			
1,1,1-Trichloroethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,1,1-Trichloroethane	U	2760	µg/kg	1.0	< 1.0			
Tetrachloromethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Tetrachloromethane	U	2760	µg/kg	1.0	< 1.0			
1,1-Dichloropropene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0			
Benzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Benzene	U	2760	µg/kg	1.0	< 1.0			
1,2-Dichloroethane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,2-Dichloroethane	U	2760	µg/kg	2.0	< 2.0			
Trichloroethene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Trichloroethene	N	2760	µg/kg	1.0	< 1.0			
1,2-Dichloropropane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20

Results - Soil (Phenols)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				
		19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				
		775915	775917	775919	775920
	Sample Location:	BHA	BHB	BHB	BHB
	Sample Type:	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):	2.20	0.60	4.50	8.50
	Bottom Depth (m):			5.00	9.00
	Date Sampled:	13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:	DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD	
1,2-Dichloropropane	U	2760	µg/kg	1.0	< 1.0
Dibromomethane	N	2760	µg/kg	0.20	< 0.20
Dibromomethane	U	2760	µg/kg	1.0	< 1.0
Bromodichloromethane	N	2760	µg/kg	0.20	< 0.20
Bromodichloromethane	U	2760	µg/kg	5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
Toluene	N	2760	µg/kg	0.20	< 0.20
Toluene	U	2760	µg/kg	1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
1,1,2-Trichloroethane	N	2760	µg/kg	0.20	< 0.20
1,1,2-Trichloroethane	U	2760	µg/kg	10	< 10
Tetrachloroethene	N	2760	µg/kg	0.20	< 0.20
Tetrachloroethene	U	2760	µg/kg	1.0	< 1.0
1,3-Dichloropropane	N	2760	µg/kg	0.20	< 0.20
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0
Dibromochloromethane	N	2760	µg/kg	0.20	< 0.20
Dibromochloromethane	U	2760	µg/kg	10	< 10
1,2-Dibromoethane	N	2760	µg/kg	0.20	< 0.20
1,2-Dibromoethane	U	2760	µg/kg	5.0	< 5.0
Chlorobenzene	N	2760	µg/kg	0.20	< 0.20
Chlorobenzene	U	2760	µg/kg	1.0	< 1.0
1,1,1,2-Tetrachloroethane	N	2760	µg/kg	0.20	< 0.20
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0	< 2.0
Ethylbenzene	N	2760	µg/kg	0.20	< 0.20
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0
m & p-Xylene	N	2760	µg/kg	0.20	< 0.20
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0
o-Xylene	N	2760	µg/kg	0.20	< 0.20
o-Xylene	U	2760	µg/kg	1.0	< 1.0
Styrene	N	2760	µg/kg	0.20	< 0.20
Styrene	U	2760	µg/kg	1.0	< 1.0
Tribromomethane	N	2760	µg/kg	0.20	< 0.20
Tribromomethane	U	2760	µg/kg	1.0	< 1.0
Isopropylbenzene	N	2760	µg/kg	0.20	< 0.20
Isopropylbenzene	U	2760	µg/kg	1.0	< 1.0

Results - Soil (Phenols)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919	775920
	Sample Location:				BHA	BHB	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50	8.50
	Bottom Depth (m):						5.00	9.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD				
Bromobenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Bromobenzene	U	2760	µg/kg	1.0	< 1.0			
1,2,3-Trichloropropane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50			
N-Propylbenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0			
2-Chlorotoluene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
2-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0			
1,3,5-Trimethylbenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0			
4-Chlorotoluene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0			
Tert-Butylbenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0			
1,2,4-Trimethylbenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0			
Sec-Butylbenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0			
1,3-Dichlorobenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,3-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0			
4-Isopropyltoluene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0			
1,4-Dichlorobenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,4-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0			
N-Butylbenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0			
1,2-Dichlorobenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,2-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0			
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50			
1,2,4-Trichlorobenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0	< 1.0			
Hexachlorobutadiene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0			
1,2,3-Trichlorobenzene	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0			
Methyl Tert-Butyl Ether	N	2760	µg/kg	0.20		< 0.20	< 0.20	< 0.20

Results - Soil (Phenols)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:	19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:	775915	775917	775919	775920
	Sample Location:	BHA	BHB	BHB	BHB
	Sample Type:	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):	2.20	0.60	4.50	8.50
	Bottom Depth (m):			5.00	9.00
	Date Sampled:	13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:	DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD	
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0

Results - Soil (SVOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:		775915	775917	775919	775920
	Sample Location:		BHA	BHB	BHB	BHB
	Sample Type:		SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		2.20	0.60	4.50	8.50
	Bottom Depth (m):				5.00	9.00
	Date Sampled:		13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:		DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD		
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050	
N-Nitrosodimethylamine	U	2790	mg/kg	0.50	< 0.50	< 0.50
Phenol	N	2790	mg/kg	0.050	< 0.050	
Phenol	U	2790	mg/kg	0.50	< 0.50	< 0.50
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050	
2-Chlorophenol	U	2790	mg/kg	0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050	
Bis-(2-Chloroethyl)Ether	U	2790	mg/kg	0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	
1,3-Dichlorobenzene	U	2790	mg/kg	0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	
1,2-Dichlorobenzene	U	2790	mg/kg	0.50	< 0.50	< 0.50
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050	
2-Methylphenol	U	2790	mg/kg	0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050	
Bis(2-Chloroisopropyl)Ether	U	2790	mg/kg	0.50	< 0.50	< 0.50
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050	
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050	
N-Nitrosodi-n-propylamine	U	2790	mg/kg	0.50	< 0.50	< 0.50
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050	
4-Methylphenol	U	2790	mg/kg	0.50	< 0.50	< 0.50
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050	
Nitrobenzene	U	2790	mg/kg	0.50	< 0.50	< 0.50
Isophorone	N	2790	mg/kg	0.050	< 0.050	
Isophorone	U	2790	mg/kg	0.50	< 0.50	< 0.50
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050	
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050	
Bis(2-Chloroethoxy)Methane	U	2790	mg/kg	0.50	< 0.50	< 0.50
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050	
2,4-Dichlorophenol	U	2790	mg/kg	0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050	

Results - Soil (SVOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919	775920
	Sample Location:				BHA	BHB	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50	8.50
	Bottom Depth (m):						5.00	9.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD				
1,2,4-Trichlorobenzene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Naphthalene	N	2790	mg/kg	0.050		< 0.050		
Naphthalene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
4-Chloroaniline	N	2790	mg/kg	0.050		< 0.050		
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Hexachlorobutadiene	N	2790	mg/kg	0.050		< 0.050		
Hexachlorobutadiene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050		< 0.050		
4-Chloro-3-Methylphenol	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
2-Methylnaphthalene	N	2790	mg/kg	0.050		< 0.050		
2-Methylnaphthalene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050		< 0.050		
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050		< 0.050		
2,4,6-Trichlorophenol	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050		< 0.050		
2,4,5-Trichlorophenol	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
2-Chloronaphthalene	N	2790	mg/kg	0.050		< 0.050		
2-Chloronaphthalene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
2-Nitroaniline	N	2790	mg/kg	0.050		< 0.050		
2-Nitroaniline	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Acenaphthylene	N	2790	mg/kg	0.050		< 0.050		
Acenaphthylene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Dimethylphthalate	N	2790	mg/kg	0.050		< 0.050		
Dimethylphthalate	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
2,6-Dinitrotoluene	N	2790	mg/kg	0.050		< 0.050		
2,6-Dinitrotoluene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Acenaphthene	N	2790	mg/kg	0.050		< 0.050		
Acenaphthene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
3-Nitroaniline	N	2790	mg/kg	0.050		< 0.050		
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Dibenzofuran	N	2790	mg/kg	0.050		< 0.050		
Dibenzofuran	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
4-Chlorophenylphenylether	N	2790	mg/kg	0.050		< 0.050		
4-Chlorophenylphenylether	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
2,4-Dinitrotoluene	N	2790	mg/kg	0.050		< 0.050		

Results - Soil (SVOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919	775920
	Sample Location:				BHA	BHB	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50	8.50
	Bottom Depth (m):						5.00	9.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD				
2,4-Dinitrotoluene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Fluorene	N	2790	mg/kg	0.050		< 0.050		
Fluorene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Diethyl Phthalate	N	2790	mg/kg	0.050		< 0.050		
Diethyl Phthalate	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
4-Nitroaniline	N	2790	mg/kg	0.050		< 0.050		
4-Nitroaniline	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050		< 0.050		
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Azobenzene	N	2790	mg/kg	0.050		< 0.050		
Azobenzene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050		< 0.050		
4-Bromophenylphenyl Ether	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Hexachlorobenzene	N	2790	mg/kg	0.050		< 0.050		
Hexachlorobenzene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Pentachlorophenol	N	2790	mg/kg	0.050		< 0.050		
Pentachlorophenol	N	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Phenanthrene	N	2790	mg/kg	0.050		< 0.050		
Phenanthrene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Anthracene	N	2790	mg/kg	0.050		< 0.050		
Anthracene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Carbazole	N	2790	mg/kg	0.050		< 0.050		
Carbazole	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050		< 0.050		
Di-N-Butyl Phthalate	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Fluoranthene	N	2790	mg/kg	0.050		0.065		
Fluoranthene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Pyrene	N	2790	mg/kg	0.050		0.087		
Pyrene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Butylbenzyl Phthalate	N	2790	mg/kg	0.050		< 0.050		
Butylbenzyl Phthalate	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Benzo[a]anthracene	N	2790	mg/kg	0.050		< 0.050		
Benzo[a]anthracene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Chrysene	N	2790	mg/kg	0.050		< 0.050		
Chrysene	U	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050		< 0.050		
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50	< 0.50		< 0.50	< 0.50

Results - Soil (SVOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:		775915	775917	775919	775920
	Sample Location:		BHA	BHB	BHB	BHB
	Sample Type:		SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		2.20	0.60	4.50	8.50
	Bottom Depth (m):				5.00	9.00
	Date Sampled:		13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:		DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD		
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	
Di-N-Octyl Phthalate	U	2790	mg/kg	0.50	< 0.50	< 0.50
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	< 0.050	
Benzo[b]fluoranthene	U	2790	mg/kg	0.50	< 0.50	< 0.50
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	< 0.050	
Benzo[k]fluoranthene	U	2790	mg/kg	0.50	< 0.50	< 0.50
Benzo[a]pyrene	N	2790	mg/kg	0.050	< 0.050	
Benzo[a]pyrene	U	2790	mg/kg	0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	< 0.050	
Indeno(1,2,3-c,d)Pyrene	U	2790	mg/kg	0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	< 0.050	
Dibenz(a,h)Anthracene	U	2790	mg/kg	0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	< 0.050	
Benzo[g,h,i]perylene	U	2790	mg/kg	0.50	< 0.50	< 0.50
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	

Results - Soil (Other)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-05692	19-05692	19-05692	19-05692
Quotation No.:	Chemtest Sample ID.:				775915	775917	775919	775920
	Sample Location:				BHA	BHB	BHB	BHB
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.20	0.60	4.50	8.50
	Bottom Depth (m):						5.00	9.00
	Date Sampled:				13-Feb-2019	13-Feb-2019	13-Feb-2019	13-Feb-2019
	Asbestos Lab:				DURHAM	COVENTRY	DURHAM	
Determinand	Accred.	SOP	Units	LOD				
Moisture	N	2030	%	0.020	17	8.3	13	12
Soil Colour	N	2040		N/A			Brown	
Other Material	N	2040		N/A			Stones	
Soil Texture	N	2040		N/A			Sand	
pH	U	2010		N/A	8.2	8.3	8.2	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.57	0.89	< 0.40	
Total Sulphur	U	2175	%	0.010	0.013	0.026	0.65	
Sulphate (Acid Soluble)	U	2430	%	0.010	0.035	0.040	0.051	
Chromium (Trivalent)	N	2490	mg/kg	1.0	1.9	21	1.4	
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	0.71	1.6	< 0.40	
PCB 28	N	2815	mg/kg	0.0010		< 0.0010		
PCB 28	U	2815	mg/kg	0.010	< 0.010		< 0.010	
PCB 52	N	2815	mg/kg	0.0010		< 0.0010		
PCB 52	U	2815	mg/kg	0.010	< 0.010		< 0.010	
PCB 90+101	N	2815	mg/kg	0.0010		< 0.0010		
PCB 90+101	U	2815	mg/kg	0.010	< 0.010		< 0.010	
PCB 118	N	2815	mg/kg	0.0010		< 0.0010		
PCB 118	U	2815	mg/kg	0.010	< 0.010		< 0.010	
PCB 153	N	2815	mg/kg	0.0010		< 0.0010		
PCB 153	U	2815	mg/kg	0.010	< 0.010		< 0.010	
PCB 138	N	2815	mg/kg	0.0010		< 0.0010		
PCB 138	U	2815	mg/kg	0.010	< 0.010		< 0.010	
PCB 180	N	2815	mg/kg	0.0010		< 0.0010		
PCB 180	U	2815	mg/kg	0.010	< 0.010		< 0.010	
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010		< 0.0010		
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10	< 0.10		< 0.10	

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



Final Report

Report No.: 19-06016-1

Initial Date of Issue: 26-Feb-2019

Client Dunelm Geotechnical and Environmental

Client Address: Foundation House
St Johns Road
Meadowfield
County Durham
DH78TZ

Contact(s): Ben Carvey

Project D9298 - Weldale Street, Reading

Quotation No.: **Date Received:** 18-Feb-2019

Order No.: **Date Instructed:** 18-Feb-2019

No. of Samples: 1

Turnaround (Wkdays): 5 **Results Due:** 22-Feb-2019

Date Approved: 26-Feb-2019

Approved By:



Details: Martin Dyer, Laboratory Manager

Results - Soil

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06016		
Quotation No.:	Chemtest Sample ID.:		777326		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		28.00		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-
Moisture	N	2030	%	0.020	17
Soil Colour	N	2040		N/A	Brown,
Other Material	N	2040		N/A	Stones,
Soil Texture	N	2040		N/A	Stones,
pH	M	2010		N/A	9.4
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	< 0.40
Arsenic	M	2450	mg/kg	1.0	8.1
Cadmium	M	2450	mg/kg	0.10	< 0.10
Copper	M	2450	mg/kg	0.50	0.56
Mercury	M	2450	mg/kg	0.10	< 0.10
Lead	M	2450	mg/kg	0.50	2.2
Selenium	M	2450	mg/kg	0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	3.6
Chromium (Trivalent)	N	2490	mg/kg	1.0	< 1.0
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	M	2625	%	0.40	0.47
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06016		
Quotation No.:	Chemtest Sample ID.:		777326		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		28.00		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	< 2.0
Naphthalene	M	2700	mg/kg	0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0
Dichlorodifluoromethane	N	2760	µg/kg	0.20	< 0.20
Chloromethane	N	2760	µg/kg	0.20	< 0.20
Vinyl Chloride	N	2760	µg/kg	0.20	< 0.20
Bromomethane	N	2760	µg/kg	0.20	< 0.20
Chloroethane	N	2760	µg/kg	0.20	< 0.20
Trichlorofluoromethane	N	2760	µg/kg	0.20	< 0.20
1,1-Dichloroethene	N	2760	µg/kg	0.20	< 0.20
Trans 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20
1,1-Dichloroethane	N	2760	µg/kg	0.20	< 0.20
cis 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20
Bromochloromethane	N	2760	µg/kg	0.50	< 0.50
Trichloromethane	N	2760	µg/kg	0.20	< 0.20
1,1,1-Trichloroethane	N	2760	µg/kg	0.20	< 0.20
Tetrachloromethane	N	2760	µg/kg	0.20	< 0.20
1,1-Dichloropropene	N	2760	µg/kg	0.20	< 0.20
Benzene	N	2760	µg/kg	0.20	< 0.20
1,2-Dichloroethane	N	2760	µg/kg	0.20	< 0.20
Trichloroethene	N	2760	µg/kg	0.20	< 0.20
1,2-Dichloropropane	N	2760	µg/kg	0.20	< 0.20
Dibromomethane	N	2760	µg/kg	0.20	< 0.20

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06016		
Quotation No.:	Chemtest Sample ID.:		777326		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		28.00		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Bromodichloromethane	N	2760	µg/kg	0.20	< 0.20
cis-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20
Toluene	N	2760	µg/kg	0.20	< 0.20
Trans-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20
1,1,2-Trichloroethane	N	2760	µg/kg	0.20	< 0.20
Tetrachloroethene	N	2760	µg/kg	0.20	< 0.20
1,3-Dichloropropane	N	2760	µg/kg	0.20	< 0.20
Dibromochloromethane	N	2760	µg/kg	0.20	< 0.20
1,2-Dibromoethane	N	2760	µg/kg	0.20	< 0.20
Chlorobenzene	N	2760	µg/kg	0.20	< 0.20
1,1,1,2-Tetrachloroethane	N	2760	µg/kg	0.20	< 0.20
Ethylbenzene	N	2760	µg/kg	0.20	< 0.20
m & p-Xylene	N	2760	µg/kg	0.20	< 0.20
o-Xylene	N	2760	µg/kg	0.20	< 0.20
Styrene	N	2760	µg/kg	0.20	< 0.20
Tribromomethane	N	2760	µg/kg	0.20	< 0.20
Isopropylbenzene	N	2760	µg/kg	0.20	< 0.20
Bromobenzene	N	2760	µg/kg	0.20	< 0.20
1,2,3-Trichloropropane	N	2760	µg/kg	0.20	< 0.20
N-Propylbenzene	N	2760	µg/kg	0.20	< 0.20
2-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20
1,3,5-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20
4-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20
Tert-Butylbenzene	N	2760	µg/kg	0.20	< 0.20
1,2,4-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20
Sec-Butylbenzene	N	2760	µg/kg	0.20	< 0.20
1,3-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20
4-Isopropyltoluene	N	2760	µg/kg	0.20	< 0.20
1,4-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20
N-Butylbenzene	N	2760	µg/kg	0.20	< 0.20
1,2-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	0.20	< 0.20
1,2,4-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20
Hexachlorobutadiene	N	2760	µg/kg	0.20	< 0.20
1,2,3-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20
Methyl Tert-Butyl Ether	N	2760	µg/kg	0.20	< 0.20
N-Nitrosodimethylamine	M	2790	mg/kg	0.50	< 0.50
Phenol	M	2790	mg/kg	0.50	< 0.50

Project: D9298 - Weldale Street, Reading

Results - Soil

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06016		
Quotation No.:	Chemtest Sample ID.:		777326		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		28.00		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
2-Chlorophenol	M	2790	mg/kg	0.50	< 0.50
Bis-(2-Chloroethyl)Ether	M	2790	mg/kg	0.50	< 0.50
1,3-Dichlorobenzene	M	2790	mg/kg	0.50	< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50
1,2-Dichlorobenzene	M	2790	mg/kg	0.50	< 0.50
2-Methylphenol	M	2790	mg/kg	0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	M	2790	mg/kg	0.50	< 0.50
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50
N-Nitrosodi-n-propylamine	M	2790	mg/kg	0.50	< 0.50
4-Methylphenol	M	2790	mg/kg	0.50	< 0.50
Nitrobenzene	M	2790	mg/kg	0.50	< 0.50
Isophorone	M	2790	mg/kg	0.50	< 0.50
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50
Bis(2-Chloroethoxy)Methane	M	2790	mg/kg	0.50	< 0.50
2,4-Dichlorophenol	M	2790	mg/kg	0.50	< 0.50
1,2,4-Trichlorobenzene	M	2790	mg/kg	0.50	< 0.50
Naphthalene	M	2790	mg/kg	0.50	< 0.50
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50
Hexachlorobutadiene	M	2790	mg/kg	0.50	< 0.50
4-Chloro-3-Methylphenol	M	2790	mg/kg	0.50	< 0.50
2-Methylnaphthalene	M	2790	mg/kg	0.50	< 0.50
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	< 0.50
2,4,6-Trichlorophenol	M	2790	mg/kg	0.50	< 0.50
2,4,5-Trichlorophenol	M	2790	mg/kg	0.50	< 0.50
2-Chloronaphthalene	M	2790	mg/kg	0.50	< 0.50
2-Nitroaniline	M	2790	mg/kg	0.50	< 0.50
Acenaphthylene	M	2790	mg/kg	0.50	< 0.50
Dimethylphthalate	M	2790	mg/kg	0.50	< 0.50
2,6-Dinitrotoluene	M	2790	mg/kg	0.50	< 0.50
Acenaphthene	M	2790	mg/kg	0.50	< 0.50
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50
Dibenzofuran	M	2790	mg/kg	0.50	< 0.50
4-Chlorophenylphenylether	M	2790	mg/kg	0.50	< 0.50
2,4-Dinitrotoluene	M	2790	mg/kg	0.50	< 0.50
Fluorene	M	2790	mg/kg	0.50	< 0.50
Diethyl Phthalate	M	2790	mg/kg	0.50	< 0.50

Project: D9298 - Weldale Street, Reading

Results - Soil

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06016		
Quotation No.:	Chemtest Sample ID.:		777326		
	Sample Location:		BHA		
	Sample Type:		SOIL		
	Top Depth (m):		28.00		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
4-Nitroaniline	M	2790	mg/kg	0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50
Azobenzene	M	2790	mg/kg	0.50	< 0.50
4-Bromophenylphenyl Ether	M	2790	mg/kg	0.50	< 0.50
Hexachlorobenzene	M	2790	mg/kg	0.50	< 0.50
Pentachlorophenol	N	2790	mg/kg	0.50	< 0.50
Phenanthrene	M	2790	mg/kg	0.50	< 0.50
Anthracene	M	2790	mg/kg	0.50	< 0.50
Carbazole	M	2790	mg/kg	0.50	< 0.50
Di-N-Butyl Phthalate	M	2790	mg/kg	0.50	< 0.50
Fluoranthene	M	2790	mg/kg	0.50	< 0.50
Pyrene	M	2790	mg/kg	0.50	< 0.50
Butylbenzyl Phthalate	M	2790	mg/kg	0.50	< 0.50
Benzo[a]anthracene	M	2790	mg/kg	0.50	< 0.50
Chrysene	M	2790	mg/kg	0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50	< 0.50
Di-N-Octyl Phthalate	M	2790	mg/kg	0.50	< 0.50
Benzo[b]fluoranthene	M	2790	mg/kg	0.50	< 0.50
Benzo[k]fluoranthene	M	2790	mg/kg	0.50	< 0.50
Benzo[a]pyrene	M	2790	mg/kg	0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	M	2790	mg/kg	0.50	< 0.50
Dibenz(a,h)Anthracene	M	2790	mg/kg	0.50	< 0.50
Benzo[g,h,i]perylene	M	2790	mg/kg	0.50	< 0.50
PCB 28	M	2815	mg/kg	0.010	< 0.010
PCB 52	M	2815	mg/kg	0.010	< 0.010
PCB 90+101	M	2815	mg/kg	0.010	< 0.010
PCB 118	M	2815	mg/kg	0.010	< 0.010
PCB 153	M	2815	mg/kg	0.010	< 0.010
PCB 138	M	2815	mg/kg	0.010	< 0.010
PCB 180	M	2815	mg/kg	0.010	< 0.010
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10	< 0.10

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



Final Report

Report No.: 19-06052-1

Initial Date of Issue: 12-Mar-2019

Client Dunelm Geotechnical and Environmental

Client Address: Foundation House
St Johns Road
Meadowfield
County Durham
DH78TZ

Contact(s): Stacey Hornsby

Project D9298 - Weldale Street, Reading

Quotation No.:

Order No.:

No. of Samples: 1

Turnaround (Wkdays): 7

Date Approved: 12-Mar-2019

Approved By:



Details: Martin Dyer, Laboratory Manager

Date Received: 18-Feb-2019

Date Instructed: 27-Feb-2019

Results Due: 07-Mar-2019

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
Quotation No.:	Chemtest Sample ID.:		777461		
	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
Quotation No.:	Chemtest Sample ID.:		777461		
	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	5.3
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	35
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	180
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	220
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	9.7
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	190
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	200
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	420

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
Quotation No.:	Chemtest Sample ID.:		777461		
	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Arsenic	M	2450	mg/kg	1.0	21
Cadmium	M	2450	mg/kg	0.10	0.14
Copper	M	2450	mg/kg	0.50	19
Mercury	M	2450	mg/kg	0.10	0.11
Lead	M	2450	mg/kg	0.50	100
Selenium	M	2450	mg/kg	0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	83

Results - Soil (PAH)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
Quotation No.:	Chemtest Sample ID.:		777461		
	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Naphthalene	N	2700	mg/kg	0.010	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	< 0.010
Fluorene	N	2700	mg/kg	0.010	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	0.97
Anthracene	N	2700	mg/kg	0.010	0.20
Fluoranthene	N	2700	mg/kg	0.010	1.5
Pyrene	N	2700	mg/kg	0.010	1.5
Benzo[a]anthracene	N	2700	mg/kg	0.010	0.79
Chrysene	N	2700	mg/kg	0.010	0.65
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	0.59
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	0.36
Benzo[a]pyrene	N	2700	mg/kg	0.010	0.46
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	0.33
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	0.22
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	0.49
Total Of 16 PAH's	N	2700	mg/kg	0.20	8.1

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
Quotation No.:	Chemtest Sample ID.:		777461		
	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Dichlorodifluoromethane	N	2760	µg/kg	0.20	< 0.20
Chloromethane	N	2760	µg/kg	0.20	< 0.20
Vinyl Chloride	N	2760	µg/kg	0.20	< 0.20
Bromomethane	N	2760	µg/kg	0.20	< 0.20
Chloroethane	N	2760	µg/kg	0.20	< 0.20
Trichlorofluoromethane	N	2760	µg/kg	0.20	< 0.20
1,1-Dichloroethene	N	2760	µg/kg	0.20	< 0.20
Trans 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20
1,1-Dichloroethane	N	2760	µg/kg	0.20	< 0.20
cis 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20
Bromochloromethane	N	2760	µg/kg	0.50	< 0.50
Trichloromethane	N	2760	µg/kg	0.20	< 0.20
1,1,1-Trichloroethane	N	2760	µg/kg	0.20	< 0.20
Tetrachloromethane	N	2760	µg/kg	0.20	< 0.20
1,1-Dichloropropene	N	2760	µg/kg	0.20	< 0.20
Benzene	N	2760	µg/kg	0.20	< 0.20
1,2-Dichloroethane	N	2760	µg/kg	0.20	< 0.20
Trichloroethene	N	2760	µg/kg	0.20	< 0.20
1,2-Dichloropropane	N	2760	µg/kg	0.20	< 0.20
Dibromomethane	N	2760	µg/kg	0.20	< 0.20
Bromodichloromethane	N	2760	µg/kg	0.20	< 0.20
cis-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20
Toluene	N	2760	µg/kg	0.20	< 0.20
Trans-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20
1,1,2-Trichloroethane	N	2760	µg/kg	0.20	< 0.20
Tetrachloroethene	N	2760	µg/kg	0.20	< 0.20
1,3-Dichloropropane	N	2760	µg/kg	0.20	< 0.20
Dibromochloromethane	N	2760	µg/kg	0.20	< 0.20
1,2-Dibromoethane	N	2760	µg/kg	0.20	< 0.20
Chlorobenzene	N	2760	µg/kg	0.20	< 0.20
1,1,1,2-Tetrachloroethane	N	2760	µg/kg	0.20	< 0.20
Ethylbenzene	N	2760	µg/kg	0.20	< 0.20
m & p-Xylene	N	2760	µg/kg	0.20	< 0.20
o-Xylene	N	2760	µg/kg	0.20	< 0.20
Styrene	N	2760	µg/kg	0.20	< 0.20
Tribromomethane	N	2760	µg/kg	0.20	< 0.20
Isopropylbenzene	N	2760	µg/kg	0.20	< 0.20
Bromobenzene	N	2760	µg/kg	0.20	< 0.20

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
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	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
1,2,3-Trichloropropane	N	2760	µg/kg	0.20	< 0.20
N-Propylbenzene	N	2760	µg/kg	0.20	< 0.20
2-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20
1,3,5-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20
4-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20
Tert-Butylbenzene	N	2760	µg/kg	0.20	< 0.20
1,2,4-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20
Sec-Butylbenzene	N	2760	µg/kg	0.20	< 0.20
1,3-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20
4-Isopropyltoluene	N	2760	µg/kg	0.20	< 0.20
1,4-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20
N-Butylbenzene	N	2760	µg/kg	0.20	< 0.20
1,2-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	0.20	< 0.20
1,2,4-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20
Hexachlorobutadiene	N	2760	µg/kg	0.20	< 0.20
1,2,3-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20
Methyl Tert-Butyl Ether	N	2760	µg/kg	0.20	< 0.20

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
Quotation No.:	Chemtest Sample ID.:		777461		
	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050
Phenol	N	2790	mg/kg	0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050	0.16
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	0.20
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	0.14
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	0.15

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
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	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	2.1
Anthracene	N	2790	mg/kg	0.050	0.65
Carbazole	N	2790	mg/kg	0.050	0.20
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	0.079
Fluoranthene	N	2790	mg/kg	0.050	3.0
Pyrene	N	2790	mg/kg	0.050	2.6
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	0.11
Benzo[a]anthracene	N	2790	mg/kg	0.050	2.0
Chrysene	N	2790	mg/kg	0.050	1.6
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	2.1
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	0.84
Benzo[a]pyrene	N	2790	mg/kg	0.050	1.6
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	0.96
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	0.46
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	0.94
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06052		
Quotation No.:	Chemtest Sample ID.:		777461		
	Sample Location:		BHD		
	Sample Type:		SOIL		
	Top Depth (m):		0.50		
	Date Sampled:		14-Feb-2019		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Moisture	N	2030	%	0.020	11
Soil Colour	N	2040		N/A	Brown,
Other Material	N	2040		N/A	Stones,
Soil Texture	N	2040		N/A	Sand,
pH	M	2010		N/A	10.6
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.4
Total Sulphur	M	2175	%	0.010	0.28
Sulphate (Acid Soluble)	M	2430	%	0.010	0.35
Chromium (Trivalent)	N	2490	mg/kg	1.0	19
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	M	2625	%	0.40	0.98
PCB 28	N	2815	mg/kg	0.0010	< 0.0010
PCB 52	N	2815	mg/kg	0.0010	< 0.0010
PCB 90+101	N	2815	mg/kg	0.0010	< 0.0010
PCB 118	N	2815	mg/kg	0.0010	< 0.0010
PCB 153	N	2815	mg/kg	0.0010	< 0.0010
PCB 138	N	2815	mg/kg	0.0010	< 0.0010
PCB 180	N	2815	mg/kg	0.0010	< 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	< 0.0010

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



2183



Final Report

Report No.: 19-06400-1

Initial Date of Issue: 08-Mar-2019

Client Dunelm Geotechnical and Environmental

Client Address: Foundation House
St Johns Road
Meadowfield
County Durham
DH78TZ

Contact(s): Stacey Hornsby

Project D9298 - Weldale Street, Reading

Quotation No.:

Order No.: 16525/D9298/SH

No. of Samples: 3

Turnaround (Wkdays): 8

Date Approved: 08-Mar-2019

Approved By:



Details: Robert Monk, Technical Manager

Date Received: 21-Feb-2019**Date Instructed:** 26-Feb-2019**Results Due:** 07-Mar-2019

Results - Soil (Asbestos)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400
Quotation No.:	Chemtest Sample ID.:				779407	779417
	Sample Location:				BHF	TTA
	Sample Type:				SOIL	SOIL
	Top Depth (m):				1.00	2.00
	Bottom Depth (m):				1.50	
	Date Sampled:				15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400	19-06400
Quotation No.:	Chemtest Sample ID.:				779407	779410	779417
	Sample Location:				BHF	BHF	TTA
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	4.50	2.00
	Bottom Depth (m):				1.50		
	Date Sampled:				15-Feb-2019	15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	< 2.0	< 2.0	< 2.0

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400
Quotation No.:	Chemtest Sample ID.:				779407	779417
	Sample Location:				BHF	TTA
	Sample Type:				SOIL	SOIL
	Top Depth (m):				1.00	2.00
	Bottom Depth (m):				1.50	
	Date Sampled:				15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD		
Arsenic	M	2450	mg/kg	1.0	27	24
Cadmium	M	2450	mg/kg	0.10	0.15	0.15
Copper	M	2450	mg/kg	0.50	18	18
Mercury	M	2450	mg/kg	0.10	0.19	0.20
Lead	M	2450	mg/kg	0.50	69	65
Selenium	M	2450	mg/kg	0.20	< 0.20	0.25
Zinc	M	2450	mg/kg	0.50	73	70

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400	19-06400
Quotation No.:	Chemtest Sample ID.:				779407	779410	779417
	Sample Location:				BHF	BHF	TTA
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	4.50	2.00
	Bottom Depth (m):				1.50		
	Date Sampled:				15-Feb-2019	15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Naphthalene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	< 0.010	< 0.010	0.39
Anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010	0.080
Fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010	0.67
Pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010	0.69
Benzo[a]anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	2700	mg/kg	0.20	< 0.20	< 0.20	1.8

Results - Soil (Phenols)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400	19-06400
Quotation No.:	Chemtest Sample ID.:				779407	779410	779417
	Sample Location:				BHF	BHF	TTA
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	4.50	2.00
	Bottom Depth (m):				1.50		
	Date Sampled:				15-Feb-2019	15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Dichlorodifluoromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Vinyl Chloride	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trichlorofluoromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trans 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
cis 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromochloromethane	N	2760	µg/kg	0.50	< 0.50	< 0.50	< 0.50
Trichloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,1-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tetrachloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Benzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Dibromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromodichloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
cis-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Toluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trans-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,2-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tetrachloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Dibromochloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dibromoethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,1,2-Tetrachloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Ethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
m & p-Xylene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
o-Xylene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Styrene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tribromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Isopropylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400	19-06400
Quotation No.:	Chemtest Sample ID.:				779407	779410	779417
	Sample Location:				BHF	BHF	TTA
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	4.50	2.00
	Bottom Depth (m):				1.50		
	Date Sampled:				15-Feb-2019	15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Bromobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,3-Trichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
N-Propylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
2-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3,5-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
4-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tert-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,4-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Sec-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
4-Isopropyltoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,4-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
N-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,4-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Hexachlorobutadiene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,3-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Methyl Tert-Butyl Ether	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400	19-06400
Quotation No.:	Chemtest Sample ID.:				779407	779410	779417
	Sample Location:				BHF	BHF	TTA
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	4.50	2.00
	Bottom Depth (m):				1.50		
	Date Sampled:				15-Feb-2019	15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD			
N-Nitrosodimethylamine	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Phenol	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Isophorone	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Naphthalene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Acenaphthene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400	19-06400
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	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	4.50	2.00
	Bottom Depth (m):				1.50		
	Date Sampled:				15-Feb-2019	15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD			
2,4-Dinitrotoluene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Fluorene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Azobenzene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Pentachlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Phenanthrene	M	2790	mg/kg	0.50	< 0.50	< 0.50	0.60
Anthracene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Carbazole	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Fluoranthene	M	2790	mg/kg	0.50	< 0.50	< 0.50	1.5
Pyrene	M	2790	mg/kg	0.50	< 0.50	< 0.50	1.2
Butylbenzyl Phthalate	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]anthracene	M	2790	mg/kg	0.50	< 0.50	< 0.50	1.1
Chrysene	M	2790	mg/kg	0.50	< 0.50	< 0.50	0.94
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene	M	2790	mg/kg	0.50	< 0.50	< 0.50	1.6
Benzo[k]fluoranthene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene	M	2790	mg/kg	0.50	< 0.50	< 0.50	1.1
Indeno(1,2,3-c,d)Pyrene	M	2790	mg/kg	0.50	< 0.50	< 0.50	0.60
Dibenz(a,h)Anthracene	M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene	M	2790	mg/kg	0.50	< 0.50	< 0.50	0.56

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06400	19-06400	19-06400
Quotation No.:	Chemtest Sample ID.:				779407	779410	779417
	Sample Location:				BHF	BHF	TTA
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	4.50	2.00
	Bottom Depth (m):				1.50		
	Date Sampled:				15-Feb-2019	15-Feb-2019	18-Feb-2019
	Asbestos Lab:				COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Moisture	N	2030	%	0.020	11	21	10
Soil Colour	N	2040		N/A	Brown,	White,	Brown,
Other Material	N	2040		N/A	Stones,	Stones,	Stones,
Soil Texture	N	2040		N/A	Sand,	Sand, S	Sand,
pH	M	2010		N/A	8.8		8.7
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.76		1.1
Total Sulphur	M	2175	%	0.010	0.041		0.046
Sulphate (Acid Soluble)	M	2430	%	0.010	0.059		0.049
Chromium (Trivalent)	N	2490	mg/kg	1.0	26		26
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	0.64		1.5
PCB 28	N	2815	mg/kg	0.0010	< 0.0010		< 0.0010
PCB 52	N	2815	mg/kg	0.0010	< 0.0010		< 0.0010
PCB 90+101	N	2815	mg/kg	0.0010	< 0.0010		< 0.0010
PCB 118	N	2815	mg/kg	0.0010	< 0.0010		< 0.0010
PCB 153	N	2815	mg/kg	0.0010	< 0.0010		< 0.0010
PCB 138	N	2815	mg/kg	0.0010	< 0.0010		< 0.0010
PCB 180	N	2815	mg/kg	0.0010	< 0.0010		< 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	< 0.0010		< 0.0010

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



Final Report

Report No.: 19-06591-1

Initial Date of Issue: 12-Mar-2019

Client Dunelm Geotechnical and Environmental

Client Address: Foundation House
St Johns Road
Meadowfield
County Durham
DH78TZ

Contact(s): Stacey Hornsby

Project D9298 - Weldale Street, Reading

Quotation No.:

Order No.:

No. of Samples: 3

Turnaround (Wkdays): 7

Date Approved: 12-Mar-2019

Approved By:



Details: Martin Dyer, Laboratory Manager

Date Received: 21-Feb-2019

Date Instructed: 27-Feb-2019

Results Due: 07-Mar-2019

Results - Soil (Asbestos)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06591
Quotation No.:	Chemtest Sample ID.:				780311
	Sample Location:				BHC
	Sample Type:				SOIL
	Top Depth (m):				0.40
	Date Sampled:				19-Feb-2019
	Asbestos Lab:				DURHAM
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06591	19-06591	19-06591
Quotation No.:	Chemtest Sample ID.:				780311	780315	780321
	Sample Location:				BHC	BHC	BHE
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.40	5.00	5.50
	Date Sampled:				19-Feb-2019	19-Feb-2019	19-Feb-2019
	Asbestos Lab:				DURHAM		
Determinand	Accred.	SOP	Units	LOD			
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	1.0	< 0.10	8.9
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	4.9	< 0.10	28
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	26	< 0.10	71
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	61	< 0.10	57
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	330	< 0.10	69
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	230	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	650	< 1.0	230
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	8.6	< 0.10	7.1
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	2.7	< 0.10	6.0
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	14	< 0.10	27
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	4.4	< 0.10	5.2
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	750	< 0.10	58
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	430	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	1200	< 1.0	100
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	1900	< 2.0	340

Results - Soil (Metals)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-06591		
Quotation No.:	Chemtest Sample ID.:		780311		
	Sample Location:		BHC		
	Sample Type:		SOIL		
	Top Depth (m):		0.40		
	Date Sampled:		19-Feb-2019		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
Arsenic	M	2450	mg/kg	1.0	22
Cadmium	M	2450	mg/kg	0.10	0.31
Copper	M	2450	mg/kg	0.50	2.9
Mercury	M	2450	mg/kg	0.10	< 0.10
Lead	M	2450	mg/kg	0.50	17
Selenium	M	2450	mg/kg	0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	34

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06591	19-06591	19-06591
Quotation No.:	Chemtest Sample ID.:				780311	780315	780321
	Sample Location:				BHC	BHC	BHE
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.40	5.00	5.50
	Date Sampled:				19-Feb-2019	19-Feb-2019	19-Feb-2019
	Asbestos Lab:				DURHAM		
Determinand	Accred.	SOP	Units	LOD			
Naphthalene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	< 0.010	< 0.010	3.0
Anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010	0.41
Fluoranthene	N	2700	mg/kg	0.010	0.11	< 0.010	0.060
Pyrene	N	2700	mg/kg	0.010	0.14	< 0.010	0.53
Benzo[a]anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	2700	mg/kg	0.20	0.25	< 0.20	4.0

Results - Soil (Phenols)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06591	19-06591	19-06591
Quotation No.:	Chemtest Sample ID.:				780311	780315	780321
	Sample Location:				BHC	BHC	BHE
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.40	5.00	5.50
	Date Sampled:				19-Feb-2019	19-Feb-2019	19-Feb-2019
	Asbestos Lab:				DURHAM		
Determinand	Accred.	SOP	Units	LOD			
Dichlorodifluoromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Vinyl Chloride	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trichlorofluoromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trans 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
cis 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromochloromethane	N	2760	µg/kg	0.50	< 0.50	< 0.50	< 0.50
Trichloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,1-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tetrachloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Benzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Dibromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromodichloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
cis-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Toluene	N	2760	µg/kg	0.20	0.88	< 0.20	< 0.20
Trans-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,2-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tetrachloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Dibromochloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dibromoethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,1,2-Tetrachloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Ethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
m & p-Xylene	N	2760	µg/kg	0.20	0.52	< 0.20	< 0.20
o-Xylene	N	2760	µg/kg	0.20	0.24	< 0.20	< 0.20
Styrene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tribromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Isopropylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06591	19-06591	19-06591
Quotation No.:	Chemtest Sample ID.:				780311	780315	780321
	Sample Location:				BHC	BHC	BHE
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.40	5.00	5.50
	Date Sampled:				19-Feb-2019	19-Feb-2019	19-Feb-2019
	Asbestos Lab:				DURHAM		
Determinand	Accred.	SOP	Units	LOD			
1,2,3-Trichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
N-Propylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
2-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3,5-Trimethylbenzene	N	2760	µg/kg	0.20	0.22	< 0.20	< 0.20
4-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tert-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,4-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Sec-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
4-Isopropyltoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,4-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
N-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,4-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Hexachlorobutadiene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,3-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Methyl Tert-Butyl Ether	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06591	19-06591	19-06591
Quotation No.:	Chemtest Sample ID.:				780311	780315	780321
	Sample Location:				BHC	BHC	BHE
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.40	5.00	5.50
	Date Sampled:				19-Feb-2019	19-Feb-2019	19-Feb-2019
	Asbestos Lab:				DURHAM		
Determinand	Accred.	SOP	Units	LOD			
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Phenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	< 0.050	< 0.050	0.39
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	< 0.050	0.12
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	0.052	< 0.050	0.67

Results - Soil (SVOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06591	19-06591	19-06591
Quotation No.:	Chemtest Sample ID.:				780311	780315	780321
	Sample Location:				BHC	BHC	BHE
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.40	5.00	5.50
	Date Sampled:				19-Feb-2019	19-Feb-2019	19-Feb-2019
	Asbestos Lab:				DURHAM		
Determinand	Accred.	SOP	Units	LOD			
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050	0.49	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	0.37	< 0.050	1.8
Anthracene	N	2790	mg/kg	0.050	0.073	< 0.050	0.10
Carbazole	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Fluoranthene	N	2790	mg/kg	0.050	0.51	< 0.050	0.090
Pyrene	N	2790	mg/kg	0.050	0.41	< 0.050	0.21
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	0.27	< 0.050	< 0.050
Chrysene	N	2790	mg/kg	0.050	0.30	< 0.050	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	0.34	< 0.050	< 0.050
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	0.073	< 0.050	< 0.050
Benzo[a]pyrene	N	2790	mg/kg	0.050	0.19	< 0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	0.10	< 0.050	< 0.050
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	0.13	< 0.050	< 0.050
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-06591	19-06591	19-06591
Quotation No.:	Chemtest Sample ID.:				780311	780315	780321
	Sample Location:				BHC	BHC	BHE
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.40	5.00	5.50
	Date Sampled:				19-Feb-2019	19-Feb-2019	19-Feb-2019
	Asbestos Lab:				DURHAM		
Determinand	Accred.	SOP	Units	LOD			
Moisture	N	2030	%	0.020	3.8	21	22
Soil Colour	N	2040		N/A	Brown,	White,	White,
Other Material	N	2040		N/A	Stones,	Stones,	Stones,
Soil Texture	N	2040		N/A	Sand,	Chalk,	Chalk,
pH	M	2010		N/A	10.3		
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.83		
Total Sulphur	M	2175	%	0.010	0.17		
Sulphate (Acid Soluble)	M	2430	%	0.010	< 0.010		
Chromium (Trivalent)	N	2490	mg/kg	1.0	4.5		
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	4.1		
PCB 28	N	2815	mg/kg	0.0010	< 0.0010		
PCB 52	N	2815	mg/kg	0.0010	< 0.0010		
PCB 90+101	N	2815	mg/kg	0.0010	< 0.0010		
PCB 118	N	2815	mg/kg	0.0010	< 0.0010		
PCB 153	N	2815	mg/kg	0.0010	< 0.0010		
PCB 138	N	2815	mg/kg	0.0010	< 0.0010		
PCB 180	N	2815	mg/kg	0.0010	< 0.0010		
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	< 0.0010		

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



2183



Final Report

Report No.: 19-07667-1

Initial Date of Issue: 14-Mar-2019

Client Dunelm Geotechnical and Environmental

Client Address: Foundation House
St Johns Road
Meadowfield
County Durham
DH78TZ

Contact(s): Stacey Hornsby

Project D9298

Quotation No.: **Date Received:** 04-Mar-2019

Order No.: **Date Instructed:** 04-Mar-2019

No. of Samples: 4

Turnaround (Wkdays): 7 **Results Due:** 14-Mar-2019

Date Approved: 14-Mar-2019

Approved By:

Details: Robert Monk, Technical Manager

Results - Soil (Asbestos)

Project: D9298

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801
	Sample Location:				WSB	WSC	WSF
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-

Results - Soil (TPH)

Project: D9298

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801	785804
	Sample Location:				WSB	WSC	WSF	WSF
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50	1.70
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	
Determinand	Accred.	SOP	Units	LOD				
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	16	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	33	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	160	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	16	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	220	< 1.0	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	0.86	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	15	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	230	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	34	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	280	< 1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	500	< 2.0	< 2.0	< 2.0

Results - Soil (Metals)

Project: D9298

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801	785804
	Sample Location:				WSB	WSC	WSF	WSF
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50	1.70
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	
Determinand	Accred.	SOP	Units	LOD				
Arsenic	M	2450	mg/kg	1.0	17	20	22	6.0
Cadmium	M	2450	mg/kg	0.10	0.17	< 0.10	0.40	< 0.10
Copper	M	2450	mg/kg	0.50	24	6.6	29	< 0.50
Mercury	M	2450	mg/kg	0.10	0.19	< 0.10	1.4	< 0.10
Lead	M	2450	mg/kg	0.50	290	6.8	380	3.0
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	77	23	180	1.5

Results - Soil (PAH)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801	785804
	Sample Location:				WSB	WSC	WSF	WSF
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50	1.70
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	
Determinand	Accred.	SOP	Units	LOD				
Naphthalene	N	2700	mg/kg	0.010	0.47	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	0.38	< 0.010	< 0.010	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	0.36	< 0.010	< 0.010	< 0.010
Fluorene	N	2700	mg/kg	0.010	0.57	< 0.010	< 0.010	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	4.0	< 0.010	< 0.010	< 0.010
Anthracene	N	2700	mg/kg	0.010	1.2	< 0.010	< 0.010	< 0.010
Fluoranthene	N	2700	mg/kg	0.010	6.1	< 0.010	0.63	< 0.010
Pyrene	N	2700	mg/kg	0.010	5.6	< 0.010	0.78	< 0.010
Benzo[a]anthracene	N	2700	mg/kg	0.010	3.2	< 0.010	< 0.010	< 0.010
Chrysene	N	2700	mg/kg	0.010	2.8	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	2.7	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	1.2	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010	2.2	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	1.6	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	0.12	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	2.1	< 0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	2700	mg/kg	0.20	35	< 0.20	1.4	< 0.20

Project: D9298

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801
	Sample Location:				WSB	WSC	WSF
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Dichlorodifluoromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Vinyl Chloride	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trichlorofluoromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trans 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	0.23
1,1-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
cis 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromochloromethane	N	2760	µg/kg	0.50	< 0.50	< 0.50	< 0.50
Trichloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,1-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tetrachloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Benzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Dibromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromodichloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
cis-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Toluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Trans-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,2-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tetrachloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Dibromochloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dibromoethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Chlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,1,1,2-Tetrachloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Ethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
m & p-Xylene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
o-Xylene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Styrene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tribromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Isopropylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Bromobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20

Results - Soil (Phenols)

Project: D9298

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801
	Sample Location:				WSB	WSC	WSF
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
1,2,3-Trichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
N-Propylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
2-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3,5-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
4-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Tert-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,4-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Sec-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,3-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
4-Isopropyltoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,4-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
N-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,4-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Hexachlorobutadiene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
1,2,3-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20
Methyl Tert-Butyl Ether	N	2760	µg/kg	0.20	< 0.20	< 0.20	< 0.20

Project: D9298

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801
	Sample Location:				WSB	WSC	WSF
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Phenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050

Project: D9298

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801
	Sample Location:				WSB	WSC	WSF
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	0.27	< 0.050	0.85
Anthracene	N	2790	mg/kg	0.050	0.11	< 0.050	0.32
Carbazole	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Fluoranthene	N	2790	mg/kg	0.050	0.74	< 0.050	2.5
Pyrene	N	2790	mg/kg	0.050	0.62	< 0.050	1.9
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	0.56	< 0.050	1.8
Chrysene	N	2790	mg/kg	0.050	0.55	< 0.050	1.4
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	0.23
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	0.67	< 0.050	1.8
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	0.27	< 0.050	0.53
Benzo[a]pyrene	N	2790	mg/kg	0.050	0.47	< 0.050	1.4
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	0.29	< 0.050	0.76
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	0.13	< 0.050	0.28
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	0.31	< 0.050	0.78
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	0.23

Results - Soil (Other)

Project: **D9298**

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07667	19-07667	19-07667	19-07667
Quotation No.:	Chemtest Sample ID.:				785796	785799	785801	785804
	Sample Location:				WSB	WSC	WSF	WSF
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.50	0.50	1.70
	Date Sampled:				25-Feb-2019	25-Feb-2019	25-Feb-2019	25-Feb-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	
Determinand	Accred.	SOP	Units	LOD				
Moisture	N	2030	%	0.020	8.3	4.7	13	20
Soil Colour	N	2040		N/A	Brown	Brown	Brown	White
Other Material	N	2040		N/A	Stones	Stones	Stones	Chalk
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Clay
pH	M	2010		N/A	10.0	8.5	8.1	
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.4	0.54	0.89	< 0.40
Total Sulphur	M	2175	%	0.010	< 0.010	0.018	0.17	
Sulphate (Acid Soluble)	M	2430	%	0.010	0.37	0.030	0.073	
Chromium (Trivalent)	N	2490	mg/kg	1.0	19	12	23	< 1.0
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	2.1	< 0.40	3.1	
PCB 28	N	2815	mg/kg	0.0010	< 0.0010	< 0.0010	< 0.0010	
PCB 52	N	2815	mg/kg	0.0010	< 0.0010	< 0.0010	< 0.0010	
PCB 90+101	N	2815	mg/kg	0.0010	< 0.0010	< 0.0010	< 0.0010	
PCB 118	N	2815	mg/kg	0.0010	< 0.0010	< 0.0010	< 0.0010	
PCB 153	N	2815	mg/kg	0.0010	< 0.0010	< 0.0010	< 0.0010	
PCB 138	N	2815	mg/kg	0.0010	< 0.0010	< 0.0010	< 0.0010	
PCB 180	N	2815	mg/kg	0.0010	< 0.0010	< 0.0010	< 0.0010	
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	< 0.0010	< 0.0010	< 0.0010	

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



Amended Report

Report No.: 19-07949-2

Initial Date of Issue: 13-Mar-2019 **Date of Re-Issue:** 05-Apr-2019

Client Dunelm Geotechnical and Environmental

Client Address: Foundation House
St Johns Road
Meadowfield
County Durham
DH78TZ

Contact(s): Stacey Hornsby

Project D9298 - Weldale Street, Reading

Quotation No.: **Date Received:** 04-Mar-2019

Order No.: **Date Instructed:** 04-Mar-2019

No. of Samples: 2

Turnaround (Wkdays): 25 **Results Due:** 05-Apr-2019

Date Approved: 05-Apr-2019

Approved By:



Details: Robert Monk, Technical Manager

Results - Soil (Asbestos)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:		19-07949		
Quotation No.:	Chemtest Sample ID.:		787036		
	Sample Location:		BHF		
	Sample Type:		SOIL		
	Top Depth (m):		13.00		
	Date Sampled:		27-Feb-2019		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07949	19-07949
Quotation No.:	Chemtest Sample ID.:				787029	787036
	Sample Location:				BHD1	BHF
	Sample Type:				SOIL	SOIL
	Top Depth (m):				3.50	13.00
	Date Sampled:				27-Feb-2019	27-Feb-2019
	Asbestos Lab:					DURHAM
Determinand	Accred.	SOP	Units	LOD		
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	< 2.0	< 2.0

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07949	19-07949
Quotation No.:	Chemtest Sample ID.:				787029	787036
	Sample Location:				BHD1	BHF
	Sample Type:				SOIL	SOIL
	Top Depth (m):				3.50	13.00
	Date Sampled:				27-Feb-2019	27-Feb-2019
	Asbestos Lab:					DURHAM
Determinand	Accred.	SOP	Units	LOD		
Arsenic	M	2450	mg/kg	1.0	7.5	17
Cadmium	M	2450	mg/kg	0.10	< 0.10	< 0.10
Copper	M	2450	mg/kg	0.50	< 0.50	1.8
Mercury	M	2450	mg/kg	0.10	< 0.10	< 0.10
Lead	M	2450	mg/kg	0.50	1.2	5.4
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	< 0.50	24

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07949	19-07949
Quotation No.:	Chemtest Sample ID.:				787029	787036
	Sample Location:				BHD1	BHF
	Sample Type:				SOIL	SOIL
	Top Depth (m):				3.50	13.00
	Date Sampled:				27-Feb-2019	27-Feb-2019
	Asbestos Lab:					DURHAM
Determinand	Accred.	SOP	Units	LOD		
Naphthalene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Fluorene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	1.6	< 0.010
Anthracene	N	2700	mg/kg	0.010	0.35	< 0.010
Fluoranthene	N	2700	mg/kg	0.010	1.4	0.15
Pyrene	N	2700	mg/kg	0.010	1.1	0.18
Benzo[a]anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Chrysene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Total Of 16 PAH's	N	2700	mg/kg	0.20	4.5	0.33

Results - Soil (Phenols)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07949	19-07949
Quotation No.:	Chemtest Sample ID.:				787029	787036
	Sample Location:				BHD1	BHF
	Sample Type:				SOIL	SOIL
	Top Depth (m):				3.50	13.00
	Date Sampled:				27-Feb-2019	27-Feb-2019
	Asbestos Lab:					DURHAM
Determinand	Accred.	SOP	Units	LOD		
Dichlorodifluoromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Chloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Vinyl Chloride	N	2760	µg/kg	0.20	< 0.20	< 0.20
Bromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Chloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Trichlorofluoromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,1-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Trans 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,1-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
cis 1,2-Dichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Bromochloromethane	N	2760	µg/kg	0.50	< 0.50	< 0.50
Trichloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,1,1-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Tetrachloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,1-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Benzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,2-Dichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Trichloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,2-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Dibromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Bromodichloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
cis-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Toluene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Trans-1,3-Dichloropropene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,1,2-Trichloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Tetrachloroethene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,3-Dichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Dibromochloromethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,2-Dibromoethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Chlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,1,1,2-Tetrachloroethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Ethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
m & p-Xylene	N	2760	µg/kg	0.20	< 0.20	< 0.20
o-Xylene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Styrene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Tribromomethane	N	2760	µg/kg	0.20	< 0.20	< 0.20
Isopropylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Bromobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07949	19-07949
Quotation No.:	Chemtest Sample ID.:				787029	787036
	Sample Location:				BHD1	BHF
	Sample Type:				SOIL	SOIL
	Top Depth (m):				3.50	13.00
	Date Sampled:				27-Feb-2019	27-Feb-2019
	Asbestos Lab:					DURHAM
Determinand	Accred.	SOP	Units	LOD		
1,2,3-Trichloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20
N-Propylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
2-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,3,5-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
4-Chlorotoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Tert-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,2,4-Trimethylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Sec-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,3-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
4-Isopropyltoluene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,4-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
N-Butylbenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,2-Dichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,2,4-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Hexachlorobutadiene	N	2760	µg/kg	0.20	< 0.20	< 0.20
1,2,3-Trichlorobenzene	N	2760	µg/kg	0.20	< 0.20	< 0.20
Methyl Tert-Butyl Ether	N	2760	µg/kg	0.20	< 0.20	< 0.20

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07949	19-07949
Quotation No.:	Chemtest Sample ID.:				787029	787036
	Sample Location:				BHD1	BHF
	Sample Type:				SOIL	SOIL
	Top Depth (m):				3.50	13.00
	Date Sampled:				27-Feb-2019	27-Feb-2019
	Asbestos Lab:					DURHAM
Determinand	Accred.	SOP	Units	LOD		
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050
Phenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	< 0.050	< 0.050
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	< 0.050	< 0.050

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07949	19-07949
Quotation No.:	Chemtest Sample ID.:				787029	787036
	Sample Location:				BHD1	BHF
	Sample Type:				SOIL	SOIL
	Top Depth (m):				3.50	13.00
	Date Sampled:				27-Feb-2019	27-Feb-2019
	Asbestos Lab:					DURHAM
Determinand	Accred.	SOP	Units	LOD		
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Anthracene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Carbazole	N	2790	mg/kg	0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Fluoranthene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Pyrene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Chrysene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[a]pyrene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-07949	19-07949
Quotation No.:	Chemtest Sample ID.:				787029	787036
	Sample Location:				BHD1	BHF
	Sample Type:				SOIL	SOIL
	Top Depth (m):				3.50	13.00
	Date Sampled:				27-Feb-2019	27-Feb-2019
	Asbestos Lab:					DURHAM
Determinand	Accred.	SOP	Units	LOD		
Moisture	N	2030	%	0.020	17	21
Soil Colour	N	2040		N/A	White	White,
Other Material	N	2040		N/A	Stones	Stones,
Soil Texture	N	2040		N/A	Chalk	Chalk,
pH	M	2010		N/A		8.5
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	< 0.40	< 0.40
Chromium (Trivalent)	N	2490	mg/kg	1.0	1.0	1.7
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40		< 0.40
PCB 28	N	2815	mg/kg	0.0010		< 0.0010
PCB 52	N	2815	mg/kg	0.0010		< 0.0010
PCB 90+101	N	2815	mg/kg	0.0010		< 0.0010
PCB 118	N	2815	mg/kg	0.0010		< 0.0010
PCB 153	N	2815	mg/kg	0.0010		< 0.0010
PCB 138	N	2815	mg/kg	0.0010		< 0.0010
PCB 180	N	2815	mg/kg	0.0010		< 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010		< 0.0010

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



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Amended Report

Report No.:	19-16700-2		
Initial Date of Issue:	24-May-2019	Date of Re-Issue:	31-May-2019
Client	Dunelm Geotechnical and Environmental		
Client Address:	Foundation House□ St Johns Road□ Meadowfield□ County Durham□ DH78TZ		
Contact(s):	Stacey Hornsby		
Project	D9298		
Quotation No.:	Q19-17098	Date Received:	17-May-2019
Order No.:		Date Instructed:	17-May-2019
No. of Samples:	11		
Turnaround (Wkdays):	10	Results Due:	31-May-2019
Date Approved:	31-May-2019		
Approved By:			
Details:	Martin Dyer, Laboratory Manager□		

Results - Water (TPH)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827795	827796	827797	827798	827799	827800	827801	827802	827803
	Sample Location:				BHA	BHB	BHC	BHD1	BHE	BHF	BH1	WS1	WS103B
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD									
Fuel Type	N	1670		N/A							W.Diesel		
TPH >C6-C10	N	1670	µg/l	0.10							5200		
TPH >C10-C21	N	1670	µg/l	0.10							390000		
TPH >C21-C40	N	1670	µg/l	0.10							49000		
Total TPH >C6-C40	U	1670	µg/l	10							440000		
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	5.4	< 0.10	190	1200	< 0.10	5500	< 0.10	57
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	100	< 0.10	1700	5300	< 0.10	35000	< 0.10	570
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	250	< 0.10	5500	15000	< 0.10	110000	< 0.10	2500
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	450	< 0.10	6300	17000	< 0.10	140000	< 0.10	3300
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	11000	< 0.10	2100	5000	< 0.10	38000	< 0.10	1100
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	12000	< 5.0	16000	44000	< 5.0	330000	< 5.0	7500
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	8.1	< 0.10	67	< 0.10	< 0.10	250	< 0.10	68
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	72	< 0.10	370	580	< 0.10	4800	< 0.10	250
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	290	< 0.10	2200	4300	< 0.10	50000	< 0.10	1400
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	34	< 0.10	2100	3100	< 0.10	27000	< 0.10	940
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	840	< 0.10	470	550	< 0.10	4900	< 0.10	130
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	1200	< 5.0	5100	8600	< 5.0	87000	< 5.0	2800
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	13000	< 10	21000	52000	< 10	420000	< 10	10000

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827804	827805
	Sample Location:				WS101	BH4B
	Sample Type:				WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD		
Fuel Type	N	1670		N/A	W.Diesel	
TPH >C6-C10	N	1670	µg/l	0.10	490	
TPH >C10-C21	N	1670	µg/l	0.10	45000	
TPH >C21-C40	N	1670	µg/l	0.10	6800	
Total TPH >C6-C40	U	1670	µg/l	10	52000	
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	360	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	3600	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	15000	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	17000	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	5600	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	41000	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	130	13
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	570	21
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	2700	11
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	3600	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	620	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	7700	45
Total Petroleum Hydrocarbons	N	1675	µg/l	10	49000	45

Results - Water (Metals)

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827795	827796	827797	827798	827799	827800	827801	827802	827803
	Sample Location:				BHA	BHB	BHC	BHD1	BHE	BHF	BH1	WS1	WS103B
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD									
Iron (Dissolved)	N	1450	µg/l	20	270	260	280				390	330	510
Manganese (Dissolved)	U	1450	µg/l	1.0	3.4	42	9.2	240	88	4.6	27	16	35
Manganese [II]	N	1450	µg/l	1.0	3.4	42	48	66	65	4.6	27	16	35
Manganese [IV]	N	1450	µg/l	1.0	< 1.0	< 1.0	44	170	23	< 1.0	< 1.0	< 1.0	< 1.0
Iron [II]	N	1450	µg/l	20	30	530	20				100	50	130
Iron [III]	N	1450	µg/l	20	240	< 20	260				290	280	380

Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827804	827805
	Sample Location:				WS101	BH4B
	Sample Type:				WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD		
Iron (Dissolved)	N	1450	µg/l	20	320	
Manganese (Dissolved)	U	1450	µg/l	1.0	100	36
Manganese [II]	N	1450	µg/l	1.0	75	36
Manganese [IV]	N	1450	µg/l	1.0	25	< 1.0
Iron [II]	N	1450	µg/l	20	210	
Iron [III]	N	1450	µg/l	20	110	

Results - Water (PAHs)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:	827795	827796	827797	827798	827799	827800	827801	827802	827803	
	Sample Location:	BHA	BHB	BHC	BHD1	BHE	BHF	BH1	WS1	WS103B	
	Sample Type:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	
	Date Sampled:	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	
Determinand	Accred.	SOP	Units	LOD							
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Results - Water (PAHs)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827804	827805
	Sample Location:				WS101	BH4B
	Sample Type:				WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD		
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	< 2.0

Results - Water (VOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827795	827796	827797	827798	827799	827800	827801	827802	827803
	Sample Location:				BHA	BHB	BHC	BHD1	BHE	BHF	BH1	WS1	WS103B
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD									
Dichlorodifluoromethane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Chloromethane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Vinyl Chloride	N	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Bromomethane	U	1760	µg/l	5.0			< 5.0				< 5.0	< 5.0	
Chloroethane	U	1760	µg/l	2.0			< 2.0				< 2.0	< 2.0	
Trichlorofluoromethane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
1,1-Dichloroethene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
1,1-Dichloroethane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
cis 1,2-Dichloroethene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Bromochloromethane	U	1760	µg/l	5.0			< 5.0				< 5.0	< 5.0	
Trichloromethane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
1,1,1-Trichloroethane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Tetrachloromethane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
1,1-Dichloropropene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0			< 2.0				< 2.0	< 2.0	
Trichloroethene	N	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
1,2-Dichloropropane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Dibromomethane	U	1760	µg/l	10			< 10				< 10	< 10	
Bromodichloromethane	U	1760	µg/l	5.0			< 5.0				< 5.0	< 5.0	
cis-1,3-Dichloropropene	N	1760	µg/l	10			< 10				< 10	< 10	
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10			< 10				< 10	< 10	
1,1,2-Trichloroethane	U	1760	µg/l	10			< 10				< 10	< 10	
Tetrachloroethene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
1,3-Dichloropropane	U	1760	µg/l	2.0			< 2.0				< 2.0	< 2.0	
Dibromochloromethane	U	1760	µg/l	10			< 10				< 10	< 10	
1,2-Dibromoethane	U	1760	µg/l	5.0			< 5.0				< 5.0	< 5.0	
Chlorobenzene	N	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0			< 2.0				< 2.0	< 2.0	
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Tribromomethane	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Isopropylbenzene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
Bromobenzene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	
1,2,3-Trichloropropane	N	1760	µg/l	50			< 50				< 50	< 50	
N-Propylbenzene	U	1760	µg/l	1.0			< 1.0				< 1.0	< 1.0	

Results - Water (VOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:	827795	827796	827797	827798	827799	827800	827801	827802	827803
	Sample Location:	BHA	BHB	BHC	BHD1	BHE	BHF	BH1	WS1	WS103B
	Sample Type:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD						
2-Chlorotoluene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50			< 50		< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0			< 1.0		< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0			< 2.0		< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
VOC TIC	N	1760	µg/l	N/A					None Detected	

Results - Water (VOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827804	827805
	Sample Location:				WS101	BH4B
	Sample Type:				WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD		
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5.0	< 5.0	< 5.0
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5.0	< 5.0	< 5.0
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0

Results - Water (VOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827804	827805
	Sample Location:				WS101	BH4B
	Sample Type:				WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD		
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0
VOC TIC	N	1760	µg/l	N/A		

Results - Water (SVOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827797	827798	827799	827801	827802	827803	827804	827805
	Sample Location:				BHC	BHD1	BHE	BH1	WS1	WS103B	WS101	BH4B
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD								
N-Nitrosodimethylamine	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	4.9	< 0.50	< 0.50	0.86	< 0.50
2-Chlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	6.7	< 0.50	< 0.50	0.53	< 0.50
1,3-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.50	< 0.50	< 0.50	0.97	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane	N	1790	µg/l	0.50	< 0.50	30	1.3	180	< 0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	11	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Isophorone	N	1790	µg/l	0.50	< 0.50	1.7	10	18	< 0.50	< 0.50	< 0.50	< 0.50
2-Nitrophenol	N	1790	µg/l	0.50	< 0.50	1.5	8.5	18	< 0.50	< 0.50	6.0	< 0.50
2,4-Dimethylphenol	N	1790	µg/l	0.50	< 0.50	< 0.50	2.4	8.2	< 0.50	< 0.50	2.0	< 0.50
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	2.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	1.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene	N	1790	µg/l	0.50	< 0.50	< 0.50	1.3	3.4	< 0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline	N	1790	µg/l	0.50	< 0.50	4.8	19	< 0.50	< 0.50	1.7	9.8	< 0.50
Hexachlorobutadiene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	38	< 0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene	N	1790	µg/l	0.50	< 0.50	< 0.50	1.7	33	< 0.50	5.1	< 0.50	< 0.50
Hexachlorocyclopentadiene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	1.8	< 0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50	4.0	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Acenaphthene	N	1790	µg/l	0.50	< 0.50	1.9	3.9	19	< 0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline	N	1790	µg/l	0.50	< 0.50	3.4	14	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Fluorene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Results - Water (SVOC)

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827797	827798	827799	827801	827802	827803	827804	827805
	Sample Location:				BHC	BHD1	BHE	BH1	WS1	WS103B	WS101	BH4B
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD								
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.50	< 0.50	71	130	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Azobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Pentachlorophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenanthrene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Anthracene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbazole	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Fluoranthene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Pyrene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Butylbenzyl Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[a]anthracene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chrysene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[k]fluoranthene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol	N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
SVOC TIC	N	1790	µg/l	N/A		None Detected	None Detected	None Detected		None Detected	None Detected	

Results - Water (Other)

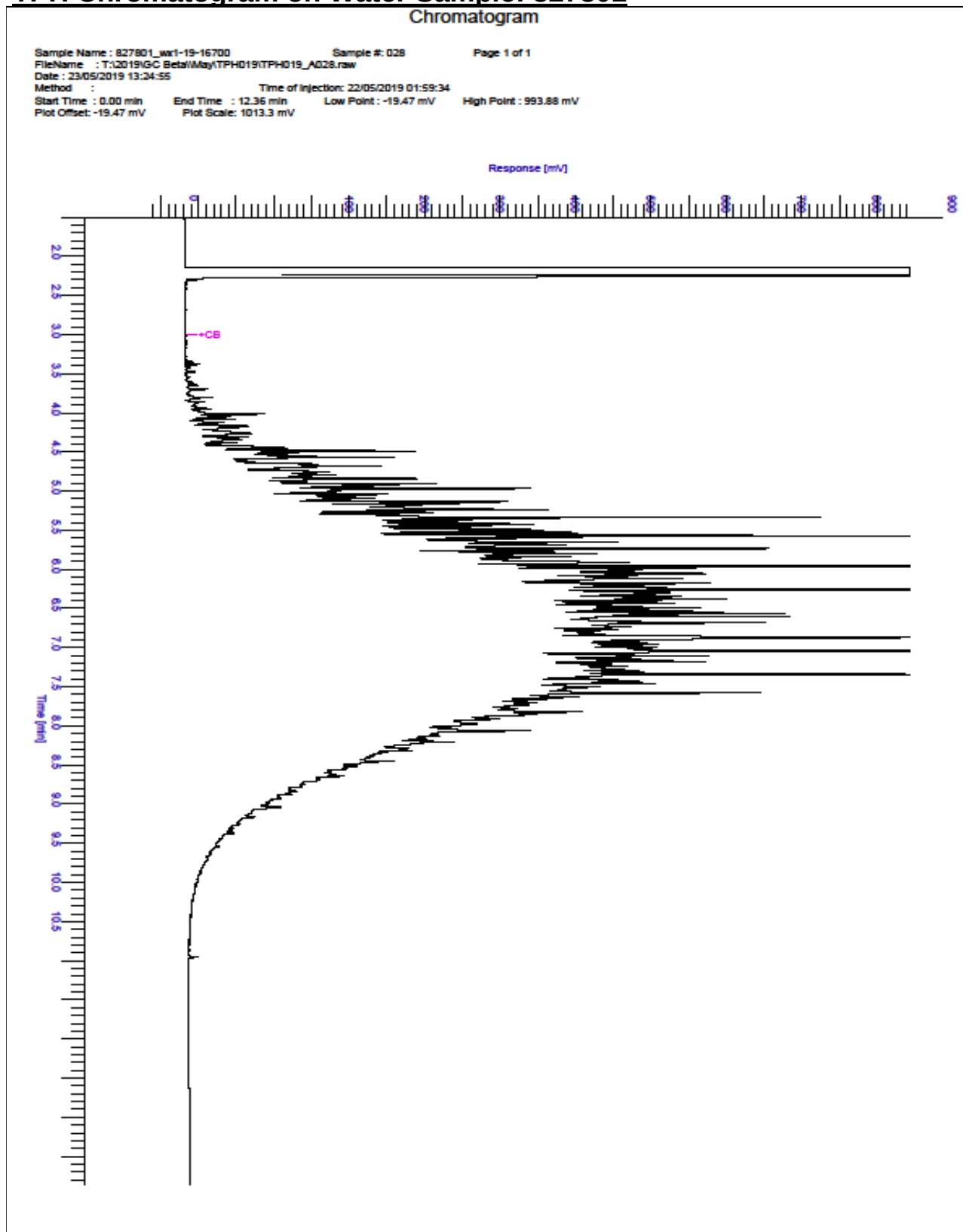
Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827795	827796	827797	827798	827799	827800	827801	827802	827803
	Sample Location:				BHA	BHB	BHC	BHD1	BHE	BHF	BH1	WS1	WS103B
	Sample Type:				WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD									
Chromatogram (TPH)	N			N/A							See Attached		
Nitrate	U	1220	mg/l	0.50	44	13	49	0.82	< 0.50	34	< 0.50	5.9	< 0.50
Sulphate	U	1220	mg/l	1.0	61	50	66				33	61	40

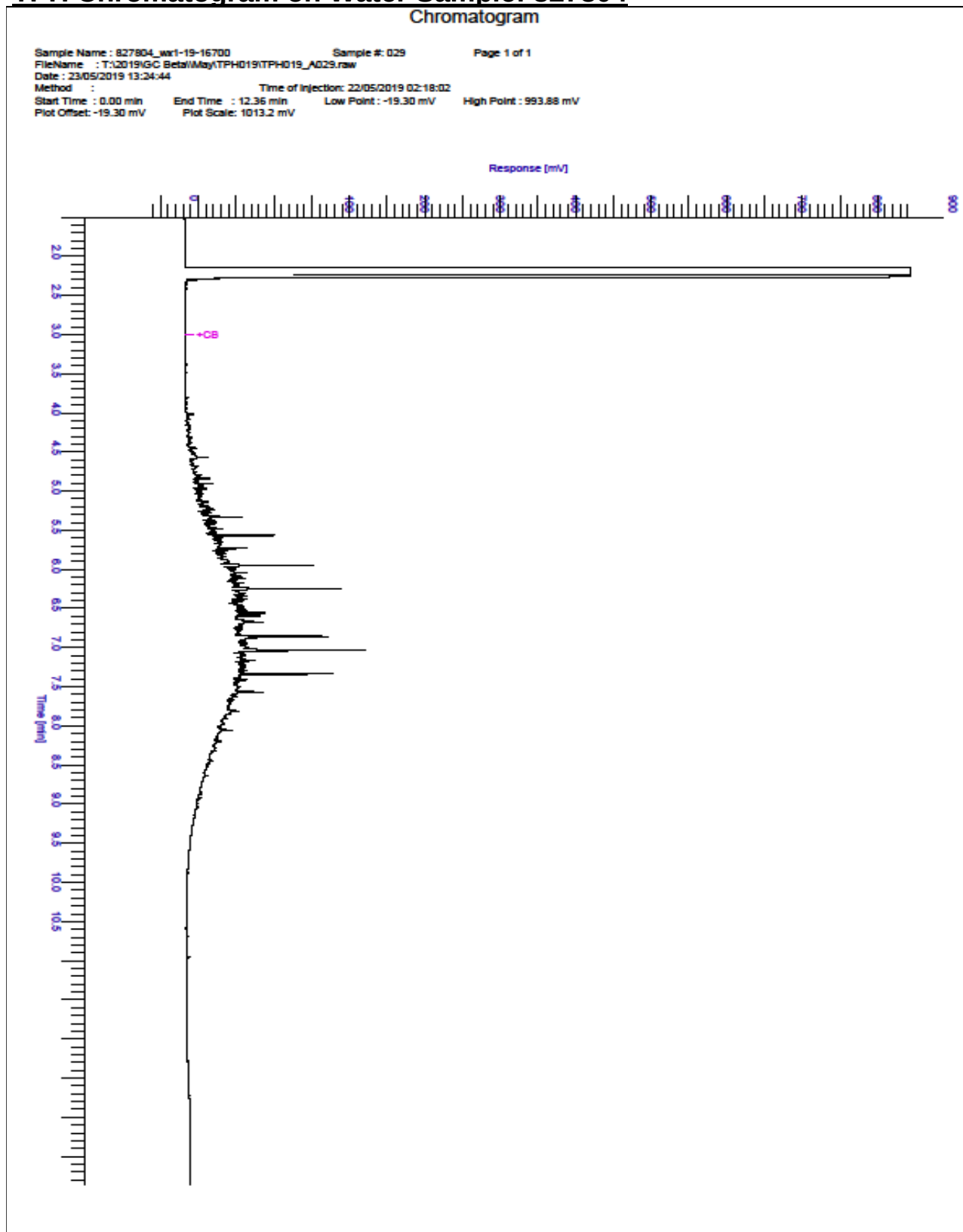
Project: D9298 - Weldale Street, Reading

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				19-16700	19-16700
Quotation No.: Q19-17098	Chemtest Sample ID.:				827804	827805
	Sample Location:				WS101	BH4B
	Sample Type:				WATER	WATER
	Date Sampled:				15-May-2019	15-May-2019
Determinand	Accred.	SOP	Units	LOD		
Chromatogram (TPH)	N			N/A	See Attached	
Nitrate	U	1220	mg/l	0.50	< 0.50	< 0.50
Sulphate	U	1220	mg/l	1.0	20	

TPH Chromatogram on Water Sample: 827801



TPH Chromatogram on Water Sample: 827804



SOP	Title	Parameters included	Method summary
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35–C44 Aromatics: >C5–C7, >C7–C8, >C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35–C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

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

customerservices@chemtest.com



Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

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Tel: +44 (0) 1244 833780

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Attention :	Ben Carvey
Date :	23rd May, 2019
Your reference :	
Our reference :	Test Report 19/7889 Batch 1
Location :	Reading
Date samples received :	16th May, 2019
Status :	Final report
Issue :	1

Two samples were received for analysis on 16th May, 2019 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Lucas Halliwell
Project Co-ordinator

Client Name: Dunelm Geotechnical and Environmental Ltd
Reference:
Location: Reading
Contact: Ben Carvey

Sample Date: 15 May 2019
Date of Receipt: 16 May 2019
Date Analysed: 20 May 2019

Sample ID: BH1
Depth:
JE Job No: 19/7889
JE Sample No: 1
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: -
Sample Train Serial number: ST-164

Q* - Qualifiers

B Indicates analyte found in associated method blank
++ Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT ppbv	RESULT ug/m ³	RL ppbv	MDL ppbv	RL ug/m ³	MDL ug/m ³
75-01-4	62.5	# Vinyl Chloride		<1.5	<3.8	<1.5	<1.5	<3.8	<3.8
75-71-8	120.91	Dichlorodifluoromethane (F-12)		<2.5	<12.4	<2.5	<2.5	<12.4	<12.4
74-87-3	50.49	Chloromethane		<1.5	<3.1	<1.5	<1.5	<3.1	<3.1
74-83-9	94.95	# Bromomethane		<1.5	<5.8	<1.5	<1.5	<5.8	<5.8
75-00-3	64.52	# Chloroethane		<1.5	<4.0	<1.5	<1.5	<4.0	<4.0
75-69-4	137.36	# Trichlorofluoromethane (F-11)		<1.5	<8.4	<1.5	<1.5	<8.4	<8.4
75-35-4	96.95	1,1-Dichloroethene (1,1 DCE)		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-09-2	84.93	# Dichloromethane (DCM)		<14.4	<50	<14.4	<14.4	<50	<50
156-60-5	96.94	Trans-1,2-Dichloroethene		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-34-3	98.97	# 1,1-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
156-59-2	96.94	# cis-1,2-Dichloroethene		1	<4	<1	<1	<4	<4
594-20-7	112.99	2,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-97-5	129.38	Bromochloromethane (Int Std)		NA	NA	<1.5	<1.5	<7.9	<7.9
67-66-3	119.39	# Chloroform		<1.5	<7.3	<1.5	<1.5	<7.3	<7.3
71-55-6	133.42	# 1,1,1-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
563-58-6	110.97	1,1-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
56-23-5	153.84	# Carbon Tetrachloride		<1.5	<9.4	<1.5	<1.5	<9.4	<9.4
107-06-2	98.96	# 1,2-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
71-43-2	78.11	# Benzene		<1.5	<4.8	<1.5	<1.5	<4.8	<4.8
79-01-6	131.4	# Trichloroethene (TCE)		3.1	16.7	<1.5	<1.5	<8.1	<8.1
78-87-5	112.99	# 1,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-95-3	173.83	Dibromomethane		<1.5	<10.7	<1.5	<1.5	<10.7	<10.7
75-27-4	163.83	Bromodichloromethane		<1.5	<10.1	<1.5	<1.5	<10.1	<10.1
10061-01-5	110.97	# cis-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
108-88-3	92.13	# Toluene		3	11.3	<1.5	<1.5	<5.7	<5.7
10061-02-6	110.97	# trans-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
79-00-5	133.4	# 1,1,2-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
127-18-4	165.85	# Tetrachloroethene (PCE)		<1.5	<10.2	<1.5	<1.5	<10.2	<10.2
142-28-9	112.99	1,3-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
124-48-1	208.28	Dibromochloromethane		<1.5	<12.8	<1.5	<1.5	<12.8	<12.8
106-93-4	187.86	# 1,2-Dibromoethane		<1.5	<11.5	<1.5	<1.5	<11.5	<11.5
108-90-7	112.56	# Chlorobenzene		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
630-20-6	167.85	1,1,1,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
100-41-4	106.16	# Ethylbenzene		<1.5	<6.5	<1.5	<1.5	<6.5	<6.5
	106.17	# m/p-Xylene		2	8.7	<1.5	<1.5	<6.5	<6.5
95-47-6	106.17	# o-Xylene		<1.5	<6.5	<1.5	<1.5	<6.5	<6.5
100-42-5	104.14	# Styrene		<1.5	<6.4	<1.5	<1.5	<6.4	<6.4
75-25-2	252.77	Bromoform		<1.5	<15.5	<1.5	<1.5	<15.5	<15.5
98-82-8	120.19	Isopropylbenzene		<1.5	<7.4	<1.5	<1.5	<7.4	<7.4

Client Name: Dunelm Geotechnical and Environmental Ltd
Reference:
Location: Reading
Contact: Ben Carvey

Sample Date: 15 May 2019
Date of Receipt: 16 May 2019
Date Analysed: 20 May 2019

Sample ID: WS101
Depth:
JE Job No: 19/7889
JE Sample No: 2
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: QT 852 0.45
Sample Train Serial number: ST-167

Q* - Qualifiers

B Indicates analyte found in associated method blank
++ Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT ppbv	RESULT ug/m ³	RL ppbv	MDL ppbv	RL ug/m ³	MDL ug/m ³
75-01-4	62.5	# Vinyl Chloride		7.8	19.9	<1.5	<1.5	<3.8	<3.8
75-71-8	120.91	Dichlorodifluoromethane (F-12)		4.1	20.3	<2.5	<2.5	<12.4	<12.4
74-87-3	50.49	Chloromethane		10.4	21.5	<1.5	<1.5	<3.1	<3.1
74-83-9	94.95	# Bromomethane		<1.5	<5.8	<1.5	<1.5	<5.8	<5.8
75-00-3	64.52	# Chloroethane		<1.5	<4.0	<1.5	<1.5	<4.0	<4.0
75-69-4	137.36	# Trichlorofluoromethane (F-11)		<1.5	<8.4	<1.5	<1.5	<8.4	<8.4
75-35-4	96.95	1,1-Dichloroethene (1,1 DCE)		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-09-2	84.93	# Dichloromethane (DCM)		<14.4	<50	<14.4	<14.4	<50	<50
156-60-5	96.94	Trans-1,2-Dichloroethene		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-34-3	98.97	# 1,1-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
156-59-2	96.94	# cis-1,2-Dichloroethene		2	8	<1	<1	<4	<4
594-20-7	112.99	2,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-97-5	129.38	Bromochloromethane (Int Std)		NA	NA	<1.5	<1.5	<7.9	<7.9
67-66-3	119.39	# Chloroform		<1.5	<7.3	<1.5	<1.5	<7.3	<7.3
71-55-6	133.42	# 1,1,1-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
563-58-6	110.97	1,1-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
56-23-5	153.84	# Carbon Tetrachloride		<1.5	<9.4	<1.5	<1.5	<9.4	<9.4
107-06-2	98.96	# 1,2-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
71-43-2	78.11	# Benzene		12.8	40.9	<1.5	<1.5	<4.8	<4.8
79-01-6	131.4	# Trichloroethene (TCE)		2.8	15	<1.5	<1.5	<8.1	<8.1
78-87-5	112.99	# 1,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-95-3	173.83	Dibromomethane		<1.5	<10.7	<1.5	<1.5	<10.7	<10.7
75-27-4	163.83	Bromodichloromethane		<1.5	<10.1	<1.5	<1.5	<10.1	<10.1
10061-01-5	110.97	# cis-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
108-88-3	92.13	# Toluene		2.6	9.8	<1.5	<1.5	<5.7	<5.7
10061-02-6	110.97	# trans-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
79-00-5	133.4	# 1,1,2-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
127-18-4	165.85	# Tetrachloroethene (PCE)		1.9	12.9	<1.5	<1.5	<10.2	<10.2
142-28-9	112.99	1,3-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
124-48-1	208.28	Dibromochloromethane		<1.5	<12.8	<1.5	<1.5	<12.8	<12.8
106-93-4	187.86	# 1,2-Dibromoethane		<1.5	<11.5	<1.5	<1.5	<11.5	<11.5
108-90-7	112.56	# Chlorobenzene		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
630-20-6	167.85	1,1,1,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
100-41-4	106.16	# Ethylbenzene		<1.5	<6.5	<1.5	<1.5	<6.5	<6.5
	106.17	# m/p-Xylene		2	8.7	<1.5	<1.5	<6.5	<6.5
95-47-6	106.17	# o-Xylene		<1.5	<6.5	<1.5	<1.5	<6.5	<6.5
100-42-5	104.14	# Styrene		<1.5	<6.4	<1.5	<1.5	<6.4	<6.4
75-25-2	252.77	Bromoform		<1.5	<15.5	<1.5	<1.5	<15.5	<15.5
98-82-8	120.19	Isopropylbenzene		<1.5	<7.4	<1.5	<1.5	<7.4	<7.4

Client Name: Dunelm Geotechnical and Environmental Ltd

Reference:

Location: Reading

Contact: Ben Carvey

[illegible]

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/7889

SOILS

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

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

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

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

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

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

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

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

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

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

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

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

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

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

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

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

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

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

DILUTIONS

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

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

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

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 19/7889

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM68	Modified TO-15 method. Volatile Organic Compounds (VOCs) sampled using Gas Canisters, BottleVacs or Tedlar bags and analysed using Entech GC-MS.	PM0	No preparation is required.				
TM68	Modified TO-15 method. Volatile Organic Compounds (VOCs) sampled using Gas Canisters, BottleVacs or Tedlar bags and analysed using Entech GC-MS.	PM0	No preparation is required.	Yes			

APPENDIX F

Gas and Groundwater Monitoring Results



PRE FIELDWORK GAS MONITORING SHEET

Contract Number D9298										Dunelm Geotechnical & Environmental Ltd
Contract Name Weldale Street, Reading										
Date 05/02/2019										
Time (start & finish) 10:00 to 15:00								Visit No. 1	of 4	
Weather Overcast										
Ground Conditions wet										
Operator Initials RD										
Ambient Readings		O ₂ (% v/v)	20.9	CO ₂ (% v/v)	0.1	CH ₄ (% v/v)	0.0	PID reading (ppm)	0	
Atmospheric Pressure (mbar)		Start:		1017		Finish:		1021		
Air temperature °C		Start:		5		Finish:		7		
Instrument Details GA 5000										
Last Calibration 25/03/2019										
Instrument Details										
Last Calibration										

BH No.	Peak	Steady	Relative pressure mbar	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Low	Range	Range	SWL (m bgl)	Free Phase Hydrocarbons (m bgl)	Base of pipe (m bgl)	Remarks
	Flow Rate (l/hr)			CH ₄ (%v/v)		CO ₂ (%v/v)		O ₂ (%v/v)		PID (ppm)		H ₂ S (ppm)	CO (ppm)				
BH1	0.00	0.00	0.28	ND	ND	1.80	1.80	18.50	18.50	ND	ND	ND	ND	4.47	ND	9.45	
BH2																	Missed
BH4B	0.00	0.00	-0.05	ND	ND	1.90	1.90	18.90	18.90	ND	ND	ND	ND	4.48	ND	9.09	
BH101	0.00	0.00	-0.10	ND	ND	0.10	0.10	19.40	19.40	ND	ND	ND	ND	4.58	ND	6.46	
BH102A	0.00	0.00	0.02	ND	ND	1.00	1.00	16.70	16.70	ND	ND	ND	ND	4.28	ND	4.77	
WS1																	Not monitored due to safety reasons - homeless person in West part of site
WS2A																	
WS4																	Unable to access industrial building
WS5																	
WS6	0.10	0.10	-0.48	ND	ND	0.20	0.20	21.00	21.00	ND	ND	ND	ND	5.11	ND	5.89	
WS9	0.00	0.00	0.12	ND	ND	2.00	2.00	19.80	19.80	ND	ND	ND	ND	4.79	ND	4.96	
WS101	0.00	0.00	0.02	ND	ND	2.30	2.30	18.30	18.30	ND	ND	ND	3.00	5.05	ND	5.96	CO Peak 10 ppm
WS103	0.00	0.00	0.01	ND	ND	0.10	0.10	20.90	10.90	ND	ND	ND	ND	4.74	ND	4.95	No gas tap, monitored without bung
WS103B	0.00	0.00	0.05	ND	ND	0.10	0.10	20.90	20.90	ND	ND	ND	ND	4.54	ND	5.84	Gas tap broken, monitored without bung
WS106A	0.00	0.00	0.03	ND	ND	0.70	0.70	19.80	19.80	ND	ND	ND	ND	DRY	ND	2.05	
	Details of groundwater purging & sampling inc. volume sampled												Observations				
BH1	Purged 10 L, FULL suite sampled.												Hydrocarbon odour, oil sheen, black colour				
BH4B	Purged 10 L, x2 Glass L, x1 Plastic L, x1 vial												Hydrocarbon odour, oil sheen, white/ cream colour				
BH101	Purged 4 L, FULL suite sampled.												Hydrocarbon odour, oil sheen, white/ cream colour				
BH102A	Purged 1 L, x1 Glass L, x1 vial (RAN DRY DURING SAMPLING)												Hydrocarbon odour, oil sheen, dark grey colour				
WS6	Purged 2 L, x2 Glass L, x1 Plastic L, x1 Vial												Hydrocarbon odour, oil sheen, white/ cream colour				
WS9	Insufficient to sample												-				
WS101	Purged 2 L, FULL suite sampled.												Hydrocarbon odour, oil sheen, white/ cream colour				
WS103	Insufficient to sample												-				
WS103B	Purged 2 L, x1 Glass L, x1 Plastic, x1 Vial												Hydrocarbon odour, oil sheen, white/ cream colour				
WS106A	DRY - no sample												-				

Notes:

Full sample suite for each point comprises 3 No. Glass L, 3 No. Glass Vials, and 1 No. Plastic L
 Not enough bottles from ChemTest - some glass bottles smashed during transit - thus some borehole sample suites incomplete

Monitoring order is from left to right across table above.
 Regional trend is that shown at nearest Met office location at time of monitoring.
 Key: ND None Detected
 NR Not Recorded
 SWL Standing Water Level

PRE FIELDWORK GAS MONITORING SHEET																		
Contract Number D9298										Dunelm Geotechnical & Environmental Ltd								
Contract Name Weldale Street, Reading																		
Date 11/02/2019																		
Time (start & finish) 11:30 to 15:00 Visit No.2of4																		
Weather sun/ cloud																		
Ground Conditions damp																		
Operator Initials RD																		
Ambient Readings		O ₂ (% v/v)		20.9		CO ₂ (% v/v)		0.1		CH ₄ (% v/v)		0.0		PID reading (ppm)		0		
Atmospheric Pressure (mbar)		Start:		1022				Finish:		1025				Regional Trend:				
Air temperature °C		Start:		7				Finish:		10								
Instrument Details		GA 5000																
Last Calibration		25/03/2019																
Instrument Details																		
Last Calibration																		

BH No.	Peak	Steady	Relative pressure mbar	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Low	Range	Range	SWL (m bgl)	Free Phase Hydrocarbons (m bgl)	Base of pipe (m bgl)	Remarks
	Flow Rate (l/hr)			CH ₄ (%v/v)		CO ₂ (%v/v)		O ₂ (%v/v)		PID (ppm)		H ₂ S (ppm)	CO (ppm)				
BH1	0.00	0.00	-0.16	ND	ND	1.60	1.60	19.10	19.10	ND	ND	ND	ND	4.40	ND	9.44	Gas tap full of mud - monitored without bung
BH2	0.00	0.00	-0.10	ND	ND	0.10	0.10	20.90	20.90	ND	ND	ND	ND	4.76	ND	8.31	
BH4B	0.00	0.00	-0.12	ND	ND	1.80	1.80	18.90	18.90	ND	ND	ND	ND	4.45	ND	9.07	
BH101	0.00	0.00	2.26	ND	ND	0.10	0.10	20.90	20.90	ND	ND	ND	1.00	4.54	ND	6.36	
BH102A	0.10	0.10	0.10	ND	ND	0.20	0.20	20.70	20.70	ND	ND	ND	ND	4.33	ND	4.70	
WS1	0.00	0.00	-0.14	ND	ND	2.00	2.00	13.80	13.80	ND	ND	ND	ND	4.34	ND	5.78	
WS2A	0.00	0.00	0.10	ND	ND	0.80	0.80	20.60	20.60	ND	ND	ND	ND	4.34	ND	5.98	Gas tap open when found
WS4	0.00	0.00	0.14	ND	ND	0.20	0.20	20.90	20.90	ND	ND	ND	9.00	DRY	ND	4.83	Site work in building using petrol powered rig - might have contributed to high CO. Purged GA outside building prior to monitoring
WS5																	Not Found - searched building with engineer
WS6	0.00	0.00	0.03	ND	ND	0.10	0.10	21.00	21.00	ND	ND	ND	ND	5.03	ND	5.88	
WS9	0.00	0.00	-0.02	ND	ND	2.50	2.50	19.90	19.90	ND	ND	ND	ND	4.85	ND	4.91	
WS101	0.10	0.10	0.10	ND	ND	0.40	0.40	20.90	20.90	ND	ND	ND	1.00	4.99	ND	5.96	
WS103	0.00	0.00	0.03	ND	ND	0.10	0.10	20.90	20.90	ND	ND	ND	ND	4.67	ND	4.94	No gas tap, monitored without bung
WS103B	0.00	0.00	-0.07	ND	ND	1.40	1.40	20.40	20.40	ND	ND	ND	ND	4.50	ND	4.80	Gas tap broken, monitored without bung
WS106A	0.00	0.00	0.17	ND	ND	0.10	0.10	21.40	21.40	ND	ND	ND	ND	DRY	ND	2.05	

	Details of groundwater purging & sampling inc. volume sampled	Observations
BH1	Purged 10 L, FULL suite sampled.	Hydrocarbon odour, oil sheen, dark grey colour
BH2	Purged 10 L, FULL suite sampled.	Hydrocarbon odour, oil sheen, light brown colour
BH4B	Purged 10 L, FULL suite sampled.	Hydrocarbon odour, oil sheen, white/ cream colour
BH101	Purged 10 L, FULL suite sampled.	Hydrocarbon odour, oil sheen, white/ cream colour
BH102A	Insufficient to sample	-
WS1	Purged 9 L, FULL suite sampled	Hydrocarbon odour, oil sheen, white colour
WS2A	Purged 9 L, FULL suite sampled	Hydrocarbon odour, oil sheen, white colour
WS4	DRY - no sample	-
WS5	NOT FOUND	-
WS6	Purged 5 L, FULL suite sampled	Hydrocarbon odour, oil sheen, white/ cream colour
WS9	Insufficient to sample	-
WS101	Purged 6 L, FULL suite sampled	Hydrocarbon odour, oil sheen, white/ cream colour
WS103	Insufficient to sample	-
WS103B	Insufficient to sample	-
WS106A	DRY - no sample	-

Notes:

Full sample suite for each point comprises 3 No. Glass L, AND 3 No. Glass Vials

NO PLASTIC BOTTLES ARRIVED FROM CHEM TEST

Monitoring order is from **left to right** across table above.
Regional trend is that shown at nearest Met office location at time of monitoring.

Key: **ND** **None Detected**
NR **Not Recorded**
SWL **Standing Water Level**

POST FIELDWORK GAS MONITORING SHEET																			
Contract Number		D9298										Dunelm Geotechnical & Environmental Ltd							
Contract Name		Weldale Street, Reading																	
Date		12/03/2019																	
Time (start & finish)		07:45 - 10:05				Visit No.		3		of								4	
Weather		Rain																	
Ground Conditions		Wet																	
Operator Initials		RD																	
Ambient Readings		O ₂ (% v/v)		20.9		CO ₂ (% v/v)		0.1		CH ₄ (% v/v)		0.0		PID reading (ppm)		0			
Atmospheric Pressure (mbar)		Start:		1002				Finish:		1000				Regional Trend:					
Air temperature °C		Start:		8				Finish:		9									
Instrument Details		GA 5000																	
Last Calibration		25/03/2019																	
Instrument Details																			
Last Calibration																			
BH No.	Peak	Steady	Relative pressure mbar	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Low	Range	Range	SWL (m bgl)	Free Phase Hydrocarbons (m bgl)	Base of pipe (m bgl)	Remarks		
	Flow Rate (l/hr)			CH ₄ (%v/v)		CO ₂ (%v/v)		O ₂ (%v/v)		PID (ppm)		H ₂ S (ppm)	CO (ppm)						
BH1	0.00	0.00	-1.60	ND	ND	1.80	1.80	19.80	19.80	NR	NR	ND	ND	4.42	ND	9.44	Gas tap full of mud - monitored without bung		
BH2	0.00	0.00	0.00	ND	ND	1.60	1.60	19.00	19.00	NR	NR	ND	ND	4.78	ND	8.30			
BH4B	0.10	0.10	-2.53	ND	ND	2.40	2.40	18.80	18.80	NR	NR	ND	ND	4.45	ND	9.07			
BH101	0.10	0.10	-0.07	ND	ND	0.50	0.50	20.60	20.60	NR	NR	ND	1.00	4.54	ND	6.25			
BH102A	0.10	0.10	0.10	ND	ND	0.30	0.30	20.10	20.10	NR	NR	ND	ND	4.25	ND	4.71			
WS1	0.00	0.00	0.00	ND	ND	3.00	3.00	18.50	18.50	NR	NR	ND	1.00	4.37	ND	5.77			
WS2A	0.00	0.00	-0.16	ND	ND	0.80	0.80	18.10	18.10	NR	NR	ND	ND	4.35	ND	5.94			
WS4	0.00	0.00	0.05	ND	ND	4.30	4.20	9.10	9.10	NR	NR	ND	ND	DRY	ND	4.94			
WS5															ND		Not Found		
WS6	0.00	0.00	0.12	ND	ND	0.30	0.30	20.70	20.70	NR	NR	ND	1.00	5.08	ND	5.89			
WS9	0.00	0.00	0.03	ND	ND	2.50	2.50	20.40	20.40	NR	NR	ND	1.00	4.78	ND	4.97			
WS101	0.00	0.00	0.17	ND	ND	0.70	0.70	20.80	20.80	NR	NR	ND	1.00	5.00	ND	5.95			
WS103	0.00	0.00	0.00	ND	ND	0.60	0.50	20.40	20.40	NR	NR	ND	ND	4.66	ND	4.95	No gas tap, monitored without bung		
WS103B	0.00	0.00	0.10	ND	ND	0.20	0.20	20.70	20.70	NR	NR	ND	1.00	4.51	ND	4.80	Gas tap broken, monitored without bung		
WS106A	0.00	0.00	-0.07	ND	ND	0.50	0.50	20.80	20.80	NR	NR	ND	ND	DRY	ND	2.05			
Additional Installs																			
BHA	0.00	0.00	0.16	ND	ND	1.60	1.60	19.40	19.40	NR	NR	ND	ND	4.67	ND	28.93	Bailer held within borehole		
BHB	0.00	0.00	0.07	ND	ND	1.00	0.80	19.70	19.70	NR	NR	ND	1.00	4.98	ND	11.90			
BHC	0.00	0.00	0.05	ND	ND	0.50	0.50	20.30	20.30	NR	NR	ND	ND	4.66	ND	31.05			
BHD1	0.00	0.00	0.09	ND	ND	0.70	0.70	20.70	20.70	NR	NR	ND	1.00	4.12	ND	9.31			
BHD1 (shallow)	0.00	0.00	-0.02	ND	ND	0.10	0.10	20.90	20.99	NR	NR	ND	1.00	DRY	ND	3.18			
BHE	0.00	0.00	0.07	ND	ND	0.90	0.90	19.20	19.20	NR	NR	ND	5.00	4.97	ND	39.16			
BHF	0.00	0.00	0.07	ND	ND	3.10	3.10	16.40	16.40	NR	NR	ND	ND	5.15	ND	15.83	CO peak - 2 ppm		
BHF (shallow)	0.00	0.00	0.26	ND	ND	1.20	1.20	19.00	19.00	NR	NR	ND	2.00	DRY	ND	1.54			
Details of groundwater purging & sampling inc. volume sampled										Observations									
No sampling required																			
Notes:																			

Monitoring order is from **left to right** across table above.
Regional trend is that shown at nearest Met office location at time of monitoring.

Key: ND None Detected
NR Not Recorded
SWL Standing Water Level

POST FIELDWORK AS MONITORING SHEET																					
Contract Number		D9298																			
Contract Name		Weldale Street, Reading																			
Date		25/03/2019																			
Time (start & finish)		07:45 - 10:05				Visit No.		4		of		4		Dunelm Geotechnical & Environmental Ltd							
Weather		Sunny/ Windy																			
Ground Conditions		Dry																			
Operator Initials		W.M																			
Ambient Readings		O ₂ (% v/v)		20.9		CO ₂ (% v/v)		0.1		CH ₄ (% v/v)		0.0							PID reading (ppm)		0
Atmospheric Pressure (mbar)		Start:		1029				Finish:		1030				Regional Trend:							
Air temperature °C		Start:		12				Finish:		12											
Instrument Details		GA 5000 ; G501538																			
Last Calibration		25/03/2019																			
Instrument Details																					
Last Calibration																					
BH No.	Peak	Steady	Relative pressure mbar	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Low	Range	Range	SWL (m bgl)	Free Phase Hydrocarbons (m bgl)	Base of pipe (m bgl)	Remarks				
	Flow Rate (l/hr)			CH ₄ (%v/v)		CO ₂ (%v/v)		O ₂ (%v/v)		PID (ppm)		H ₂ S (ppm)	CO (ppm)								
BH1	-0.10	-0.10	0.10	ND	ND	1.50	1.50	20.10	20.10	NR	NR	ND	ND	4.50	ND	9.45	Gas tap full of mud - monitored without bung- borehole Silty				
BH2	0.10	0.10	0.14	ND	ND	0.10	0.10	21.20	21.20	NR	NR	ND	ND	4.89	ND	8.71					
BH4B	0.00	0.00	0.07	ND	ND	1.10	1.10	20.20	20.20	NR	NR	ND	ND	4.56	ND	9.08					
BH101	0.10	0.10	0.14	ND	ND	0.10	0.10	21.00	21.00	NR	NR	ND	ND	4.66	ND	5.73					
BH102A	0.10	0.10	0.15	ND	ND	0.30	0.30	20.40	20.40	NR	NR	ND	ND	4.35	ND	4.70					
WS1	0.00	0.00	0.19	ND	ND	1.60	1.60	19.40	19.40	NR	NR	ND	ND	4.47	ND	5.78	Homeless person near borehole area on map. Avioded due to safety reasons				
WS2A																					
WS4																					
WS5																					
WS6	0.00	0.00	0.10	ND	ND	0.20	0.20	20.00	20.00	NR	NR	ND	ND	5.20	ND	5.90	No gas tap, monitored without bung				
WS9	0.00	0.00	0.19	ND	ND	2.00	2.00	20.10	20.10	NR	NR	ND	ND	4.82	ND	4.97					
WS101	0.10	0.10	0.14	ND	ND	1.00	1.00	20.50	20.50	NR	NR	ND	ND	5.09	ND	5.93					
WS103	0.00	0.00	0.10	ND	ND	0.10	0.10	20.90	20.90	NR	NR	ND	ND	4.78	ND	4.95					
WS103B	0.00	0.00	0.12	ND	ND	0.10	0.10	20.80	20.90	NR	NR	ND	ND	4.91	ND	4.77					
WS106A	0.10	0.10	0.21	ND	ND	0.10	0.10	21.30	21.30	NR	NR	ND	ND	DRY	ND	2.05	Gas tap broken, monitored without bung				
Additional Installs												ND	ND								
BHA	0.10	0.10	0.15	ND	ND	0.20	0.20	20.60	20.60	NR	NR	ND	ND	4.77	ND	28.91					
BHB	0.00	0.00	0.10	ND	ND	0.70	0.70	20.50	20.50	NR	NR	ND	ND	5.08	ND	11.87					
BHC	0.10	0.10	0.15	ND	ND	0.20	0.20	20.90	20.90	NR	NR	ND	ND	4.79	ND	31.04					
BHD1	0.00	0.00	-0.02	ND	ND	0.50	0.50	20.30	20.30	NR	NR	ND	1.00	4.18	ND	9.31	No access to building				
BHD1 (shallow)	0.00	0.00	0.07	ND	ND	0.10	0.10	20.90	20.90	NR	NR	ND	ND	DRY	ND	3.16					
BHE	0.10	0.10	0.17	ND	ND	1.20	1.20	17.20	17.20	NR	NR	ND	2.00	5.09	ND	39.16					
BHF																					
BHF (shallow)																					
Details of groundwater purging & sampling inc. volume sampled										Observations											
No sampling required																					
Notes:																					

Monitoring order is from **left to right** across table above.
Regional trend is that shown at nearest Met office location at time of monitoring.

Key: ND None Detected
NR Not Recorded
SWL Standing Water Level

Groundwater Sampling Field Records

Groundwater Monitoring

Well Development Record Sheet

Job	D9298 Weldale Street		SITE	Reading
CLIENT	Ropemaker Properties Ltd		TIME	On: 08:00 Off: 14:15
DATE	08/05/2019			
WEATHER	Rain/ showers	MONITORING PERSONNEL	RD and BF	



Monitoring Location	Time	DTL m	DTB m	End DTL m	Purge Volume (total) L	Well Volume No.	Odour description	Sediment description	Oil/grease visible	Colour description	Turbidity description	Comments
BHA	13:30:00	4.77	28.91	4.78	300	1	None	Low	No	Grey	High	Purge water ran clear after 2 well volumes. Pump Intake at 21m
						2	None	Low	No	Clear	Low	
						3	None	None	No	Clear	Low	
BHB	12:50:00	5.08	11.89	5.12	300	1	Slight Hydrocarbon	High	No	Light Brown	High	Purge water ran clear after 12 well volumes. Pump Intake at 10m
						2	Slight Hydrocarbon	High	No	Cream	Moderate	
						3	Slight Hydrocarbon	Moderate	No	Light Grey	Moderate	
BHC	10:35:00	4.80	31.00	4.82	300	1	None	Low	No	Clear	Low	Pump intake at 21m
						2	None	Low	No	Clear	Low	
						3	None	Low	No	Clear	Low	
BHD1	09:30:00	4.20	9.85	4.23	300	1	Slight Hydrocarbon	High	No	Cream	V. High	Pump intake at 9m. Progressively stronger sulphurous odour after 5 well volumes purged
						2	None	High	No	Cream	V. High	
						3	None	High	No	Cream	V. High	
BHE	08:30:00	5.11	39.15	5.12	300	1	Musty	Low	No	Grey	High	Pump intake at 21m. Purge water ran clear after 2 well volumes
						2	None	Low	No	Clear	Low	
						3	None	Low	No	Clear	Low	
BHF	11:35:00	5.26	15.82	5.27	300	1	Hydrocarbon	High	No	Brown	High	Pump intake at 15m. Purge water ran clear after 3 well volumes
						2	Hydrocarbon	High	No	Brown	High	
						3	Slight Hydrocarbon	High	No	Very Light Brown	High	
WSF		D	5.51									DRY - Not Developed

Groundwater Sampling Field Records

Groundwater Monitoring

Sampling Record Sheet

Job D9298 Weldale Street
 CLIENT Ropemaker Properties
 DATE 14.05.2019
 WEATHER clear sunny

SITE Reading
 TIME On: 9:20 Off: 15:10
 MONITORING PERSONNEL MTM



Monitoring Location	DTL m	DTB m	EC mS/cm	Temp C	pH	ORP	DO %	Burge Volume L	Odour description	Sediment description	Oil/grease visible	Colour description	Turbidity description	Comments
BH1	4.46	9.45	915.0	12.80	6.69	223.00	4.83	3	sulphurous	fine	no	clear	low	
BH4B	4.76	9	1592.0	12.60	6.69	311.20	5.53	2	none	fine	no	white	high	
WS1	4.56	5.76	1523.0	12.70	6.79	336.80	6.70	1	none	fine	no	white	high	
WS4	DRY	4.93	-	-	-	-	-		-	-	-	-	-	
WS6	DRY	4.97	-	-	-	-	-		-	-	-	-	-	
WS101	5.18	5.89	1333.0	14.20	6.77	227.00	3.05	1	sulphurous	fine	no	white	high	
WS103B	4.73	5.77	1524.0	12.90	6.72	141.80	3.71	2	sulphurous	fine	no	white	high	
WSF	DRY	5.5	-	-	-	-	-		-	-	-	-	-	
BHA	4.88	28.88	1046.0	13.50	6.98	281.00	7.06	10	none	fine	no	clear	low	
BHB	5.16	11.8	1608.0	14.60	6.94	280.20	5.61	3	none	fine	no	white	high	
BHC	4.89	31.04	1239.0	13.40	6.97	314.00	6.93	10	none	fine	no	clear	low	
BHD1	4.3	8.75	1203.0	12.80	6.82	315.00	5.82	3	none	fine	no	white	high	
BHE	5.28	5.88	972.0	14.30	7.03	323.60	5.92	1	none	fine	no	white	high	
BHF	3.35	15.83	1066.0	13.80	7.14	362.90	8.00	5	none	fine	no	light brown	high	

APPENDIX G

Dunelm Notes On Limitations



Dunelm Conditions of Offer, Notes on Limitations & Basis for Contract

These conditions accompany our tender and supercede any previous conditions issued. The firm will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of the firm. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from the firm. A charge may be levied against such approval, the same to be made at the discretion of the firm.

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, soil gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

The firm cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. The firm are not responsible for the action negligent or otherwise of subcontractors or third parties.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2001 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, the firm cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

All information acquired by the firm in the course of investigation is the property of the firm, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. The firm reserves the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning the firm, you understand and accept that you/your agent have a contractual relationship with the firm & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Dunelm are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete. Dunelm have not allowed for subsequent reinstatement as a result of settlement. No price has been provided or requested for a return visit to remove pipework and covers. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If

warranties are required, legal costs incurred will be passed on to you assuming the firm agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We reserve the right to pursue full payment of the invoice prior to release of any information including reports. We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. We will also apply the right to claim any associated legal costs incurred with recovery of late payments. The firm is exempt from the CIS Scheme. The firm offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. The company are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by the firm, and we give notice that consequential loss as a direct or indirect result of the firm's activities or omission of the same are excluded.

APPENDIX C – SCHEME OF GROUND INVESTIGATION

Hole	Depth	Drilling Method	Justification
BHA	30m	Rotary drilling from top of chalk bedrock to obtain cores (Open Hole prior to this)	Provide information for foundation design in vicinity of 8 storey structure. No requirement for cable percussive drilling at shallow depths due to existing / proposed investigation. Rotary drilling at depth to obtain high quality sample in vicinity of possible deep foundations.
BHA1	30m	Rotary drilling from 15m to obtain SPT data (open hole prior to this)	Provide information for foundation design in vicinity of 8 storey structure. No requirement for cable percussive drilling at shallow depths due to existing / proposed investigation.
BHB	40m	Cable percussive to 12m bgl with rotary follow on	Provide information for foundation design in vicinity of 6 and 10 storey structures. Cable percussive drilling to undertake shallow SPT and U100 testing at shallow depths and to reach competent chalk. Rotary drilling at depth to obtain high quality sample in vicinity of possible deep foundations.
BHC	40m	Cable percussive to 5.60m bgl with rotary follow on	Provide information for foundation design in vicinity of 8 and 12 storey structures. Cable percussive drilling to undertake shallow SPT and U100 testing at shallow depths and facilitate deviation of design characteristics for retaining wall advice. Rotary drilling at depth to obtain high quality sample in vicinity of possible deep foundations.
BHD	20m	Cable Percussive only	Provide information for foundation design in vicinity of 5 storey structure. Cable percussive drilling to reduce costs from rotary drilling method and to undertake shallow SPT and U100 testing at shallow depths
BHE	40m	Cable percussive to 11m bgl with rotary follow on	Provide information for foundation design in vicinity of possible 20 storey structure. Cable percussive drilling to undertake shallow SPT and U100 testing at shallow depths and to reach competent chalk. Rotary drilling at depth to obtain high quality sample in vicinity of possible deep foundations.
BHF	40m	Cable percussive to 12m bgl with rotary follow on	Provide information for foundation design in vicinity of 15 storey structure. Cable percussive drilling to undertake shallow SPT and U100 testing at shallow depths. Rotary drilling at depth to obtain high quality sample in vicinity of possible deep foundations.
WSA	6m	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing in the vicinity of proposed ramp and facilitate deviation of design characteristics for retaining wall advice
WSB	6m	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing in the vicinity of proposed ramp and facilitate deviation of design characteristics for retaining wall advice
WSC	6m	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing in the vicinity of proposed ramp and facilitate deviation of design characteristics for retaining wall advice
WSD	6m	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing where a data gap is present

			from previous ground investigations.
WSE	6m	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing where a data gap is present from previous ground investigations.
WSF	6m	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing where a data gap is present from previous ground investigations
WSG	Deep as possible	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing where a data gap is present from previous ground investigations
WSH	Deep as possible	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing where a data gap is present from previous ground investigations
WSI	Deep as possible	Windowless Sampling	Determine near surface ground conditions. Obtain shallow SPT data and geotechnical testing where a data gap is present from previous ground investigations
HPA	1.2m	Hand excavated foundation pit	Expose foundations of existing retaining wall
HPB	1.2m	Hand excavated foundation pit	Expose foundations of existing retaining wall
HPC	1.2m	Hand excavated foundation pit	Expose foundations of existing retaining wall
HPD	1.2m	Hand excavated foundation pit	Expose foundations of existing structures
TTA	3.5m	Trial trench Machine Excavated (JCB or similar)	Determine near surface ground conditions. Identify presence of obstruction identified during previous ground investigations.
TTB	3.5m	Trial trench Machine Excavated (JCB or similar)	Determine near surface ground conditions. Identify presence of obstruction identified during previous ground investigations.
TTC	3.5m	Trial trench Machine Excavated (JCB or similar)	Determine near surface ground conditions. Identify presence of obstruction identified during previous ground investigations.
TTD	3.5m	Trial trench Machine Excavated (JCB or similar)	Determine near surface ground conditions. Identify presence of obstruction identified during previous ground investigations.

APPENDIX D – POINT LOAD AND UCS TESTING RESULTS TABLE

Borehole	Depth	Type	UCS (MPa) (PL = Estimate from Point Load Test)	Classification (BS 5930)
BHA	9.26	D	3.06	Very Weak
	9.26	A	4.32	Very Weak
	13.38	D	1.62	Very Weak
	13.38	A	1.98	Very Weak
	16.93	D	-	-
	16.93	A	-	-
	18.68	UCS	1.2	Very Weak
	19.6	D	1.44	Very Weak
	19.6	A	1.62	Very Weak
	21.64	D	4.86	Very Weak
	21.64	A	4.68	Very Weak
	22.9	UCS	2.8	Very Weak
	25	I	1.26	Very Weak
	25	I	-	-
	26.22	UCS	1.6	Very Weak
	28.21	D	1.08	Very Weak
	28.21	A	1.98	Very Weak
	29.44	UCS	2.8	Very Weak
BHB	12.6	D	5.76	Weak
	12.6	A	2.34	Very Weak
	17.68	D	1.62	Very Weak
	17.68	A	1.62	Very Weak
	19.5	D	6.12	Weak
	19.5	A	1.26	Very Weak
	21.85	UCS	1.3	Very Weak
	22.58	D	4.68	Very Weak
	22.58	A	1.26	Very Weak
	25.75	D	1.62	Very Weak
	25.75	A	8.1	Weak
	27.15	UCS	1.9	Very Weak
	28.53	D	1.62	Very Weak
	28.53	A	1.26	Very Weak
	30.55	D	3.06	Very Weak
	30.55	A	7.74	Weak
	32.54	UCS	2.7	Very Weak
	33.32	D	1.62	Very Weak
	33.32	A	2.7	Very Weak
	35.02	D	1.62	Very Weak
	35.02	A	2.7	Very Weak
	36.56	UCS	1.8	Very Weak

	37.62	D	3.06	Very Weak
	37.72	A	3.24	Very Weak
	39.14	UCS	1	Very Weak
BHC	14.6	D	3.24	Very Weak
	14.6	A	1.26	Very Weak
	16.38	D	1.44	Very Weak
	16.38	A	1.8	Very Weak
	19.18	D	1.62	Very Weak
	19.18	A	2.34	Very Weak
	19.5	UCS	0.9	Extremely Weak
	23.23	UCS	2.3	Very Weak
	24.91	UCS	2.2	Very Weak
	28.13	D	1.44	Very Weak
	28.13	A	3.06	Very Weak
	29.65	UCS	1.7	Very Weak
	31.6	D	1.44	Very Weak
	31.6	A	7.38	Very Weak
BHE	12.3	D	1.98	Very Weak
	12.3	A	-	-
	13.82	D	1.62	Very Weak
	13.82	A	1.8	Very Weak
	20.86	D	-	-
	20.86	A	-	-
	23.76	UCS	2	Very Weak
	25.5	D	1.44	Very Weak
	25.5	A	6.84	Weak
	28.8	D	1.8	Very Weak
	28.8	A	2.7	Very Weak
	31.03	UCS	1.6	Very Weak
	31.7	D	1.62	Very Weak
	31.7	A	1.26	Very Weak
	34.08	D	3.96	Very Weak
	34.08	A	1.8	Very Weak
	35.68	UCS	1.3	Very Weak
	36	D	1.62	Very Weak
	36	A	2.16	Very Weak
	38.55	UCS	1.5	Very Weak
BHF	13.91	A	1.62	Very Weak
	13.91	D	1.62	Very Weak
	16.33	A	1.44	Very Weak
	16.33	D	-	-

	19.96	UCS	1.6	Very Weak
	22.33	A	1.62	Very Weak
	22.33	D	2.88	Very Weak
	23.55	A	-	-
	23.55	D	-	-
	24.57	UCS	2.3	Very Weak
	25.6	A	3.24	Very Weak
	25.6	D	-	-
	28	UCS	2.9	Very Weak
	31.08	A	1.44	Very Weak
	31.08	D	0.36	Very Weak
	32.74	A	4.68	Very Weak
	32.74	D	-	-
	33.12	UCS	3.3	Very Weak
	35.84	A	1.62	Very Weak
	35.84	D	2.88	Very Weak
	36.98	UCS	1.6	Very Weak
	37.6	A	6.3	Weak
	37.6	D	2.88	Very Weak
	39.57	UCS	1.7	Very Weak

APPENDIX E – CHEMICAL RESULTS VS WATER QUALITY STANDARDS

APPENDIX F – VAPOUR CONTAMINATION ASSESSMENT

As part of the monitoring visit in May the 15th 2019, two samples were taken from standpipes installed in BH1 and WS101 and submitted for chemical analysis. Although, generally, the concentrations were found at relatively low levels, concentrations above the laboratory detection limits were found with respect to the chlorinated hydrocarbons tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, vinyl chloride, benzene, toluene, m/p-xylene, dichlorodifluoromethane and chloromethane. The latter two were once widely used as refrigerants.

A summary of contaminants with concentrations above detection limits is provided in Table F - 1 below.

Table F- 1: Summary of volatile organic compounds (VOCs) found in samples

		BH1	WS101
	Date sampled	15/05/2019	15/05/2019
	Determinand	$\mu\text{g}/\text{m}^3$	
Refrigerants	Dichlorodifluoromethane (R-12)	<12.4	20.3
	Chloromethane (R-40)	<3.1	21.5
Chlorinated hydrocarbons	Tetrachloroethene (PCE)	<10.2	12.9
	Trichloroethene (TCE)	16.7	15
	cis-1,2-Dichloroethene (1,2-DCE)	<4	8
	Vinyl Chloride (VC)	<3.8	19.9
BTEX	Benzene	<4.8	40.9
	Toluene	11.3	9.8
	Ethylbenzene	<6.5	<6.5
	m/p-Xylene	8.7	8.7
	o-Xylene	<6.5	<6.5

For the derivation of health criteria values, toxicological input parameters were adopted as reported for the derivation of 'S4UL' human health risk assessment criteria. Input parameters and values derived to be protective for the contaminants PCE, TCE, 1,2-DCE, VC, benzene, toluene, xylene under the residential scenario are summarised in Table 4 – 2 below.

Table F- 2: Derivation of health criteria values (HCVs)

VOCs	PCE	TCE	1,2-DCE	VC	Benzene	Toluene	Xylenes*
Inhalation TDI in $\mu\text{g kg}^{-1} \text{BW day}^{-1}$	11	-	-		-	1,400	60
Inhalation HCV equivalent to TDI in $\mu\text{g/m}^3$	39	-	-		-	4,900	210
Inhalation MDI in $\mu\text{g day}^{-1}$ (adult)	200	-	-		-	92	104
Inhalation MDI in $\mu\text{g day}^{-1}$ (child)**	144	-	-		-	66.2	74.9
Inhalation TDSI in $\mu\text{g kg}^{-1} \text{BW day}^{-1}$ (adult)	8.1	-	-		-	1,400	58.5
Inhalation TDSI in $\mu\text{g kg}^{-1} \text{BW day}^{-1}$ (child)	0.2	-	-		-	1,400	54
TDI / MDI (adult)	0.26	-	-		-	0.001	0.025
TDI / MDI (child)	1.1	-	-		-	0.004	0.1
Inhalation HCV equivalent to TDSI in $\mu\text{g/m}^3$ (adult)	29	-	-		-	4,900	205
TDI x 0.5 where TDI / MDI >0.5	5.5	-	-		-	-	-
Inhalation HCV equivalent to TDSI in $\mu\text{g/m}^3$ (child)***	6.0****	-	-		-	1,500	60
Inhalation ID in $\mu\text{g kg}^{-1} \text{BW day}^{-1}$	-	0.57	0.12	0.3	1.4	-	-
Inhalation HCV equivalent to ID in $\mu\text{g/m}^3$ (adult)	-	2.0	0.42	1.1	5	-	-
Inhalation HCV equivalent to ID in $\mu\text{g/m}^3$ (child)***	-	0.6	0.13	0.33	1.5	-	-

ID: index dose; BW: body weight

HCV: health criteria value

TDI: tolerable daily intake

TDSI: tolerable daily soil intake

MDI: mean daily intake

* Sum of m&p and o-Xylenes

** Adopting an average correction factor of ~0.72 for the 0 to 6-year-old child

*** With age class 1 to 6 average bodyweight (13.3 kg) and inhalation rate (12.1 m³/day)

**** With 0.5 x TDI (rather than TDI - MDI), due to TDI / MDI >0.5 in accordance with SC050021/SR2

A direct comparison of concentrations found in the two samples indicate concentration exceedances with respect to TCE in BH1 and PCE, TCE, 1,2-DCE, VC and benzene in WS101 (see Table F - 3 below).

Table F - 3: Concentrations compared to HCVs

		BH1	WS101	Child	Adult
	Date sampled	15/05/2019	15/05/2019		
	Determinand	$\mu\text{g}/\text{m}^3$			
Chlorinated hydrocarbons	Tetrachloroethene (PCE)	<10.2	13	6.0	29
	Trichloroethene (TCE)	17	15	0.6	2.0
	cis-1,2-Dichloroethene (1,2-DCE)	<4	8	0.13	0.42
	Vinyl Chloride (VC)	<3.8	20	0.33	1.1
BTEX	Benzene	<4.8	41	1.5	5.0
	Toluene	11	9.8	1,500	4,900
	m/p-Xylene	8.7	8.7		
	o-Xylene	<6.5	<6.5	60	205

However, in order to assess the likelihood of concentrations of volatile organic compounds (VOCs) to result in 'indoor' concentrations near the respective health criteria value (HCV), a 'soil-vapour to indoor air attenuation factor attenuation coefficient' should be applied.

Under the residential land-use scenario, under worst case conditions, assuming a sandy soil, in combination with the above contaminants, the CLEA model indicates 'soil-vapour to indoor air attenuation coefficients' to range between approximately 0.0007 and 0.0008.

If for example, the benzene 'soil-vapour to indoor air attenuation coefficient' of 0.0007 (from the CLEA model) is applied to the maximum benzene concentration ($41 \mu\text{g}/\text{m}^3$) that was found in WS101, then a concentration is calculated ($0.03 \mu\text{g}/\text{m}^3$) that is at least on order of magnitude below the derived assessment criteria for benzene ($\text{HCV}_{\text{child}}: 1.5 \mu\text{g}/\text{m}^3$ & $\text{HCV}_{\text{adult}}: 5.0 \mu\text{g}/\text{m}^3$).

Similarly, if the VC concentration of $20 \mu\text{g}/\text{m}^3$ is multiplied with the 'soil-vapour to indoor air attenuation factor attenuation coefficient' of 0.0008, then a concentration is calculated ($0.016 \mu\text{g}/\text{m}^3$) that is at least one order of magnitude below the derived assessment criteria for VC ($\text{HCV}_{\text{child}}: 0.33 \mu\text{g}/\text{m}^3$ & $\text{HCV}_{\text{adult}}: 1.1 \mu\text{g}/\text{m}^3$). The most recent (2019) monitoring did not reveal PID results above detection limits (<1 ppm). However, monitoring completed in 2016 found PID results are steady rates of up to 35 ppm and 1 ppm in standpipes of boreholes BH1 and WS101 respectively, the standpipes the vapour samples that are discussed in this note have been taken from.

APPENDIX G – Outline DQRA for aromatic EC12 – EC16 fraction

R&D Publication 20 Remedial Targets Worksheet, Release 3.2



Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

Variable	Value	Unit	Source
Contaminant	Aro EC12-EC16		from Level 1
Target Concentration	C _T 9.00E-02	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state	Equations in HRA publication
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Approach for simulating vertical dispersion:

Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants:

Apply degradation rate to dissolved pollutants only

Select Method for deriving Partition Co-efficient (using pull down menu)

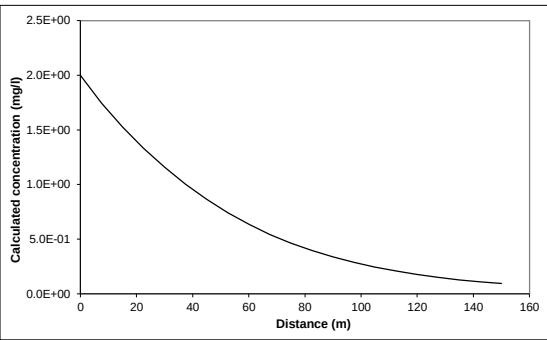
Calculate for non-polar organic chemicals

Entry if specify partition coefficient (option)			
Soil water partition coefficient	K _d		l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	f _{oc}	1.00E-03	fraction
Organic carbon partition coefficient	K _{oc}	5.01E+03	l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	K _{oc,n}		l/kg
Sorption coefficient for ionised species	K _{oc,i}		l/kg
pH value	pH		
acid dissociation constant	pK _a		
Fraction of organic carbon in aquifer	f _{oc}		fraction
Soil water partition coefficient	K _d	5.01E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

Dispersivity based on Xu & Eckstein (1995)
--

	Enter value	Calc value Xu & Eckstein	m
Longitudinal dispersivity	ax	0.00E+00	1.50E+01
Transverse dispersivity	az	0.00E+00	1.50E+00
Vertical dispersivity	ay	0.00E+00	1.50E-01
Note values of dispersivity must be > 0			
For calculated value, assumes ax = 0.1 * x, az = 0.01 * x, ay = 0.001 * x			
Xu & Eckstein (1995) report ax = 0.83(log ₁₀ x) ^{2.414} ; az = ax/10, ay = ax/100 are assumed			



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks. By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action. Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best described by an electron limited degradation such as oxidation by O₂, NO₃, SO₄ etc than an alternative solution should be used

Calculated concentrations for distance-concentration graph

Domenico - Steady state	
Distance	Concentration
	mg/l
0	2.0E+00
7.5	1.75E+00
15.0	1.53E+00
22.5	1.33E+00
30.0	1.16E+00
37.5	1.00E+00
45.0	8.63E-01
52.5	7.42E-01
60.0	6.35E-01
67.5	5.43E-01
75.0	4.63E-01
82.5	3.95E-01
90.0	3.36E-01
97.5	2.86E-01
105.0	2.43E-01
112.5	2.07E-01
120.0	1.76E-01
127.5	1.50E-01
135.0	1.28E-01
142.5	1.09E-01
150.0	9.26E-02

Initial contaminant concentration in groundwater at plume core	C ₀	2.00E+00	mg/l	[1]
Half life for degradation of contaminant in water	t _{1/2}	2.00E+02	days	[2]
Calculated decay rate	λ	3.47E-03	days ⁻¹	
Width of plume in aquifer at source (perpendicular to flow)	Sz	4.00E+01	m	[3]
Plume thickness at source	Sy	5.00E+00	m	[4]
Saturated aquifer thickness	da	2.00E+01	m	[5]
Bulk density of aquifer materials	ρ	1.40E+00	g/cm ³	[6]
Effective porosity of aquifer	n	2.00E-02	fraction	[7]
Hydraulic gradient	i	1.00E-03	fraction	[8]
Hydraulic conductivity of aquifer	K	3.50E+00	m/d	[9]
Distance to compliance point	x	1.50E+02	m	[10]
Distance (lateral) to compliance point perpendicular to flow direction	z		m	[11]
Distance (depth) to compliance point perpendicular to flow direction	y		m	[12]
Time since pollutant entered groundwater	t	1.00E+100	days	time variant options only
Parameters values determined from options				
Partition coefficient	K _d	5.01E+00	l/kg	see options
Longitudinal dispersivity	ax	5.42E+00	m	see options
Transverse dispersivity	az	5.42E-01	m	see options
Vertical dispersivity	ay	5.42E-02	m	see options

Calculated Parameters

Variable			
Groundwater flow velocity	v	1.75E-01	m/d
Retardation factor	R _f	3.52E+02	fraction
Decay rate used	λ	9.85E-06	d ⁻¹
Rate of contaminant flow due to retardation	u	4.97E-04	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C _{ED}	9.26E-02	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	AF	2.16E+01	

Remedial Targets

Remedial Target	1.94E+00	mg/l	For comparison with measured groundwater concentration.
Domenico - Steady state			
Distance to compliance point	150	m	
Concentration of contaminant at compliance point	C _{ED} /C ₀	9.26E-02	mg/l Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target. The recommended value for time when calculating the remedial target is 9.9E+99.

Table G - 3: Source of parameter value

[1]	C_0	Assumed initial concentrations in the vicinity of monitoring locations BH1, WS103B and WS101
[2]	$t_{1/2}$	Conservative estimate based on literature values for various aromatic EC12-EC16 according to Howard et al (Howard et al (1991), Handbook of Environmental Degradation Rates. Lewis publishers, London)
[3]	S_z	Area between BH1, WS103B and WS101. Conservative estimate / further increase results in little effect on the results
[4]	S_y	Estimate based on observations recorded on exploratory hole logs
[5]	da	Conservative value from Allen, D J, Brewerton, L J, Coleby, L M, Gibbs, B R, Lewis, M A, MacDonald, A M, Wagstaff, S J, and Williams, A T. 1997. The physical properties of major aquifers in England and Wales. British Geological Survey Technical Report WD/97/34. 312pp. Environment Agency R&D Publication 8.
[6]	ρ	Estimate / model results are insensitive to this parameter
[7]	n	CHILTON, P J, STUART, M E, GODDY, D C, WILLIAMS, R J, JOHNSON, A C, AND HARIA, A H. 2002. Transport and fate of pesticides in the Chalk aquifer of southern England. British Geological Survey Research Report, RR/02/04. 36pp.
[8]	i	Based on groundwater contour lines in CBRE. 2015. Phase I & II Geo-Environmental Assessment. Units 1-3, Weldale Street, Reading. December 2015.
[9]	K	Maximum result found 3.93×10^{-5} m/s (3.4 m/d) found as part of infiltration tests in the chalk.
[10]	x	[150 m]
[11]	z	Not applicable
[12]	y	Not applicable
[13]	foc	Conservative estimate
[14]	Koc	CL:AIRE. 2017. Petroleum Hydrocarbons in Groundwater. Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies. CL:AIRE. London

