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LAND OFF HINDMANS WAY, DAGENHAM

Site Investigation & Contamination Assessment



Prepared for:

Olleco Convert

Report Ref: BEK-22137-2 (Rev B)

August 2023



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Project Quality Assurance Information Sheet

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REVISION STATUS / HISTORY

Rev	Date	Issue / Comment	Prepared	Checked
A	19/01/2023	Updating new Proposed Site Layout	MLM	MB
B	29/08/23	Additional of landscaped areas	JM	MB

GENERAL REPORT LIMITATIONS

BEK Enviro Limited (BEK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and BEK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by BEK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Unless explicitly agreed otherwise, in writing, this report has been prepared under BEK's limited standard Terms and Conditions as included within our proposal to the Client.

The report needs to be considered in the light of the BEK proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

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TMA Drawing No 230336-TMA-XX-XX-DR-L-3000	Landscape Proposals Plan

1. INTRODUCTION

1.1 Appointment

1.1.1 BEK Enviro (BEK) has been commissioned by Olleco Convert to carry out a site investigation at an area of derelict land located off Hindmans Way, Dagenham, London (hereafter referred to as 'the site') to assess the ground conditions with respect to potential risks associated with contamination and ground gas and provide recommendations for foundation design site considering the development proposals. The site is located within the Stolthaven Dagenham site.

1.1.2 The site location and layout are presented on BEK Drawing No 22137-1 and BEK Drawing No 22137-2, respectively. Copies of these drawings are presented in Appendix E.

1.2 Background

1.2.1 The site is part of a larger site which has been subject to site investigation and contamination assessment previously by SLR Consulting (SLR) and URS Infrastructure & Environment UK Limited (URS) and the following reports have been reviewed:

SLR - Phase 2 Environmental Site Assessment - Factual Report for Stolthaven Dagenham Ltd - April 2013 (SLR Ref: 402.04310.00002)

SLR - Phase 2 Environmental Site Assessment - Generic Quantitative Risk Assessment Stolthaven Dagenham Ltd - April 2013 (SLR Ref: 402.04310.00002)

URS - Maskell Site, Dagenham Detailed Quantitative Risk Assessment for Controlled Water - March 2014 (Ref: 47069381 / LORP0001)

BACTEC - Explosive Ordnance Threat Assessment – Maskell Site, Dagenham – January 2013 (Ref: 4113TA)

1.3 Proposed Development

1.3.1 It is proposed to construct a large warehouse type building with machinery and loadings bays under a canopy to the west. There will be a row of 11 processing tanks to the south of the new build.

1.3.2 The proposed development is illustrated on the 'Landscape Proposals Plan' shown on TMA Drawing No 230336-TMA-XX-XX-DR-L-3000, dated August 2023, a copy of which is presented in Appendix E. An extract of the drawing is presented as Figure 1 below:



Figure 1: Proposed Site Layout

1.4 Objective & Scope of Work

- 1.4.1 The site investigation was undertaken by BEK during November 2022 in accordance with background information presented in previous reports and the proposed development
- 1.4.2 This report has been prepared to provide a summary of the site details and ground conditions to inform a quantitative assessment of the potential contamination sources identified within the SLR reports.

1.5 Limitations

- 1.5.1 The conclusions and recommendations presented in this report are the result of our professional interpretation of the information currently available. BEK reserve the right to amend the conclusions and recommendations if further information becomes available.
- 1.5.2 However, it should be noted that much of the information has been derived from reports written by others and BEK takes no responsibility for the accuracy of that information. Notwithstanding the above, the reports reviewed have all been written by professional environmental consultants with a duty of care to provide relevant and accurate information.

- 1.5.3 The comments given in this report and the opinions expressed are based on review of reports provided to BEK, ground conditions encountered during site works and the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigations and therefore could not be taken into account.
- 1.5.4 The assessment/investigation of the presence of invasive plant species is outside the remit of this assessment.

2. BACKGROUND INFORMATION

2.0.1 This section provides an overview of the findings and recommendations presented in previous SLR reports, relative to the current site.

2.1 Site Location & History

2.1.1 The site is located on the northern bank of the River Thames, approximately 20 km east of central London. The approximate national grid reference for the site is 548680, 182227. The site covers an area of approximately 20,000 m² and is located to the east of Hindmans Way and to the west of Stolt's Dagenham Terminal.

2.1.2 The site comprises a disused and unoccupied section of land with a perimeter earth bund on its western side.

Site History

2.1.3 The first development identified on site is a Sports Ground in the 1940s, possibly associated with the adjacent works to the east. The works (later identified as Chemical Works) also extended onto the eastern edge of the site with several buildings and tanks present on this section of the site during the 1960s and 1970s. Most of the site is mapped as unoccupied throughout the 1970s and 1990s with only the adjacent works extending onto the eastern section of the site. Aerial photographs show a scrap yard in the south-western corner of the site in 1999 and up to at least 2002. Anecdotal information indicates that the scrap yard was operated illegally and ultimately closed down by the authorities around 2003/2004. In 2005 and 2006 tipping and land raising is evident across all of the site. Further filling and/or stockpiling of materials is also shown in 2010 extending onto the south-eastern corner of the site from Hales Waste.

2.2 Environmental Setting

Geology

2.2.1 The British Geological Survey (BGS) 1:50,000 Sheet 257 for Romford indicates that made ground and natural superficial drift deposits are present beneath the site. The natural drift deposits comprise Alluvium and Thames Gravel (RTG) and are shown to be overlain by made ground.

2.2.2 According to the BGS the site is underlain by the solid geology of 'Thanet Sand Formation' and 'Upper Chalk'.

Hydrogeology

- 2.2.3 The Upper Chalk is a Principal Aquifer, whereas the Thanet Sands and RTG are classified as Secondary A aquifers. However, all are in hydraulic continuity so behave as a single aquifer.
- 2.2.4 The site is not located in a groundwater Source Protection Zone.

Hydrology

- 2.2.5 There are two small areas of surface water on the site. The River Thames is located approximately 230 m south of the site.

2.3 SLR Site Investigation Information

- 2.3.1 This section provides an overview of previous site investigation information presented in previous SLR reports, relative to the current site.

Exploratory Locations

- 2.3.2 Previous site investigation locations relevant to the current site are highlighted on Figure 2 below:



Figure 2: Previous SI Locations within Current Planning Boundary (orange shading)

- 2.3.3 The investigation took place in March 2013 and it can be seen from Figure 2 that there are nine locations within the current planning boundary. The area of the site relative to this assessment herein is referred to as 'Maskell North' in the SLR reports.
- 2.3.4 Boreholes BH203, BH205, BH311 and BH312 were drilled using a cable and percussion borehole rig to a maximum depth of 15.80 m and monitoring wells were installed in each one. Boreholes BH307, BH308 and BH309 were drilled using a windowless sampler borehole rig to a maximum depth of 2.7 m. Trial Pits TP108 and TP108A were excavated using a JCB 3CX to a maximum depth of 2.4 m.

Summary of Ground Conditions

- 2.3.5 Made ground was encountered at the surface of each exploratory locations to a maximum depth of 4.3 m. The windowless sample boreholes and the trial pits did not encounter the base of the made ground, indicating that the minimum depth of made ground encountered was in excess of 1.6 m. The made ground is variable but generally described as black, clayey fine to coarse sand with fine to coarse angular gravel with various inclusions of brick, concrete, ash etc.).
- 2.3.6 Underlying the made ground, the deeper boreholes encountered organic clay at thicknesses ranging between 3.5 to 4.8 m. Boreholes BH311 and BH312 terminated in the clay. A layer of peat was encountered beneath the clay in Boreholes BH203 and BH205 at a thickness of 1.8 m and 2.5 m, respectively. Sand was encountered beneath the peat, over a thick layer of sand and gravels. Sand was encountered beneath the sand and gravels at the base of both boreholes.
- 2.3.7 The previous site investigation logs are included within Appendix B.

Summary of Contamination Assessment

- 2.3.8 Based on the former land uses, chemical testing was performed on selected soil samples for a wide range of contaminants including speciated polynuclear aromatic hydrocarbons (16 EPA PAHs), total petroleum hydrocarbons (TPH), BTEX compounds, heavy metals, asbestos, polychlorinated biphenyl, total organic carbon (TOC), pH, natural moisture content, total sulphate and monohydric phenol. Of the samples tested by SLR, 18 are from seven within the current site boundary.
- 2.3.9 When compared against the commercial assessment criteria, the chemical test results analysed were all lower than the screening criteria indicating an absence of significant risk from these potential contaminants. Notwithstanding, asbestos was detected in 10 of the 14 samples tested. Quantification analyses on two of the soil samples indicate an asbestos content below or at the laboratory detection limit (0.001%).
- 2.3.10 Contaminated groundwater was present in the made ground and superficial deposits and requires further evaluation. Non-aqueous phase liquids were not encountered, the contamination was considered to be dissolved within the water matrix.

Recommendations

- 2.3.11 Recommendations presented at within the SLR report include a programme of gas monitoring and a further controlled waters risk assessment.

2.4 URS Controlled Waters Risk Assessment

- 2.4.1 Given that the soil results from the SLR investigation were not assessed against the controlled water screening criteria (GAC), URS considered it prudent to revisit the SLR generic assessment to reassess the potential risk to controlled water receptors from both the soil and groundwater beneath the site. The results of this screening indicated that copper, lead, zinc and polycyclic aromatic hydrocarbons (PAHs) were detected above the GAC in the Made Ground and vinyl chloride and 1,1-dichloroethane were detected above the GAC in groundwater. URS therefore further assessed these compounds in a controlled water DQRA.
- 2.4.2 The results of the URS DQRA indicated that copper and zinc were simulated to pose a theoretical risk to surface water quality at Dagenham Breach, the nearest controlled water receptor to the site. The model simulated that it would take between 100 and 1,000 years for these metals to reach the Breach, with steady state concentrations of both metals only being reached after 1,000 years. In the absence of data on the concentrations of these metals in groundwater on-site, URS considered these risks to be theoretical and unlikely to be realised due to the over-prediction of metal mobility within the model and that no dilution of the compounds was considered in the within Dagenham Breach.
- 2.4.3 No risks were simulated to the surface water quality of Dagenham Breach from compounds detected in groundwater with the Made Ground below the site. With respect to 1,1-Dichloroethane and vinyl chloride the results of the risk assessment were supported by groundwater quality within the Made Ground on the down-gradient northern and eastern boundaries where neither compound was detected above method detection limit. URS recognised that both 1,1-dichloroethane and vinyl chloride were detected above GAC in groundwater in the underlying River Terrace Gravels. However due to lack of information on hydraulic conductivity, groundwater flow, hydraulic gradient and organic carbon value a risk assessment was not completed.
- 2.4.4 It was further noted that exceedances were reported only on Maskell South (off-site) and were not detected in the monitoring well closer to the receptor. URS considered that the potential risks posed by 1,1-dichloroethane and vinyl chloride to be dependent on the EA view on the resource value of the aquifer locally, and the rate and direction of migration of these contaminants in relation to attenuation processes (primarily biodegradation).

2.5 BEK Comments

- 2.5.1 BEK considers the SLR reports to be concise and well written and generally the assessment conforms with current guidance on the assessment of potential risks associated with contamination.
- 2.5.2 There is no gas monitoring or gas risk assessment available.

- 2.5.3 The contamination assessment by SLR has identified potential pollutant linkages with respect to human health via gas/vapour inhalation, risks to surface water features and risks to water pipes and has recommended further site investigation assessment to quantify these risks further. Further assessment is also required to inform waste classification of the soils.
- 2.5.4 There is very limited information on the deeper ground conditions at the site (only four of the locations extend below the made ground and only two of which extend below 4.7 m). In addition, Figure 3 below shows the approximate outline of the proposed new build on site, it can be seen that only the two shallow trial pits are present within this location.



Figure 3: Previous SI Locations within Current Planning Boundary (orange shading) and Approximate Outline of Proposed New Building (purple outline)

- 2.5.5 BEK recommends further site investigation to provide a full geo-environmental assessment for the site, addressing the potential risks from contamination to human health (principally from ground gas and vapours) and to provide information on deeper ground conditions as will be required by the piling contractors to inform pile specification. The locations should target the footprint of the proposed new warehouse building, as well as other locations on site. Gas/groundwater monitoring wells should be installed in selected boreholes
- 2.5.6 Given the significant depths of made ground encountered across the site, BEK recommends a gas monitoring programme, followed by a Gas Risk Assessment. The assessment of risks from ground gas should follow the standard presented in 'Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings' (BS8485:2015+A1:2019).
- 2.5.7 BEK is in broad agreement with the controlled waters assessment completed by URS. Risks from heavy metals are likely to be theoretical and unlikely to be realised due to the over-prediction of metal mobility within the URS model and considering that no dilution of the compounds was considered in the within Dagenham Breach.

- 2.5.8 BEK acknowledges that URS have discerned that the potential risks posed by 1,1-dichloroethane and vinyl chloride should be dependent on the EA view on the resource value of the aquifer locally/the rate and direction of migration of these contaminants in relation to attenuation processes. However, the exceedances of these compounds were reported only on Maskell South (off-site) and were not detected on site (Maskell north) or in the monitoring well closer to the receptor. Therefore, BEK considers risks to controlled waters from the proposed development to be low/negligible and are not considered further.

3. SITE INVESTIGATION

3.1 General

3.1.1 This section provides a summary of the site investigation works undertaken by BEK during November 2022.

3.1.2 The site investigation has been designed to provide indicative information for the ground conditions at the site, specifically within the footprint of the proposed new build, to provide a quantitative assessment of potential risks associated with contamination and ground gas and to provide recommendations with respect to foundation design.

3.1.3 All exploration locations were set out by the site engineer to provide indicative information across the full footprint of the site considering the development proposals. The exploratory locations are illustrated on BEK Drawing No 22137-3 presented in Appendix E.

3.1.4 Considering the risks from UXO, all site investigation works were supervised by a UXO engineer from SafeLane to ensure safe excavations/drilling works.

3.2 Cable and Percussive Boreholes

3.2.1 Eight boreholes (BH1 to BH8) were drilled using a cable and percussive borehole rig to a maximum depth of 20.45 m. Borehole locations were set out by the site engineer in order to establish representative conditions at the site. In-situ testing (SPTs) were carried out in each of the boreholes.

3.2.2 Gas monitoring probes were installed in Boreholes BH1 and BH8.

3.2.3 Representative samples were recovered for chemical and geotechnical testing.

3.2.4 The ground conditions were recorded by an engineer from BEK and copies of the borehole records are presented in Appendix A.

3.3 Window Sample Boreholes

3.3.1 Three window sample boreholes (WS1 to WS3) were drilled using a window sample borehole rig to a maximum depth of 4.45 m. Borehole locations were set out by the site engineer in order to establish representative conditions at the site. In-situ testing (SPTs) were carried out in each of the boreholes.

3.3.2 A gas monitoring probe was installed in Borehole WS2.

3.3.3 The ground conditions were recorded by an engineer from BEK and copies of the Borehole records are presented in Appendix A.

3.4 Laboratory Testing

Soil Chemical Testing

3.4.1 Chemical laboratory testing was undertaken by the UKAS accredited laboratory of Envirolab. All testing was undertaken to MCERTS standard (where available). The following samples were submitted for chemical analysis:

- Ten samples were tested for the standard BEK soil suite which includes: Arsenic (Total), Cadmium (Total), Copper (Total), Lead (Total), Nickel (Total), Zinc (Total), Chromium (Total), Selenium (Total), Mercury (Total), Boron (Soluble), Hexavalent Chromium, Cyanide (Total), pH, 16 EPA Poly-Aromatic Hydrocarbons (PAH), Speciated Total Petroleum Hydrocarbons (TPH-CWG), Total Phenols, Sulphate (acid soluble), Sulphate 2:1 extract and Soil Organic Matter.¹
- Ten samples were subjected to Asbestos ID testing.
- Four samples were subjected to Waste Acceptance Criteria (WAC) testing

3.4.2 Copies of the chemical test results are presented in Appendix C.

Geotechnical Testing

3.4.3 Following a review of ground conditions, natural clay samples were submitted to the UKAS accredited laboratory of Murray Rix for geotechnical testing:

- Three bulk samples were and were tested for Plasticity Index and Moisture Content
- One core sample was subjected to Triaxial testing.

3.4.4 Copies of the geotechnical test results are presented in Appendix D.

3.5 Ground Conditions

Made Ground

3.5.1 Made ground was identified at the surface of each exploratory location to a maximum depth of 4.45 m. The made ground can generally be described as black/grey/brown fine to coarse sand and fine to coarse angular gravel with brick and ash'. This strata was encountered at the surface of all locations to a maximum depth of 4.45 m and was often clayey and included various deleterious elements including concrete and tarmacadam. Wood and plastic were encountered in Borehole BH6

- 3.5.2 Tarmacadam was encountered beneath the surface made ground types described above in Boreholes BH2, BH5 and BH6. Tarmacadam gravels were also noted in BH6. 'Brown Clay with brick' was encountered beneath the tarmacadam in Borehole BH2 at 1.2 to 4.3 m with a 0.5 m layer of 'Peaty Relic Topsoil' at 2.5 to 3 m.
- 3.5.3 Concrete/tarmacadam boulders were encountered beneath the surface made ground in Borehole BH4, over a layer of 'Brown fine to medium coarse angular gravel'. 'Black fine to medium coarse sand with much black wood was encountered beneath the tarmacadam in Borehole BH5
- 3.5.4 Black clay with tarmacadam was encountered beneath the surface made ground in Borehole BH7

Superficial Strata

- 3.5.5 The superficial strata was encountered beneath the made ground in all of the cable and percussive boreholes.
- 3.5.6 Clay was encountered beneath the made ground in all locations and can generally be described as brown/grey clay and was silty in a number of locations. A thick layer of peat was encountered underlying the clay in all locations with the exception of Borehole BH6 where grey very peaty clay was encountered.
- 3.5.7 Sandy/silty clay was encountered beneath the peat in Boreholes BH1 and BH4. Green sand was encountered beneath the peat in Borehole BH2 and at the base of Borehole BH7. Clayey sand was encountered beneath the peat in borehole BH8
- 3.5.8 A thick layer of 'brown medium coarse sand and fine to medium coarse subrounded gravel' was encountered in each location to the base, with the exception of Boreholes BH7 and BH4 where the sand and gravels were underlain by a layer of sand.
- 3.5.9 Bedrock was not encountered during the site investigation works. All boreholes were recorded as dry during drilling.
- 3.5.10 The exploratory logs are presented in Appendix A.

Visual/Olfactory Evidence

- 3.5.11 Olfactory evidence for the presence of contamination was encountered in the following locations:

Location	Depth	Strata - Comments
WS1	3.2 – 3.6	Slight Hydrocarbon Odour
BH5	2.2 – 3.5	Slight Hydrocarbon Odour
BH7	2.2 – 3.5	Slight Hydrocarbon Odour
BH8	2.0 – 3.2	Slight Hydrocarbon Odour

Table 1: Olfactory Evidence for Contamination

3.6 Environmental Monitoring

3.6.1 Whilst on site, an engineer from BEK located two boreholes from previous site investigation works (BH203 and BH205). Gas and groundwater monitoring probes were present within both the boreholes. BH203 was submerged with water, therefore it was not possible to monitor. It was possible to carry out gas monitoring at BH203, although a groundwater depth check was not undertaken due to issues with removing the bung.

3.6.2 Groundwater levels have been monitored in the BEK boreholes on one occasion to date and the results to date are summarised in the Table 2:

Borehole Location	Recorded Water Level (m bgl)	Well Depth (m bgl)
BH1	Unable to locate	
BH8	4.6	11.9
WS2	1.8	2.55
BH203	Flooded	

Table 2: Summary of Water Levels in Boreholes (to date)

3.6.3 It can be seen from the above table that groundwater was present in the boreholes at the site. Based on the available information, the water encountered in the boreholes is considered to represent perched water within the made ground. Note that seasonal variations in water levels cannot be accounted for over the short monitoring period. Laterally continuous perched water is not considered to be present.

3.6.4 The boreholes have been monitored for ground gas on one occasion to date and a summary of the gas monitoring results (steady flows) are presented in Table 3:

Location	Concentrations (% v/v)			Maximum Flow Rate (l/hr)
	Carbon Dioxide	Methane	Oxygen	
BH1	Unable to Locate			
BH8	0.0	0.0	20.2	0
WS2	0.0	0.0	2.70	0
BH203	12.3	5.7	0.4	0
BH205	Borehole Flooded			

Table 3: Summary of Gas Monitoring Data

- 3.6.5 It can be seen from the above table that there are no flow rates recorded, however concentrations of methane and carbon dioxide can be seen to be in some cases an order of magnitude above the 'typical maximum' from the 'old' monitoring borehole, whilst there are no methane or carbon dioxide concentration from the BEK boreholes (although the engineer was unable to locate BH1 on this occasion).
- 3.6.6 It should be noted that the gas monitoring program is incomplete, a full Gas Risk Assessment will be prepared as a separate report.

4. QUANTITATIVE RISK ASSESSMENT

4.1 Potentially Significant Pollutant Linkages

4.1.1 Potentially significant pollutant linkages identified within the SLR reports include:

- (i) Human Health - risks associated with contamination in the made ground and/or natural strata: via direct contact, ingestion of contaminated soils or via inhalation (asbestos and/or vapours)
- (ii) Human Health - risks associated with indoor inhalation of vapours/ground gas
- (iii) Controlled Waters – risks associated with contamination in the made ground and/or natural strata affecting water quality in the superficial and bedrock Secondary A Aquifers, as well as close by surface waters (River Thames).
- (iv) Property (including services, concrete and flora) - risks associated contamination affecting concrete and service pipes.
- (v) Property - risks associated with potentially explosive vapours/ground gas entering buildings.

4.2 Risk Assessment: Human Health Risks from Exposure to Contaminated Soil

4.2.1 The risks to human health have been assessed by inspection of shallow soils for the presence of elevated contaminants based on the expected contaminant findings detailed in the conceptual model and completion of a quantitative risk assessment.

4.2.2 The soil contamination concentrations have initially been compared to a range of generic assessment criteria. These include the use of the Land Quality Management and Chartered Institute of Environmental Health assessment criteria (S4ULs), Category 4 Screening Levels (C4SLs) and the Contaminated Land: Applications in Real Environments assessment criteria (CL:AIRE).

4.2.3 These assessment criteria have been derived using the CLEA model and fully justified input parameters to be protective of risks to human health considering a commercial end use. The initial assessment assumes a soil organic matter (SOM) of 2.5%, based on the SOM of the samples tested.

4.2.4 The following table summarises the chemical test results for the samples tested and lists the relevant assessment criteria and the samples with a concentration in excess of the assessment criteria. Note that only determinands with a concentration above the laboratory limit of detection are presented in the table below:

Determinand	Range of Concentrations (mg/kg)	Assessment Criteria (mg/kg)	Samples Fail
Arsenic	3 - 12	640 ¹	---
Boron (water soluble)	1.3 - 8.2	240000 ¹	---
Cadmium	0.8 - 2.2	190 ¹	---
Copper	34 - 1750	68000 ¹	---
Chromium	23 - 124	8600 ¹	---
Lead	67 - 732	6000 ²	---
Mercury	0.76 - 2.82	1100 ¹	---
Nickel	19 - 30	980 ¹	---
Zinc	57 - 900	730000 ¹	---
Acenaphthene	<0.01 - 1.53	97000 ¹	---
Acenaphthylene	<0.01 - 0.20	97000 ¹	---
Anthracene	<0.02 - 0.86	540000 ¹	---
Benzo(a)anthracene	0.07 - 2.22	170 ¹	---
Benzo(a)pyrene	0.07 - 2.27	35 ¹	---
Benzo(b)fluoranthene	0.08 - 2.23	44 ¹	---
Benzo(ghi)perylene	<0.05 - 1.56	4000 ¹	---
Benzo(k)fluoranthene	<0.07 - 0.77	1200 ¹	---
Chrysene	0.09 - 2.2	350 ¹	---
Dibenzo(ah)anthracene	<0.04 - 0.31	3.6 ¹	---
Fluoranthene	0.19 - 6.08	23000 ¹	---
Fluorene	<0.01 - 0.95	68000 ¹	---
Indeno(123-cd)pyrene	0.04 - 1.72	510 ¹	---
Naphthalene	<0.03 - 0.61	460 ¹	---
Phenanthrene	0.09 - 2.96	22000 ¹	---
Pyrene	0.17 - 4.79	54000 ¹	---
Aliphatic Hydrocarbons C5-C6	<0.01 - 0.02	5900 ¹	---
Aliphatic Hydrocarbons C6-C8	<0.01 - 0.42	17000 ¹	---
Aliphatic Hydrocarbons C8-C10	<1 - 35	4800 ¹	---
Aliphatic Hydrocarbons C10-C12	<1 - 40	23000 ¹	---
Aliphatic Hydrocarbons C12-C16	<1 - 124	82000 ¹	---
Aliphatic Hydrocarbons C16-C21	3 - 279	1700000* ¹	---
Aliphatic Hydrocarbons C21-C35	17 - 1830	1700000* ¹	---
Aromatic Hydrocarbons C7-C8	<0.01 - 0.05	110000 ¹	---
Aromatic Hydrocarbons C8-C10	<2 - 100	8100* ¹	---
Aromatic Hydrocarbons C10-C12	1 - 86	28000 ¹	---
Aromatic Hydrocarbons C12-C16	3 - 173	37000 ¹	---
Aromatic Hydrocarbons C16-C21	15 - 261	28000 ¹	---
Aromatic Hydrocarbons C21-C35	36 - 238	28000 ¹	---
BTEX - Toluene	<0.01 - 0.05	110000 ¹	---
BTEX - Ethyl Benzene	<0.01 - 0.09	13000 ¹	---
BTEX - m & p Xylene	<0.01 - 0.56	28000 ¹	---
BTEX - o Xylene	<0.01 - 0.77	15000 ¹	---
Asbestos ID	4 out of 10 samples tested		BH2 (1.5 m), BH3 (1 m), BH5 (3 m), BH7 (2.2 m)

Table 4: Summary of Contamination Assessment

Notes from Table

1 CIEH/LQM Derived Assessment Criteria (S4ULs based on 1% SOM)

4.2.5 It can be seen from the above table that there are no elevated contaminants of concern above the commercial assessment criteria within any of the sampled tested.

4.2.6 However, four samples tested proved positive for the presence of asbestos.

Further Assessment - Asbestos

4.2.7 To further assess potential risks associated with asbestos BEK instructed the laboratory to carry out the asbestos quantification testing on the soil sample which proved positive with respect to the presence of asbestos. The results for the quantification test is presented in Table 4:

Location, Depth & Strata	Asbestos Type/Matrix Description	Quantification Result (% w/w)
BH2 (1.5 m)	Chrysotile - loose fibres	0.001
BH3 (1 m)		<0.001
BH7 (2.2 m)		
BH5 (3 m)	Amosite - loose fibres	

Table 4: Summary of Asbestos Quantification Testing in Positive Sample

4.2.8 The SLR investigation encountered positive asbestos results in 10 of the 14 samples tested. Quantification analyses was undertaken on two of the soil sample and indicate an asbestos content below or at the laboratory detection limit (0.001 %).

4.2.9 The asbestos encountered within a total of 14 locations was identified at ‘trace’ concentrations. In accordance with HSG248 if asbestos [fibres] are identified at the limit of detection this is taken to be the equivalent of ‘trace’ asbestos for bulk materials. In addition, work with soils containing asbestos concentrations of <0.001% are not considered to fall under CAR-SOIL given that the concentration of asbestos encountered are at trace.

4.2.10 Notwithstanding, further consideration should be given to the concentration of asbestos fibres encountered at 0.001% (i.e marginally above <0.001% and not considered trace).

4.2.11 To further assess the potential issues with the asbestos present, site specific information (ie type, concentration and end use) were input into the ‘Joint Industry and Working Group’ (JIWG) risk scoring algorithm for work categories. Where parameters were unknown, the most conservative data was input into the algorithm.

4.2.12 Based on the testing carried out work with the soils where asbestos has been encountered at 0.001% should as a minimum be regarded as non-notifiable non-licensed works (low intensity work).

4.2.13 It would be prudent to carry out all sub-surface ground works in accordance with an Asbestos Management Plan given the observed positive concentrations of asbestos, the significant quantities of made ground encountered at the site and its inherent variability.

4.2.14 Specific mitigation measures will be required within soft landscaping areas to mitigate the risks to end users associated with the potential presence of asbestos in the shallow soils at the site.

4.3 Risk Assessment: Human Health Risks from Exposure to Hazardous Gases

4.3.1 Based on the ground conditions encountered at the site and the one gas monitoring visit, there are potential risks from ground gas at the site.

4.3.2 A separate Ground Gas Risk Assessment will be prepared upon completion of the current gas monitoring programme.

4.4 Risk Assessment: Controlled Waters

4.4.1 Potential risks to the quality of surface water and groundwater have been identified in the ground conceptual model.

4.4.2 Risks are associated with contamination in the made ground and/or natural strata affecting the quality of perched water and surface waters in the vicinity of the site. Risks are also associated with dissolution of contamination into perched water/leachate and migration to water receptors including the bedrock Aquifer.

4.4.3 BEK is in broad agreement with the controlled waters assessment completed by URS. Risks from heavy metals are likely to be theoretical and unlikely to be realised due to the over-prediction of metal mobility within the URS model and considering that no dilution of the compounds was considered in the within Dagenham Breach. BEK acknowledges that URS have discerned that the potential risks posed by 1,1-dichloroethane and vinyl chloride should be dependent on the EA view on the resource value of the aquifer locally/the rate and direction of migration of these contaminants in relation to attenuation processes. However, the exceedances of these compounds were reported only on Maskell South (off-site) and were not detected on site (Maskell north) or in the monitoring well closer to the receptor. Therefore, BEK considers risks to controlled waters from the proposed development to be low/negligible and are not considered further.

4.5 Risk Assessment: Buildings

4.5.1 Risks to buildings include the assessment of the aggressive nature of the shallow ground with respect to concrete, the risks to the degradation of water pipes and flora due to contamination.

Risk to Concrete

- 4.5.2 To assess the potential risks to concrete, BEK has compared the previous site investigation data to assessment criteria presented in the BRE Special Digest 1: Concrete in Aggressive Ground.
- 4.5.3 The sulphate concentrations (water soluble 2:1) in the shallow ground range between <0.1 g/l to 1.39 g/l. The pH values ranged from 8.03 to 11.01.
- 4.5.4 In accordance with BRE SD1, in a data set where there are ten or more results, the mean of the highest 20% of the sulphate test results should be taken as the characteristic value. This would result in a characteristic sulphate value of 1.305 g/l.
- 4.5.5 Again, the characteristic value of pH was derived using the mean of the lowest 20% of pH values derived from the BEK investigation. This resulted in a characteristic pH value of 8.09.
- 4.5.6 With consideration to the characteristic pH and sulphate value from both the BEK investigations, the concrete classification suitable for the site is DS-1 AC-1.

Risks to Services

- 4.5.7 Potable water supply pipes can be at risk from degradation if the shallow ground consists of specific organic contamination. Guidance published by UKWIR includes a methodology for the site investigation and risk assessment to determine pipe specification.
- 4.5.8 For brownfield sites, site investigation may be required along the intended route of the water pipeline and samples recovered from specific depths and tested for specific contaminants of concern.
- 4.5.9 On the basis of the ground conditions encountered, risks to water supply pipelines are considered to be medium, however it is recommended that consultation is undertaken with the water service supplier to confirm this.

4.6 Risk Assessment: Conclusions

- 4.6.1 Made ground was identified at the surface of each exploratory location to a maximum depth of 4.45 m.
- 4.6.2 The samples recovered from site investigation have been tested for a wide range of contaminants in accordance with background information, the proposed development and based on the observations made during the site investigation. The chemical test results have been compared to relevant generic assessment criteria to identify potential contaminants of concern.

- 4.6.3 Based on the contamination assessment herein and with respect to the redevelopment of the site for commercial use, the only contaminant of concern identified at the site is considered to be low level asbestos fibres (0.001 %). Specific mitigation measures will need to be implemented to protect construction workers and end users from this contamination.
- 4.6.4 The gas monitoring program is ongoing and a full Gas Risk Assessment will be prepared as a separate report.
- 4.6.5 Risks to controlled water are considered to be negligible.
- 4.6.6 Risks to concrete are considered to be low and concrete classification of DS-1 AC-1 is likely to be suitable.
- 4.6.7 Potential risks to the service pipes are considered to be medium, but advice should be sought from the water supply provider if new water pipes are to be installed.

5. GEOTECHNICAL ASSESSMENT

- 5.1 The proposed development consists of the construction of a new food waste processing plant. The site will mainly be covered with hardstanding and will contain foundation bases to plant, machinery and silos. It is also expected that there will be a small reception building at the site access to the west, presumed to be of masonry construction with a timber roof and concrete slabs. The guidance given herein will therefore need to be reviewed in terms of the actual building type to be adopted, by a suitably qualified and experienced engineer.
- 5.2 The SLR investigation (2013) included the drilling of several boreholes at various locations across the site (logs are presented in Appendix B) and BEK has more recently drilled 8 cable percussive boreholes at various locations across the site, predominantly within the footprint of the proposed new build on site (logs are presented in Appendix A). From the SLR boreholes, it was established that the site was underlain with a significant depth of made ground (at least 3 m) overlying soft organic clay over significant depths of peat layers before sands and gravels are found.
- 5.3 The BEK site investigation (to depths of 20 m) encountered made ground varying in depth from 2.6 m to 4.3 m. The made ground is generally described as black clayey sand and gravel with varying amounts brick, ash and concrete. Underlying the made ground there is generally soft organic clays down to levels between 5 m and 6.6 m. Below the soft clays are peat band deposits (described as organic clay in Borehole BH6), which extend down to depths of between 9 m and 11.8 m. The peat deposits were found to be up to 6.5 m in thickness.
- 5.4 Underlying the peat in Borehole BH1, from 9 m to 11.8 m, is a band of very sandy clay. Underlying the peat in Borehole BH2, between 11.5m and 13.2 m, is a band of green sand. There is soft silty clay between 10.2 m and 11.9 m under the peat in Borehole BH4. Underlying this are sands and gravels which extend to the bases of Borehole BH1, BH2, BH3, BH5, BH6 and BH8. To the base of the boreholes at Borehole BH4 (18.6 m) and BH7 (19.5 m) is a layer of silty sand.
- 5.5 Groundwater was not recorded in any of the cable and percussive boreholes. Bedrock was not believed to have been encountered within any of the boreholes.
- 5.6 Standard Penetration Tests (SPT) were generally conducted in the cable and percussive boreholes, starting at a depth of 1 m and repeated at 1 m levels from 2 m onwards up to a depth of 10 m, then at every 2 m. The SPT results are summarised in Table 5 below:

Depth of Test (m)	SPT Readings (N)							
	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8
1 - 1.45	16	14	-	18	22	10	7	14
2 - 2.45	-	15	-	-	42	-	42	27
3 - 3.45	17	15	23	9	19	8	4	23
4 - 4.45	7	14	9	3	4	7	7	11
5 - 5.45	5	7	3	3	6	7	1	6
6 - 6.45	8	1	2	2	5	3	2	6
7 - 7.45	2	2	2	3	1	2	2	2
8 - 8.45	8	3	2	2	1	4	4	2
9 - 9.45	2	6	2	1	1	3	3	5
10 - 10.45	8	6	6	3	1	4	5	8
12 - 12.45	22	21	10	9	13	12	10	11
14 - 14.45	19	27	20	16	16	21	21	21
16 - 16.45	24	33	20	-	22	23	23	23
18 - 18.45	28	30	29	25	23	-	27	30
20 - 20.45	>50	46	>50	>50	>50	-	>50	>50

Table 5: Borehole SPT Results

- 5.7 Clay samples recovered from Borehole BH1 (4 to 4.5 m), BH4 (4.5 to 5.0 m) and BH8 (4 to 4.5 m) were submitted for Atterberg tests in the laboratory conditions to determine the plasticity index of the clay.
- 5.8 The plasticity results are reasonably consistent and can be categorised as very high volume change potential. Foundation formation depths should therefore be taken based on very high volume change potential. Clay heave potential must be considered as part of the foundation design and must be appraised in accordance with NHBC Ch.4.2 requirements

Assessment and Conclusions

- 5.9 Based on the SPT results, the surface made ground has a bearing capacities of at least 80 kN/m². These materials are not deemed suitable to sustain loadings from buildings as there is likely to be unacceptable issues relating to disproportionate settlements. The materials are also unsuitable for heavy or tall structures for the same reasons. Lightweight structures may be founded on these materials if spread using raft slabs to distribute the surcharge loads and if some settlement of the footing is deemed acceptable.
- 5.10 Underlying the made ground are soft clays and peaty/organic ground with very poor bearing capacities as low as 12 kN/m², there is more suitable bearing material underlying the peat.

- 5.11 We understand that the reception building is likely be formed from masonry walling, timber roof and concrete ground floors. This is likely to generate foundation loadings of between 25 and 35 kN/m, however, as noted above this building should not be supported on the made ground, with a suspended ground floor slab recommended. This building should be formed on a pile and ground beam foundation. Any heavy plant bases or large silos will also need to have loads transferred through the fill and peaty layers, through the use of piled foundations. Small plant bases could be formed on raft slabs, adopting a conservative bearing capacity of 40 kN/m².
- 5.12 All formations must be checked on site to confirm that the design bearing capacity is extent before foundations are installed. Should areas of poor ground be encountered, the excavations may require extending until suitable strata is found, and the design engineer's instruction must be sought.
- 5.13 Trees are unlikely to have a significant bearing on the proposed building foundations, as piled foundations are proposed. Some heave protection measures, however, may be considered to the north side of the building where some trees exist within 10 m of the structure. Heave protection measures may also require consideration to the slab base, particularly to the north side of the building. Formation levels must be designed to comply with LABC requirements and NHBC Ch.4.2 guidance.
- 5.14 All foundation designs must be reviewed and designed by a suitably qualified design engineer. The above advice is based upon the ground condition information obtained during the survey. The design engineer must satisfy themselves that the information meets with their design requirements.

6. RECOMMENDATIONS

6.1 This report provides an assessment of the ground conditions based on the assessment of available site investigation information. The assessment quantifies the potential risks associated with contamination and provides recommendations for foundation design considering the redevelopment proposals.

Contamination Assessment

6.2 Based on the results of the contamination risk assessment undertaken at the land located at the Hindmans Way, Dagenham site and with consideration to the environmental setting and the proposed redevelopment of the site for commercial use, risks to human health have been identified with respect to the inhalation of asbestos fibres.

6.3 Based on the available site investigation information and the contamination assessment herein, BEK recommends the following:

- (i) To mitigate the potential risks to human health associated with potential presence of asbestos in the made ground all groundworks should be carried out in accordance with an Asbestos Management Plan (AMP). The groundworkers risk assessment and method statements should reflect the information presented herein and the AMP.
- (ii) All landscaped areas will need to be capped with a minimum of 300 mm of clean soils overlying a geotextile membrane
- (iii) A detailed remediation strategy should be prepared to remove the risks from asbestos to future site users.
- (iv) All ground workers adopts suitable PPE when working on the site and consider the requirements of site specific risk assessments and working method statements.
- (v) All groundworkers should remain vigilant during ground excavations for the presence (or suspected presence) of contamination. Should suspected contamination be identified then work should cease and specialist advice sought.
- (vi) Any material removed from the site should be disposed of in accordance with appropriate in accordance with appropriate legislation and regulations, including the Duty of Care Regulations.

6.5 A Ground Gas Risk Assessment will be prepared on completion of the gas monitoring programme. The recommendations of that report (if any) should be included within the Remediation Method Statement.

Geotechnical Assessment

- 6.6 Based on the SPT results, the surface made ground has a bearing capacities of at least 80 kN/m². These materials are not deemed suitable to sustain loadings from buildings as there is likely to be unacceptable issues relating to disproportionate settlements. The materials are also unsuitable for heavy or tall structures for the same reasons. Lightweight structures may be founded on these materials if spread using raft slabs to distribute the surcharge loads and if some settlement of the footing is deemed acceptable.
- 6.7 Underlying the made ground are soft clays and peaty/organic ground with very poor bearing capacities as low as 12 kN/m², there is more suitable bearing material underlying the peat.
- 6.8 We understand that the reception building is likely be formed from masonry walling, timber roof and concrete ground floors. This is likely to generate foundation loadings of between 25 and 35 kN/m, however, as noted above this building should not be supported on the made ground, with a suspended ground floor slab recommended. This building should be formed on a pile and ground beam foundation. Any heavy plant bases or large silos will also need to have loads transferred through the fill and peaty layers, through the use of piled foundations. Small plant bases could be formed on raft slabs, adopting a conservative bearing capacity of 40 kN/m².
- 6.9 All formations must be checked on site to confirm that the design bearing capacity is extent before foundations are installed. Should areas of poor ground be encountered, the excavations may require extending until suitable strata is found, and the design engineer's instruction must be sought.
- 6.10 All foundation designs must be reviewed and designed by a suitably qualified design engineer. The above advice is based upon the ground condition information obtained during the survey. The design engineer must satisfy themselves that the information meets with their design requirements.

Waste Soil Management

- 6.11 Careful management of soils during the excavation works will ensure optimum utilisation of soil resources.
- 6.12 Excavated soils which require off-site disposal are anticipated to be classified in accordance with the following document: Guidance on the Disposal of "Contaminated Soils" Version 3 (April 2001); produced by the Environment Agency.

- 6.13 On the basis it is considered likely that soils from the majority of the site would classify as non-hazardous or inert for disposal, however this is subject to confirmation of the potential landfill use.
- 6.14 In all cases where excess soils require off-site disposal, the materials need to be managed under the appropriate legislation and consideration given to any remedial techniques that could be used to improve the soil.
- 6.15 If waste soils are to be re-used on site then a suitable permit exemption should be put in place (if appropriate) or a Material Management Plan should be prepared as part of compliance with the CL:AIRE Definition of Waste:Code of Practice.

Water Pipe Specification

- 6.16 Consideration should be given to the requirements of the water supply provider. They are likely to require the UKWIR risk assessment to be completed to determine the specification for the water pipes. It is recommended that the water supply provider is contacted and enquiries made.

APPENDIX A

BEK Exploratory Logs



GEO-ENVIRONMENTAL CONSULTANTS DRAFT

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22137	DATE 5th November 2022
PROJECT NAME Hindmans Way, Rochdale	DRILLING METHOD Cable & Percussive Borehole
CLIENT Stolthaven Dagenham Ltd	BOREHOLE NO BH1
	BOREHOLE NGR 48734, 82268
	SHEET 1/8

COMPLETION

COMMENTS Borehole dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1	1	D=1.0 m					Black/grey/brown fine to medium coarse sand and fine to medium coarse angular gravel with ash and large concrete (made ground)	1
	1.2 - 1.6	SPT (S) N=16	3,4/3,4,4,5					
2	2.0 - 2.45	D=2.0 m 50 for no movement						2
3	3.0 - 3.45	SPT (S) N=17	3,4/4,4,5,4					3
4	4.0 - 4.45	SPT (S) N=7	1,2/1,2,2,2				Firm grey clay	4
5	5.0 - 5.45	SPT (S) N=5	1,1/1,2,1,1				Peat	5
6	6.0 - 6.45	SPT (S) N=8	2,2/2,2,2,2					6
7	7.0 - 7.45	SPT (S) N=2	1,0/1,0,1,0					7
8	8.0 - 8.45	SPT (S) N=8	1,1/2,2,2,2					8
9	9.0 - 9.45	SPT (S) N=2	1,0/1,0,1,0				Soft to firm very sandy clay	9
10	10.0 - 10.45	SPT (S) N=8	1,1/2,2,2,2					10
11								11
12	12.0 - 12.45	SPT (S) N=22	5,6/6,5,6,5				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	12
13								13
14	14.0 - 14.45	SPT (S) N=19	3,4/5,5,5,4					14
15								15
16	16.0 - 16.45	SPT (S) N=24	5,5/6,6,6,6					16
17								17
18	18.0 - 18.45	SPT (S) N=28	5,6/6,7,7,8					18
19								19
20	20 - 20.45	50 for no movement						20
21							Termination depth at: 20.45	21



GEO-ENVIRONMENTAL CONSULTANTS DRAFT

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22137	DATE 5th November 2022
PROJECT NAME Hindmans Way, Rochdale	DRILLING METHOD Cable & Percussive Borehole
CLIENT Stolthaven Dagenham Ltd	BOREHOLE NO BH2
	BOREHOLE NGR 48726, 82251
	SHEET 2/8

COMPLETION

COMMENTS Borehole dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1	1.0 - 1.45	SPT (S) N=14	7,10/8,2,2,2				Black clayey fine to medium coarse sand with brick fragments (made ground)	1
2	1.5	D=1.5 m					Tarmacadam	1
2	2.0 - 2.45	SPT (S) N=15	2,3/4,3,5,3				Stiff brown clay (made ground)	2
3	3.0 - 3.45	SPT (S) N=15	4,5/3,3,4,5				Peaty relic topsoil (made ground)	3
3		D=3.0 m					Brown clay and brick (made ground)	3
4	4.0 - 4.45	SPT (S) N=14	2,3/3,4,4,3				Soft to firm grey silty clay	4
5	5.0 - 5.45	SPT (S) N=7	1,2,/2,2,1,2				Soft to firm grey silty clay	5
6	6.0 - 6.45	SPT (S) N=1	1,1/0,1,0,0				Peat	6
7	7.0 - 7.45	SPT (S) N=2	1,0/1,0,0,1				Peat	7
8	8.0 - 8.55	SPT (S) N=3	0,1/1,0,1,1				Peat	8
9	9.0 - 9.45	SPT (S) N=6	1,1/1,2,2,1				Peat	9
10	10.0 - 10.5	SPT (S) N=6	1,0/1,2,2,1				Peat	10
11							Peat	11
12	12.0 - 12.45	SPT (S) N=21	6,6/6,5,5,5				Green fine to medium coarse sand	12
13							Green fine to medium coarse sand	13
14	14.0 - 14.45	SPT (S) N=27	6,7/5,6,8,8				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	14
15							Brown medium coarse sand and fine to medium coarse sub-rounded gravel	15
16	16.0 - 16.45	SPT (S) N=33	5,5/7,8,9,9				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	16
17							Brown medium coarse sand and fine to medium coarse sub-rounded gravel	17
18	18 - 18.45	SPT (S) N=30	4,5/6,6,8,8				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	18
19							Brown medium coarse sand and fine to medium coarse sub-rounded gravel	19
20	20 - 20.45	SPT (S) N=46	6,9/11,9,13,13				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	20
21							Termination depth at: 20.45 m	21



GEO-ENVIRONMENTAL CONSULTANTS DRAFT

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22137	DATE 5th November 2022
PROJECT NAME Hindmans Way, Rochdale	DRILLING METHOD Cable & Percussive Borehole
CLIENT Stolthaven Dagenham Ltd	BOREHOLE NO BH3
	BOREHOLE NGR 48708, 82262
	SHEET 3/8

COMPLETION

COMMENTS Borehole dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1	1.0 - 1.45	D=1.0 m 50 for no movement					Black clayey fine to medium coarse sand with much fine to medium coarse angular gravel and brick fragments (made ground)	1
2	2.0 - 2.45	50 for no movement			2			
3	3.0 - 3.45	D=3.0 m SPT (S) N=23	3,4/5,5,7,6		3			
4	4.0 - 4.45	SPT (S) N=9	1,2/2,2,2,3				Firm brown/black silty clay	4
5	5.0 - 5.45	SPT (S) N=3	1,0/1,1,0,1		5			
6	6.0 - 6.45	SPT (S) N=2	1,0/0,1,1,0		6			
7	7.0 - 7.45	SPT (S) N=2	1,1/0,0,1,1		7			
8	8.0 - 8.55	SPT (S) N=2	1,0/0,0,1,1		8			
9	9.0 - 9.45	SPT (S) N=2	1,1/1,0,0,1		9			
10	10.0 - 10.5	SPT (S) N=6	1,1/1,2,2,1		10			
11					11			
12	12.0 - 12.45	SPT (S) N=12	2,2/3,3,2,2		12			
13					13			
14	14.0 - 14.45	SPT (S) N=20	2,3/4,5,5,6		14			
15					15			
16	16.0 - 16.45	SPT (S) N=20	3,4/6,5,5,4		16			
17					17			
18	18 - 18.45	SPT (S) N=29	4,5/6,6,8,8		18			
19					19			
20	20 - 20.45	50 for no movement			20			
21						Termination depth at: 20.45 m	21	



GEO-ENVIRONMENTAL CONSULTANTS DRAFT

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22137	DATE 1st & 2nd November 2022
PROJECT NAME Hindmans Way, Rochdale	DRILLING METHOD Cable & Percussive Borehole
CLIENT Stolthaven Dagenham Ltd	BOREHOLE NO BH4
	BOREHOLE NGR 48698, 82281
	SHEET 4/8

COMPLETION

COMMENTS Borehole dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1	0.5	D=0.5 m					Black slightly clayey fine to medium coarse sand and fine to medium angular gravel with concrete cobbles (made ground)	1
2	1.2 - 1.65 1.5	SPT (S) N=18 D=1.5 m	3,2/4,5,5,4				Concrete/tarmacadam boulders	2
3	2.0 - 2.45	50 for no movement					Brown fine to medium coarse angular gravel	3
4	3.0 - 3.45	SPT (S) N=9	3,2/2,2,2,3				Soft brown/black silty clay	4
5	4.0 - 4.45	SPT (S) N=3	1,1/1,0,1,1					5
6	5.0 - 5.45	SPT (S) N=3	1,0/0,1,1,1					6
7	6.0 - 6.45	SPT (S) N=2	1,0/1,0,0,1				Peat	7
8	7.0 - 7.45	SPT (S) N=3	1,1/1,0,1,1					8
9	8.0 - 8.55	SPT (S) N=2	1,0/0,0,1,1					9
10	9.0 - 9.45	SPT (S) N=1	1,0/0,0,0,1					10
11	10.0 - 10.5	SPT (S) N=3	1,0/1,1,1,0				Soft grey silty clay	11
12	12.0 - 12.45	SPT (S) N=9	2,2/3,2,2,2				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	12
13								13
14	14.0 - 14.45	SPT (S) N=16	2,3/4,4,3,5					14
15								15
16								16
17								17
18	18 - 18.45	SPT (S) N=25	3,4/5,7,6,7					18
19							Grey silty sand	19
20	20 - 20.45	50 for no movement						20
21							Termination depth at: 20.45 m	21



GEO-ENVIRONMENTAL CONSULTANTS DRAFT

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22137	DATE 5th November 2022
PROJECT NAME Hindmans Way, Rochdale	DRILLING METHOD Cable & Percussive Borehole
CLIENT Stolthaven Dagenham Ltd	BOREHOLE NO BH5
	BOREHOLE NGR 48688, 82265
	SHEET 5/8

COMPLETION

COMMENTS Borehole dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1	1.0	D=1.0 m					Black/brown fine to medium coarse sand with fine to medium coarse angular gravel with much concrete and tarmacadam (made ground)	1
	1.2 - 1.65	SPT (S) N=20	2,3/3,5,6,6					
2	2.0 - 2.45	SPT (S) N=42	9,13/10,9,12,11				Tarmacadam	2
3	3.0 - 3.45	D=3.0 m SPT (S) N=19	6,7/5,5,4,5				Black fine to medium coarse sand with much black wood - slight hydrocarbon odour (made ground)	3
4	4.0 - 4.45	SPT (S) N=4	1,1/1,1,1,1				Soft brown silty clay	4
5	5.0 - 5.45	SPT (S) N=6	1,1/1,2,2,1					5
6	6.0 - 6.45	SPT (S) N=5	1,2/1,1,2,1					6
7	7.0 - 7.45	SPT (S) N=1	1,0/0,1,0,0				Peat	7
8	8.0 - 8.55	SPT (S) N=1	0,1/0,1,0,0					8
9	9.0 - 9.45	SPT (S) N=2	1,0/0,1,0,0					9
10	10.0 - 10.5	SPT (S) N=1	1,0/0,0,1,0					10
11								11
12	12.0 - 12.45	SPT (S) N=13	2,2/2,3,3,5				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	12
13								13
14	14.0 - 14.45	SPT (S) N=16	3,4/4,3,4,5					14
15								15
16	16.0 - 16.45	SPT (S) N=22	3,5/4,7,6,5					16
17								17
18	18 - 18.45	SPT (S) N=23	3,5/5,6,6,6					18
19								19
20	20 - 20.45	50 for no movement						20
21							Termination depth at: 20.45 m	21



GEO-ENVIRONMENTAL CONSULTANTS DRAFT

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22137	DATE 5th November 2022
PROJECT NAME Hindmans Way, Rochdale	DRILLING METHOD Cable & Percussive Borehole
CLIENT Stolthaven Dagenham Ltd	BOREHOLE NO BH6
	BOREHOLE NGR 48674, 82278
	SHEET 6/8

COMPLETION

COMMENTS Borehole dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1	0.50	D=0.5 m					Black clayey fine to medium coarse sand and fine to medium coarse angular gravel with much concrete and occasional wood and plastic (made ground)	1
	1.0	D=1.0 m						
2	1.2 - 1.65	SPT (S) N=10	3,2/1,2,2,5				Tarmacadam and tarmacadam gravels	2
	2.0 - 2.45	D=2.0 m 50 for no movement						
3	3.0 - 3.45	SPT (S) N=8	10,1/5,1,1,1				Soft to firm grey silty clay	3
4	4.0 - 4.45	SPT (S) N=7	2,1/2,1,2,2					4
5	5.0 - 5.45	SPT (S) N=7	2,1/2,2,1,2					5
6	6.0 - 6.45	SPT (S) N=3	0,0/0,1,1,1					6
7	7.0 - 7.45	SPT (S) N=2	1,0/1,0,1,0					7
8	8.0 - 8.55	SPT (S) N=4	1,1/1,1,1,1					8
9	9.0 - 9.45	SPT (S) N=3	1,1/1,0,1,1					9
10	10.0 - 10.5	SPT (S) N=4	1,0/1,1,1,1					10
11								11
12	12.0 - 12.45	SPT (S) N=12	2,3/3,3,3,3					
13						13		
14	14.0 - 14.45	SPT (S) N=21	3,4/5,6,6,4			14		
15						15		
16	16.0 - 16.45	SPT (S) N=25	3,5/5,6,6,6					16
17							Termination depth at: 16.45 m	17
18								18
19								19
20								20
21								21



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22137	DATE 12th & 13th November 2022
PROJECT NAME Hindmans Way, Rochdale	DRILLING METHOD Cable & Percussive Borehole
CLIENT Stolthaven Dagenham Ltd	BOREHOLE NO BH7
	BOREHOLE NGR 48659, 82271
	SHEET 7/8

COMPLETION

COMMENTS Borehole dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1	1.2 - 1.65	SPT (S) N=7	2,3/3,5,6,6				Black clayey fine to medium coarse sand with brick fragments (made ground)	1
2	1.5	D=1.5 m						2
3	2.0 - 2.45	50 for no movement	9,13/10,9,12,11				Black clay with tarmacadam - slight hydrocarbon odour (made ground)	3
4	2.2 m	D=2.2 m						4
5	3.0 - 3.45	SPT (S) N=4	6,7/5,5,4,5				Soft grey silty clay	5
6	4.0 - 4.45	SPT (S) N=7	1,1/1,1,1,1					6
7	5.0 - 5.45	U1	1,1/1,2,2,1				Peat	7
8	6.0 - 6.45	SPT (S) N=2	1,2/1,1,2,1					8
9	7.0 - 7.45	SPT (S) N=2	1,0/0,1,0,0				Peat	9
10	8.0 - 8.55	SPT (S) N=4	0,1/0,1,0,0					10
11	9.0 - 9.45	SPT (S) N=3	1,0/0,1,0,0				Peat	11
12	10.0 - 10.5	SPT (S) N=5	1,0/0,0,1,0					12
13	12.0 - 12.45	SPT (S) N=10	2,2/2,3,3,5				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	13
14	14.0 - 14.45	SPT (S) N=21	3,4/4,3,4,5					14
15	16.0 - 16.45	SPT (S) N=23	3,5/4,7,6,5				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	15
16	18.0 - 18.45	SPT (S) N=27	3,5/5,6,6,6					16
17	20.0 - 20.45	50 for no movement					Dense green silty sand	17
18								18
19							Dense green silty sand	19
20								20
21							Termination depth at: 20.45 m	21



GEO-ENVIRONMENTAL CONSULTANTS DRAFT

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22137	DATE 4th November 2022
PROJECT NAME Hindmans Way, Rochdale	DRILLING METHOD Cable & Percussive Borehole
CLIENT Stolthaven Dagenham Ltd	BOREHOLE NO BH8
	BOREHOLE NGR 48657, 82280
	SHEET 8/8

COMPLETION

COMMENTS Borehole dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1	1.0	D=1.0 m					Black/brown/grey fine to medium coarse sand and fine to medium coarse angular gravel with ask and concrete (made ground)	1
2	1.2 - 1.6	SPT (S) N=14	2,3/3,4,3,4					
2	2.0 - 2.45	SPT (S) N=27	3,4/6,6,7,8				Slight hydrocarbon odour from 2.0 m	2
3	3.0 - 3.45	SPT (S) N=23	9,6/9,5,4,5					
4	4.0 - 4.45	SPT (S) N=11	2,2/3,3,2,3				Firm grey clay	4
5	5.0 - 5.45	SPT (S) N=6	1,2/1,2,1,2				Peat	5
6	6.0 - 6.45	SPT (S) N=6	1,2/1,2,1,2					6
7	7.0 - 7.45	SPT (S) N=2	1,0/1,0,1,0					7
8	8.0 - 8.45	SPT (S) N=2	1,0/1,0,1,0					8
9	9.0 - 9.45	SPT (S) N=5	1,2/1,1,2,1				Brown fine to medium coarse clayey sand	9
10	10.0 - 10.45	SPT (S) N=8	1,2/2,2,2,2					10
11								11
12	12.0 - 12.45	SPT (S) N=11	2,2/3,3,2,3				Brown medium coarse sand and fine to medium coarse sub-rounded gravel	12
13								13
14	14.0 - 14.45	SPT (S) N=21	3,4/4,5,6,6					14
15								15
16	16.0 - 16.45	SPT (S) N=21	4,4/4,4,6,7					16
17								17
18	18.0 - 18.45	SPT (S) N=30	5,6/7,7,8,8					18
19								19
20	20 - 20.45	50 for no movement						20
21							Termination depth at: 20.45	21

APPENDIX B

SLR Previous Site Investigation Logs

BOREHOLE LOG

BOREHOLE No.
BH203

Client:
STOLTHAVEN DAGENHAM LTD



Project No: 402.04310.00002 Date: 11/03/13 Ground Level: 3.71maOD Co-ordinates:

Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
1 of 2

SAMPLES & TESTS						STRATA				Instrument/ Backfill
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thickness)	Depth	
0.50		0				1 ↓	2.91		(0.80)	MADE GROUND - Soft to firm dark brown black/grey slightly sandy very gravelly CLAY with rare cobbles and roots and rootlets throughout. Gravels comprise fine to coarse angular to sub-angular brick, concrete, flint, limestone, rubber, ceramic, metal, plastic, glass and wood. Cobbles comprise angular concrete.
1.00		0			2.71			1.00	MADE GROUND - Grey slightly sandy GRAVEL. Gravel comprises angular, fine to coarse concrete.	
1.50	J1	0						1.51	2.20	MADE GROUND - Soft to firm dark brown black/grey slightly sandy very gravelly CLAY with rare cobbles. Gravels comprise fine to coarse angular to sub-angular brick, concrete, rubber, ceramic, metal, plastic, brick, glass and wood. Cobbles comprise angular concrete.
2.00		0								
2.50		0								
3.00	J2	0							(1.60)	MADE GROUND - Soft brown/grey/black slightly sandy gravelly CLAY with rare cobbles. Gravels comprise fine to coarse angular to sub-rounded asphalt, brick, concrete, glass, plastic, ceramic, metal, glass and rubber. Cobbles comprise angular concrete.
3.50		0								
4.00	J3	0						-0.09	3.80	Soft to firm dark grey/black/green slightly sandy very gravelly organic CLAY. Gravels comprise fine to coarse, angular to sub-rounded
4.50		0						-0.49	4.20	Soft to firm dark grey/black/green slightly sandy slightly gravelly organic CLAY. Gravels comprise fine to coarse, sub-angular to sub-rounded quartzite, mudstone and flint.
5.00		0						-1.29	5.00	Soft to firm dark grey/black/green slightly sandy organic CLAY with roots, rootlets and wooded fragments throughout. Slight sulphide odour.
6.00		0								
6.50		0								
7.00		0						(3.60)		
8.00		0								
8.50		0					-4.89	8.60		
9.00	J4	1					-5.29	9.00	Spongy dark brown/orange-brown fibrous PEAT with wood fragments. Slight Sulphide odour.	
9.50		1						(1.40)	Spongy dark black/brown/ slightly sandy fibrous PEAT with small wood fragments. Slight Sulphide odour.	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
											1) Hand dug inspection pit to 1.2m 2) Bored 200mm casing to 4.2m, 150mm casing to 15.50m, bentonite seal from 2.0m-3.0m. 3) Monitoring well screened from 12.5-15.5m.

All dimensions in metres Contractor: Endeavour Drilling Ltd Method: Cable Percussion Logged By: ALawrence Approved By: PWarland
 Scale 1:62.5 Plant: Dando 2000 Hole Size: 200

Form SLR AGS3 UK BH File 130328_402.04310.00002_X_LCPLOGS.GPJ 11-04-13

BOREHOLE LOG

BOREHOLE No.
BH203

Client:
STOLTHAVEN DAGENHAM LTD



Project No:
402.04310.00002

Date:
11/03/13

Ground Level:
3.71maOD

Co-ordinates:

Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
2 of 2

SAMPLES & TESTS						STRATA				Instrument/ Backfill
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thickness)	Depth	
10.00		1					-6.69		10.40	Spongy dark black/brown/ slightly sandy fibrous PEAT with small wood fragments. Slight Sulphide odour. <i>(continued)</i>
10.50		0							(1.50)	Grey/green/blue slightly clayey slightly gravelly fine to coarse SAND. Gravels comprise fine to medium, sub-angular to sub-rounded quartzite, flint and mudstone.
11.00	J5	0								
11.50		0								
12.00		0					-8.19		11.90	Yellow/brown medium to coarse SAND and GRAVEL. Gravels comprise fine to coarse, sub-angular to sub-rounded flint, mudstone, quartz and shell fragments.
13.00		0							(3.50)	
14.00		0								
15.00		0					-11.69 -11.79		15.40 15.50	Yellow/brown slightly gravelly coarse SAND. Gravels comprise fine to coarse, angular to sub-rounded flint, mudstone, quartz and shell fragments.
16.00										Borehole complete at 15.50m
17.00										
18.00										
19.00										

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
									11.9	15.5	1) Hand dug inspection pit to 1.2m 2) Bored 200mm casing to 4.2m, 150mm casing to 15.50m, bentonite seal from 2.0m-3.0m. 3) Monitoring well screened from 12.5-15.5m.

All dimensions in metres Scale 1:62.5	Contractor: Endeavour Drilling Ltd Plant: Dando 2000	Method: Cable Percussion Hole Size: 200	Logged By: ALawrence Approved By: PWarland
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Form SLR AGS3 UK BH File 130328_402.04310.00002_X_LCPLOGS.GPJ 11-04-13

BOREHOLE LOG

BOREHOLE No.
BH205

Client:
STOLTHAVEN DAGENHAM LTD



Project No: 402.04310.00002 Date: 06/03/13 Ground Level: 3.45maOD Co-ordinates:

Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
1 of 2

SAMPLES & TESTS						STRATA				Instrument/ Backfill
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thickness)	Depth	
0.50	J	0						X	(2.00)	MADE GROUND - Firm dark brown/black/grey slightly sandy very gravelly CLAY with rare cobbles and roots/rootlets throughout. Gravels comprise fine to coarse angular to sub-angular brick, limestone, chalk, concrete, rubber and plastic. Cobbles comprise angular concrete.
1.00		0						X		
1.50	J	0						X		
2.00	J	0					1.45	X	2.00	MADE GROUND - Firm brown/grey/black slightly sandy gravelly CLAY with rare cobbles. Gravels comprise fine to coarse angular to sub-rounded brick, chalk, plastic, ceramic, and concrete. Cobbles comprise angular concrete.
2.50		0						X	(1.20)	
3.00	J	0					0.25	X	3.20	
						↓	0.05	X	3.40	MADE GROUND - Grey slightly sandy GRAVEL. Gravel comprises angular, fine to coarse concrete. No recovery - presumed made ground.
4.00								?	(1.10)	
4.50		0					-1.05	X	4.50	
5.00	J	2					-1.15	X	4.60	Soft to firm dark grey/black/green slightly sandy very gravelly organic CLAY. Gravels comprise fine to coarse, angular to sub-rounded limestone and flint.
5.50								X	(1.60)	Soft to firm dark grey/black/green slightly sandy slightly gravelly organic CLAY. Gravels comprise fine to coarse, sub-angular to sub-rounded quartzite, flint and mudstone.
6.00	J	1					-2.75	X	6.20	Soft to firm dark grey/black/green slightly sandy organic CLAY with occasional wood fragments. Slight sulphide odour.
6.50		0						X	(1.80)	
7.00		0						X		
7.50	J	0						X		
8.00		0					-4.55	X	8.00	Spongy dark brown/orange-brown fibrous PEAT with wooded fragments. Slight sulphide odour.
8.50	J	0						X		
9.00		0						X	(2.00)	
9.50		0						X		
							-6.55	X	10.00	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
											1) Hand dug inspection pit to 1.2m 2) 200mm casing to 4.6m, 150mm casing to 15.6m, bentonite seal from 4.5-5.3m. 3) Monitoring well screened from 12.8-15.8m.

All dimensions in metres Contractor: Endeavour Drilling Ltd Method: Cable Percussion Logged By: ALawrence Approved By: PWarland
 Scale 1:62.5 Plant: Dando 2000 Hole Size: 200

Form SLR AGS3 UK BH File 130328_402.04310.00002_X_LCPLOGS.GPJ 11-04-13

BOREHOLE LOG

BOREHOLE No.
BH205

Client:
STOLTHAVEN DAGENHAM LTD



Project No: 402.04310.00002 Date: 06/03/13 Ground Level: 3.45maOD Co-ordinates:

Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
2 of 2

SAMPLES & TESTS						STRATA				Instrument/ Backfill	
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thickness)	Depth		DESCRIPTION
10.00	J	0					-7.05		(0.50) 10.50	Soft to firm dark black/grey very sandy slightly gravelly organic CLAY with occasional wood fragments. Gravels comprise fine to medium, sub-angular to sub-rounded mudstone and quartzite.	
10.50		0									Soft grey/green/blue slightly clayey slightly gravelly SAND. Gravels comprise fine to medium, sub-angular to sub-rounded quartzite, flint and mudstone.
11.00	J	0					-8.05		(1.00) 11.50		Yellow/brown slightly gravelly coarse SAND. Gravels comprise fine to coarse, angular to sub-rounded quartzite, flint and mudstone.
11.50		0									
12.00	J	1					-8.55		(0.50) 12.00		Yellow/brown medium to coarse SAND and GRAVEL. Gravels comprise fine to coarse, sub-angular to sub-rounded, quartz, mudstone, flint and shell fragments.
12.50		1									
13.00		1								(3.20) 13.20	
14.00		0									
15.00	J	0					-11.75		(0.60) 15.20		Yellow/brown slightly gravelly coarse SAND. Gravels comprise fine to coarse, angular to sub-rounded quartzite, flint and mudstone.
15.50							-12.35			(0.60) 15.80	
16.00										Borehole complete at 15.80m	
17.00											
18.00											
19.00											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
									11	15.6	1) Hand dug inspection pit to 1.2m 2) 200mm casing to 4.6m, 150mm casing to 15.6m, bentonite seal from 4.5-5.3m. 3) Monitoring well screened from 12.8-15.8m.

All dimensions in metres Contractor: Endeavour Drilling Ltd Method: Cable Percussion Logged By: ALawrence Approved By: PWarland
 Scale 1:62.5 Plant: Dando 2000 Hole Size: 200

Form SLR AGS3 UK BH File 130328_402.04310.00002_X_LCPLOGS.GPJ 11-04-13

BOREHOLE LOG

BOREHOLE No.
BH311

Client:
STOLTHAVEN DAGENHAM LTD



Project No:
402.04310.00002

Date:
12/03/13

Ground Level:
3.63maOD

Co-ordinates:

Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
1 of 1

SAMPLES & TESTS						STRATA				Instrument/ Backfill
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thickness)	Depth	
1	1.00	0							(2.80)	MADE GROUND - Soft dark brown/black/grey slightly sandy very gravelly CLAY with abundant cobbles and roots/rootlets throughout. Gravels comprise fine to coarse angular to sub-angular brick and concrete. Cobbles comprise angular concrete.
2	2.00	0								
							0.83		2.80	
3	3.00	0					0.63		3.00	MADE GROUND - Grey slightly sandy GRAVEL. Gravel comprises angular, fine to coarse concrete.
									(1.30)	MADE GROUND - Soft to firm brown/grey/black slightly sandy gravelly CLAY. Gravels comprise fine to coarse angular to sub-rounded brick, glass, metal, plastic and concrete.
4	4.00	0								
	4.30	0					-0.67		4.30	
							-0.77		4.40	Soft to firm dark grey/black/green slightly sandy very gravelly organic CLAY. Gravels comprise fine to coarse, angular to sub-rounded quartzite, flint and mudstone.
5										Borehole complete at 4.70m
6										
7										
8										
9										

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
											1) Hand dug inspection pit to 1.2m 2) Bored 150mm casing to 4.7m. 3) 50mm well installed, screened from 1.2-4.7m.

All dimensions in metres
Scale 1:62.5

Contractor: Endeavour Drilling Ltd
Plant: Dando 2000

Method: Cable Percussion
Hole Size: 150

Logged By:
ALawrence

Approved By:
PWarland

BOREHOLE LOG

BOREHOLE No.
BH312

Client:
STOLTHAVEN DAGENHAM LTD



Project No:
402.04310.00002

Date:
13/03/13

Ground Level:
3.37maOD

Co-ordinates:

Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
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SAMPLES & TESTS						STRATA				Instrument/ Backfill
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	
1	1.00	0							(2.90)	MADE GROUND - Soft to firm dark brown/black/grey slightly sandy very gravelly CLAY with abundant cobbles and roots/rootlets throughout. Gravels comprise fine to coarse angular to sub-angular brick and concrete. Cobbles comprise angular concrete.
2	2.00	0								
3	3.00	0					0.47 0.27		2.90 3.10	MADE GROUND - Grey slightly sandy GRAVEL. Gravel comprises angular, fine to coarse concrete.
4	4.00	0					-0.83		(1.10) 4.20	MADE GROUND - Firm brown/grey/black slightly sandy gravelly CLAY. Gravels comprise fine to coarse angular to sub-rounded brick, asphalt, metal, plastic and concrete.
5	4.70	0					-1.33		(0.50) 4.70	Soft to firm dark grey/black/green slightly sandy slightly gravelly organic CLAY. Gravels comprise fine to coarse, angular to sub-rounded limestone and mudstone.
5										Borehole complete at 4.20m

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
											1) Hand dug inspection pit to 1.2m 2) Bored 150mm casing to 4.2m. 3) 50mm well installed, screened from 1.2-4.2m.

All dimensions in metres
Scale 1:62.5

Contractor: Endeavour Drilling Ltd
Plant: Dando 2000

Method: Cable Percussion
Hole Size: 150

Logged By:
ALawrence

Approved By:
PWarland

BOREHOLE LOG

BOREHOLE No.
BH307

Client:
STOLTHAVEN DAGENHAM LTD



Project No: 402.04310.00002	Date: 06/03/13	Ground Level: 3.90maOD	Co-ordinates:
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Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
1 of 1

SAMPLES & TESTS						STRATA				Instrument/ Backfill
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thickness)	Depth	
0.30	J1	50							(1.70)	MADE GROUND - Brown/black slightly clayey sandy GRAVEL. Gravel comprises angular to rounded, fine to coarse brick, tile, pottery, glass, concrete, coal and occasional ash.
1.10	J2	75							1.70	1.00 ...becoming damp... 1.40 ...becoming wet and very clayey...
1.80	J3	95							(0.50)	MADE GROUND - Black/brown slightly clayey sandy GRAVEL. Gravel comprises angular to rounded, fine to coarse, brick, wire, rubber, concrete, flint and mudstone. 1.80 ...moderate solvent odour...
2.20	J4	45							2.20	Borehole complete at 2.20m

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
											1) Hand dug inspection pit to 1.2m. 2) Refusal at 2.2m, further progress not possible. 3) 50mm well installed, screened from 0.5m to 2.2m.

All dimensions in metres Scale 1:50	Contractor: Endeavour Drilling Plant: Terrier 2002	Method: Windowless Sampler Hole Size: 100	Logged By: RMoakes Approved By: PWarland
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Form SLR AGS3 UK BH File 130326_402.04310.00002_X_DSLOGS.GPJ 11-04-13

BOREHOLE LOG

BOREHOLE No.
BH308

Client:
STOLTHAVEN DAGENHAM LTD



Project No:
402.04310.00002

Date:
05/03/13

Ground Level:
3.67maOD

Co-ordinates:

Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
1 of 1

SAMPLES & TESTS						STRATA				Instrument/ Backfill
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thickness)	Depth	
0.50	J1	85					2.87	(0.80)	0.80	MADE GROUND - Brown/black slightly clayey sandy GRAVEL. Gravel comprises angular to rounded, fine to coarse brick, concrete, flint, mudstone and occasional pottery and wood.
0.90	HS	85						(1.50)	1.50	MADE GROUND - Soft brown/black sandy gravelly CLAY. Gravel comprises angular to rounded, fine to coarse brick, concrete, flint, mudstone and occasional pottery.
1.40	J2	25								
2.00	HS	35					1.37		2.30	
2.30	J3	45								Borehole complete at 2.30m
3										
4										
5										
6										
7										

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
											1) Hand dug inspection pit to 1.2m. 2) Refusal at 2.3m, further progress not possible. 3) 50mm well installed, screened from 0.5m to 2.3m.

All dimensions in metres
Scale 1:50

Contractor: Endeavour Drilling
Plant: Terrier 2002

Method: Windowless Sampler
Hole Size: 100

Logged By:
RMOakes

Approved By:
PWarland

BOREHOLE LOG

BOREHOLE No.
BH309

Client:
STOLTHAVEN DAGENHAM LTD



Project No:
402.04310.00002

Date:
05/03/13

Ground Level:
3.43maOD

Co-ordinates:

Project:
MASKELL, HINDMANS WAY, DAGENHAM

Sheet:
1 of 1

SAMPLES & TESTS						STRATA				Instrument/ Backfill
Depth	Type No	HS (ppm)	HV (kPa)	PP (kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	
0.30	J1	65						X	(1.30)	MADE GROUND - Brown/grey clayey sandy GRAVEL. Gravel comprises angular to rounded, fine to coarse brick, concrete, flint, mudstone, pottery and tile with occasional concrete cobbles.
1.20	J2	115					2.13	X	1.30	MADE GROUND - Firm black/brown mottled sandy gravelly CLAY. Gravel comprises angular to rounded, fine to coarse brick, flint, concrete, glass, tile and ash.
1.60	HS	105						X	(1.40)	2.30 ...becoming damp...
2.10	J3	110						X	2.70	
2.60	J4	240					0.73	X		Borehole complete at 2.70m

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	
											1) Hand dug inspection pit to 1.2m. 2) Refusal at 2.7m, further progress not possible.. 3) 50mm well installed, screened from 0.5m to 2.7m.


All dimensions in metres
Scale 1:50



Contractor: Endeavour Drilling
Plant: Terrier 2002

Method: Windowless Sampler
Hole Size: 100

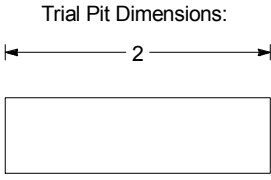
Logged By:
RMOakes

Approved By:
PWarland


TRIAL PIT LOG				TRIAL PIT No TP108	
Client: STOLTHAVEN DAGENHAM LTD					
Project: MASKELL, HINDMANS WAY, DAGENHAM					
Project No: 402.04310.00002	Date: 04/03/13	Ground Level: 3.53mAOD	Co-ordinates:	Sheet: 1 of 1	

SAMPLES & TESTS				Water	STRATA			Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thickness)	
0.40	J1	HS	35ppm			(1.50)	MADE GROUND - Soft locally firm brown/black/grey sandy very gravelly CLAY with rare cobbles and boulders. Gravels comprise angular to rounded, fine to coarse brick, concrete, pottery, tile, metal and flint. Cobbles and boulders comprise angular concrete.	
1.10	J2	HS	30ppm					
1.60	J3	HS	60ppm		2.03 1.93	1.50 1.60	MADE GROUND - Soft/firm locally stiff brown/grey/yellow mottled slightly sandy gravelly CLAY. Gravels comprise angular to rounded, fine to coarse brick, ash, clinker, concrete and flint. ...concrete obstructions encountered, further progress not possible, trial pit relocated to TP108A...	
Trial Pit complete at 1.60m								

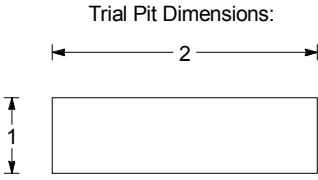
Form SLR AGS3 UK TP File 130326_402.04310.00002_X_TPLOGS.GPJ 11-04-13

<p>GENERAL REMARKS:</p> <ol style="list-style-type: none"> Pit sides stable and upright. Water seepage at 1.55m. Concrete obstruction encountered at 1.6m, further progress not possible. Pit backfilled and relocated. <p>KEY:</p> <p>V = Hand Vane Shear Strength PP = Pocket Penetrometer Shear Strength D = Small Disturbed Sample B = Large Bulk Sample HS = Head Space Measurement</p>	<p>Trial Pit Dimensions:</p>  <p>Shoring/Support: NO Stability: See 1.</p>
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All dimensions in metres Scale 1:25	Contractor : Endeavour Drilling Ltd Plant: JCB 3CX	Method: Trial Pit/trench	Logged By: RMOakes	Approved By: PWarland
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TRIAL PIT LOG				TRIAL PIT No TP108A	
Client: STOLTHAVEN DAGENHAM LTD					
Project: MASKELL, HINDMANS WAY, DAGENHAM					
Project No: 402.04310.00002	Date: 04/03/13	Ground Level: 3.49mAOD	Co-ordinates:	Sheet: 1 of 1	

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.50	J1	HS	95ppm		[Cross-hatch pattern]	(1.40)	MADE GROUND - Soft locally firm sandy very gravelly brown/black/grey CLAY with rare cobbles and boulders. Gravels comprise angular to rounded, fine to coarse brick, concrete, pottery, tile, metal and flint. Cobbles and boulders comprise angular concrete.	[Gravel pattern]	
1.10	J2	HS	35ppm			2.09			1.40
1.50	J3	HS	25ppm			(0.90)	MADE GROUND - Soft/firm locally stiff brown/grey/yellow mottled slightly sandy gravelly CLAY. Gravels comprise angular to rounded, fine to coarse brick, ash, clinker, concrete and flint.		
2.20	J4	HS	155ppm	↓	1.19	2.30			
2.40	J5	HS	140ppm	↓	1.09	2.40	MADE GROUND - Grey/black/white sandy GRAVEL. Gravels comprise angular to rounded, fine to coarse clinker, ash, pottery and occasional metal.		
Trial Pit complete at 2.40m									

<p>GENERAL REMARKS:</p> <ol style="list-style-type: none"> Pit sides stable and upright. Water seepage at 2.4m. Backfilled with arisings. <p>KEY:</p> <p>V = Hand Vane Shear Strength PP = Pocket Penetrometer Shear Strength D = Small Disturbed Sample B = Large Bulk Sample HS = Head Space Measurement</p>	<p>Trial Pit Dimensions:</p>  <p>Shoring/Support: NO Stability: See 1.</p>
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All dimensions in metres Scale 1:25	Contractor : Endeavour Drilling Ltd Plant: JCB 3CX	Method: Trial Pit/trench	Logged By: RMOakes	Approved By: PWarland
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Form SLR AGS3 UK TP File 130326_402.04310.00002_X_TPLOGS.GPJ 11-04-13

APPENDIX C

Chemical Test Results

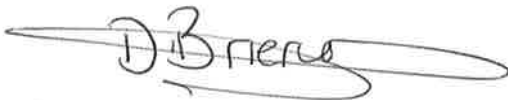
FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 22/11200
Issue Number: 1
Date: 22 November, 2022

Client: BEK Enviro Ltd
Suite One
No 3 Mitton Road Business Park
Mitton Road
Whalley
Lancashire
BB7 9YE

Project Manager: Mick Buckley
Project Name: Stolthaven, Dagenham
Project Ref: Not specified
Order No: 7626-22137-M
Date Samples Received: 14/11/22
Date Instructions Received: 14/11/22
Date Analysis Completed: 22/11/22

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Envirolab Job Number: 22/11200

Client Project Name: Stolthaven, Dagenham

Client Project Ref: Not specified

Lab Sample ID	22/11200/1	22/11200/2	22/11200/3	22/11200/4	22/11200/5	22/11200/6	22/11200/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	BH2	BH3	BH3	BH4	BH5	BH6			
Depth to Top	2.00	1.50	1.00	3.00	0.50	3.00	0.50			
Depth To Bottom										
Date Sampled	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22			
Sample Type	Soil	Soil	Soil	Solid	Soil	Soil	Soil			
Sample Matrix Code	6A	4AB	4AE	7	6AE	6A	6A			
% Stones >10mm _A	26.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
pH _D ^{M#}	8.14	9.02	9.83	11.01	10.27	8.44	8.75	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.34	0.87	0.20	0.09	1.39	0.55	0.35	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	3000	4300	2100	3700	14000	4700	1600	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Organic Matter _D ^{M#}	3.6	9.5	5.1	2.7	5.1	10.0	3.9	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	3	12	4	6	12	5	10	mg/kg	1	A-T-024s
Boron (water soluble) _D	2.1	1.9	2.2	1.8	3.6	2.0	1.3	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	1.5	1.8	1.4	1.1	1.6	1.6	0.8	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	118	91	51	34	105	71	27	mg/kg	1	A-T-024s
Chromium _D ^{M#}	35	25	36	46	35	124	38	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Lead _D ^{M#}	195	216	169	86	442	732	67	mg/kg	1	A-T-024s
Mercury _D	0.89	1.82	1.39	1.98	2.14	2.73	2.82	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	25	24	19	21	30	19	23	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc _D ^{M#}	269	421	120	89	164	159	57	mg/kg	5	A-T-024s

Envirolab Job Number: 22/11200

Client Project Name: Stolthaven, Dagenham

Client Project Ref: Not specified

Lab Sample ID	22/11200/1	22/11200/2	22/11200/3	22/11200/4	22/11200/5	22/11200/6	22/11200/7	Units	Limit of Detection	Method ref			
Client Sample No													
Client Sample ID	BH1	BH2	BH3	BH3	BH4	BH5	BH6						
Depth to Top	2.00	1.50	1.00	3.00	0.50	3.00	0.50						
Depth To Bottom													
Date Sampled	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22						
Sample Type	Soil	Soil	Soil	Solid	Soil	Soil	Soil						
Sample Matrix Code	6A	4AB	4AE	7	6AE	6A	6A						
Asbestos in Soil (inc. matrix) [^] @													
Asbestos in soil [#]	NAD	Chrysotile	Chrysotile	NAD	NAD	Amosite	NAD			A-T-045			
Asbestos Matrix (visual) ^o	-	-	-	-	-	-	-			A-T-045			
Asbestos Matrix (microscope) ^o	-	Loose Fibres	Loose Fibres	-	-	Loose Fibres	-			A-T-045			
Asbestos ACM - Suitable for Water Absorption Test? ^o	N/A	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045			
Asbestos in Soil Quantification % @ (Hand Picking&Weighing)													
Asbestos in soil % composition (hand picking and weighing) ^o	-	0.001	<0.001	-	-	<0.001	-	% w/w	0.001	A-T-054			

Envirolab Job Number: 22/11200

Client Project Name: Stolthaven, Dagenham

Client Project Ref: Not specified

Lab Sample ID	22/11200/1	22/11200/2	22/11200/3	22/11200/4	22/11200/5	22/11200/6	22/11200/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	BH2	BH3	BH3	BH4	BH5	BH6			
Depth to Top	2.00	1.50	1.00	3.00	0.50	3.00	0.50			
Depth To Bottom										
Date Sampled	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22			
Sample Type	Soil	Soil	Soil	Solid	Soil	Soil	Soil			
Sample Matrix Code	6A	4AB	4AE	7	6AE	6A	6A			
PAH-16MS										
Acenaphthene _A ^{M#}	0.03	0.06	0.40	1.09	0.15	1.53	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.03	0.14	0.08	0.09	0.08	<0.01	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.03	0.18	0.84	0.77	0.35	0.60	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.08	0.37	1.94	1.80	1.00	1.15	0.07	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.08	0.37	1.89	1.34	0.89	0.73	0.07	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.09	0.47	2.05	1.48	1.04	0.82	0.08	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.07	0.28	1.07	0.78	0.54	0.37	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	0.14	0.65	0.45	0.32	0.26	<0.07	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.13	0.46	2.11	1.77	1.10	1.15	0.09	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.06	0.22	0.16	0.11	0.08	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.25	0.92	5.14	6.08	2.81	4.97	0.19	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.03	0.06	0.45	0.92	0.15	1.00	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.06	0.28	1.10	0.81	0.55	0.39	0.04	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	0.12	0.14	0.23	0.07	0.27	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.15	0.58	3.62	2.96	1.71	2.66	0.09	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.25	0.82	4.55	4.79	2.47	3.86	0.17	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	1.25	5.20	26.3	25.5	13.3	19.9	0.80	mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/11200

Client Project Name: Stolthaven, Dagenham

Client Project Ref: Not specified

Lab Sample ID	22/11200/1	22/11200/2	22/11200/3	22/11200/4	22/11200/5	22/11200/6	22/11200/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	BH2	BH3	BH3	BH4	BH5	BH6			
Depth to Top	2.00	1.50	1.00	3.00	0.50	3.00	0.50			
Depth To Bottom										
Date Sampled	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22	09-Nov-22			
Sample Type	Soil	Soil	Soil	Solid	Soil	Soil	Soil			
Sample Matrix Code	6A	4AB	4AE	7	6AE	6A	6A			
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	8	<1	<1	<1	<1	22	<1	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	8	<1	<1	<1	<1	30	<1	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	5	3	9	2	<1	127	<1	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	12	11	34	3	4	194	3	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	137	55	65	33	37	656	17	mg/kg	1	A-T-055s
Total Aliphatics _A	169	70	109	39	41	1030	20	mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	3	3	5	<2	2	8	2	mg/kg	1	A-T-055s
Aro >C10-C12 _A	4	2	5	1	2	22	1	mg/kg	1	A-T-055s
Aro >C12-C16 _A	11	7	11	7	7	109	3	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	24	28	43	16	37	138	15	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	72	52	84	45	107	149	36	mg/kg	1	A-T-055s
Total Aromatics _A	114	93	148	69	156	426	57	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	283	163	256	108	197	1450	77	mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 22/11200

Client Project Name: Stolthaven, Dagenham

Client Project Ref: Not specified

Lab Sample ID	22/11200/8	22/11200/9	22/11200/10					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH7	BH8	BH8							
Depth to Top	2.20	1.00	2.00							
Depth To Bottom										
Date Sampled	09-Nov-22	09-Nov-22	09-Nov-22							
Sample Type	Soil	Solid	Soil							
Sample Matrix Code	6AE	7	6A							
% Stones >10mm _A	<0.1	<0.1	<0.1							
pH _D ^{M#}	8.03	10.38	8.94					pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	1.22	0.10	0.89					g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	8600	2200	5900					mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	<1	<1	<1					mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2					mg/kg	0.2	A-T-050s
Organic Matter _D ^{M#}	2.7	4.0	3.0					% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	4	9	9					mg/kg	1	A-T-024s
Boron (water soluble) _D	8.2	1.8	3.7					mg/kg	1	A-T-027s
Cadmium _D ^{M#}	2.2	1.6	1.9					mg/kg	0.5	A-T-024s
Copper _D ^{M#}	1750	46	84					mg/kg	1	A-T-024s
Chromium _D ^{M#}	23	45	42					mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1					mg/kg	1	A-T-040s
Lead _D ^{M#}	543	190	188					mg/kg	1	A-T-024s
Mercury _D	0.76	2.14	1.22					mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	20	30	30					mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1					mg/kg	1	A-T-024s
Zinc _D ^{M#}	900	211	320					mg/kg	5	A-T-024s

Envirolab Job Number: 22/11200

Client Project Name: Stolthaven, Dagenham

Client Project Ref: Not specified

Lab Sample ID	22/11200/8	22/11200/9	22/11200/10					Units	Limit of Detection	Method ref			
Client Sample No													
Client Sample ID	BH7	BH8	BH8										
Depth to Top	2.20	1.00	2.00										
Depth To Bottom													
Date Sampled	09-Nov-22	09-Nov-22	09-Nov-22										
Sample Type	Soil	Solid	Soil										
Sample Matrix Code	6AE	7	6A										
Asbestos in Soil (inc. matrix) [^] @													
Asbestos in soil [#]	Chrysotile	NAD	NAD							A-T-045			
Asbestos Matrix (visual) _D	-	-	-							A-T-045			
Asbestos Matrix (microscope) _D	Loose Fibres	-	-							A-T-045			
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A							A-T-045			
Asbestos in Soil Quantification % @ (Hand Picking&Weighing)													
Asbestos in soil % composition (hand picking and weighing) _D	<0.001	-	-					% w/w	0.001	A-T-054			

Envirolab Job Number: 22/11200

Client Project Name: Stolthaven, Dagenham

Client Project Ref: Not specified

Lab Sample ID	22/11200/8	22/11200/9	22/11200/10					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH7	BH8	BH8							
Depth to Top	2.20	1.00	2.00							
Depth To Bottom										
Date Sampled	09-Nov-22	09-Nov-22	09-Nov-22							
Sample Type	Soil	Solid	Soil							
Sample Matrix Code	6AE	7	6A							
PAH-16MS										
Acenaphthene _A ^{M#}	0.53	0.08	0.19					mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.15	0.20	0.09					mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.86	0.46	0.42					mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	1.34	2.22	1.07					mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	1.09	2.27	1.09					mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	1.14	2.33	1.10					mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.72	1.56	0.66					mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.35	0.77	0.36					mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	1.32	2.20	1.09					mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.16	0.31	0.13					mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	3.20	4.49	2.75					mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.95	0.08	0.26					mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.77	1.72	0.72					mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.61	0.07	0.13					mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	2.90	1.37	1.46					mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	3.56	4.06	2.54					mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	19.6	24.2	14.1					mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/11200

Client Project Name: Stolthaven, Dagenham

Client Project Ref: Not specified

Lab Sample ID	22/11200/8	22/11200/9	22/11200/10						
Client Sample No									
Client Sample ID	BH7	BH8	BH8						
Depth to Top	2.20	1.00	2.00						
Depth To Bottom									
Date Sampled	09-Nov-22	09-Nov-22	09-Nov-22						
Sample Type	Soil	Solid	Soil						
Sample Matrix Code	6AE	7	6A						
TPH CWG with Clean Up									
Ali >C5-C6 _A [#]	0.02	<0.01	<0.01				mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	0.42	<0.01	0.08				mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	35	1	9				mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	40	<1	18				mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	124	<1	42				mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	279	3	89				mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	1830	77	690				mg/kg	1	A-T-055s
Total Aliphatics _A	2300	81	848				mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	0.05	<0.01	<0.01				mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	100	4	4				mg/kg	1	A-T-055s
Aro >C10-C12 _A	86	3	14				mg/kg	1	A-T-055s
Aro >C12-C16 _A	173	6	52				mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	261	21	87				mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	238	114	61				mg/kg	1	A-T-055s
Total Aromatics _A	857	148	218				mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	3160	229	1070				mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	0.05	<0.01	<0.01				mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	0.09	<0.01	<0.01				mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	0.56	<0.01	<0.01				mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	0.77	<0.01	<0.01				mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s

REPORT NOTES

General

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

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Subscript "A" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these

humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	BEK Enviro Ltd, Suite One , No 3 Mitton Road Business Park , Mitton Road , Whalley , Lancashire , BB7 9YE	Project No:	22/11200
Project:	Stolthaven, Dagenham	Date Received:	14/11/2022 (am)
Clients Project No:		Cool Box Temperatures (°C):	10.1, 10.9, 10.2

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	22/11200/1	22/11200/2	22/11200/3	22/11200/4	22/11200/5	22/11200/6	22/11200/7	22/11200/8	22/11200/9	22/11200/10
Client Sample No										
Client Sample ID/Depth	BH1 2.00m	BH2 1.50m	BH3 1.00m	BH3 3.00m	BH4 0.50m	BH5 3.00m	BH6 0.50m	BH7 2.20m	BH8 1.00m	BH8 2.00m
Date Sampled	09/11/22	09/11/22	09/11/22	09/11/22	09/11/22	09/11/22	09/11/22	09/11/22	09/11/22	09/11/22
A-T-004s	17/11/2022		17/11/2022			17/11/2022				17/11/2022
A-T-007s	18/11/2022		18/11/2022			18/11/2022				18/11/2022
A-T-019s	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
A-T-022s	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
A-T-024s	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
A-T-025w	22/11/2022		22/11/2022			22/11/2022				22/11/2022
A-T-026s	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
A-T-026w	22/11/2022		22/11/2022			22/11/2022				22/11/2022
A-T-027s	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
A-T-028s	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
A-T-030s	18/11/2022		16/11/2022			16/11/2022				18/11/2022
A-T-031s	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
A-T-031w	22/11/2022		22/11/2022			22/11/2022				22/11/2022
A-T-032 OM	22/11/2022	18/11/2022	18/11/2022	21/11/2022	21/11/2022	18/11/2022	21/11/2022	18/11/2022	21/11/2022	21/11/2022
A-T-032s	22/11/2022		18/11/2022			18/11/2022				21/11/2022
A-T-032w	22/11/2022		22/11/2022			22/11/2022				22/11/2022
A-T-037w	22/11/2022		22/11/2022			22/11/2022				22/11/2022
A-T-040s	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
A-T-042sTCN	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
A-T-044	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
A-T-045	15/11/2022	15/11/2022	15/11/2022	15/11/2022	15/11/2022	15/11/2022	15/11/2022	15/11/2022	15/11/2022	15/11/2022
A-T-050s	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
A-T-050w	22/11/2022		22/11/2022			22/11/2022				22/11/2022
A-T-054		16/11/2022	16/11/2022			16/11/2022		16/11/2022		
A-T-055s	17/11/2022	17/11/2022	21/11/2022	21/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
A-T-ANCs	18/11/2022		18/11/2022			18/11/2022				18/11/2022
Calc-As Recd	18/11/2022	18/11/2022	21/11/2022	21/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
Calc-no stones	22/11/2022		22/11/2022			22/11/2022				22/11/2022
Probe (w)	22/11/2022		22/11/2022			22/11/2022				22/11/2022

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

Final Test Report

Envirolab Job Number: 22/11200
Issue Number: 1
Date: 22-Nov-22

Client: BEK Enviro Ltd
Suite One
No 3 Mitton Road Business Park
Mitton Road
Whalley
Lancashire, BB7 9YE

Project Manager: Mick Buckley
Project Name: Stolthaven, Dagenham
Project Ref: Not specified
Order No: 7626-22137-M

Date Samples Received: 14-Nov-22
Date Instructions Received: 14-Nov-22
Date Analysis Completed: 22-Nov-22

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

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

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

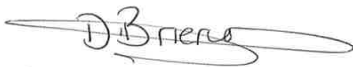
IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

HWOL TPH Code: EH_CU_1D_AL: Extractable hydrocarbons - i.e. everything extracted by the solvent(s), Clean-up - e.g. by florisil, silica gel, GC - Single coil gas chromatography, Aliphatics only

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Sample Details					Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	22/11200/1	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample Number								
Client Sample ID				BH1				
Depth to Top				2				
Depth to Bottom								
Date Sampled				09/11/2022				
Sample Type				Soil				
Sample Matrix Code				6A				
Solid Waste Analysis								
pH (pH Units) _D	A-T-031	N	N	8.14	-	>6	-	
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.35	-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.05	-	to be evaluated	to be evaluated	
Loss on Ignition (%) _D	A-T-030	N	N	4.7	-	-	10	
Total Organic Carbon (%) _D	A-T-032	N	N	2.08	3	5	6	
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	1.28	100	-	-	
Mineral Oil (mg/kg) _{A EH_CU_1D_AL}	A-T-007	N	N	252	500	-	-	
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007	1	-	-	
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01	6	-	-	
Eluate Analysis				10:1	10:1	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
				mg/l	mg/kg			
Arsenic	A-T-025	N	N	0.002	0.020	0.5	2	25
Barium	A-T-025	N	N	0.037	0.370	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.01	0.04	1	5
Chromium	A-T-025	N	N	<0.001	<0.01	0.5	10	70
Copper	A-T-025	N	N	<0.004	<0.04	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.018	0.180	0.5	10	30
Nickel	A-T-025	N	N	0.003	0.030	0.4	10	40
Lead	A-T-025	N	N	0.002	0.020	0.5	10	50
Antimony	A-T-025	N	N	0.009	0.090	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.004	0.040	4	50	200
Chloride	A-T-026	N	N	12	116	800	15000	25000
Fluoride	A-T-026	N	N	0.4	4.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	215	2147	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	271	2710	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<2.0	<200	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	7.9				
Conductivity (µS/cm)	A-T-037	N	N	542				
Mass Sample (kg)				0.232				
Dry Matter (%)	A-T-044	N	N	75.3				
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation								

Sample Details					Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	22/11200/3				
Client Sample Number					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				BH3				
Depth to Top				1				
Depth to Bottom								
Date Sampled				09/11/2022				
Sample Type				Soil				
Sample Matrix Code				4AE				
Solid Waste Analysis								
pH (pH Units) _D	A-T-031	N	N	9.83	-	>6	-	
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.69	-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.12	-	to be evaluated	to be evaluated	
Loss on Ignition (%) _D	A-T-030	N	N	NDP	-	-	10	
Total Organic Carbon (%) _D	A-T-032	N	N	2.96	3	5	6	
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	26.6	100	-	-	
Mineral Oil (mg/kg) _A <small>EH, CU, 1D, AL</small>	A-T-007	N	N	143	500	-	-	
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	0.02	1	-	-	
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01	6	-	-	
Eluate Analysis					10:1	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
					mg/l	mg/kg		
Arsenic	A-T-025	N	N	0.026	0.260	0.5	2	25
Barium	A-T-025	N	N	0.009	0.090	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.002	0.020	0.5	10	70
Copper	A-T-025	N	N	0.013	0.130	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.011	0.110	0.5	10	30
Nickel	A-T-025	N	N	<0.002	<0.02	0.4	10	40
Lead	A-T-025	N	N	0.006	0.060	0.5	10	50
Antimony	A-T-025	N	N	0.017	0.170	0.06	0.7	5
Selenium	A-T-025	N	N	0.002	0.020	0.1	0.5	7
Zinc	A-T-025	N	N	0.002	0.020	4	50	200
Chloride	A-T-026	N	N	6	61	800	15000	25000
Fluoride	A-T-026	N	N	0.3	3.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	80	799	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	147	1470	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<2.0	<200	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	7.8				
Conductivity (µS/cm)	A-T-037	N	N	294				
Mass Sample (kg)				0.194				
Dry Matter (%)	A-T-044	N	N	90.2				
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation								

Sample Details					Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	22/11200/6				
Client Sample Number					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				BH5				
Depth to Top				3				
Depth to Bottom								
Date Sampled				09/11/2022				
Sample Type				Soil				
Sample Matrix Code				6A				
Solid Waste Analysis								
pH (pH Units) _D	A-T-031	N	N	8.44	-	>6	-	
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.34	-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.09	-	to be evaluated	to be evaluated	
Loss on Ignition (%) _D	A-T-030	N	N	NDP	-	-	10	
Total Organic Carbon (%) _D	A-T-032	N	N	5.82	3	5	6	
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	20	100	-	-	
Mineral Oil (mg/kg) _A <small>EH, CU, 1D, AL</small>	A-T-007	N	N	2110	500	-	-	
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007	1	-	-	
Sum of BTEX (mg/kg) _A	A-T-022	N	N	0.01	6	-	-	
Eluate Analysis					10:1	10:1	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)	
					mg/l	mg/kg		
Arsenic	A-T-025	N	N	0.003	0.030	0.5	2	25
Barium	A-T-025	N	N	0.038	0.380	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.01	0.04	1	5
Chromium	A-T-025	N	N	<0.001	<0.01	0.5	10	70
Copper	A-T-025	N	N	<0.004	<0.04	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.014	0.140	0.5	10	30
Nickel	A-T-025	N	N	<0.002	<0.02	0.4	10	40
Lead	A-T-025	N	N	0.002	0.020	0.5	10	50
Antimony	A-T-025	N	N	0.016	0.160	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.003	0.030	4	50	200
Chloride	A-T-026	N	N	3	34	800	15000	25000
Fluoride	A-T-026	N	N	0.2	2.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	98	979	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	215	2150	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<2.0	<200	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	8.9				
Conductivity (µS/cm)	A-T-037	N	N	430				
Mass Sample (kg)				0.189				
Dry Matter (%)	A-T-044	N	N	92.4				
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation								

Sample Details					Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	22/11200/10				
Client Sample Number					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				BH8				
Depth to Top				2				
Depth to Bottom								
Date Sampled				09/11/2022				
Sample Type				Soil				
Sample Matrix Code				6A				
Solid Waste Analysis								
pH (pH Units) _D	A-T-031	N	N	8.94	-	>6	-	
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.51	-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.12	-	to be evaluated	to be evaluated	
Loss on Ignition (%) _D	A-T-030	N	N	4.9	-	-	10	
Total Organic Carbon (%) _D	A-T-032	N	N	1.75	3	5	6	
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	14.2	100	-	-	
Mineral Oil (mg/kg) _A <small>EH, CU, 1D, AL</small>	A-T-007	N	N	1250	500	-	-	
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007	1	-	-	
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01	6	-	-	
Eluate Analysis					10:1	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
					mg/l	mg/kg		
Arsenic	A-T-025	N	N	0.005	0.050	0.5	2	25
Barium	A-T-025	N	N	0.020	0.200	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.01	0.04	1	5
Chromium	A-T-025	N	N	<0.001	<0.01	0.5	10	70
Copper	A-T-025	N	N	<0.004	<0.04	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.016	0.160	0.5	10	30
Nickel	A-T-025	N	N	<0.002	<0.02	0.4	10	40
Lead	A-T-025	N	N	<0.001	<0.01	0.5	10	50
Antimony	A-T-025	N	N	0.010	0.100	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.002	0.020	4	50	200
Chloride	A-T-026	N	N	11	109	800	15000	25000
Fluoride	A-T-026	N	N	0.3	3.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	211	2106	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	245	2450	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<2.0	<200	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	7.8				
Conductivity (µS/cm)	A-T-037	N	N	489				
Mass Sample (kg)				0.23				
Dry Matter (%)	A-T-044	N	N	76.2				
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation								

APPENDIX D

Geotechnical Test Results

TEST REPORT

Client BEK Enviro Ltd

Address Suite One
No. 3 Mitton Road Business Park
Mitton Road
Whalley
Lancashire
BB7 9YE

Contract Stolthaven, Dagenham

Job Number MRN 4265/50
Date of Issue 22 November 2022
Page 1 of 5

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.
- 5 The results included within the report are representative of the samples submitted for analysis.
- 6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.



MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014

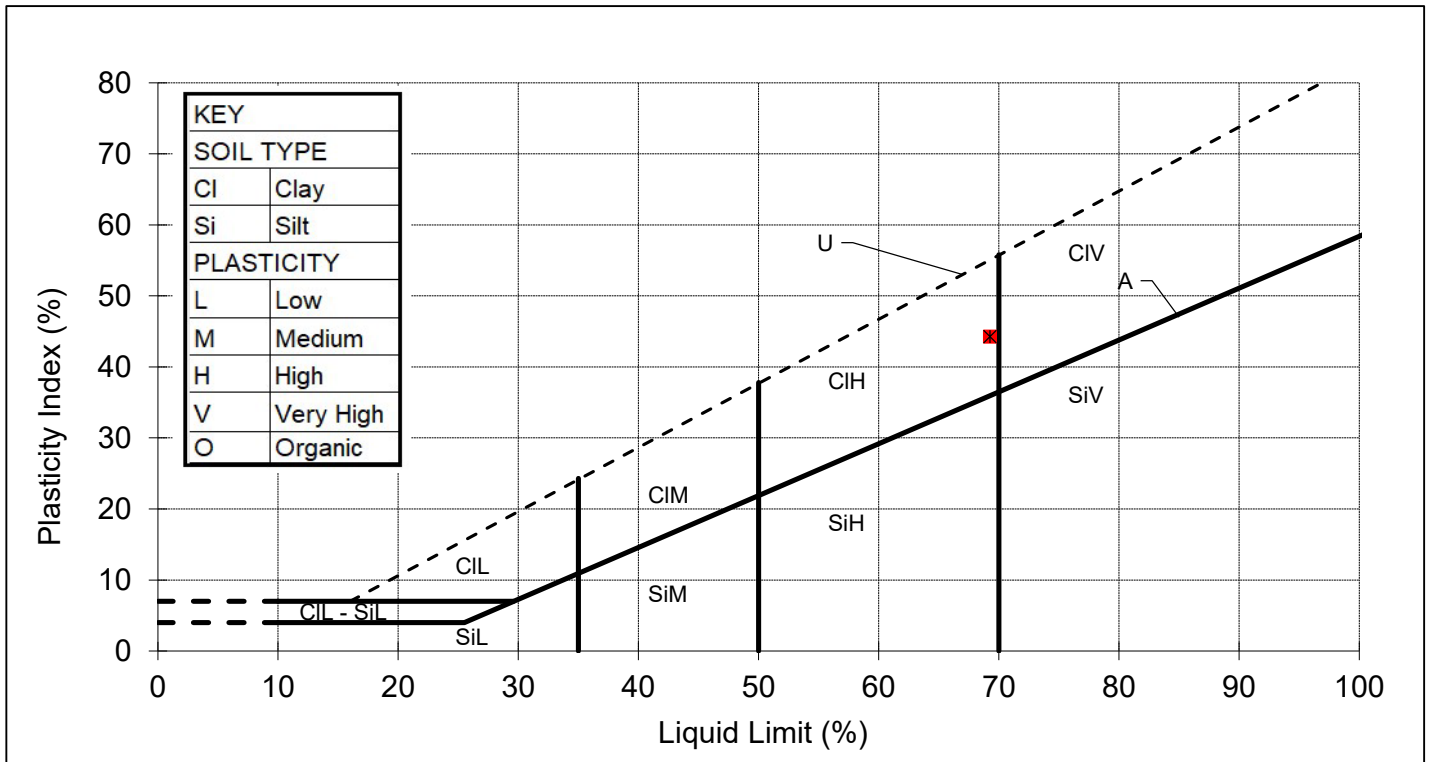
CLIENT	BEK Enviro Ltd
SITE	Stolthaven, Dagenham
JOB NUMBER	MRN 4265/50

SAMPLE LABEL	BH1 (4.0-4.5m)	DATE SAMPLED	05-Nov-22
SAMPLE No.	118816	DATE RECEIVED	15-Nov-22
DATE TESTED	16-Nov-22	SAMPLED BY	Client

MATERIAL	Firm to stiff brown silty CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978	
Determination 1 (avg)	19.1	68.2		1.017
Determination 2 (avg)	19.0	68.0		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
47.9	69	25	44	100



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

22-Nov-22

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014

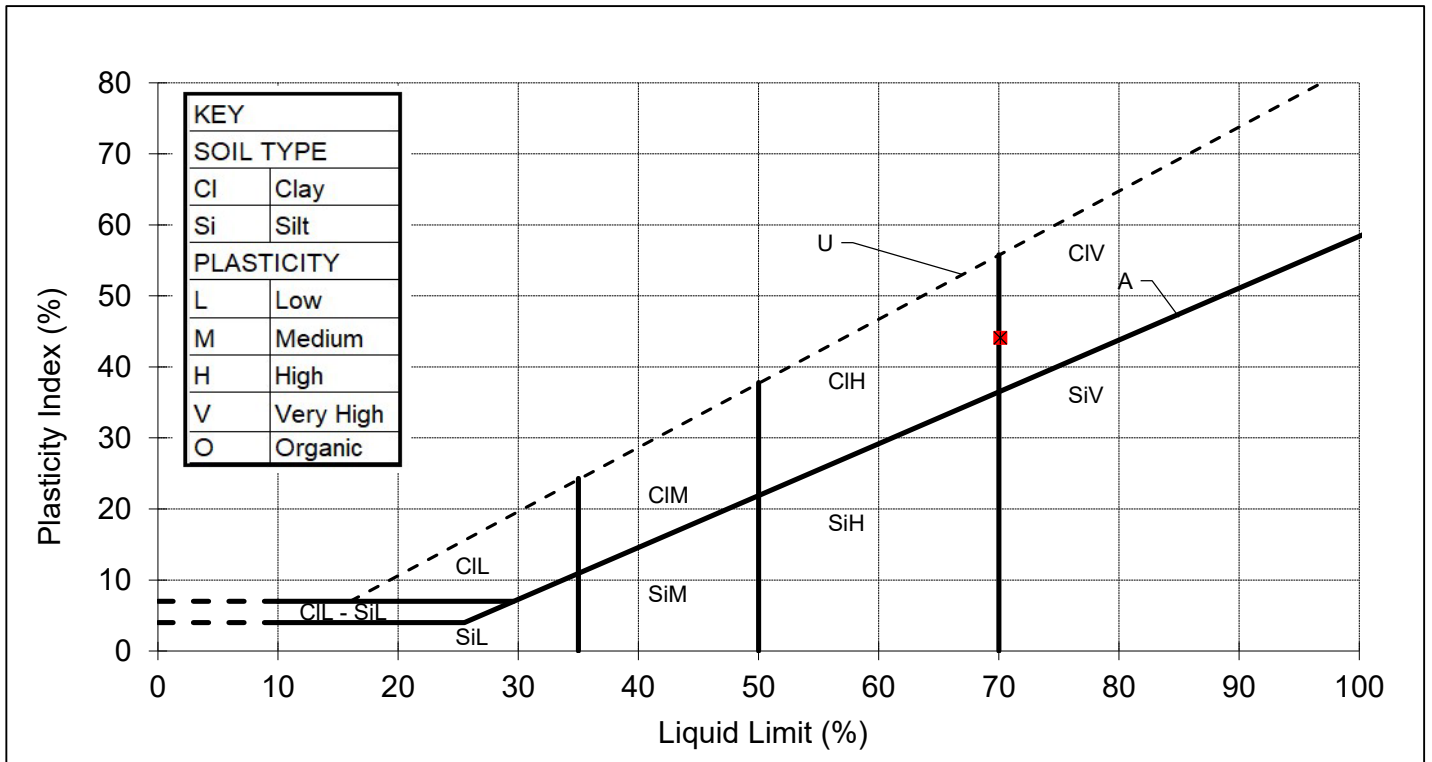
CLIENT	BEK Enviro Ltd
SITE	Stolthaven, Dagenham
JOB NUMBER	MRN 4265/50

SAMPLE LABEL	BH4 (4.5-5.0m)	DATE SAMPLED	05-Nov-22
SAMPLE No.	118817	DATE RECEIVED	15-Nov-22
DATE TESTED	16-Nov-22	SAMPLED BY	Client

MATERIAL	Firm to stiff brown silty CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978	
Determination 1 (avg)	20.0	70.1		1.001
Determination 2 (avg)	20.0	70.0		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
38.5	70	26	44	100



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

22-Nov-22

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014

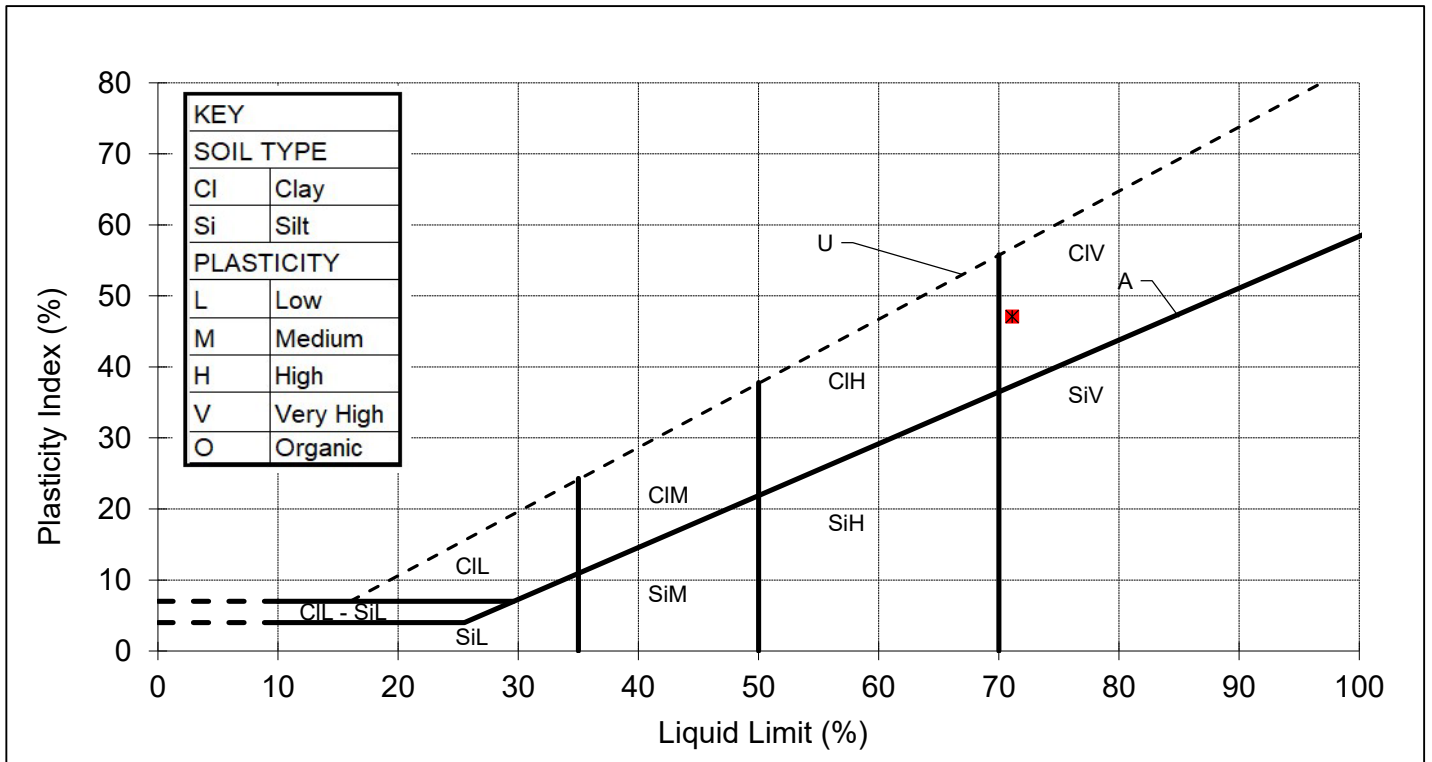
CLIENT	BEK Enviro Ltd
SITE	Stolthaven, Dagenham
JOB NUMBER	MRN 4265/50

SAMPLE LABEL	BH8 (4.0-4.5m)	DATE SAMPLED	05-Nov-22
SAMPLE No.	118818	DATE RECEIVED	15-Nov-22
DATE TESTED	16-Nov-22	SAMPLED BY	Client

MATERIAL	Soft to firm brown silty CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)	Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.2	1.030	
Determination 2 (avg)	18.5		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
58.2	71	24	47	100



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

22-Nov-22

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870


TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS EN ISO 17892-8:2018

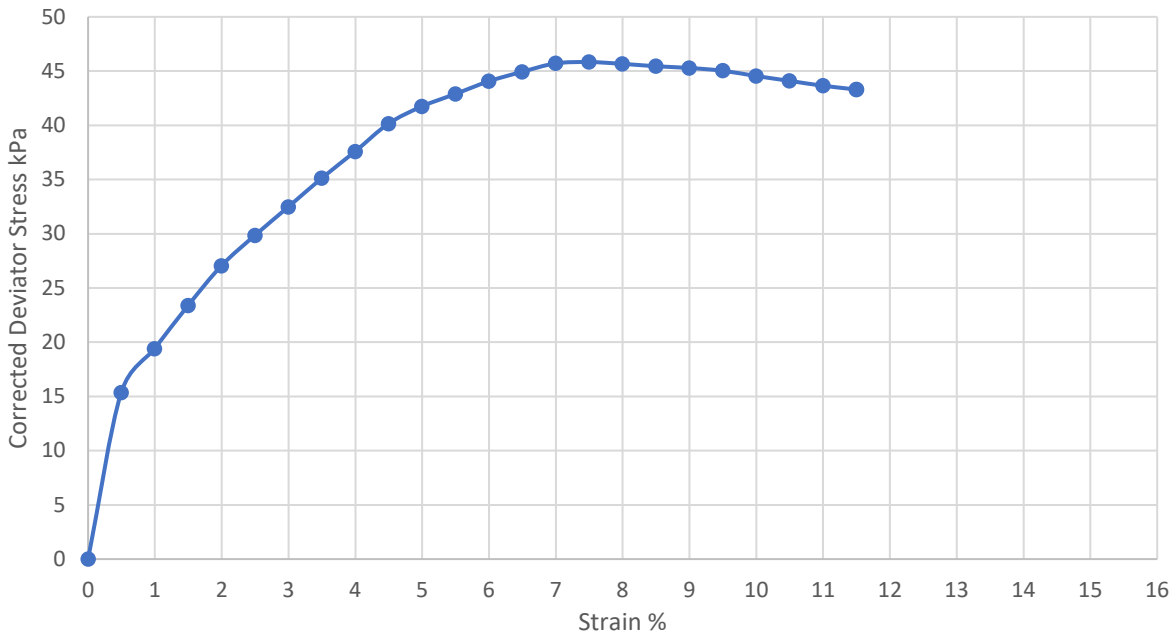
CLIENT	BEK Enviro Ltd
SITE	Stolthaven, Dagenham
JOB NUMBER	MRN 4252/50

SAMPLE LABEL	BH7 (5.0-5.45m)	DATE SAMPLED	05-Nov-22
LAB SAMPLE No.	118819	DATE RECEIVED	15-Nov-22
DATE TESTED	15-Nov-22	SAMPLED BY	Client
MATERIAL	Soft brown silty CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

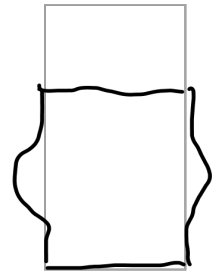
Specimen Location 	Sample Length (mm)	450	Specimen depth from top of Sample (mm)	80
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	203	Specimen Water Content (%)	65.8
	Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	1.63
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	0.98
	Membrane Correction	2.60		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



BULGING

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
105	7.5	2.0	46	23

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

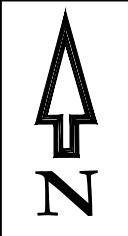
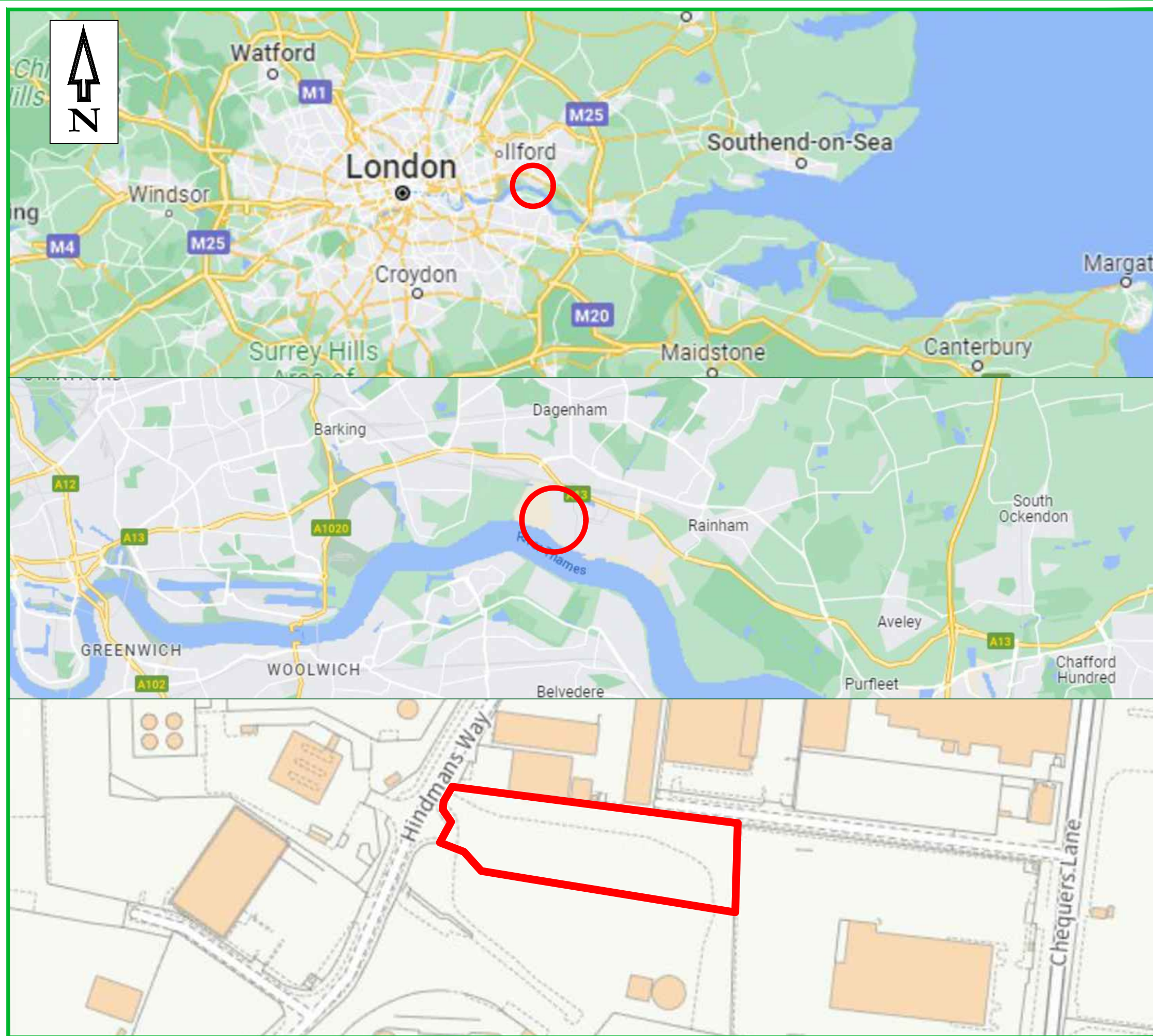
Signed



Date 22 November 2022

APPENDIX E

Drawings



LEGEND

— SITE LOCATION

REV	DESCRIPTION	DATE	BY



GEO-ENVIRONMENTAL CONSULTING ENGINEERS
 Suite One, No 3 Mitton Road Business Park, Mitton Road,
 Whalley, Lancashire BB7 9YE
 Tel: 01254 377622 Mob: 07906753583
 Email: mbuckley@benviro.co.uk
 Web: www.benviro.co.uk

CLIENT.

JOB TITLE.
 STALTHAVEN, DAGENHAM

DRAWING TITLE.
 SITE LOCATION PLAN

SCALE © A3. N'TS	DRAWN BY. D.E.	APPROVED BY. M.B.	DATE. 25/11/22
---------------------	-------------------	----------------------	-------------------

DRAWING No. 22137-1	REV. -
------------------------	-----------



LEGEND

— SITE FOOTPRINT

REV	DESCRIPTION	DATE	BY



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Suite One, No 3 Mitton Road Business Park, Mitton Road,
Whalley, Lancashire BB7 9YE
Tel: 01254 377622 Mob: 07906753583
Email: mbuckley@bekenviron.co.uk
Web: www.bekenviron.co.uk

CLIENT.

JOB TITLE.

STALTHAVEN, DAGENHAM

DRAWING TITLE.





SITE LAYOUT PLAN

SCALE © A3. N'TS	DRAWN BY. D.E.	APPROVED BY. M.B.	DATE. 25/11/22
---------------------	-------------------	----------------------	-------------------

DRAWING No. 22137-2	REV. -
------------------------	-----------



LEGEND

-  CABLE PERCUSSIVE BOREHOLE
-  CABLE PERCUSSIVE BOREHOLE (GAS/GROUNDWATER MONITORING PROBE)
-  WINDOW SAMPLE BOREHOLE
-  WINDOW SAMPLE BOREHOLE (GAS/GROUNDWATER MONITORING PROBE)

REV	DESCRIPTION	DATE	BY



GEO-ENVIRONMENTAL CONSULTING ENGINEERS
 Suite One, No 3 Mitton Road Business Park, Mitton Road,
 Whalley, Lancashire BB7 9YE
 Tel: 01254 377622 Mob: 07906753583
 Email: mbuckley@bekenviro.co.uk
 Web: www.bekenviro.co.uk

CLIENT.

JOB TITLE.
 STALTHAVEN, DAGENHAM







DRAWING TITLE.
 SITE INVESTIGATION PLAN

SCALE © A3. N'TS	DRAWN BY. D.E.	APPROVED BY. M.B.	DATE. 25/11/22
---------------------	-------------------	----------------------	-------------------

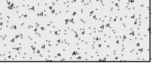


DRAWING No. 22137-3	REV. -
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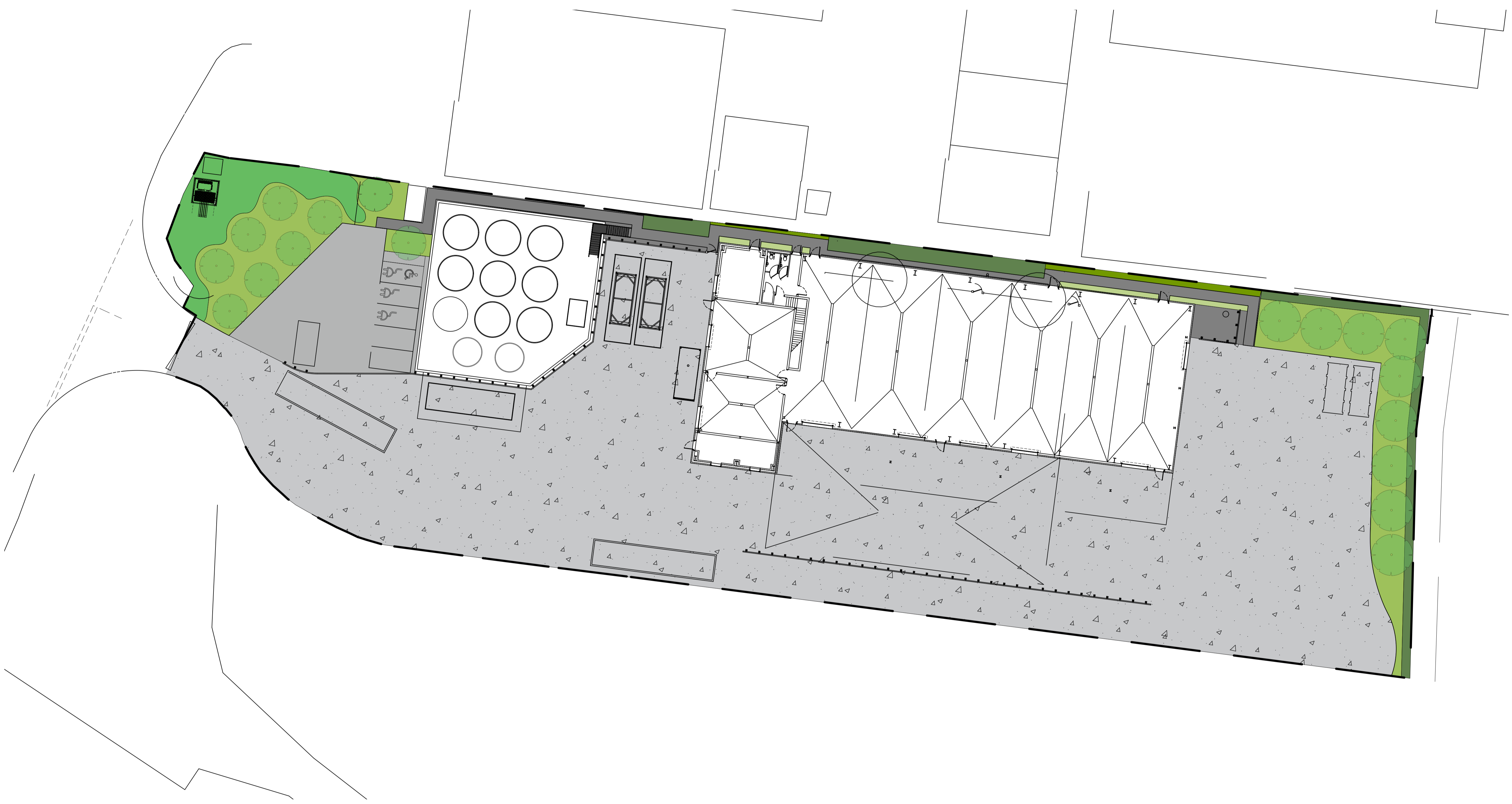


Soft Landscape

-  Proposed Tree
-  Proposed Shrub and Perennial Planting
-  Amenity Grass
-  Tree and Shrub Planting
-  Proposed Climbers
-  Proposed Native Hedge

Hard Landscape

-  Proposed Concrete
-  Proposed Vehicular Tarmac
-  Proposed Pedestrian Tarmac



P03	24/08/2023	Updated Layout	11
P02	08/06/2023	minor amendments to specification	10
P01	23/05/2023	220404 Oleco Proposed Planning 22.05.2023	09
REV	Date	Description	Drawn by

Base drawing:
 Title: Landscape Proposals Plan Stage: Stage 3

Client:
 Oleco Dagenham, Barking, RM9 6LN

Project:
 Meller Limited

Date:	Drawn by:	Authorised:
24/08/2023	HR	MR

Drawing Number:	REV:
230336-TMA-XX-XX-DR-L-3000	P03
	Scale: 1:200 @A1



The Barn, Felthames Park
 Chalk Lane, Harlow
 Essex CM17 0PF

0845 094 3268
 info@tma-consultants.co.uk
 www.timmoassociates.co.uk