WML CONSULTING

Geo-Environmental Investigation & Assessment

For

Our Lady's RC High School, Blackley

Undertaken on behalf of

Pozzoni Architecture

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Executive Summary

Site Location	The site comprises an area of soft landscaping to the west of the existing Our Lady's School off Alworth Road in Blackley. It is centred on approximate Ordnance Survey National Grid Reference 385419E, 404480N with an indicative postcode of M9 0RP.
Development Proposals	Construction of a new-build, two-storey additional learning facilities block at the existing school site. The proposed building is anticipated to be a free standing structure adjacent to the existing school building and will be steel-framed with composite or precast floors.
Ground Conditions	A surface horizon of topsoil is underlain by made ground to depths of between 1.70 and 4.00mbgl. This is locally underlain by suspected reworked Glacial Till to 3.80mbgl and in turn Glacial Till to a maximum proven depth of 10.50mbgl. Perched groundwater was encountered within made ground at depths of 1.50 to 2.00mbgl.
Site Preparation	A degree of earthworks will be required to provide a level platform for construction which will require removal of made ground forming the existing landscaped mounds. The made ground may be used as general bulk fill subject to screening and testing to confirm suitability in this respect. Site enabling works will need to take account of the integrity of all existing/ adjacent services at the site, including the existing attenuation tank recorded immediately to the west.
Foundations and Floor Slabs	In view of the ground conditions encountered, consideration will need to be given to the adoption of piled foundations, with piles being taken into the underlying firm to stiff Glacial Till to achieve adequate working loads. Floor slabs should be suspended.
Excavations and Groundwater	No significant inflow of groundwater are anticipated within excavations at the site.
Pavements	New road pavement design should be based on a California Bearing Ratio (CBR) value of no more than 3.0% for preliminary purposes.
Concrete Classification	The worst case design sulphate (DS) class and "Aggressive Chemical Environment for Concrete" (ACEC) class for the site are DS-1 and AC-2z respectively.
Drainage and Soakaways	In consideration of the site being generally underlain by cohesive soils, soakaways are not considered to be a suitable drainage option for the site.
Ground Gas	The preliminary risk from ground gas at the site is considered low. This will need to be confirmed by a programme of ground gas monitoring and assessment when access to the site is available.
Ground Contamination	The risk to human health and controlled waters from soils at the site is considered negligible with no specific environmental remediation required in this respect.
Waste Soils	Preliminary assessment indicates that the levels of contamination measured would classify the majority of samples as Non-hazardous waste for disposal, with the concentrations of hydrocarbons measured within WS04 (0.30m) classifying as Hazardous. It should be noted that further analysis of soils destined for disposal for assessment against Waste Acceptance Criteria (WAC) will possibly determine that the main body of soils will classify as Inert. WAC testing will also need to be undertaken on soils characterised as Hazardous for appropriate disposal at the landfill. It will be the responsibility of the waste producer to undertake further testing and classification of any waste soils for disposal to an appropriately licenced landfill in accordance with current guidelines and Duty of Care requirements.

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1.0 INTRODUCTION

Appointment

1.1 WML Consulting has been commissioned by Pozzoni Architecture Limited to undertake a Geo-environmental Investigation and Assessment of a site referred to as Our Lady's RC High School, located off Alworth Road in Blackley.

Proposed Development

1.2 The proposed development involves construction of a new-build, 2- storey additional learning facilities block at the existing school site. The proposed building is anticipated to be a free standing structure adjacent to the existing school building and will be steel-framed with composite or precast floors.

1.3 The current development options for the proposed development are included on the Pozzoni drawing POZ-XX-00-DR-A-1200 within Appendix 01.

Objective

1.4 The objective of the ground investigation and assessment was to provide geotechnical recommendations for construction design purposes together with a geo-environmental risk assessment in terms of possible ground contamination.

1.5 To achieve the objective, the following tasks were undertaken:

- Review the existing desk study and preliminary geoenvironmental reports and design a ground investigation to provide supplementary ground information.
- Characterise the ground conditions in terms of geology, soil geotechnical parameters and ground contamination from information provided by the ground investigation.
- Provide recommendations regarding suitable foundations, floor slabs and new pavement construction, together with any other geotechnical considerations that could affect possible future development.
- Determine a ground conceptual model for the site so as to undertake a ground contamination Generic Quantitative Risk Assessment (GQRA) in line with latest guidance provided by the Environment Agency (EA) in their published document Land Contamination Risk Management (LCRM), April 2021.

Scope

1.6 The following reports relating to the site were made available for review:

- Geotechnics Ground Investigation and Desk Study reference PN061161, dated August 2006.
- SKM Preliminary Geoenvironmental Investigation reference EE10253 dated August 2006.

1.7 It is understood that a current Phase 1 Desk Study report was not required as part of the planning conditions. Nevertheless, for completeness, this report summarises data presented in the previous reports together with supplementary data from freely available technical data on-line to present a conceptual model for the site.

1.8 The current ground investigation comprised the formation of window sample probeholes and cable percussive boreholes undertaken with reference to BS5930:2015 + A1:2020 Code of Practice for Ground Investigation and BS10175:2011 together with A1:2013, "Investigation of Potentially Contaminated Sites - Code of Practice" except where superseded by EN ISO 22475-1 "Geotechnical Investigation and Assessment – Sampling by Drilling and Excavation and Groundwater Measurements".

1.9 Geotechnical soil testing has been undertaken in general accordance with guidelines provided in BS1377:1990 – Parts 1-9, "Method of Test for Soils for Civil Engineering Purposes". Samples for chemical

analysis were obtained and handled generally in accordance with the current guidelines (BS10175: 2011 and A1:2013).

1.10 The ground investigation has also been undertaken with reference to BS8576:2013, Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs).

1.11 The results of the monitoring, once complete, will be reported within an addendum Ground Gas Risk Assessment report in due course.

2.0 SITE LOCATION AND DESCRIPTION

Site Location

2.1 The site comprises an area of soft landscaping to the west of the existing Our Lady's School off Alworth Road in Blackley. It is centred on approximate Ordnance Survey National Grid Reference 385419E, 404480N with an indicative postcode of M9 0RP.

2.2 The proposed development site is bounded to the east by the existing Our Lady's School, to the north and west by playing fields and to the south by soft landscaping with residential properties beyond.

Site Description

2.3 At the time of the site inspection in March 2021, the site comprised an area of maintained grass landscaping within the existing Our Lady's School grounds.

2.4 A temporary classroom formed the sites eastern boundary.

2.5 Two vent pipes, understood to relate to an underground surface water attenuation tank, demarcate the sites western boundary.

2.6 The site topography comprised a linear bund elevated around 0.50 to 1.00m above the surrounding level playing fields running along the eastern boundary and a further oval-shaped mound elevated around 1.00 to 1.50m above the surrounding playing fields which extended across the western part.

2.7 The wider school site area is generally level and commensurate with the surrounding area, although the southern boundary is formed by a south facing slope to the neighbouring residential properties.

3.0 SUMMARY OF ENVIRONMENTAL AND HISTORICAL SETTING

3.1 The following paragraphs summarise the most relevant findings of the desk study report, supplemented where necessary by data obtained from freely available on-line sources.

Geology

3.2 The British Geological Survey (BGS) indicate the site to be underlain by Glacial Till, comprising mainly clay but possibly with interbedded sand and gravel horizons.

3.3 The superficial deposits are underlain by strata of the Manchester Marls Formation which is recorded to comprise mudstone.

Ground Conditions

3.4 A review of relevant data presented in the previous ground investigation report indicates that a thin (0.10 to 0.20m) thick layer of topsoil overlying Glacial Till comprising interbedded sand and clay deposits with varying secondary constituents and to a proven depth of 5.45m below ground level (bgl).

3.5 The clay deposits were described as having variable consistencies from soft to stiff with the sand deposits being described as loose and medium dense.

3.6 Standard Penetration Tests (SPT's) undertaken in the clay deposits provided 'N' values of 6 to 10, confirming a generally soft consistency.

3.7 Limited chemical analysis of samples taken from investigation probeholes in the general area of the development site indicated no exceedences above the generic assessment criteria which were relevant at the time.

3.8 No ground gas monitoring was undertaken within investigation probeholes in proximity to the development site. However, elevated levels of methane (up to 10.5% by volume in air) and carbon dioxide (up to 14.0% by volume in air) were recorded in standpipes remote from the development site on one occasion.

3.9 Elevated flow rates were also recorded but no correlation could be made between these and elevated concentrations of hazardous gasses.

Radon

3.10 The property is not in a radon affected area as defined by the BGS/Public Health England as less than 1% of properties are above the action level of exposure. Therefore, no radon protection measures are necessary for new structures as described in publication BR211 by the Building Research Establishment.

Mining and Subsidence

3.11 In consideration of the underlying geology, the risk from shallow coal mining activity at the site is considered low and can be discounted.

Environmental Setting

3.12 The superficial deposits underlying the site are classified as a 'Secondary (undifferentiated) Aquifer'. These are normally assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

3.13 The underlying bedrock is classified as a 'Secondary B Aquifer'. These comprise predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

3.14 There are no EA Source Protection Zones (SPZ) within 500m of the site.

3.15 The Haweswater Aqueduct is the nearest watercourse located around 45m south of the site, piped in two 48inch steel. The previous SKM report indicates that this has a 20m easement.

3.16 There are no active landfills recorded within 500m of the site or historic landfills recorded within 250m of the site.

Site History

3.17 Earliest historical maps indicate the site to have comprised undeveloped land in rural / agricultural use.

3.18 The area surrounding the site has historically comprised predominantly undeveloped land in rural / agricultural use with residential development to the south and west occurring in the mid to late 20th century.

3.19 As a result of the site history, with no apparent industrial and contaminative use, significant sources of ground contamination are not anticipated.

3.20 This has been confirmed to a degree by the previous ground investigations.

Preliminary Contamination Risk Assessment

3.21 Under the proposed development scenario, potential pollution linkages are considered unlikely with associated preliminary risks being assessed, on the whole, as very low to low.

3.22 However, it has been considered appropriate to confirm the low environmental risk by undertaken further ground investigations, to include chemical analysis of selected soil samples.

3.23 Also, further ground gas monitoring has been considered necessary in light of the uncertainty relating to the potential risk from ground gas.

4.0 SITE INVESTIGATION

Rationale

4.1 Intrusive investigations were undertaken primarily to provide geotechnical parameters for structural design purposes but also to verify the preliminary site conceptual model and confirm the anticipated low environmental risk.

4.2 To minimise surface disruption, window sample probeholes were undertaken to provide information on near surface deposits and to obtain samples for chemical analysis. Due to the small diameter of the probing equipment, the depth of penetration achieved is dependent on favourable ground conditions. As such, ground penetration may be restricted in circumstances where the ground is particularly strong or contains relatively large obstructions such as cobbles and/or boulders.

4.3 A cable percussive borehole was undertaken to provide information on deeper ground conditions for possible pile design purposes.

4.4 The investigation locations were chosen so as not to impact on the presence of known/suspected services beneath the site.

4.5 Monitoring standpipes were installed in selected probeholes for the measurement of ground gas and groundwater levels.

4.6 Chemical analysis of a general suite of contaminants was undertaken on selected samples of soil. This was to confirm the anticipated low contamination risk and to establish the chemical suitability of soils for possible re-use within the development.

4.7 The chemical analysis included for the identification of asbestos fibres in view of the previous development at the site.

Intrusive Works

4.8 Ground investigation work was undertaken by Geoventures (UK) Ltd on the 27th March 2021. This comprised the formation of 5no window sample probeholes to a maximum depth of 5.00mbgl and 1no cable percussive borehole to a maximum depth of 10.50mbgl.

4.9 The exploratory hole records are presented in Appendix 02 of this report whilst the exploratory hole locations are shown on Drawing 9670G-SK01 in Appendix 01.

Geotechnical and Chemical Testing

4.10 In-situ geotechnical testing was undertaken at regular intervals during the formation of the probeholes and borehole in the form of SPTs. The results for this testing are presented on the descriptive logs in Appendix 02.

4.11 Geotechnical soils testing was undertaken on selected samples for the following:

- Natural Moisture Content.
- Liquid and Plastic Limit.

4.12 The results of the geotechnical testing are presented in Appendix 03.

4.13 Chemical analysis was undertaken on selected soil samples for the following contaminants of concern:

- Total Arsenic, Boron, Cadmium, Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc.
- Total Cyanide, Phenols, Sulphur, Sulphate.
- Speciated USEPA Polyaromatic Hydrocarbons (PAH).

- TPH ID and Trace.
- Asbestos Screen and Identification.
- 2:1 water/soil sulphate extract, pH.

4.14 In order to assess the potential risk to controlled waters, selected samples of soils were submitted for leachate preparation and analyses of the following suite of contaminants:

- Total arsenic, boron, cadmium, chromium VI, copper, lead, mercury, nickel, selenium, vanadium, zinc.
- Speciated (16) hydrocarbons (PAH).
- Total phenols, sulphur, sulphate.
- Sulphate extract, pH.

4.15 The results of the chemical analysis are presented in Appendix 04.

5.0 GROUND CONDITIONS

Stratigraphy

5.1 Ground conditions encountered during the intrusive investigation generally comprised a surface horizon of topsoil underlain by made ground to depths of between 1.70 and 4.00mbgl. This was locally underlain by suspected reworked Glacial Till to 3.80mbgl and in turn Glacial Till to a maximum proven depth of 10.50mbgl.

Topsoil

5.2 Topsoil was encountered within all exploratory holes from ground level to depths of between 0.10 and 0.40mbgl.

5.3 The topsoil comprised dark brown, sandy clay with rootlets.

Made Ground

5.4 Made ground was encountered within all of exploratory holes underlying the topsoil and extending to depths of between 1.70 and 4.00mbgl.

5.5 The made ground generally comprised brown to grey, variably sandy and gravelly clay with pockets of gravelly sand and sandy gravel. Gravel sized fragments included brick, concrete, sandstone and locally slate, ceramic, ash, clinker, asphalt and coal.

5.6 SPT 'N' values within the made ground generally ranged between 7 and 13 indicating a loose to medium dense compaction.

Reworked Glacial Till

5.7 Within WS03, soil considered to represent reworked Glacial Till was encountered underlying the made ground at a depths of 1.70mbgl, extending to a depth of 3.80mbgl.

5.8 This comprised brown and grey mottled, slightly gravelly, silty, sandy clay.

5.9 It is possible that the upper section of the natural soil logged as silty / sandy clay within BH1 has also been reworked to a similar depth.

5.10 SPT 'N' values of 14 and 18 within the reworked Glacial Till indicate a firm to stiff consistency.

Glacial Till

5.11 Within all of the exploratory holes penetrating the made ground and reworked deposits, soil considered to represent Glacial Till was encountered at depths of between 3.60 and 4.00mbgl.

5.12 This generally comprised firm to stiff, brown and grey mottled, slightly silty, variably sandy and gravelly clay to depths of in excess of 10.50mbgl.

5.13 SPT 'N' values within the Glacial Till ranged between 12 and 22 with an average of 17, indicating a generally firm to stiff consistency.

5.14 This was confirmed by an undrained shear strength of 58kPa obtained from laboratory testing.

5.15 Limited laboratory classification testing on the Glacial Till/re-worked Glacial Till provided natural moisture content values of 17 to 22%. Liquid limits of 31 to 41% with corresponding plasticity indices of 13 to 21% indicate clay of low to intermediate plasticity with plastic limit values of 18 and 20% (modified to 12 to 21%) indicating low to medium volume change potential.

Visual/Olfactory Evidence of Contamination

5.16 No visual and/or olfactory evidence of significant ground contamination was identified within the exploratory holes during the investigation.

Groundwater

5.17 Perched groundwater was encountered within made ground during the formation of the WS01 and WS04 at depths of 1.50 and 2.00mbgl respectively.

5.18 It should be appreciated that the groundwater observations described above have been undertaken during a very short period of time. Significant variations in the long-term groundwater regime may occur at other times, particularly with prolonged, extreme weather conditions, and that no account can be taken of such in this report.

General

5.19 It should also be appreciated that ground conditions may vary between and away from the exploratory hole positions, and that no account can be taken in this report of such variations.

6.0 GEOTECHNICAL APPRAISAL

Site Preparation

6.1 In consideration of the existing ground profile, a degree of earthworks will be required to provide a level platform for construction.

6.2 This will require removal of made ground forming the existing landscaped mounds, which will not be suitable as fill beneath the building footprint due to its potential to consolidate and settle under loading.

6.3 Alternatively, the made ground may be used as general bulk fill subject to screening and testing to confirm suitability in this respect.

6.4 Also, any excavated cohesive natural soil, due to its potential for long-term consolidation settlement, should not be considered to bring up levels beneath the building footprint, with suitable imported granular fill being required for this purpose.

6.5 Site enabling works will need to take account of the integrity of all existing/ adjacent services at the site, including the existing attenuation tank recorded immediately to the west.

Foundations

6.6 Made ground and any soft / loose natural deposits should be considered unsuitable for the direct support of structural loads as they will be weak and compressible, leading to possibly unacceptable total and differential settlements.

6.7 The underlying firm to stiff Glacial Till will be suitable for the adoption of spread foundations with a net allowable bearing pressure of 100kPa being appropriate to reduce settlements to tolerable limits.

6.8 However, the proven thickness of made ground beneath the site may require excavations to this competent stratum to exceed 4.00mbgl locally, thus possibly rendering the use of spread foundations unfeasible and uneconomical.

6.9 Foundation construction will also need to take account of any remaining and/or new services, including the adjacent attenuation tank. Where these are in close proximity, foundations will need to be taken down to beneath the lowest level of the service trench or construction so that their structural integrity is maintained.

6.10 As such, consideration will need to be given to the adoption of piled foundations, with piles being taken into the underlying firm to stiff Glacial Till to achieve adequate working loads.

6.11 The final choice and design of pile type should to be undertaken in conjunction with a reputable, specialist piling contractor, ideally with local experience.

Floor Slabs

6.12 In view of the depth of made ground and variation in ground conditions at shallow depth beneath the site, floor slabs will need to be suspended.

6.13 This will enable the re-use of site-won excavated unsuitable materials beneath the suspended floor slab construction.

Excavations and Groundwater

6.14 Excavations at the site will be feasible using conventional hydraulic plant. All excavations requiring man-entry will need adequate lateral support, or will need to be battering back to a safe angle to ensure their stability.

6.15 No significant groundwater entries are anticipated into excavations with conventional 'sump and pump' dewatering measures likely to be adequate to keep excavations dry.

Pavement Design

6.16 In consideration of the ground conditions at shallow depth, it is recommended that new road pavement design should be based on a California Bearing Ratio (CBR) value of no more than 3.0% for preliminary purposes.

6.17 The CBR will need to be reviewed and confirmed by site inspection and possibly by suitable in-situ testing at formation levels following any earthwork operations and prior to pavement construction.

6.18 In any event, all formations should be proof-rolled with any soft, loose or otherwise unsuitable material being removed and replaced with compacted granular fill.

Concrete Design

6.19 Design/mix of buried concrete should be undertaken in accordance with the "Aggressive Chemical Environment for Concrete" (ACEC) classification, of BRE Special Digest 1:2005 (Concrete in Aggressive Ground). With reference to the site history, it is deemed appropriate to classify the site as "Brownfield", with respect to BRE Special Digest.

6.20 Values of 2:1 water/soil extract for sulphate range from less than 10 to 155mg/l. Values of pH range from 5.9 to 9.3, although the majority were above 7.0, indicating slightly alkaline conditions.

6.21 On the basis of these results and if taking the one low pH value into consideration, the typical design sulphate (DS) class and "Aggressive Chemical Environment for Concrete" (ACEC) class for the site are DS-1 and AC-2z respectively.

Drainage and Soakaways

6.22 In consideration of the site being generally underlain by cohesive soils, soakaways are not considered to be a suitable drainage option for the site.

7.0 GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA)

General

7.1 A review of the desk study information and limited relevant data from the previous ground investigation has concluded that the potential for a significant pollution linkage to be present at the site is low with corresponding low risk to human health and the environment.

7.2 Further to this, no visual or olfactory evidence of significant ground contamination has been recorded from the intrusive investigations.

7.3 However, it has been considered prudent to adopt a precautionary approach and undertake chemical analysis of the sub-surface soils to confirm the low human health risk status of the site.

Human Health

7.4 Selected samples have been analysed for a general suite of contaminants of concern and compared against Screening Levels (SL's) for human health to determine the significance of the measured concentrations in relation to the site conceptual model. Thus, a Generic Quantitative Risk Assessment has been undertaken in line with guidelines provided in CLR11, Model Procedures for the Management of Land Contamination, 2004.GQRA).

7.5 The criteria for a limited number of contaminants have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

7.6 Within the document, Category 4 Screening Levels (C4SL's) are described as being more pragmatic than previous screening criteria and represent concentrations in soil that present an 'acceptable' level of risk within the context of Part 2A.

7.7 The National Planning Policy Framework states that 'after development, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990'. Therefore, by inference, the C4SL's are appropriate for use in the planning context.

7.8 Although the SP1010 document states that C4SL only apply for a 'sandy loam soil with 6% soil organic matter', it is generally accepted that assessment criteria for metals are not sensitive to changes in soil organic content (SOM). The C4SL's have therefore been adopted as assessment criteria in this report for the listed metals within the SP1010.

7.9 Subsequent to SP1010, LQM/CIEH have published a document entitled 'The LQM/CIEH S4ULs for Human Health Risk Assessment' 2015. In brief, the document provides updated assessment criteria which have been derived in accordance with UK legislation, national as well as EA policy and using a modified version of the CLEA software and available guidance. The new screening criteria, or Suitable 4 Use Levels (S4ULs), are intended to provide a complete and updated replacement to the previous LQM/CIEH GAC of 2009. As such they are considered appropriate for use in this assessment for other contaminants not covered by C4SL's and/or for organic contaminants assuming a worst-case Soil Organic Matter (SOM) of 1% as an initial conservative assessment.

7.10 For each contaminant, S4UL's and C4SL's have been calculated for six land use scenarios, namely:

- Residential with homegrown produce.
- Residential without homegrown produce.
- Allotments.
- Commercial.
- Public Open Space, near residential housing.
- Public Parks, remote from residential housing.

7.11 In light of the proposed development as a secondary school, the SL's for a "Commercial" end-use are considered appropriate for the assessment at this stage.

7.12 A table of relevant SL's are provided in Appendix 06.

Controlled Waters

7.13 Generic criteria for the assessment of potential groundwater contamination have been derived from very conservative guidelines protective of drinking water and environmental quality, namely:

- UK Drinking Water Standards (DWS) as defined by The Water Supply (Water Quality) Regulations, 2016;
- UK Environmental Quality Standards (EQS) for Freshwater, leachates are based on a Hardness of soft <50mg/l, as determined from United Utilities web-based information in 2021.

7.14 Generic assessment criteria are provided in Appendix 05.

Chemical Analyses Results

Soils

7.15 6no soil samples were analysed for a suite of Contaminants of Concern (CoC). All of the concentrations were measured below the SL's for a "Commercial" end-use.

7.16 No asbestos fibres were detected in any of the samples analysed.

Leachates

7.17 4no samples of soil were analysed for leachable concentrations of metals, semi-metals and PAH compounds.

7.18 The majority of the results were below the generic criteria when compared to the EQS for freshwater, and the more stringent UKDWS, with the following exceedances.

Contaminant	Ref Value ug/l		Exceedances ug/l		Samples
	EQS	UKDWS	EQS	UKDWS	
Copper	2	2000	6 - 63	-	WS01 2.00m WS02 2.70m WS03 0.50m WS05 0.60m
Lead	4	10	69	69	WS02 2.70m

Discussion and Conclusions

Human Health

7.19 In consideration of the chemical test results and the ground conditions encountered, it is concluded that the site is unlikely to contain any significant and/or widespread contamination sources. As such, the risk to human health from soils at the site is considered negligible with no specific environmental remediation required in this respect.

Controlled Waters

7.20 Slightly elevated leachable concentrations of copper and very locally lead were recorded within samples of made ground when compared to the stringent drinking water standards. In addition, when the results were compared against the EQS values for surface water, a single exceedance of lead was recorded in in a sample of made ground.

7.21 These exceedances appear to correspond with the localised fragments of ash and clinker recorded within the made ground.

7.22 Taking into consideration that the site is not within an EA Source Protection Zone and there are no groundwater / surface water abstractions recorded within influencing distance, the localised elevated concentrations are not considered to pose a significant risk to controlled waters.

7.23 Furthermore, the site will include a positive drainage system which will intercept a significant volume of surface water runoff, thus greatly reducing the potential for contaminants to leach and become mobile.

7.24 Cohesive Glacial Till underlying the site will have an inherently low permeability and will therefore limit lateral or vertical migration of any localised contamination sources from the site, with the underlying aquifer being of low sensitivity.

7.25 In consideration of the likely sources of elevated copper and lead being entrained within the ash and clinker fragments and the low permeability of the underlying cohesive Glacial Till, risks to the Haweswater Aqueduct, located approximately 45m south of the site, are considered to be low.

7.26 Therefore, the risk to controlled waters from the site is considered low with no environmental remediation considered necessary.

8.0 GROUND GAS RISK ASSESSMENT

Methodology

8.1 Current guidance for the assessment of risk associated with the presence of hazardous ground gases (principally methane and carbon dioxide) is provided in two key documents, namely:

- Code of practice for the Characterisation and remediation from Ground Gas in Affected Developments. British Standard Institution (BS 8485: 2015 & A1:2019); and
- Assessing Risks posed by Hazardous Ground Gases to Buildings CIRIA (C665, 2007).

8.2 The assessment presented herein is primarily based on the BS8485 document.

8.3 Hazardous ground gas qualitative risk assessment is based on a conceptual model similar to that used for soil and groundwater contamination sources (i.e., source-pathway-receptor pollutant linkages). A semi-quantitative estimate of risk can be assessed based on knowledge of the conceptual model and a measure of hazardous gas concentration and gas flow at the site within monitoring standpipes.

8.4 Based on the measured flow rates and hazardous gas concentrations, individual "hazardous gas flow rates" (Qhg) can be derived for each monitoring point, from which the "site characteristic hazardous gas flow rate" (Qhgs), and then the "Characteristic Situation" (CS) can be determined.

8.5 BS8485 provides guidance on the level of gas protection requirements based upon the characteristic situation and the proposed development based on building type as outlined in Table 3.

Table 3 - Building Types

	Type A	Type B	Type C	Type D
Ownership	Private	Private or commercial/ Public, possible multiple	Commercial / Public	Commercial / Industrial
Control (Change of use)	None	Some but not all	Full	Full
Room Sizes	Small	Small/ medium	Small to Large	Large Industrial/ Retail Park

8.6 The proposed development therefore is indicated to comprise the construction of Type C buildings which include commercial structures with central building management.

Ground Gas Conceptual Model

8.7 The property is not in a Radon Affected Area as defined by the Health Protection Agency as less than 1% of properties are above the Action Level of exposure. Therefore, no radon protection measures are necessary for new structures as described in publication BR211 by the Building Research Establishment.

8.8 There are no active landfills recorded within 500m of the site or historic landfills recorded within 250m of the site.

8.9 There are no shallow mine workings beneath the site that could potentially provide a source of hazardous ground gas.

8.10 Furthermore, ground investigations have not encountered any organic soils that could potentially be a source of ground gas.

8.11 In light of the above, it is considered that the risk to the proposed development from ground gas is low.

8.12 However, the previous ground investigation encountered elevated levels of methane (up to 10.5% by volume in air) and carbon dioxide (up to 14.0% by volume in air) in standpipes remote from the development site on one occasion. Elevated flow rates were also recorded but no correlation could be made between these and elevated concentrations of hazardous gasses.

8.13 In view of this, it has been considered prudent to undertake ground gas monitoring, primarily for methane and carbon dioxide, with associated flow rates, on 6no occasions.

8.14 The monitoring will be undertaken when access to the school is made available and reported in an addendum Ground Gas Risk Assessment report in due course.

8.15 Notwithstanding this, it should be noted that if a suspended ground floor slab is adopted for the new building, appropriate ventilation of the under-floor void, together with incorporation of a proprietary gas resistant membrane within the floor slab construction will likely be adequate to mitigate against any assessed risk.

9.0 OTHER POTENTIAL DEVELOPMENT CONSIDERATIONS

Excavated Soils

9.1 Groundworks undertaken during the development will produce excavated soil which will require appropriate site management. Principally, and in line with the sustainable development agenda, any soils arising from site excavations should firstly be considered for re-use where possible by incorporation into the development.

9.2 No visual and/or olfactory signs of soil contamination were encountered either in the current or previous ground investigations and this has been confirmed to large degree by the results of soil chemical analysis. Soils at the site will therefore be suitable in contamination terms, for re-use on site.

9.3 However, where soil is surplus to requirements, it will need to be removed from site under appropriate duty of care.

9.4 It should be noted that the chemical analysis results for disposal classification are assessed against different assessment criteria to those relating to contamination risk assessment. Soils that are deemed suitable for use in terms of risk to human health and the environment may not necessary be un-contaminated and could be classified as Non-Hazardous or even Hazardous for disposal purposes.

9.5 For guidance, preliminary assessment of waste classification has been undertaken by the laboratory by input of the chemical test results into a waste soil characterisation assessment tool (HAZWASTE) which follows the guidelines provided in the EA Technical Guidance document WM3, Waste Classification.

9.6 This indicates that the levels of contamination measured would classify the majority of samples as Non-hazardous waste for disposal, with the concentrations of hydrocarbons measured within WS04 (0.30m) classifying as Hazardous.

9.7 However, no visual and/or olfactory evidence of hydrocarbon contamination is recorded within the descriptive log of WS04 with the elevated concentration probably being due to asphalt recorded within the sample analysed.

9.8 It should be noted also that further analysis of soils destined for disposal for assessment against Waste Acceptance Criteria (WAC) will possibly determine that the main body of soils will classify as Inert. WAC testing will also need to be undertaken on soils characterised as Hazardous for appropriate disposal at the landfill.

9.9 It will be the responsibility of the waste producer to undertake further testing and classification of any waste soils for disposal to an appropriately licenced landfill in accordance with current guidelines and Duty of Care requirements.

Imported Fill

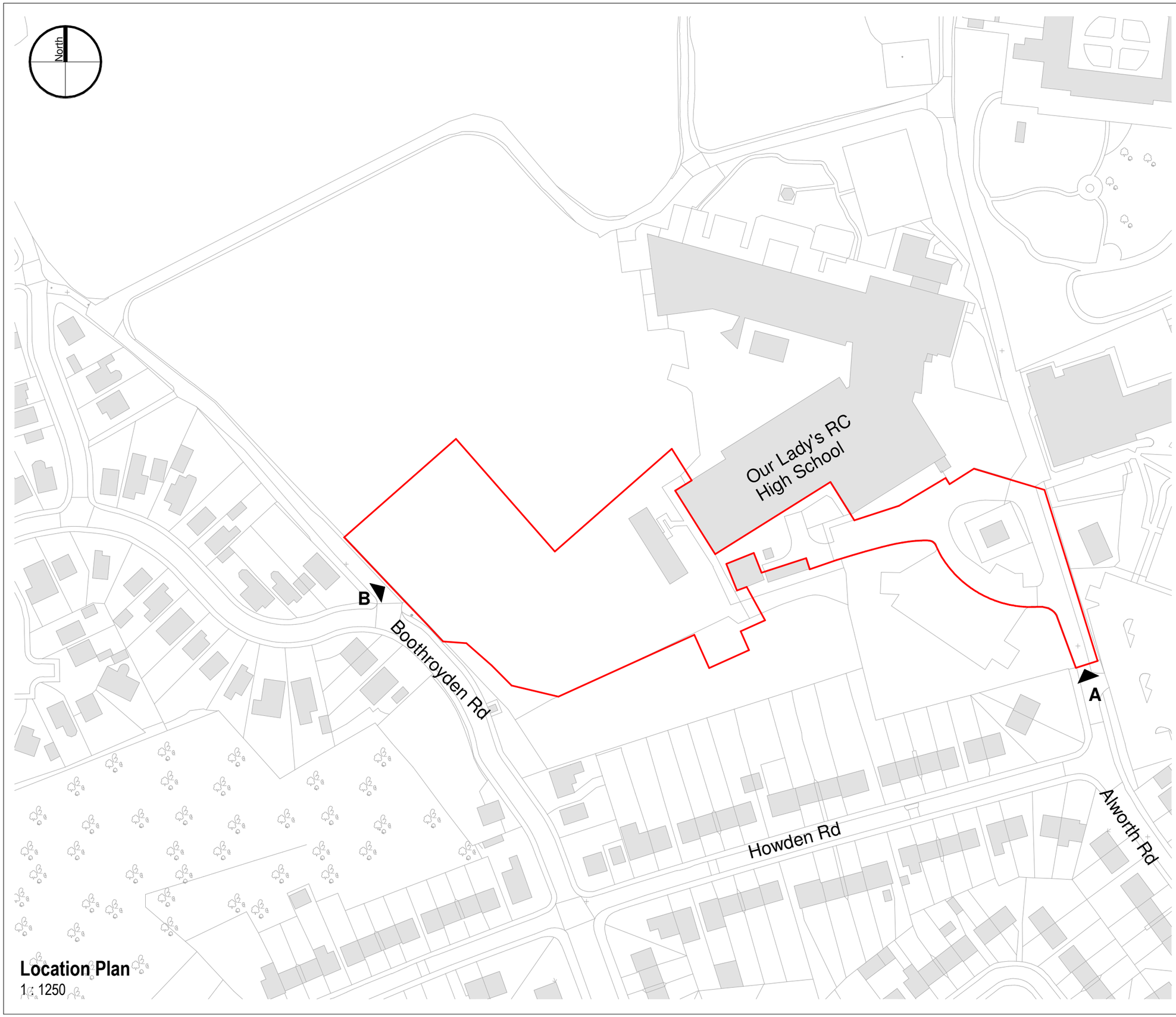
9.10 Imported fill will be subject to specific quality requirements and should be accompanied by appropriate certification to confirm its suitability. Allowance should also be made for testing imported fill materials prior to placement to ensure suitability.

Water Supply Pipes

9.11 The utilities supplier will need to be consulted with regards the selection of suitable water supply pipe materials for the development. In light of the ground conditions encountered at anticipated water pipe depths, specific materials and measures to protect the water supply from ground contamination are not anticipated.

APPENDIX 01

Drawings



Location Plan
1 : 1250

Notes

The Contractor is to check all dimensions and conditions on site before commencing. Do not scale from this drawing.
This drawing remains the copyright of POZZONI Architecture ltd.

Scale Bars — TO BE USED ONLY AS GUIDANCE

1:100	mm	1000	3000	5000		
1:200	mm	5000	8000			
1:500	M	5	15	25		
1:1250	M	10	30	50	70	

Application Site (approx. 9900m²)

A — ExistingVehicular / Pedestrian Site Access Point

B — Proposed Temporary Vehicular Access point (construction site access)

Rev	Description	By	Date
A	PLANNING APPLICATION	TC	26.02.21

Client: Our Lady's RC High School

Job: New Education Block

Drawing: Planning - Site Location Plan

POZ Ref.: P5697_1100 — Rev: A

BSRef: 5697-POZ-XX-00-DR-A-1100

Date: 22.02.21	Scale: As indicated	@ A3	
3D CoOrd: TC	2D CoOrd: OB	Approved: TC	

Project Status: ■ Planning | Tender | Construction | Design | Contract | As Built

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00 - Existing Site Plan - Planning
1 : 200

Notes

The Contractor is to check all dimensions and conditions on site before commencing. Do not scale from this drawing.
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Scale Bars TO BE USED ONLY AS GUIDANCE

1:100	mm	1000	3000	5000	
1:200	mm	5000	8000		
1:500	M	5	15	25	
1:1250	M	10	30	50	70

Application Site
(approx. 9900m²)

A — ExistingVehicular / Pedestrian Site Access Point

B — Proposed Temporary Vehicular Access point (construction site access)

Rev	Description	By	Date
A	PLANNING APPLICATION	TC	26.02.21

Client: Our Lady's RC High School

Job: New Education Block

Drawing: Planning - Existing Site

POZ Ref: P5697_1101 Rev: A

BS Ref: 5697-POZ-XX-00-DR-A-1101

Date: 22.02.21 Scale: As indicated @ A1

2D CoOrd: TC 2D CoOrd: OB Approved: TC

Project Status: Planning | Tender | Construction | Design | Contract | As Built

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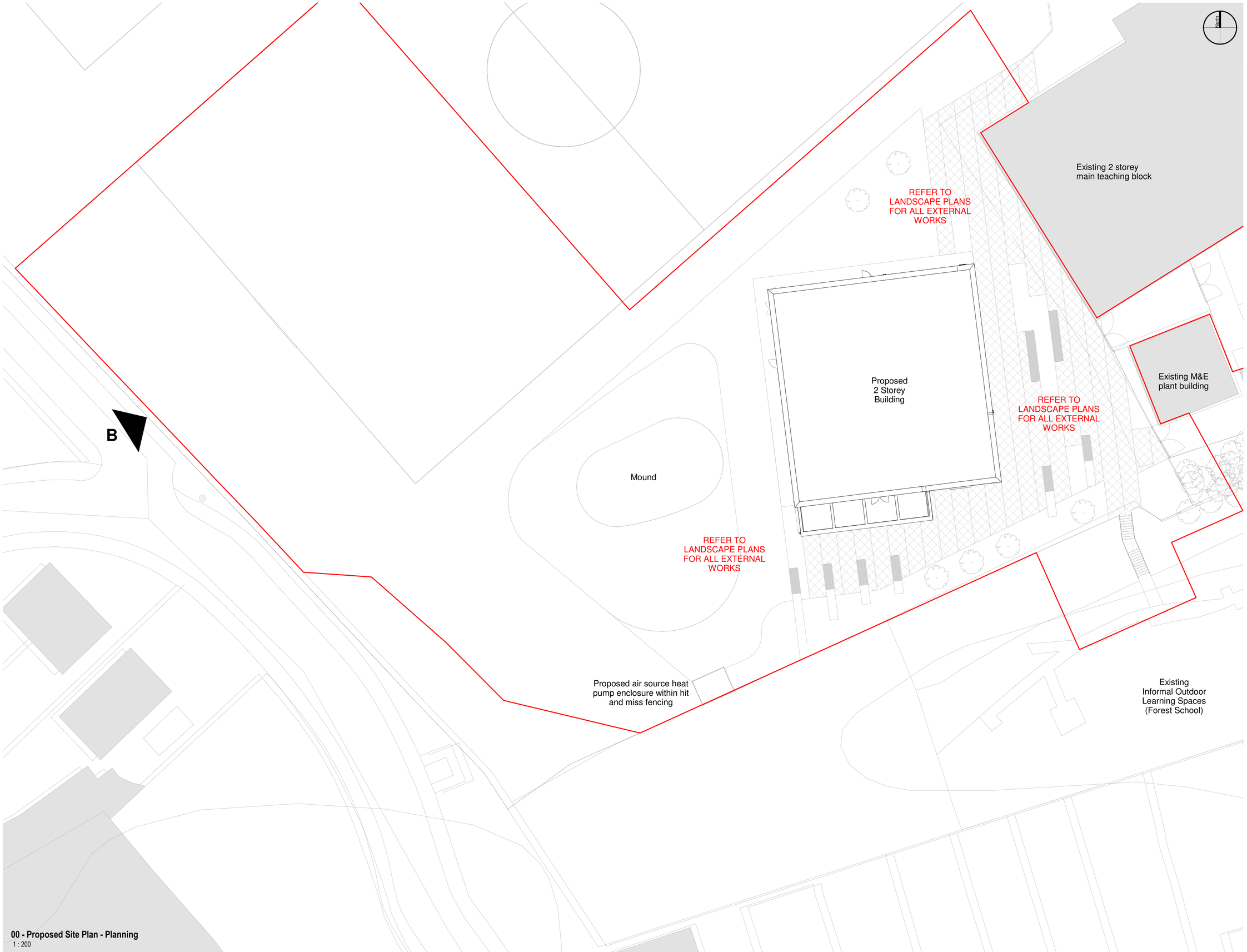

00 - Proposed Site Plan - Planning
1 : 200

Notes

The Contractor is to check all dimensions and conditions on site before commencing. Do not scale from this drawing.
This drawing remains the copyright of POZZONI Architecture ltd.

Scale Bars		TO BE USED ONLY AS GUIDANCE			
1:100	mm	1000	3000		5000
1:200	mm	5000	8000		
1:500	M	5	15		25
1:1250	M	10	30	50	70

Application Site
(approx. 9900m²)

A — ExistingVehicular / Pedestrian Site Access Point

B — Proposed Temporary Vehicular Access point (construction site access)

Rev	Description	By	Date
A	PLANNING APPLICATION	TC	26.02.21

Client: Our Lady's RC High School

Job: New Education Block

Drawing: Planning - Proposed Site Plan

POZ Ref: P5697_1110 — Rev: A

Ref: 5697-POZ-XX-00-DR-A-1110

Date: 17.02.21 — Scale: As indicated @ A1

3D CoOrd: TC — 2D CoOrd: OB — Approved: TC

Project Status: Planning | Tender | Construction | Design | Contract | As Built

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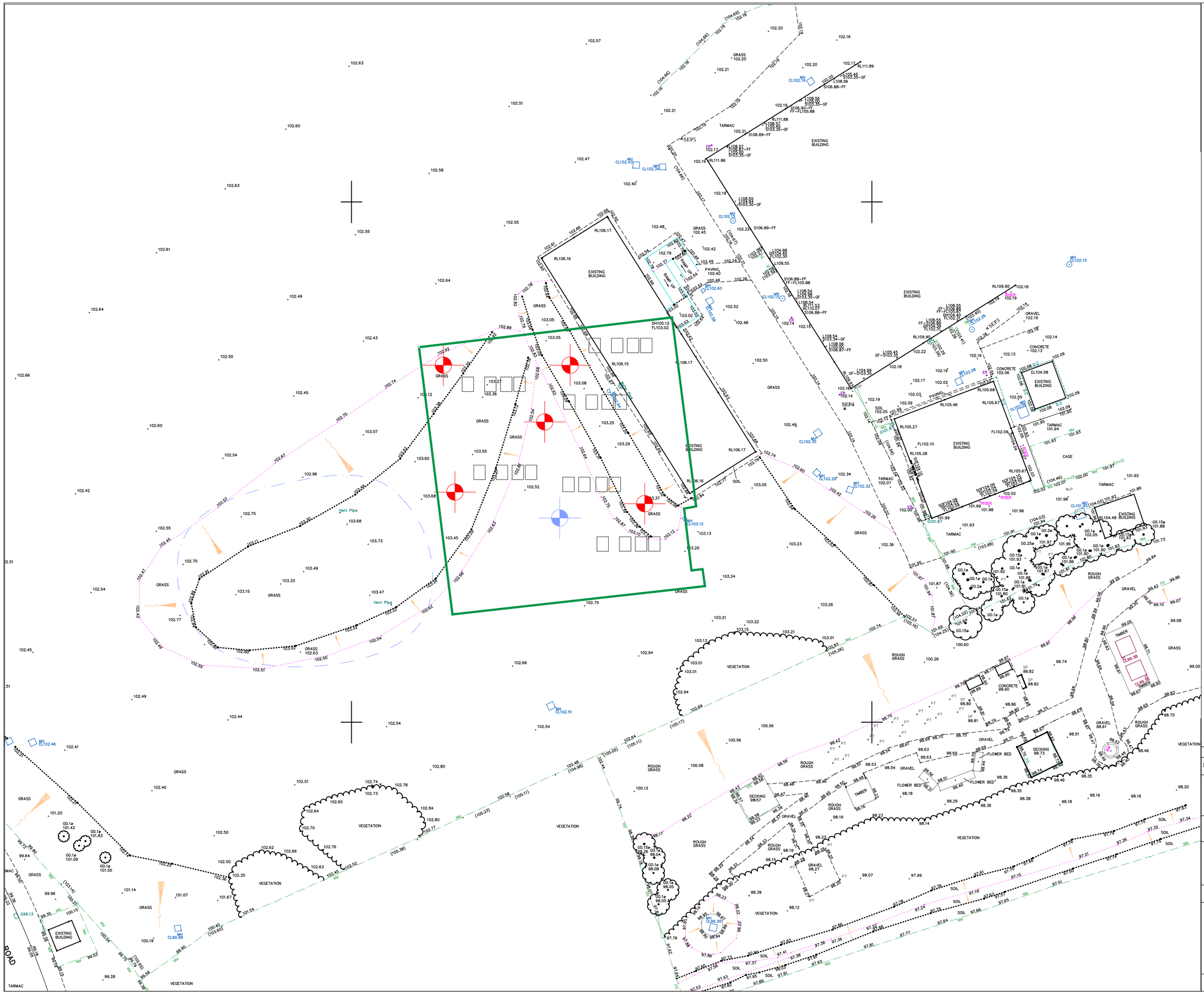

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APPENDIX 02

Exploratory Hole Records

Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Borehole Number
Our Ladys School, Manchester	BH 1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 10.00m			21-2070

Location	Dates	Engineer	Sheet
	27/03/2021	Wright Mottershaw Lydon Consulting	1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	Brown / black TOPSOIL with rootlets		
0.20	D					0.40			
0.50	D						MADE GROUND : dense / very dense brown clay, soil and broken brick fill		
						(1.50)			
1.20-1.45 1.20-1.65	SPT 50/100 DB			4,5/11,39					
						1.90	Stiff brown slightly sandy / sandy CLAY		
2.00-2.45 2.00-2.45	SPT N=13 DB			2,2/2,3,4,4					
3.00-3.45	UD			70 blows					
4.00-4.45 4.00-4.45	SPT N=15 DB			2,3/3,4,4,4					
5.00-5.45 5.00-5.45	SPT N=22 DB			3,3/4,5,6,7					
						(7.10)			
6.00-6.45 6.00-6.45	SPT N=22 DB			3,4/5,5,6,6					
7.50-7.00	UD			47 blows					
8.00	D								
						9.00	Firm to firm / stiff brown CLAY		
9.00-9.45 9.00-9.45	SPT N=12 DB			2,2/3,3,3,3					
						(1.50)			

Remarks
Borehole noted to be dry during drilling operations
Services inspection pit excavated by hand to 1.20m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 21-2070.BH 1

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Borehole Number
Our Ladys School, Manchester	BH 1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 10.00m			21-2070

Location	Dates	Engineer	Sheet
	27/03/2021	Wright Mottershaw Lydon Consulting	2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00-10.45	U			18 blows					
10.50	D					10.50	Complete at 10.50m		

Remarks
Borehole noted to be dry during drilling operations
Services inspection pit excavated by hand to 1.20m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 21-2070.BH 1

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Standard Penetration Test Results

Site : Our Ladys School, Manchester

Client :

Engineer : Wright Mottershaw Lydon Consulting

Job Number 21-2070

Sheet 1 / 1

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
BH 1	1.20	1.35	1.45	SPT	4	5	11	39			50/100mm	Refusal
BH 1	2.00	2.15	2.45	SPT	2	2	2	3	4	4	N=13	
BH 1	4.00	4.15	4.45	SPT	2	3	3	4	4	4	N=15	
BH 1	5.00	5.15	5.45	SPT	3	3	4	5	6	7	N=22	
BH 1	6.00	6.15	6.45	SPT	3	4	5	5	6	6	N=22	
BH 1	9.00	9.15	9.45	SPT	2	2	3	3	3	3	N=12	

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WML CONSULTING	Project Title: Our Lady's School		WS01
	Project Number: 9670G	Client: Pozzoni	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 27/03/2021	Method: Window Sample	Driller: Geo-Ventures (UK) Ltd	Logged By: TPB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
					0.10	Turf over dark brown, sandy CLAY with rootlets. (TOPSOIL)		
0.30	E				0.60	Dark brown, clayey, gravelly SAND with pockets of clay. Gravel is subangular, fine to coarse, including brick, concrete, sandstone and slate. (MADE GROUND)		
0.70	E							
1.00	D	N=12			1.00	Brownish grey, sandy, gravelly CLAY. Gravel is angular to subangular, fine to coarse, including brick, sandstone and concrete. (MADE GROUND)		
					1.50			
					1.65	Brown, fine to medium SAND. (MADE GROUND)		
					1.90			
2.00	E	N=57			2.00	Brownish grey, sandy, gravelly CLAY. Gravel is angular to subangular, fine to coarse, including brick, sandstone and concrete. (MADE GROUND)		
					2.25	Dark brownish grey, slightly silty, slightly sandy, subangular, fine to coarse GRAVEL including brick, sandstone, ash and clinker. (MADE GROUND)		
					3.00	End Of Borehole At 2.25 m		
					4.00			
					5.00			
					6.00			

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Barrel refused at 2.25mbgl.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed
30/03/2021	1.5				

Daily Log Of Depths / Chiselling

Date	Casing	Water	From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

WML CONSULTING	Project Title: Our Lady's School		WS02
	Project Number: 9670G	Client: Pozzoni	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 27/03/2021	Method: Window Sample	Driller: Geo-Ventures (UK) Ltd	Logged By: TPB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.10	E				0.40	Turf over dark brown, sandy CLAY with rootlets. (TOPSOIL)		
0.60	E	N=12			1.00	Brownish grey, sandy, gravelly CLAY. Gravel is angular to subangular, fine to coarse, including brick, sandstone and concrete. (MADE GROUND)		
		N=12			2.00			
					2.50			
2.70	E	N=11			3.00	Greyish brown, slightly silty, slightly gravelly, sandy CLAY. Gravel is subangular, fine to coarse, including brick, sandstone, coal and clinker. (MADE GROUND)		
		N=17			4.00			
4.50	J	N=15			5.00	Firm to stiff, grey and brown mottled, silty, sandy CLAY. (GLACIAL TILL)		
					6.00	End Of Borehole At 5.00 m		

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N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS
No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water

Chiselling

From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

WML CONSULTING	Project Title: Our Lady's School		WS03
	Project Number: 9670G	Client: Pozzoni	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 27/03/2021	Method: Window Sample	Driller: Geo-Ventures (UK) Ltd	Logged By: TPB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.10	E				0.25	Turf over dark brown, sandy CLAY with rootlets. (TOPSOIL)		
0.50	E				0.80	Dark greyish brown, slightly clayey, gravelly SAND. Gravel is angular to subangular, fine to coarse, including brick, concrete and ceramic. (MADE GROUND)		
		N=7			1.00	Greyish brown, sandy, gravelly CLAY with pockets of gravel. Gravel is subangular, fine to coarse, including brick, sandstone and concrete. (MADE GROUND)		
1.75	D				1.70	Firm to stiff, brown and grey mottled, slightly gravelly, silty, sandy CLAY. Gravel is subangular, fine to coarse, of mixed lithologies. Possibly Reworked. (GLACIAL TILL)		
		N=14			2.00			
		N=18			3.00			
					3.80			
4.00	J	N=19			4.00	Stiff brown and grey mottled, slightly silty, slightly sandy, slightly gravelly CLAY. Gravel is subangular, of mixed lithologies. (GLACIAL TILL)		
		N=18			5.00	End Of Borehole At 5.00 m		
					6.00			

KEY
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▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS
No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths			Chiselling		
Date	Casing	Water	From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

WML CONSULTING	Project Title: Our Lady's School		WS04
	Project Number: 9670G	Client: Pozzoni	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 27/03/2021	Method: Window Sample	Driller: Geo-Ventures (UK) Ltd	Logged By: TPB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
					0.10	Turf over dark brown, sandy CLAY with rootlets. (TOPSOIL)		
0.30	E				0.70	Dark greyish brown, slightly silty, sandy, subangular to subrounded, fine to coarse GRAVEL including brick, concrete, sandstone, asphalt and coal. Low cobble content. Cobbles are subrounded, including sandstone. (MADE GROUND)		
0.80	E	N=16			1.00	Brown, slightly gravelly, sandy CLAY. Gravel is subangular, fine to coarse, including sandstone and coal. (MADE GROUND)		
		N=12			2.00		▼	
					2.50	End Of Borehole At 2.50 m		
					3.00			
					4.00			
					5.00			
					6.00			

KEY

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C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

Barrel refused at 2.50mbgl.

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed
30/03/2021	2				

Daily Log Of Depths / Chiselling

Date	Casing	Water	From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

WML CONSULTING	Project Title: Our Lady's School		WS05
	Project Number: 9670G	Client: Pozzoni	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 27/03/2021	Method: Window Sample	Driller: Geo-Ventures (UK) Ltd	Logged By: TPB

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.20	E				0.30	Turf over dark brown, slightly gravelly, sandy CLAY with rootlets. Gravel subangular, fine to coarse, including sandstone and brick. (TOPSOIL)		
0.60	E					Brown, slightly sandy, gravelly CLAY with pockets of gravel. Gravel is subangular, fine to coarse, including brick, sandstone, concrete and asphalt. (MADE GROUND)		
		N=46			1.00			
					1.50	Brown and grey mottled, slightly silty, sandy CLAY. (MADE GROUND)		
1.60	D							
2.00	J	N=13			2.00			
					2.50	Brownish grey, slightly silty, slightly sandy, gravelly CLAY. Gravel is subangular, fine to coarse, including brick, coal and sandstone. (MADE GROUND)		
		N=13			3.00			
					3.60	Firm to stiff, brown and grey mottled, slightly silty, sandy CLAY. (GLACIAL TILL)		
		N=14			4.00			
		N=18			5.00	End Of Borehole At 5.00 m		
					6.00			

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▼ - Groundwater Level

AGS

REMARKS
No Groundwater Encountered

Scale: 1:40

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths / Chiselling

Date	Casing	Water	From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

APPENDIX 03

Geotechnical Test Results

LABORATORY REPORT

4043

Contract Number: PSL21/2934

Report Date: 30 April 2021

Client's Reference: 9670G

Client Name: WML Consulting
No 8 Oak Green Earl Road
Stanley Green Business Park
Cheasle Hulme
Cheshire
SK8 6QL

For the attention of: Sam Seddon

Contract Title: Our Lady's

Date Received: 12/4/2021
Date Commenced: 12/4/2021
Date Completed: 30/4/2021

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins (Director)	R Berriman (Quality Manager)	S Royle (Laboratory Manager)
L Knight (Assistant Laboratory Manager)	S Eyre (Senior Technician)	T Watkins (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rberriman@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH01		D	0.50		Brown gravelly very sandy CLAY
BH01		B	1.20		Brown gravelly very sandy CLAY
BH01		D	2.00		Brown slightly gravelly very sandy CLAY
BH01		U	3.00		Firm brown slightly gravelly sandy CLAY
BH01		D	4.00		Brown slightly gravelly sandy CLAY
BH01		B	5.00		Brown mottled grey sandy CLAY
BH01		D	7.50		Brown sandy CLAY
BH01		D	9.00		Brown sandy CLAY

UKAS TESTING 4043	PSL Professional Soils Laboratory	Our Lady's	Contract No: PSL21/2934
			Client Ref: 9670G

SUMMARY OF SOIL CLASSIFICATION TESTS

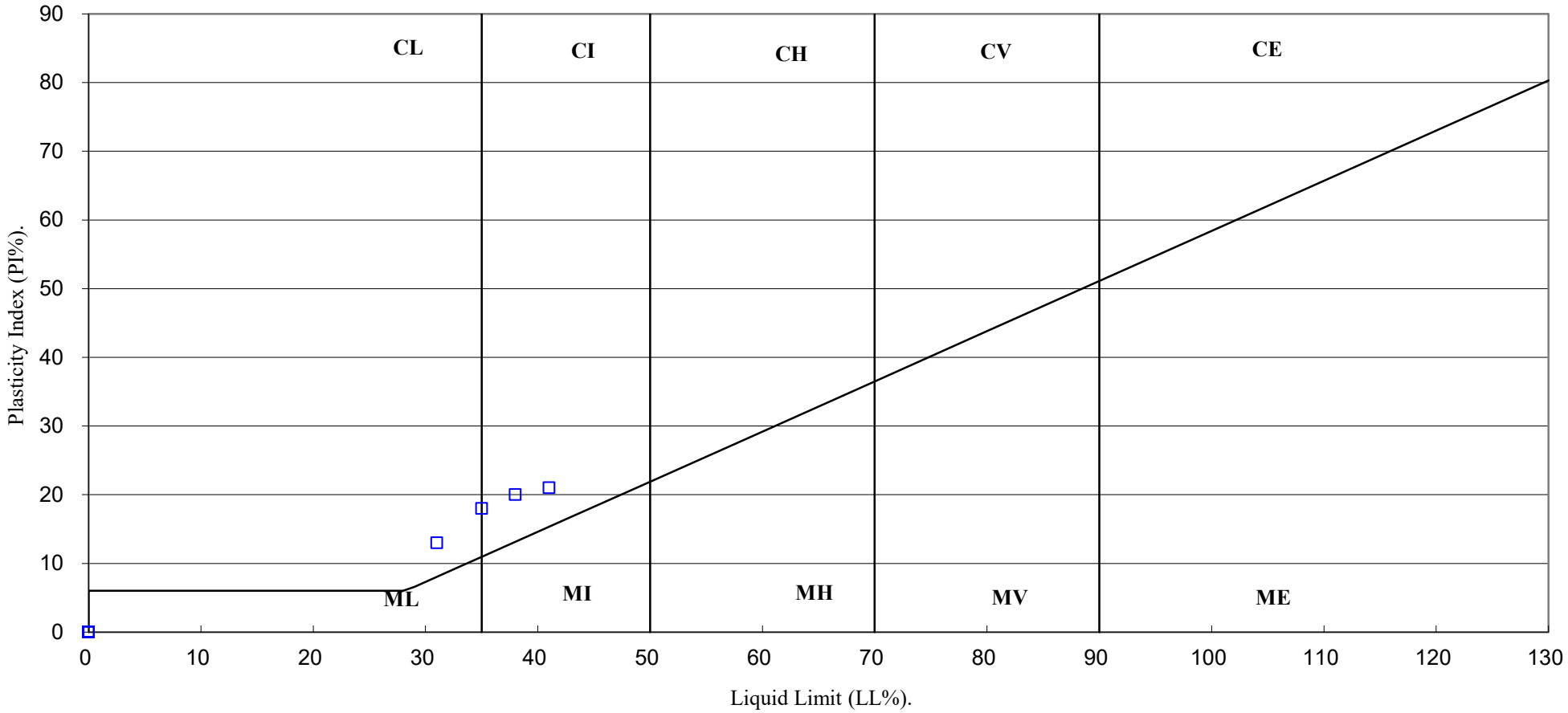
(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
BH01		D	0.50		17			35	17	18	89	Intermediate Plasticity CI
BH01		D	2.00		22			31	18	13	96	Low Plasticity CL
BH01		D	4.00		17			38	18	20	93	Intermediate Plasticity CI
BH01		B	5.00		21			41	20	21	100	Intermediate Plasticity CI
BH01		D	7.50		21							
BH01		D	9.00		20							

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

UKAS TESTING 4043	PSL Professional Soils Laboratory	Our Lady's	Contract No: PSL21/2934
			Client Ref: 9670G

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Our Lady's	Contract No: PSL21/2934
			Client Ref: 9670G

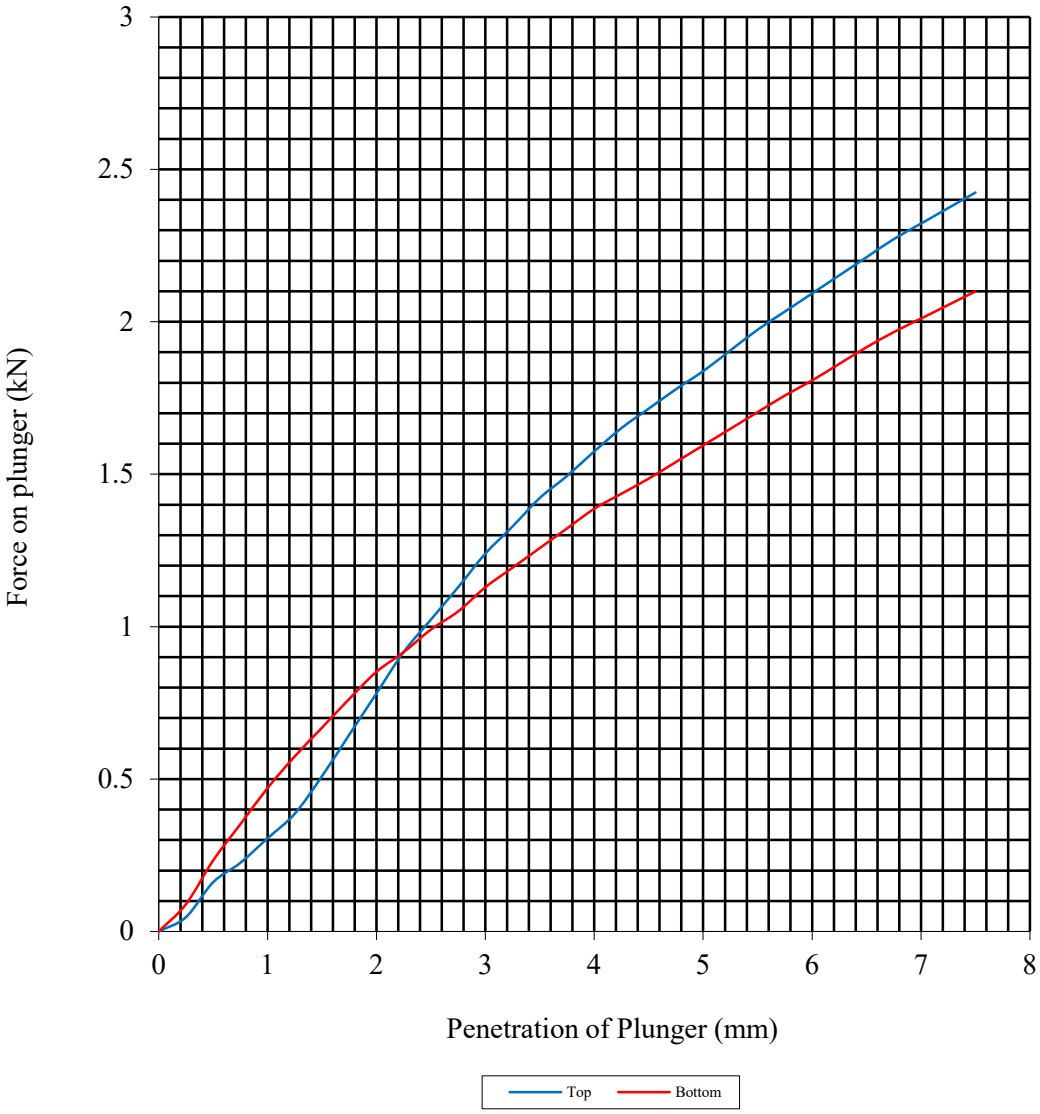
CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number: BH01 **Top Depth (m):** 1.20

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

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	16	Surcharge Kg:	4.20	Sample Top	16	Sample Top	9.2
Bulk Density Mg/m3:	2.07	Soaking Time hrs	0	Sample Bottom	16	Sample Bottom	8.0
Dry Density Mg/m3:	1.78	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			9				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Our Lady's

Contract No: PSL21/2934

Client Ref: 9670G

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

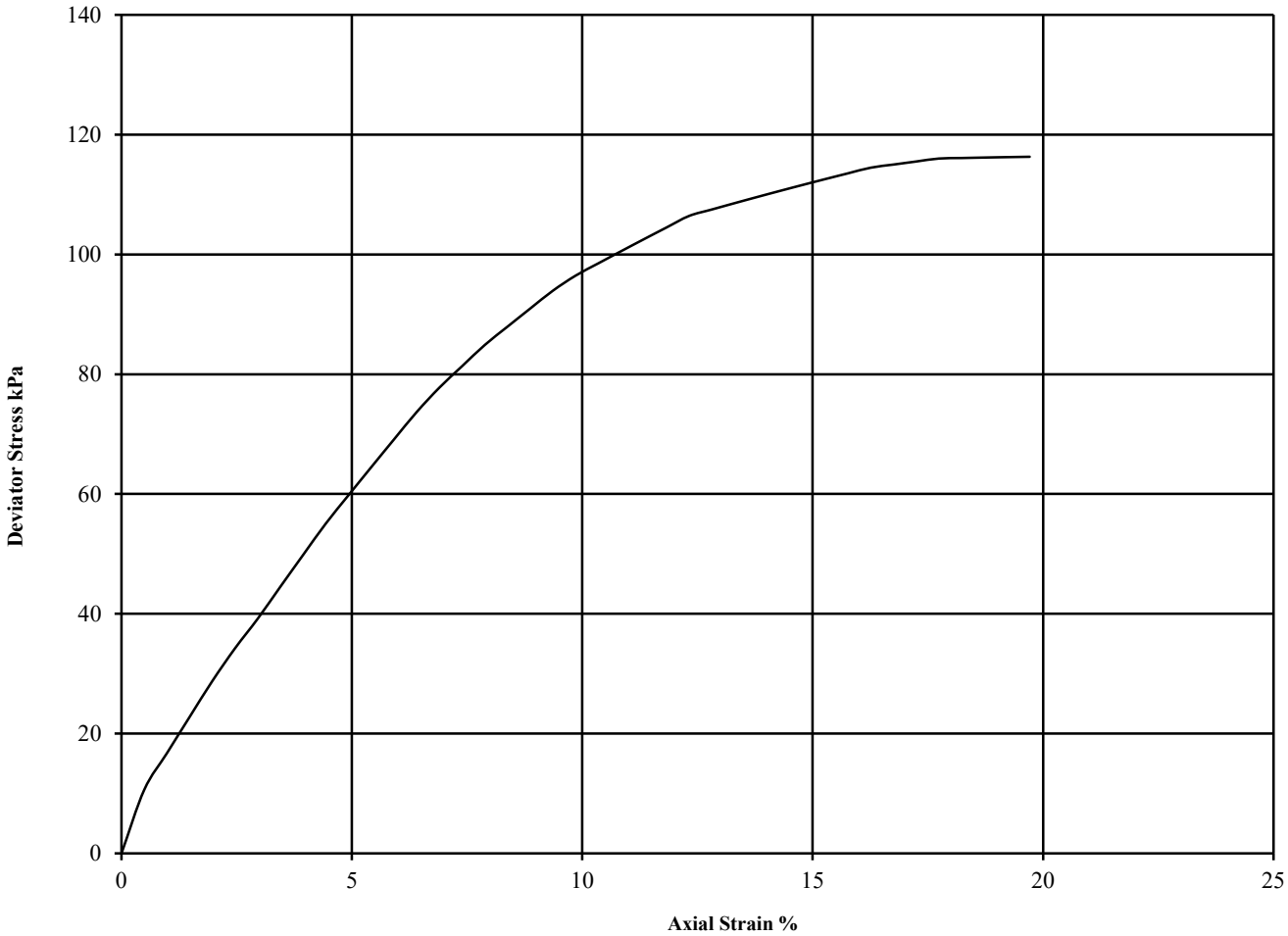
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: BH01 **Top Depth (m):** 3.00

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

Sample Type U



Diameter (mm):		102	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.33
1	21	2.00	1.65	60	116	58	19.7	Plastic	See summary of soil descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	Our Lady's	Contract No: PSL21/2934 Client Ref: 9670G

2531

ANALYTICAL TEST REPORT

Contract no: 95643

Contract name: Our Lady's

Client reference: PSL21/2934

Clients name: Professional Soils Laboratory

Clients address: 5/7 Hexthorpe Road
Doncaster
DN4 0AR

Samples received: 26 April 2021

Analysis started: 26 April 2021

Analysis completed: 29 April 2021

Report issued: 30 April 2021

Notes:
Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key:
U UKAS accredited test
M MCERTS & UKAS accredited test
$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing

Approved by:
Rachael Burton
Customer Support Squad Leader

Chemtech Environmental Limited

SOILS

Lab number			95643-1	95643-2	95643-3	95643-4	95643-5
Sample id			BH01	BH01	BH01	BH01	BH01
Depth (m)			1.20	2.00	5.00	8.00	10.50
Date sampled			-	-	-	-	-
Test	**Method**	**Units**					
pH	CE004 U	units	9.3	8.2	7.9	8.3	8.4
Sulphate (2:1 water soluble)	CE061	mg/l SO_4	155	37	<10	39	82

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		10	mg/l SO_4

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

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

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
95643-1	BH01	1.20	Y	All (NSD)
95643-2	BH01	2.00	Y	All (NSD)
95643-3	BH01	5.00	Y	All (NSD)
95643-4	BH01	8.00	Y	All (NSD)
95643-5	BH01	10.50	Y	All (NSD)

APPENDIX 04

Chemical Analytical Results

envirolab

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number:
Issue Number: **Date:**

Client:

Project Manager:
Project Name:
Project Ref:
Order No:
Date Samples Received:
Date Instructions Received:
Date Analysis Completed:

Prepared by: **Approved by:**

envirolab

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/2	21/03444/3	21/03444/4	21/03444/6	21/03444/7	21/03444/8	21/03444/10	Units	Limit of Detection	Method ref
Client Sample No	2	3	4	6	7	8	10			
Client Sample ID	WS01	WS01	WS01	WS02	WS02	WS02	WS03			
Depth to Top	0.30	0.70	2.00	0.60	2.70	4.50	0.50			
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
Sample Type	Soil	Soil	Solid	Soil	Soil	Soil	Soil			
Sample Matrix Code	2AE	2AE	7	6A	3A	3A	2AE			
Hazardous Waste Assessment	Appended	Appended	-	Appended	-	-	-			Assessment
% Moisture at <40C$_{A}$	19.4	17.6	-	17.3	-	-	-	% w/w	0.1	A-T-044
% Stones >10mm$_{A}$	7.5	14.8	<0.1	15.9	<0.1	<0.1	4.7	% w/w	0.1	A-T-044
pH$_{D}^{M\#}$	8.00	7.92	-	7.73	-	7.07	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_{D}^{M\#}$	0.03	<0.01	-	0.08	-	0.01	-	g/l	0.01	A-T-026s
Sulphate (acid soluble)$_{D}^{M\#}$	520	380	-	580	-	-	-	mg/kg	200	A-T-028s
Sulphur (total)$_{D}$	407	336	-	390	-	62	-	mg/kg	50	A-T-024s
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$_{D}^{M\#}$	5.4	4.2	-	4.1	-	-	-	% w/w	0.1	A-T-032 OM
Arsenic$_{D}^{M\#}$	5	5	-	5	-	-	-	mg/kg	1	A-T-024s
Boron (water soluble)$_{D}$	<1.0	<1.0	-	<1.0	-	-	-	mg/kg	1	A-T-027s
Cadmium$_{D}^{M\#}$	0.8	0.8	-	0.8	-	-	-	mg/kg	0.5	A-T-024s
Copper$_{D}^{M\#}$	28	28	-	25	-	-	-	mg/kg	1	A-T-024s
Chromium$_{D}^{M\#}$	21	21	-	19	-	-	-	mg/kg	1	A-T-024s
Chromium (hexavalent)$_{D}$	<1	<1	-	<1	-	-	-	mg/kg	1	A-T-040s
Lead$_{D}^{M\#}$	41	42	-	42	-	-	-	mg/kg	1	A-T-024s
Mercury$_{D}$	0.29	0.19	-	0.48	-	-	-	mg/kg	0.17	A-T-024s
Nickel$_{D}^{M\#}$	20	20	-	16	-	-	-	mg/kg	1	A-T-024s
Selenium$_{D}^{M\#}$	<1	<1	-	<1	-	-	-	mg/kg	1	A-T-024s
Vanadium$_{D}^{M\#}$	24	25	-	24	-	-	-	mg/kg	1	A-T-024s
Zinc$_{D}^{M\#}$	67	60	-	58	-	-	-	mg/kg	5	A-T-024s
Leachate Prep BS EN 12457-1 (2:1) (1 no)$_{A}$	-	-	*	-	*	-	*			A-T-001
pH (leachable)$_{A}^{\#}$	-	-	7.49	-	6.35	-	7.50	pH	0.01	A-T-031w
Sulphate (leachable)$_{A}^{\#}$	-	-	220.07	-	15	-	30.05	mg/l	1	A-T-026w
Cyanide (total) (leachable)$_{A}^{\#}$	-	-	0.008	-	<0.005	-	<0.005	mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable)$_{A}$	-	-	<0.01	-	<0.01	-	<0.01	mg/l	0.01	A-T-050w
Arsenic (leachable)$_{A}^{\#}$	-	-	5	-	5	-	1	µg/l	1	A-T-025w
Boron (leachable)$_{A}^{\#}$	-	-	121	-	56	-	39	µg/l	10	A-T-025w
Cadmium (leachable)$_{A}^{\#}$	-	-	<1	-	<1	-	<1	µg/l	1	A-T-025w
Copper (leachable)$_{A}^{\#}$	-	-	6	-	63	-	7	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable)$_{A}$	-	-	0.11	-	0.22	-	<0.10	mg/l	0.05	A-T-040w
Lead (leachable)$_{A}^{\#}$	-	-	1	-	69	-	2	µg/l	1	A-T-025w

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/2	21/03444/3	21/03444/4	21/03444/6	21/03444/7	21/03444/8	21/03444/10	Units	Limit of Detection	Method ref
Client Sample No	2	3	4	6	7	8	10			
Client Sample ID	WS01	WS01	WS01	WS02	WS02	WS02	WS03			
Depth to Top	0.30	0.70	2.00	0.60	2.70	4.50	0.50			
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
Sample Type	Soil	Soil	Solid	Soil	Soil	Soil	Soil			
Sample Matrix Code	2AE	2AE	7	6A	3A	3A	2AE			
Mercury (leachable)$_{A}^{\#}$	-	-	<0.1	-	<0.1	-	<0.1	µg/l	0.1	A-T-025w
Nickel (leachable)$_{A}^{\#}$	-	-	3	-	7	-	1	µg/l	1	A-T-025w
Selenium (leachable)$_{A}^{\#}$	-	-	2	-	2	-	<1	µg/l	1	A-T-025w
Sulphur, Total (leachable)$_{A}$	-	-	72	-	5	-	10	mg/l	1	A-T-025w
Vanadium (leachable)$_{A}^{\#}$	-	-	5	-	8	-	<1	µg/l	1	A-T-025w
Zinc (leachable)$_{A}^{\#}$	-	-	3	-	22	-	4	µg/l	1	A-T-025w
Hazardous Waste Assessment - first sample	Appended	-	-	-	-	-	-			Assessment
Hazardous Waste Assessment - samples 2-11	-	Appended	-	-	-	-	-			Assessment

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/2	21/03444/3	21/03444/4	21/03444/6	21/03444/7	21/03444/8	21/03444/10	Units	Limit of Detection	Method ref
Client Sample No	2	3	4	6	7	8	10			
Client Sample ID	WS01	WS01	WS01	WS02	WS02	WS02	WS03			
Depth to Top	0.30	0.70	2.00	0.60	2.70	4.50	0.50			
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
Sample Type	Soil	Soil	Solid	Soil	Soil	Soil	Soil			
Sample Matrix Code	2AE	2AE	7	6A	3A	3A	2AE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	NAD	NAD	-	NAD	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	N/A	N/A	-	N/A	-	-	-			A-T-045

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/2	21/03444/3	21/03444/4	21/03444/6	21/03444/7	21/03444/8	21/03444/10	Units	Limit of Detection	Method ref
Client Sample No	2	3	4	6	7	8	10			
Client Sample ID	WS01	WS01	WS01	WS02	WS02	WS02	WS03			
Depth to Top	0.30	0.70	2.00	0.60	2.70	4.50	0.50			
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
Sample Type	Soil	Soil	Solid	Soil	Soil	Soil	Soil			
Sample Matrix Code	2AE	2AE	7	6A	3A	3A	2AE			
PAH-16MS										
Acenaphthene$_{A}^{M\#}$	0.01	<0.01	-	0.02	-	-	-	mg/kg	0.01	A-T-019s
Acenaphthylene$_{A}^{M\#}$	<0.01	<0.01	-	<0.01	-	-	-	mg/kg	0.01	A-T-019s
Anthracene$_{A}^{M\#}$	0.03	<0.02	-	0.04	-	-	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_{A}^{M\#}$	0.13	0.06	-	0.11	-	-	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_{A}^{M\#}$	0.15	0.07	-	0.12	-	-	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_{A}^{M\#}$	0.15	0.07	-	0.11	-	-	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_{A}^{M\#}$	0.07	<0.05	-	0.05	-	-	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_{A}^{M\#}$	<0.07	<0.07	-	<0.07	-	-	-	mg/kg	0.07	A-T-019s
Chrysene$_{A}^{M\#}$	0.17	0.08	-	0.15	-	-	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_{A}^{M\#}$	<0.04	<0.04	-	<0.04	-	-	-	mg/kg	0.04	A-T-019s
Fluoranthene$_{A}^{M\#}$	0.32	0.12	-	0.29	-	-	-	mg/kg	0.08	A-T-019s
Fluorene$_{A}^{M\#}$	<0.01	<0.01	-	0.01	-	-	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_{A}^{M\#}$	0.07	0.04	-	0.06	-	-	-	mg/kg	0.03	A-T-019s
Naphthalene $_{A}^{M\#}$	<0.03	<0.03	-	<0.03	-	-	-	mg/kg	0.03	A-T-019s
Phenanthrene$_{A}^{M\#}$	0.14	0.05	-	0.17	-	-	-	mg/kg	0.03	A-T-019s
Pyrene$_{A}^{M\#}$	0.31	0.12	-	0.28	-	-	-	mg/kg	0.07	A-T-019s
Total PAH-16MS$_{A}^{M\#}$	1.55	0.61	-	1.41	-	-	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/2	21/03444/3	21/03444/4	21/03444/6	21/03444/7	21/03444/8	21/03444/10	Units	Limit of Detection	Method ref
Client Sample No	2	3	4	6	7	8	10			
Client Sample ID	WS01	WS01	WS01	WS02	WS02	WS02	WS03			
Depth to Top	0.30	0.70	2.00	0.60	2.70	4.50	0.50			
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
Sample Type	Soil	Soil	Solid	Soil	Soil	Soil	Soil			
Sample Matrix Code	2AE	2AE	7	6A	3A	3A	2AE			
PAH 16MS (leachable)										
Acenaphthene (leachable)$_{A}$	-	-	0.02	-	<0.02	-	<0.02	µg/l	0.02	A-T-019w
Acenaphthylene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	<0.02	µg/l	0.02	A-T-019w
Anthracene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	<0.02	µg/l	0.02	A-T-019w
Benzo(a)anthracene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	<0.02	µg/l	0.02	A-T-019w
Benzo(a)pyrene (leachable) $_{A}$	-	-	<0.02	-	<0.02	-	0.03	µg/l	0.02	A-T-019w
Benzo(b)fluoranthene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	0.04	µg/l	0.02	A-T-019w
Benzo(ghi)perylene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	0.04	µg/l	0.02	A-T-019w
Benzo(k)fluoranthene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	<0.02	µg/l	0.02	A-T-019w
Chrysene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	0.02	µg/l	0.02	A-T-019w
Dibenzo(ah)anthracene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	<0.02	µg/l	0.02	A-T-019w
Fluoranthene (leachable)$_{A}$	-	-	0.03	-	0.03	-	0.03	µg/l	0.02	A-T-019w
Fluorene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	<0.02	µg/l	0.02	A-T-019w
Indeno(123-cd)pyrene (leachable)$_{A}$	-	-	<0.02	-	<0.02	-	0.03	µg/l	0.02	A-T-019w
Naphthalene (leachable) $_{A}$	-	-	0.03	-	<0.02	-	<0.02	µg/l	0.02	A-T-019w
Phenanthrene (leachable)$_{A}$	-	-	<0.02	-	0.03	-	<0.02	µg/l	0.02	A-T-019w
Pyrene (leachable)$_{A}$	-	-	0.03	-	0.02	-	0.03	µg/l	0.02	A-T-019w
Total PAH 16MS (leachable)$_{A}$	-	-	0.11	-	0.08	-	0.22	µg/l	0.02	A-T-019w
TPH Total with ID + GC Trace										
TPH total (>C6-C40)$_{A}^{M\#}$	110	39	-	22	-	-	-	mg/kg	10	A-T-007s
TPH FID Chromatogram$_{A}$	Appended	Appended	-	Appended	-	-	-			A-T-007s
TPH ID (for FID characterisations)$_{A}$	C12-C44 hydrocarbons with some PAHs and humic substances	C12-C40 hydrocarbons with some PAHs and humic substances	-	C16-C40 hydrocarbons with some PAHs and humic substances	-	-	-			A-T-007s

envirolab

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/11	21/03444/12	21/03444/13	21/03444/14	21/03444/15	21/03444/16		Units	Limit of Detection	Method ref
Client Sample No	11	12	13	14	15	16				
Client Sample ID	WS03	WS04	WS04	WS05	WS05	WS05				
Depth to Top	4.00	0.30	0.80	0.20	0.60	2.00				
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	3A	2ABE	6AE	6AE	6A	5AE				
Hazardous Waste Assessment	-	Appended	Appended	Appended	-	-				Assessment
% Moisture at <40C$_{A}$	-	10.8	17.6	22.9	-	-		% w/w	0.1	A-T-044
% Stones >10mm$_{A}$	<0.1	22.6	2.8	3.1	21.6	<0.1		% w/w	0.1	A-T-044
pH$_{D}^{M\#}$	6.97	8.03	7.72	7.52	-	5.90		pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_{D}^{M\#}$	0.04	<0.01	0.04	0.03	-	0.08		g/l	0.01	A-T-026s
Sulphate (acid soluble)$_{D}^{M\#}$	-	350	230	440	-	-		mg/kg	200	A-T-028s
Sulphur (total)$_{D}$	81	334	179	352	-	208		mg/kg	50	A-T-024s
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$_{D}^{M\#}$	-	6.9	3.0	4.9	-	-		% w/w	0.1	A-T-032 OM
Arsenic$_{D}^{M\#}$	-	5	3	7	-	-		mg/kg	1	A-T-024s
Boron (water soluble)$_{D}$	-	<1.0	<1.0	<1.0	-	-		mg/kg	1	A-T-027s
Cadmium$_{D}^{M\#}$	-	0.9	0.8	0.8	-	-		mg/kg	0.5	A-T-024s
Copper$_{D}^{M\#}$	-	36	24	28	-	-		mg/kg	1	A-T-024s
Chromium$_{D}^{M\#}$	-	19	20	18	-	-		mg/kg	1	A-T-024s
Chromium (hexavalent)$_{D}$	-	<1	<1	<1	-	-		mg/kg	1	A-T-040s
Lead$_{D}^{M\#}$	-	56	24	47	-	-		mg/kg	1	A-T-024s
Mercury$_{D}$	-	0.57	<0.17	<0.17	-	-		mg/kg	0.17	A-T-024s
Nickel$_{D}^{M\#}$	-	19	17	18	-	-		mg/kg	1	A-T-024s
Selenium$_{D}^{M\#}$	-	<1	<1	<1	-	-		mg/kg	1	A-T-024s
Vanadium$_{D}^{M\#}$	-	26	26	24	-	-		mg/kg	1	A-T-024s
Zinc$_{D}^{M\#}$	-	62	45	61	-	-		mg/kg	5	A-T-024s
Leachate Prep BS EN 12457-1 (2:1) (1 no)$_{A}$	-	-	-	-	*	-				A-T-001
pH (leachable)$_{A}^{\#}$	-	-	-	-	7.69	-		pH	0.01	A-T-031w
Sulphate (leachable)$_{A}^{\#}$	-	-	-	-	37.57	-		mg/l	1	A-T-026w
Cyanide (total) (leachable)$_{A}^{\#}$	-	-	-	-	<0.005	-		mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable)$_{A}$	-	-	-	-	<0.01	-		mg/l	0.01	A-T-050w
Arsenic (leachable)$_{A}^{\#}$	-	-	-	-	<1	-		µg/l	1	A-T-025w
Boron (leachable)$_{A}^{\#}$	-	-	-	-	52	-		µg/l	10	A-T-025w
Cadmium (leachable)$_{A}^{\#}$	-	-	-	-	<1	-		µg/l	1	A-T-025w
Copper (leachable)$_{A}^{\#}$	-	-	-	-	4	-		µg/l	1	A-T-025w
Chromium (hexavalent) (leachable)$_{A}$	-	-	-	-	<0.10	-		mg/l	0.05	A-T-040w
Lead (leachable)$_{A}^{\#}$	-	-	-	-	<1	-		µg/l	1	A-T-025w

envirolab

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/11	21/03444/12	21/03444/13	21/03444/14	21/03444/15	21/03444/16		Units	Limit of Detection	Method ref
Client Sample No	11	12	13	14	15	16				
Client Sample ID	WS03	WS04	WS04	WS05	WS05	WS05				
Depth to Top	4.00	0.30	0.80	0.20	0.60	2.00				
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	3A	2ABE	6AE	6AE	6A	5AE				
Mercury (leachable)$_{A}^{\#}$	-	-	-	-	<0.1	-		µg/l	0.1	A-T-025w
Nickel (leachable)$_{A}^{\#}$	-	-	-	-	2	-		µg/l	1	A-T-025w
Selenium (leachable)$_{A}^{\#}$	-	-	-	-	<1	-		µg/l	1	A-T-025w
Sulphur, Total (leachable)$_{A}$	-	-	-	-	25	-		mg/l	1	A-T-025w
Vanadium (leachable)$_{A}^{\#}$	-	-	-	-	<1	-		µg/l	1	A-T-025w
Zinc (leachable)$_{A}^{\#}$	-	-	-	-	4	-		µg/l	1	A-T-025w

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/11	21/03444/12	21/03444/13	21/03444/14	21/03444/15	21/03444/16		Units	Limit of Detection	Method ref
Client Sample No	11	12	13	14	15	16				
Client Sample ID	WS03	WS04	WS04	WS05	WS05	WS05				
Depth to Top	4.00	0.30	0.80	0.20	0.60	2.00				
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	3A	2ABE	6AE	6AE	6A	5AE				
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	-	NAD	NAD	NAD	-	-				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	-	N/A	N/A	N/A	-	-				A-T-045

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/11	21/03444/12	21/03444/13	21/03444/14	21/03444/15	21/03444/16		Units	Limit of Detection	Method ref
Client Sample No	11	12	13	14	15	16				
Client Sample ID	WS03	WS04	WS04	WS05	WS05	WS05				
Depth to Top	4.00	0.30	0.80	0.20	0.60	2.00				
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	3A	2ABE	6AE	6AE	6A	5AE				
PAH-16MS										
Acenaphthene$_{A}^{M\#}$	-	0.42	0.02	0.01	-	-		mg/kg	0.01	A-T-019s
Acenaphthylene$_{A}^{M\#}$	-	0.09	<0.01	<0.01	-	-		mg/kg	0.01	A-T-019s
Anthracene$_{A}^{M\#}$	-	0.95	0.05	0.04	-	-		mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_{A}^{M\#}$	-	6.44	0.37	0.11	-	-		mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_{A}^{M\#}$	-	8.76	0.58	0.14	-	-		mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_{A}^{M\#}$	-	8.76	0.57	0.14	-	-		mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_{A}^{M\#}$	-	4.70	0.35	<0.05	-	-		mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_{A}^{M\#}$	-	2.94	0.21	<0.07	-	-		mg/kg	0.07	A-T-019s
Chrysene$_{A}^{M\#}$	-	5.66	0.46	0.16	-	-		mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_{A}^{M\#}$	-	1.02	0.06	<0.04	-	-		mg/kg	0.04	A-T-019s
Fluoranthene$_{A}^{M\#}$	-	13.3	0.74	0.30	-	-		mg/kg	0.08	A-T-019s
Fluorene$_{A}^{M\#}$	-	0.18	<0.01	<0.01	-	-		mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_{A}^{M\#}$	-	5.84	0.39	0.06	-	-		mg/kg	0.03	A-T-019s
Naphthalene $_{A}^{M\#}$	-	0.05	<0.03	<0.03	-	-		mg/kg	0.03	A-T-019s
Phenanthrene$_{A}^{M\#}$	-	2.46	0.17	0.14	-	-		mg/kg	0.03	A-T-019s
Pyrene$_{A}^{M\#}$	-	13.3	0.74	0.29	-	-		mg/kg	0.07	A-T-019s
Total PAH-16MS$_{A}^{M\#}$	-	74.9	4.71	1.39	-	-		mg/kg	0.01	A-T-019s

Envirolab Job Number: 21/03444

Client Project Name: Our Lady's School

Client Project Ref: 9670G

Lab Sample ID	21/03444/11	21/03444/12	21/03444/13	21/03444/14	21/03444/15	21/03444/16		Units	Limit of Detection	Method ref
Client Sample No	11	12	13	14	15	16				
Client Sample ID	WS03	WS04	WS04	WS05	WS05	WS05				
Depth to Top	4.00	0.30	0.80	0.20	0.60	2.00				
Depth To Bottom										
Date Sampled	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	3A	2ABE	6AE	6AE	6A	5AE				
PAH 16MS (leachable)										
Acenaphthene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Acenaphthylene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Anthracene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Benzo(a)anthracene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Benzo(a)pyrene (leachable) $_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Benzo(b)fluoranthene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Benzo(ghi)perylene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Benzo(k)fluoranthene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Chrysene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Dibenzo(ah)anthracene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Fluoranthene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Fluorene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Indeno(123-cd)pyrene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Naphthalene (leachable) $_{A}$	-	-	-	-	0.03	-		µg/l	0.02	A-T-019w
Phenanthrene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Pyrene (leachable)$_{A}$	-	-	-	-	<0.02	-		µg/l	0.02	A-T-019w
Total PAH 16MS (leachable)$_{A}$	-	-	-	-	0.03	-		µg/l	0.02	A-T-019w
TPH Total with ID + GC Trace										
TPH total (>C6-C40)$_{A}^{M\#}$	-	1560	190	60	-	-		mg/kg	10	A-T-007s
TPH FID Chromatogram$_{A}$	-	Appended	Appended	Appended	-	-				A-T-007s
TPH ID (for FID characterisations)$_{A}$	-	C12-C44 with some PAHs, humic substances and unknown heavier hydrocarbons	C15-C44 hydrocarbons with some PAHs and humic substances	C15-C40 hydrocarbons with some PAHs and humic substances	-	-				A-T-007s

REPORT NOTES

General

Soil chemical analysis:

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

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

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

Asbestos:

Predominant Matrix Codes:

Secondary Matrix Codes:

Key:

Envirolab Deviating Samples Report

Client: WML Construction , No 8 Oak Green, Earl Road, Stanley Green Business Park, Cheadle Hulme, Cheshire, SK8 6QL

Project: Our Lady's School

Clients Project No: 9670G

Project No: 21/03444

Date Received: 01/04/2021 (am)

Cool Box Temperatures (°C): 12.4, 11.9

Lab Sample ID						
Client Sample No						
Client Sample ID/Depth						
Date Sampled						
Deviation Code						
	✓	✓	✓	✓	✓	✓

Key

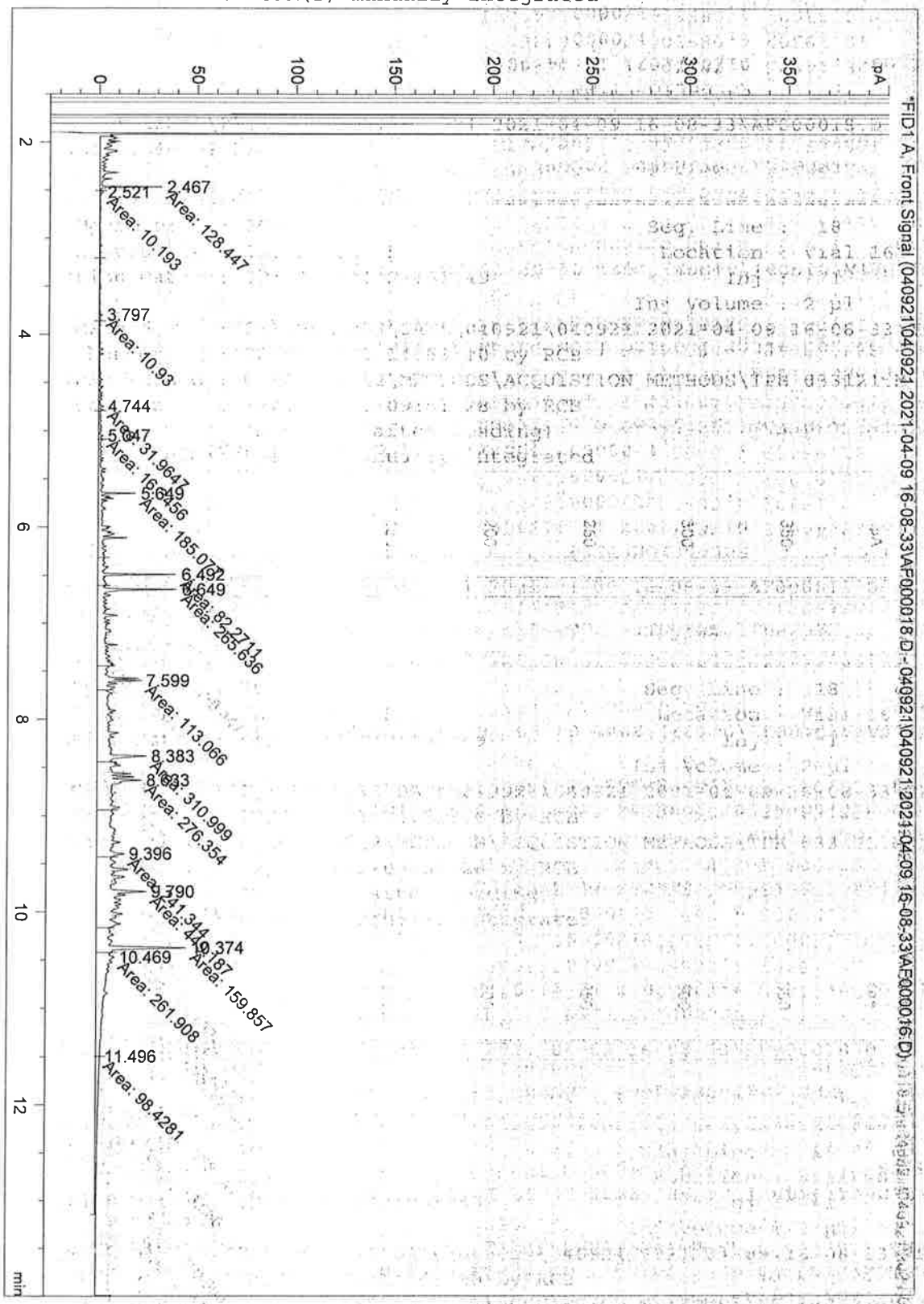
F *Maximum holding time exceeded between sampling date and analysis for analytes listed below*

Lab Sample ID						
Client Sample No						
Client Sample ID/Depth						
Date Sampled						
	✓	✓	✓	✓	✓	✓

Data File C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\AF000018.D
Sample Name: 3444-02 TS

==========

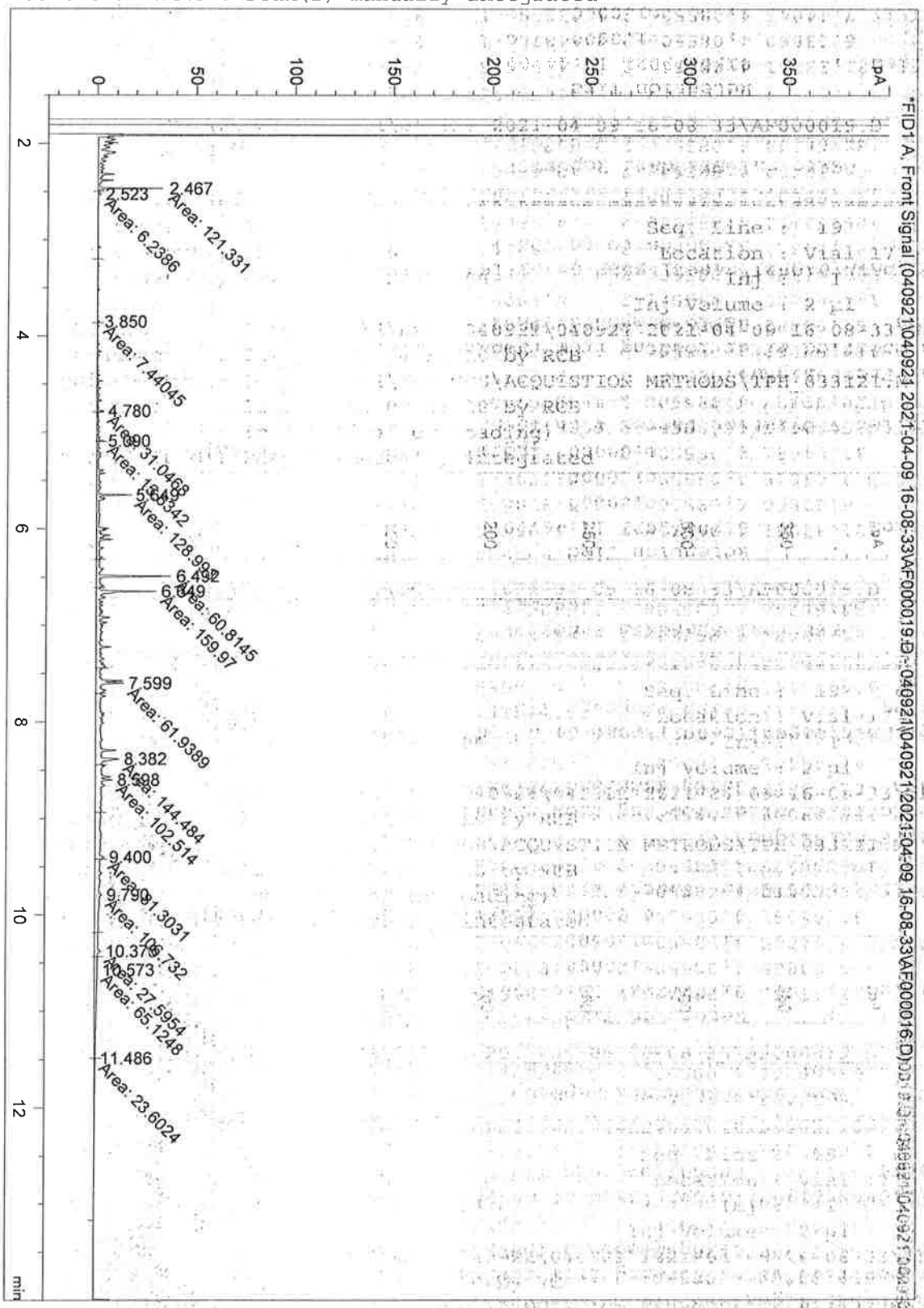
Acq. Operator	: RCB	Seq. Line	: 18
Acq. Instrument	: Instrument 5	Location	: Vial 16
Injection Date	: 09/04/2021 21:51:49	Inj	: 1
		Inj Volume	: 2 µl
Acq. Method	: C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\TPH.M		
Last changed	: 22/01/2021 14:53:10 by RCB		
Analysis Method	: C:\CHEM32\2\METHODS\ACQUISTION METHODS\TPH_033121.M		
Last changed	: 12/04/2021 09:51:28 by RCB (modified after loading)		
Additional Info	: Peak(s) manually integrated		



Data File C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\AF000019.D
Sample Name: 3444-03 TS

==========

Acq. Operator	: RCB	Seq. Line	: 19
Acq. Instrument	: Instrument 5	Location	: Vial 17
Injection Date	: 09/04/2021 22:12:06	Inj	: 1
		Inj Volume	: 2 µl
Acq. Method	: C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\TPH.M		
Last changed	: 22/01/2021 14:53:10 by RCB		
Analysis Method	: C:\CHEM32\2\METHODS\ACQUISTION METHODS\TPH_033121.M		
Last changed	: 12/04/2021 09:51:28 by RCB (modified after loading)		
Additional Info	: Peak(s) manually integrated		

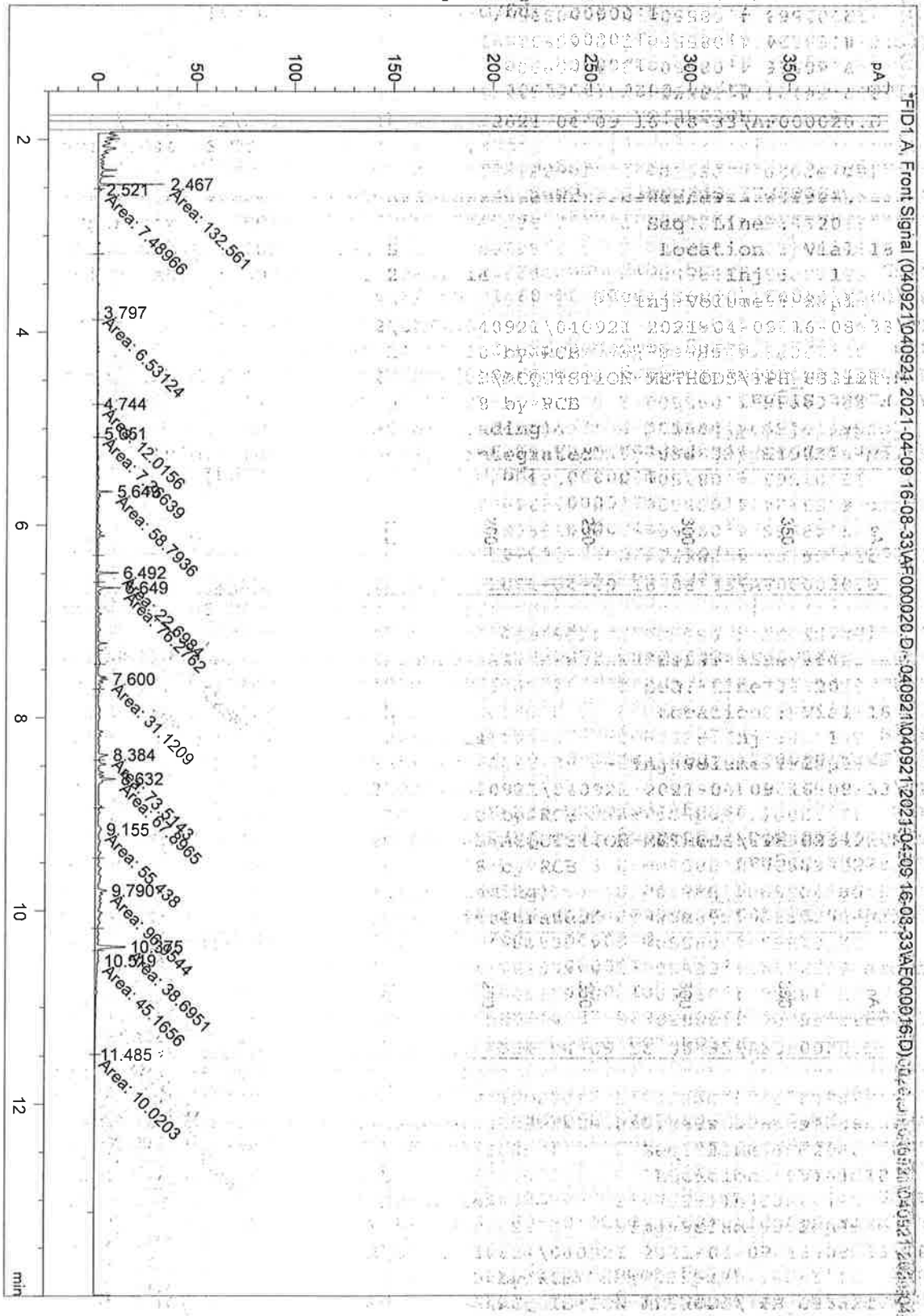


Data File C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\AF000020.D
Sample Name: 3444-06 TS

==========

Acq. Operator : RCB
Acq. Instrument : Instrument 5
Injection Date : 09/04/2021 22:32:14

Acq. Method : C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\TPH.M
Last changed : 22/01/2021 14:53:10 by RCB
Analysis Method : C:\CHEM32\2\METHODS\ACQUISITION METHODS\TPH 033121.M
Last changed : 12/04/2021 09:51:28 by RCB
(modified after loading)
Additional Info : Peak(s) manually integrated

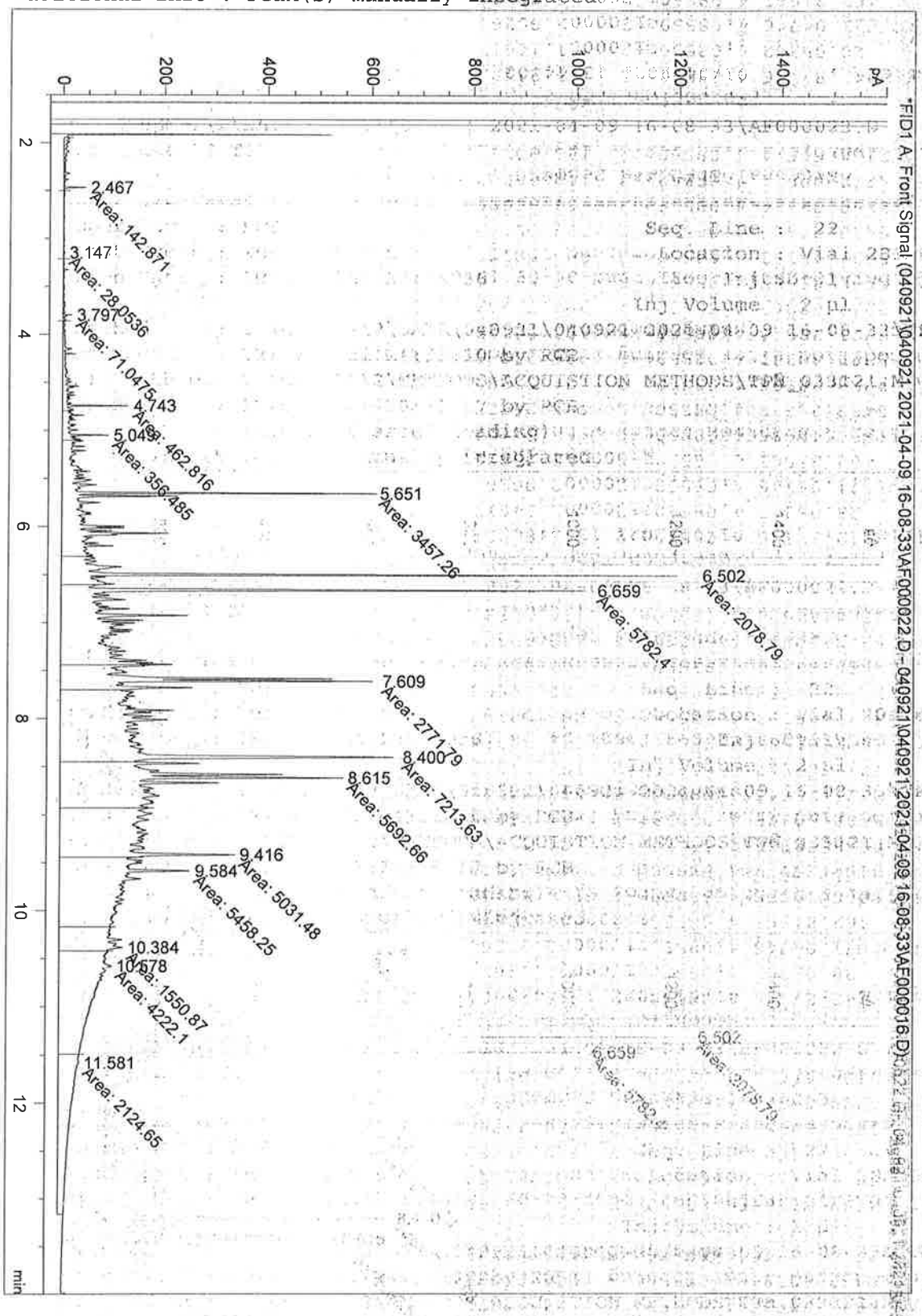


Data File C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\AF000022.D
Sample Name: 3444-12 TS

==========

Acq. Operator : RCB
Seq. Line : 22
Acq. Instrument : Instrument 5
Location : Vial 20
Injection Date : 09/04/2021 23:12:36
Inj : 1
Inj Volume : 2 µl

Acq. Method : C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\TPH.M
Last changed : 22/01/2021 14:53:10 by RCB
Analysis Method : C:\CHEM32\2\METHODS\ACQUISTION METHODS\TPH_033121.M
Last changed : 12/04/2021 10:45:17 by RCB
(modified after loading)
Additional Info : Peak(s) manually integrated



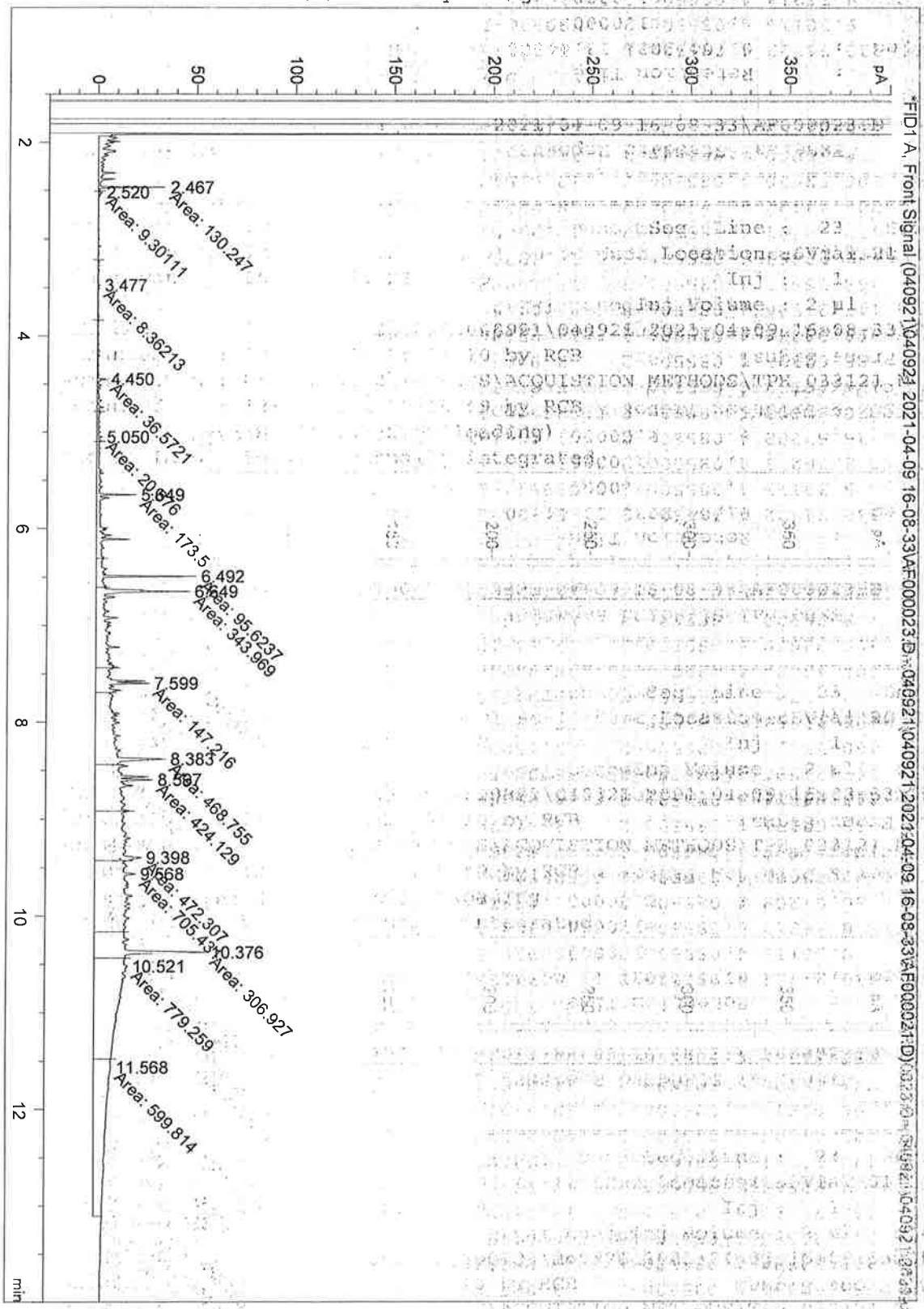
Data File C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\AF000023.D
Sample Name: 3444-13 TS

==========

Acq. Operator : RCB
Acq. Instrument : Instrument 5
Injection Date : 09/04/2021 23:32:39

Seq. Line : 23
Location : Vial 21
Inj : 1
Inj Volume : 2 µl

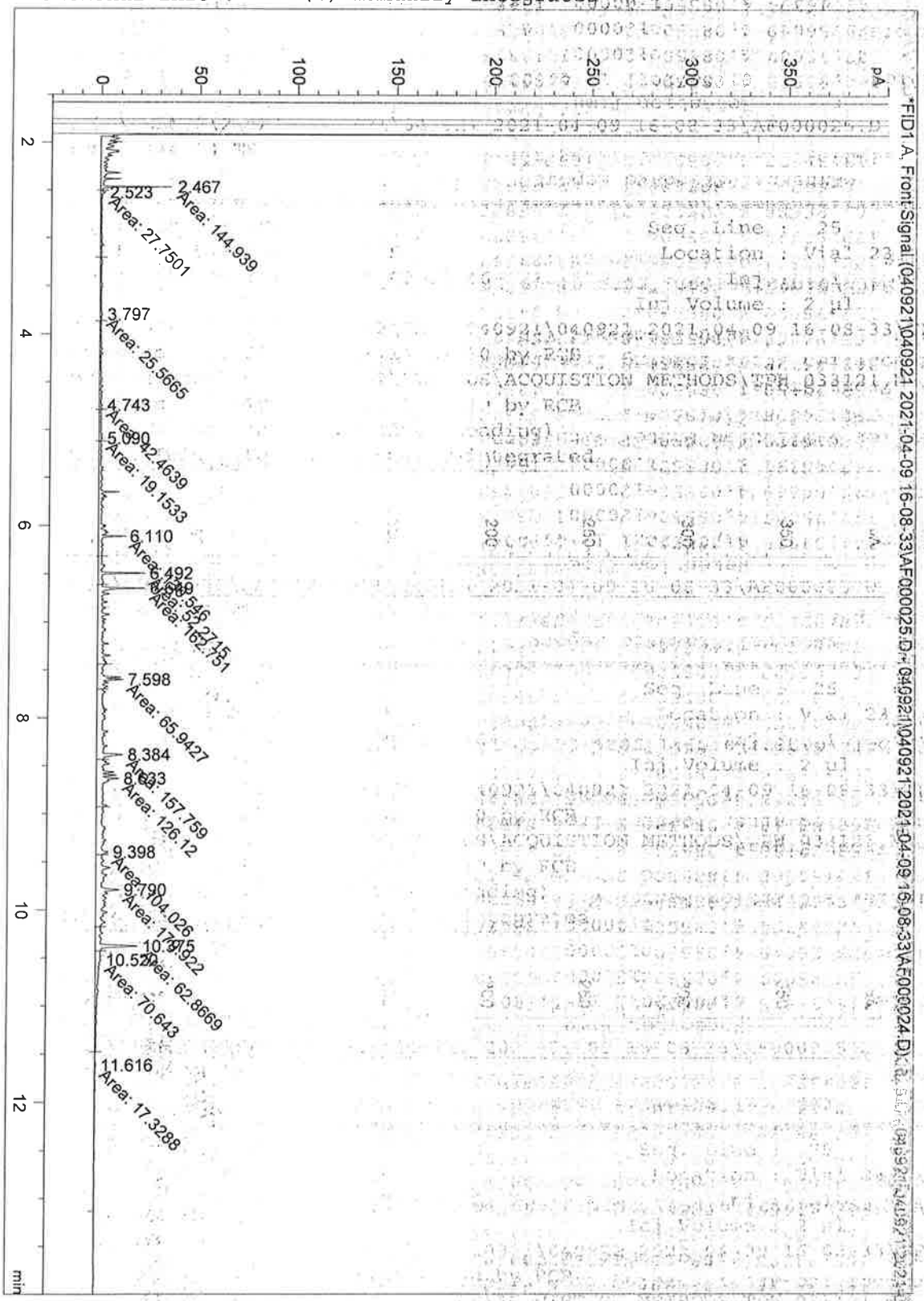
Acq. Method : C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\TPH.M
Last changed : 22/01/2021 14:53:10 by RCB
Analysis Method : C:\CHEM32\2\METHODS\ACQUISTION METHODS\TPH_033121.M
Last changed : 12/04/2021 10:45:49 by RCB
(modified after loading)
Additional Info : Peak(s) manually integrated



Data File C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\AF000025.D
Sample Name: 3444-14 TS

==========

Acq. Operator	: RCB	Seq. Line	: 25
Acq. Instrument	: Instrument 5	Location	: Vial 23
Injection Date	: 10/04/2021 00:12:46	Inj	: 1
		Inj Volume	: 2 µl
Acq. Method	: C:\CHEM32\2\DATA\040921\040921 2021-04-09 16-08-33\TPH.M		
Last changed	: 22/01/2021 14:53:10 by RCB		
Analysis Method	: C:\CHEM32\2\METHODS\ACQUISTION METHODS\TPH 033121.M		
Last changed	: 12/04/2021 10:45:49 by RCB (modified after loading)		
Additional Info	: Peak(s) manually integrated		



HAZARDOUS WASTE CLASSIFICATION REPORT

Envirolab Job Number:

Issue Number: **Date: 23/04/21**

Client: WML Construction

Project Manager: Sam Seddon
Project Name: Our Lady's School
Project Ref: 9670G
Order No: 9670G
Date Samples Received: 30/03/2021
Date Instructions Received:

Approved by:

WM3 PRELIMINARY WASTE ASSESSMENT AND CLASSIFICATION REPORT

RSK REPORT REFERENCE: 11505-R114

INTRODUCTION

On behalf of Envirolab, RSK was requested to undertake waste assessment and classification on one soil sample collected by a third-party from an unknown site on 27 March 2021.

Information relating to historical operations at the site was not reviewed as part of RSK's assessment. In addition, RSK was not present during the collection of the sample nor had any input on the chemical testing suite. Therefore, the waste assessment and classification detailed in this report are based solely on the laboratory chemical data that were provided to RSK by Envirolab and were completed without prejudice for our client, Envirolab.

CHEMICAL TESTING

The sample was analysed for a **chemical testing suite** comprising: TPH total with ID, pH, sulphate (water soluble), sulphate (acid soluble), sulphur (total), cyanide (total), phenols (total), organic matter, speciated PAH, heavy metals including hexavalent chromium, boron (water soluble) and vanadium, moisture content and asbestos screen.

Copies of the certificates of chemical analysis are provided in Appendix B.

WASTE ASSESSMENT AND CLASSIFICATION

The following assessments assume the material tested is classified subsequently as waste. Envirolab, an RSK company, has developed a waste soils characterisation assessment tool (HASWASTE), which follows the guidance within Technical Guidance WM3. The analytical results have been assessed using this tool to determine if the sample contains hazardous properties.

The results of the assessment are summarised below. A copy of the HASWASTE assessment spreadsheet is provided in Appendix C.

Sample Reference	Waste classification of sample	Hazardous property code(s)	Hazardous chemical component(s) and concentration(s)
WS01 (0.30m)	**Non-hazardous**	Not applicable	Not applicable
WS01 (0.70m)	**Non-hazardous**	Not applicable	Not applicable
WS02 (0.60m)	**Non-hazardous**	Not applicable	Not applicable
WS04 (0.30m)	**Hazardous**	HP7 (carcinogenic) HP11 (mutagenic)	TPH 1,392mg/kg *(corrected to wet weight)*
WS04 (0.80m)	**Non-hazardous**	Not applicable	Not applicable
WS05 (0.20m)	**Non-hazardous**	Not applicable	Not applicable

CONCLUSIONS

Waste assessment and classification were completed by RSK solely on the basis of chemical data provided by Envirolab. Using the data available for assessment, samples WS01 (0.30m), WS01 (0.70m), WS02 (0.60m), WS04 (0.80m) and WS05 (0.20m) may be classified as **non-hazardous waste** and sample WS04 (0.30m) may be classified as **hazardous waste** HP7 (carcinogenic) and HP11 (mutagenic) due to a TPH concentration of 1,392mg/kg (corrected to wet weight).

We are not aware of the source of the material that the samples were taken from therefore we cannot definitively assign the appropriate List of Waste (LoW) code (formerly the European Waste Catalogue (EWC)). However, if the samples waere taken from material that is CONSTRUCTION AND DEMOLITION WASTE (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES) it may be possible for the waste producer to assign the non-hazardous waste LoW code **'17 05 04 soil and stones'** to samples WS01 (0.30m), WS01 (0.70m), WS02 (0.60m), WS04 (0.80m) and WS05 (0.20m), and the hazardous waste LoW code **'17 05 03' soil and stones containing hazardous substances'** to sample WS04 (0.30m).

In the absence of specific information on potential waste volumes and waste streams the tested sample is representative of, it is noted that the chemical testing and assessment undertaken on six samples may not necessarily be representative of the waste stream(s) requiring disposal. Therefore, further testing and assessment may be required to robustly characterise the waste and satisfy the requirements of the waste receiving facility. Furthermore, specific waste receiving sites that are identified as potential disposal routes may have additional analytical requirements (e.g. WAC testing) before they are either able or willing to accept the waste; therefore, it is advised that potential disposal sites are contacted at the earliest possible convenience so any further specific requirements to support disposal can be established.

Report author: **Emma Atkinson** Technical reviewer: **Karl Hall**

APPENDIX A
RSK SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Envirolab (the "client") in accordance with the terms of the of the agreement between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials, unless specifically identified in the Services.

7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):

    a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.

    b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.

    c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

    RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated

on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on 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 investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.

12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.

APPENDIX B
CERTIFICATES OF CHEMICAL ANALYSIS

Envirolab Job Number: 21/03444
Client:
Client Project Name:
Client Project Ref:

Lab Sample ID				21/03444/2	21/03444/3	21/03444/6
Client Sample No				2	3	6
Client Sample ID				WS01	WS01	WS02
Depth to Top				0.30	0.70	0.60
Depth to Bottom						
Date Sampled				27-Mar-21	27-Mar-21	27-Mar-21
Sample Type				Soil	Soil	Soil
Sample Matrix Code	**Units**	**Limit of Detection**	**Method**	2AE	2AE	6A
% Moisture at <40C	% w/w	0.1	A-T-044	19.4	17.6	17.3
% Stones >10mm	% w/w	0.1	A-T-044	7.5	14.8	15.9
pH	pH	0.01	A-T-031s	8	7.92	7.73
Sulphate (water sol 2:1)	g/l	0.01	A-T-026s	0.03	<0.01	0.08
Sulphate (acid soluble)	mg/kg	200	A-T-028s	520	380	580
Sulphur (total)	mg/kg	50	A-T-024s	407	336	390
Cyanide (total)	mg/kg	1	A-T-042sTCN	<1	<1	<1
Phenols - Total by HPLC	mg/kg	0.2	A-T-050s	<0.2	<0.2	<0.2
Organic matter	% w/w	0.1	A-T-032 OM	5.4	4.2	4.1
Arsenic	mg/kg	1	A-T-024s	5	5	5
Boron (water soluble)	mg/kg	1	A-T-027s	<1.0	<1.0	<1.0
Cadmium	mg/kg	0.5	A-T-024s	0.8	0.8	0.8
Copper	mg/kg	1	A-T-024s	28	28	25
Chromium	mg/kg	1	A-T-024s	21	21	19
Chromium (hexavalent)	mg/kg	1	A-T-040s	<1	<1	<1
Lead	mg/kg	1	A-T-024s	41	42	42
Mercury	mg/kg	0.17	A-T-024s	0.29	0.19	0.48
Nickel	mg/kg	1	A-T-024s	20	20	16
Selenium	mg/kg	1	A-T-024s	<1	<1	<1
Vanadium	mg/kg	1	A-T-024s	24	25	24
Zinc	mg/kg	5	A-T-024s	67	60	58
Asbestos in Soil (inc. matrix)						
Asbestos in soil			A-T-045	NAD	NAD	NAD
Asbestos ACM - Suitable for Water Absorption Test?			A-T-045	N/A	N/A	N/A
PAH-16MS						
Acenaphthene	mg/kg	0.01	A-T-019s	0.01	<0.01	0.02
Acenaphthylene	mg/kg	0.01	A-T-019s	<0.01	<0.01	<0.01
Anthracene	mg/kg	0.02	A-T-019s	0.03	<0.02	0.04
Benzo(a)anthracene	mg/kg	0.04	A-T-019s	0.13	0.06	0.11
Benzo(a)pyrene	mg/kg	0.04	A-T-019s	0.15	0.07	0.12
Benzo(b)fluoranthene	mg/kg	0.05	A-T-019s	0.15	0.07	0.11
Benzo(ghi)perylene	mg/kg	0.05	A-T-019s	0.07	<0.05	0.05
Benzo(k)fluoranthene	mg/kg	0.07	A-T-019s	<0.07	<0.07	<0.07
Chrysene	mg/kg	0.06	A-T-019s	0.17	0.08	0.15
Dibenzo(ah)anthracene	mg/kg	0.04	A-T-019s	<0.04	<0.04	<0.04
Fluoranthene	mg/kg	0.08	A-T-019s	0.32	0.12	0.29
Fluorene	mg/kg	0.01	A-T-019s	<0.01	<0.01	0.01
Indeno(123-cd)pyrene	mg/kg	0.03	A-T-019s	0.07	0.04	0.06
Naphthalene	mg/kg	0.03	A-T-019s	<0.03	<0.03	<0.03
Phenanthrene	mg/kg	0.03	A-T-019s	0.14	0.05	0.17
Pyrene	mg/kg	0.07	A-T-019s	0.31	0.12	0.28
Total PAH-16MS	mg/kg	0.01	A-T-019s	1.55	0.61	1.41
TPH Total with ID + GC Trace						
TPH total (>C6-C40)	mg/kg	10	A-T-007s	110	39	22
TPH FID Chromatogram			A-T-007s	Appended	Appended	Appended

Envirolab Job Number: 21/03444
Client:
Client Project Name:
Client Project Ref:

	Units	Limit of Detection	Method			
Lab Sample ID				21/03444/2	21/03444/3	21/03444/6
Client Sample No				2	3	6
Client Sample ID				WS01	WS01	WS02
Depth to Top				0.30	0.70	0.60
Depth to Bottom						
Date Sampled				27-Mar-21	27-Mar-21	27-Mar-21
Sample Type				Soil	Soil	Soil
Sample Matrix Code				2AE	2AE	6A
TPH ID (for FID characterisations)			A-T-007s	C12-C44 hydrocarbons with some PAHs and humic substances	C12-C40 hydrocarbons with some PAHs and humic substances	C16-C40 hydrocarbons with some PAHs and humic substances

Envirolab Job Number: 21/03444
Client:
Client Project Name:
Client Project Ref:

Lab Sample ID			21/03444/12	21/03444/13	21/03444/14
Client Sample No			12	13	14
Client Sample ID			WS04	WS04	WS05
Depth to Top			0.30	0.80	0.20
Depth to Bottom					
Date Sampled			27-Mar-21	27-Mar-21	27-Mar-21
Sample Type			Soil	Soil	Soil
Sample Matrix Code	**Units**	**Limit of Detection**	2ABE	6AE	6AE
% Moisture at <40C	% w/w	0.1	10.8	17.6	22.9
% Stones >10mm	% w/w	0.1	22.6	2.8	3.1
pH	pH	0.01	8.03	7.72	7.52
Sulphate (water sol 2:1)	g/l	0.01	<0.01	0.04	0.03
Sulphate (acid soluble)	mg/kg	200	350	230	440
Sulphur (total)	mg/kg	50	334	179	352
Cyanide (total)	mg/kg	1	<1	<1	<1
Phenols - Total by HPLC	mg/kg	0.2	<0.2	<0.2	<0.2
Organic matter	% w/w	0.1	6.9	3	4.9
Arsenic	mg/kg	1	5	3	7
Boron (water soluble)	mg/kg	1	<1.0	<1.0	<1.0
Cadmium	mg/kg	0.5	0.9	0.8	0.8
Copper	mg/kg	1	36	24	28
Chromium	mg/kg	1	19	20	18
Chromium (hexavalent)	mg/kg	1	<1	<1	<1
Lead	mg/kg	1	56	24	47
Mercury	mg/kg	0.17	0.57	<0.17	<0.17
Nickel	mg/kg	1	19	17	18
Selenium	mg/kg	1	<1	<1	<1
Vanadium	mg/kg	1	26	26	24
Zinc	mg/kg	5	62	45	61
Asbestos in Soil (inc. matrix)					
Asbestos in soil			NAD	NAD	NAD
Asbestos ACM - Suitable for Water Absorption Test?			N/A	N/A	N/A
PAH-16MS					
Acenaphthene	mg/kg	0.01	0.42	0.02	0.01
Acenaphthylene	mg/kg	0.01	0.09	<0.01	<0.01
Anthracene	mg/kg	0.02	0.95	0.05	0.04
Benzo(a)anthracene	mg/kg	0.04	6.44	0.37	0.11
Benzo(a)pyrene	mg/kg	0.04	8.76	0.58	0.14
Benzo(b)fluoranthene	mg/kg	0.05	8.76	0.57	0.14
Benzo(ghi)perylene	mg/kg	0.05	4.7	0.35	<0.05
Benzo(k)fluoranthene	mg/kg	0.07	2.94	0.21	<0.07
Chrysene	mg/kg	0.06	5.66	0.46	0.16
Dibenzo(ah)anthracene	mg/kg	0.04	1.02	0.06	<0.04
Fluoranthene	mg/kg	0.08	13.3	0.74	0.3
Fluorene	mg/kg	0.01	0.18	<0.01	<0.01
Indeno(123-cd)pyrene	mg/kg	0.03	5.84	0.39	0.06
Naphthalene	mg/kg	0.03	0.05	<0.03	<0.03
Phenanthrene	mg/kg	0.03	2.46	0.17	0.14
Pyrene	mg/kg	0.07	13.3	0.74	0.29
Total PAH-16MS	mg/kg	0.01	74.9	4.71	1.39
TPH Total with ID + GC Trace					
TPH total (>C6-C40)	mg/kg	10	1560	190	60
TPH FID Chromatogram			Appended	Appended	Appended

Envirolab Job Number: 21/03444
Client:
Client Project Name:
Client Project Ref:

	Units	Limit of Detection			
Lab Sample ID			21/03444/12	21/03444/13	21/03444/14
Client Sample No			12	13	14
Client Sample ID			WS04	WS04	WS05
Depth to Top			0.30	0.80	0.20
Depth to Bottom					
Date Sampled			27-Mar-21	27-Mar-21	27-Mar-21
Sample Type			Soil	Soil	Soil
Sample Matrix Code			2ABE	6AE	6AE
TPH ID (for FID characterisations)			C12-C44 with some PAHs, humic substances and unknown heavier hydrocarbons	C15-C44 hydrocarbons with some PAHs and humic substances	C15-C40 hydrocarbons with some PAHs and humic substances

APPENDIX C
'HASWASTE' SPREADSHEET

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Haswaste, developed by Dr. Iain Haslock.

Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

11505-CTR114

TP/WS/BH		WS01	WS01	WS02	WS04	WS04	WS05			
Depth (m)		0.30	0.70	0.60	0.30	0.80	0.20			
Date		27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
% Moisture	%	19.4	17.6	17.3	10.8	17.6	22.9			
pH (soil)		8.00	7.92	7.73	8.03	7.72	7.52			
pH (leachate)										
Arsenic	mg/kg	5	5	5	5	3	7			
Cadmium	mg/kg	0.8	0.8	0.8	0.9	0.8	0.8			
Copper	mg/kg	28	28	25	36	24	28			
CrVI or Chromium	mg/kg	1	1	1	1	1	1			
Lead	mg/kg	41	42	42	56	24	47			
Mercury	mg/kg	0.29	0.19	0.48	0.57	0.17	0.17			
Nickel	mg/kg	20	20	16	19	17	18			
Selenium	mg/kg	1	1	1	1	1	1			
Zinc	mg/kg	67	60	58	62	45	61			
Barium	mg/kg									
Beryllium	mg/kg									
Vanadium	mg/kg	24	25	24	26	26	24			
Cobalt	mg/kg									
Manganese	mg/kg									
Molybdenum	mg/kg									
Antimony	mg/kg									
Aluminium	mg/kg									
Bismuth	mg/kg									
CrIII	mg/kg	21	21	19	19	20	18			
Iron	mg/kg									
Strontium	mg/kg									
Tellurium	mg/kg									
Thallium	mg/kg									
Titanium	mg/kg									
Tungsten	mg/kg									
Ammoniacal N	mg/kg									
ws Boron	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0			
PAH (Input Total PAH **OR** individual PAH results)										
Acenaphthene	mg/kg	0.01	0.01	0.02	0.42	0.02	0.01			
Acenaphthylene	mg/kg	0.01	0.01	0.01	0.09	0.01	0.01			
Anthracene	mg/kg	0.03	0.02	0.04	0.95	0.05	0.04			
Benzo(a)anthracene	mg/kg	0.13	0.06	0.11	6.44	0.37	0.11			
Benzo(a)pyrene	mg/kg	0.15	0.07	0.12	8.76	0.58	0.14			
Benzo(b)fluoranthene	mg/kg	0.15	0.07	0.11	8.76	0.57	0.14			
Benzo(ghi)perylene	mg/kg	0.07	0.05	0.05	4.70	0.35	0.05			
Benzo(k)fluoranthene	mg/kg	0.07	0.07	0.07	2.94	0.21	0.07			
Chrysene	mg/kg	0.17	0.08	0.15	5.66	0.46	0.16			
Dibenzo(ah)anthracene	mg/kg	0.04	0.04	0.04	1.02	0.06	0.04			
Fluoranthene	mg/kg	0.32	0.12	0.29	13.30	0.74	0.30			
Fluorene	mg/kg	0.01	0.01	0.01	0.18	0.01	0.01			
Indeno(123cd)pyrene	mg/kg	0.07	0.04	0.06	5.84	0.39	0.06			
Naphthalene	mg/kg	0.03	0.03	0.03	0.05	0.03	0.03			
Phenanthrene	mg/kg	0.14	0.05	0.17	2.46	0.17	0.14			
Pyrene	mg/kg	0.31	0.12	0.28	13.30	0.74	0.29			
Coronene	mg/kg									
Total PAHs (16 or 17)	mg/kg									
TPH										
Petrol	mg/kg									
Diesel	mg/kg									
Lube Oil	mg/kg									
Crude Oil	mg/kg									
White Spirit / Kerosene	mg/kg									
Creosote	mg/kg									
Unknown TPH with ID	mg/kg	110.0	39.0	22.0	1,560.0	190.0	60.0			
Unknown TPHCWG	mg/kg									
Total Sulphide	mg/kg									
Complex Cyanide	mg/kg									
Free (or Total) Cyanide	mg/kg	1	1	1	1	1	1			
Thiocyanate	mg/kg									
Elemental/Free Sulphur	mg/kg	407	336	390	334	179	352			
Phenols Input Total Phenols HPLC **OR** individual Phenol results.										
Phenol	mg/kg									
Cresols	mg/kg									
Xylenols	mg/kg									
Resourcinol	mg/kg									
Phenols Total by HPLC	mg/kg	0.2	0.2	0.2	0.2	0.2	0.2			
BTEX Input Total BTEX **OR** individual BTEX results.										
Benzene	mg/kg									
Toluene	mg/kg									
Ethylbenzene	mg/kg									
Xylenes	mg/kg									
Total BTEX	mg/kg									
PCBs (POPs)										
PCBs Total (eg EC7/WHO12)	mg/kg									
PBBs (POPs)										
Hexabromobiphenyl (Total or PBB153; 2,2',4,4',5,5'- if only available)	mg/kg									

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Haswaste, developed by Dr. Iain Haslock.

Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

11505-CTR114

TP/WS/BH		WS01	WS01	WS02	WS04	WS04	WS05			
Depth (m)		0.30	0.70	0.60	0.30	0.80	0.20			
Date		27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
POPs Dioxins and Furans Input Total Dioxins and Furans **OR** individual Dioxin and Furan results.										
2,3,7,8-TeCDD	mg/kg									
1,2,3,7,8-PeCDD	mg/kg									
1,2,3,4,7,8-HxCDD	mg/kg									
1,2,3,6,7,8-HxCDD	mg/kg									
1,2,3,7,8,9-HxCDD	mg/kg									
1,2,3,4,6,7,8-HpCDD	mg/kg									
OCDD	mg/kg									
2,3,7,8-TeCDF	mg/kg									
1,2,3,7,8-PeCDF	mg/kg									
2,3,4,7,8-PeCDF	mg/kg									
1,2,3,4,7,8-HxCDF	mg/kg									
1,2,3,6,7,8-HxCDF	mg/kg									
2,3,4,6,7,8-HxCDF	mg/kg									
1,2,3,7,8,9-HxCDF	mg/kg									
1,2,3,4,6,7,8-HpCDF	mg/kg									
1,2,3,4,7,8,9-HpCDF	mg/kg									
OCDF	mg/kg									
Total Dioxins and Furans	mg/kg									
Some Pesticides (POPs unless otherwise stated)										
Aldrin	mg/kg									
α Hexachlorocyclohexane (alpha-HCH) *(leave empty if total HCH results used)*	mg/kg									
β Hexachlorocyclohexane (beta-HCH) *(leave empty if total HCH results used)*	mg/kg									
α Cis-Chlordane (alpha) ***OR*** *Total Chlordane*	mg/kg									
δ Hexachlorocyclohexane (delta-HCH) *(leave empty if total HCH results used)*	mg/kg									
Dieldrin	mg/kg									
Endrin	mg/kg									
χ Hexachlorocyclohexane (gamma-HCH) (lindane) ***OR*** *Total HCH*	mg/kg									
Heptachlor	mg/kg									
Hexachlorobenzene	mg/kg									
o,p'-DDT *(leave empty if total DDT results used)*	mg/kg									
p,p'-DDT ***OR*** *Total DDT*	mg/kg									
χ Trans-Chlordane (gamma) *(leave empty if total Chlordane results used)*	mg/kg									
Chlordecone (kepone)	mg/kg									
Pentachlorobenzene	mg/kg									
Mirex	mg/kg									
Toxaphene (camphechlor)	mg/kg									
Tin										
Tin *(leave empty if Organotin and Tin excl Organotin results used)*	mg/kg									
Organotin										
Dibutyltin; DiBT	mg/kg									
Tributyltin; TriBT	mg/kg									
Triphenyltin; TriPT	mg/kg									
Tetrabutyltin; TeBT	mg/kg									
Tin excluding Organotin										
Tin excl Organotin	mg/kg									

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Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

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TP/WS/BH		WS01	WS01	WS02	WS04	WS04	WS05			
Depth (m)		0.30	0.70	0.60	0.30	0.80	0.20			
Date		27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
Asbestos in Soil	Thresholds									
Asbestos detected in Soil (enter Y or N)	Y	N	N	N	N	N	N			
		If Asbestos in Soil above is "Y", the soil is Hazardous Waste HP5 and HP7								
Asbestos % Composition in Soil (Matrix Loose Fibres or Microscopic Identifiable Pieces only)	see "Carc HP7 % Asbestos in Soil (Fibres)" below	%								
Carcinogenic HP7 % Asbestos in Soil (fibres or micro pieces) *Please be advised, if the calculation cell is "0.00000" DOES NOT MEAN asbestos testing has been undertaken and the result is zero.*	≥0.1%	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
		If Asbestos in Soil above is "Y", but Asbestos % above is "<0.1%", the soil is Non Hazardous Waste. You can only use Asbestos % results where loose fibres or micro pieces are only present. You cannot use Asbestos % results when visual identifiable pieces are present.								
Asbestos Identifiable Pieces visible with the naked eye detected in the Soil (enter Y or N)	Y									
		If visual identifiable pieces of asbestos are present, you cannot use Asbestos % results and the whole soil sample is Hazardous Waste HP5 and HP7 Construction material containing Asbestos 17 06 05. Therefore, if Asbestos in Soil above is "Y", the Asbestos % above is "<0.1%", but the Asbestos Identifiable Pieces visible with the naked eye is "Y", the soil is Hazardous Waste.								
		Identifiable Pieces are Cement, Fragments, Board, Rope etc, ie anything ACM that is not Loose Fibres,								
		All visual asbestos pieces need to be removed leaving only fibres (or micro pieces) with an Asbestos % Composition in Soil result of <0.1% for the soil to become non-hazardous waste.								

Hazardous Property	Thresholds	Cut Off Value	If cells below turn yellow and the text turns red, the samples should be classified as Hazardous Waste.								
Corrosive HP8	≥5%	<1%	0.00070	0.00072	0.00072	0.00078	0.00050	0.00088	0.00000	0.00000	0.00000
Irritant HP4	≥10%	<1%	0.00654	0.00683	0.00643	0.00836	0.00639	0.00646	0.00000	0.00000	0.00000
Irritant HP4	≥20%	<1%	0.03867	0.03366	0.03732	0.03840	0.01991	0.03244	0.00000	0.00000	0.00000
Specifc Target Organ Toxicity HP5	≥1%		0.00015	0.00015	0.00016	0.00017	0.00015	0.00014	0.00000	0.00000	0.00000
Specifc Target Organ Toxicity HP5	≥20%		0.00344	0.00367	0.00353	0.00413	0.00381	0.00329	0.00000	0.00000	0.00000
Specifc Target Organ Toxicity HP5	≥1%		0.00344	0.00367	0.00353	0.00413	0.00381	0.00329	0.00000	0.00000	0.00000
Specifc Target Organ Toxicity HP5	≥10%		0.00887	0.00346	0.00347	0.13915	0.01566	0.00463	0.00000	0.00000	0.00000
Aspiration Toxicity HP5	≥10%		0.00887	0.00321	0.00182	0.13915	0.01566	0.00463	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.1%	<0.1%	0.00015	0.00015	0.00016	0.00017	0.00015	0.00014	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.25%	<0.1%	0.00056	0.00056	0.00059	0.00064	0.00034	0.00073	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥5%	<0.1%	0.00028	0.00029	0.00029	0.00031	0.00029	0.00027	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥25%	<1%	0.01268	0.01316	0.01214	0.01769	0.01102	0.01227	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.25%	<0.1%	0.00017	0.00017	0.00020	0.00022	0.00017	0.00016	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥2.5%	<0.1%	0.00015	0.00016	0.00016	0.00017	0.00016	0.00015	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥15%	<0.1%	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥55%	<1%	0.00006	0.00007	0.00007	0.00008	0.00007	0.00006	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.1%	<0.1%	0.00015	0.00015	0.00016	0.00017	0.00015	0.00014	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥0.5%	<0.1%	0.00024	0.00024	0.00026	0.00030	0.00024	0.00022	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥3.5%	<0.1%	0.00013	0.00013	0.00013	0.00014	0.00013	0.00012	0.00000	0.00000	0.00000
Acute Toxicity HP6	≥22.5%	<1%	0.01255	0.01306	0.01202	0.01618	0.01086	0.01216	0.00000	0.00000	0.00000
Carcinogenic HP7	≥0.1%		0.00330	0.00346	0.00347	0.00500	0.00283	0.00362	0.00000	0.00000	0.00000
Carcinogenic HP7	≥0.1%		0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000
Carcinogenic HP7	≥1%		0.00344	0.00367	0.00353	0.00413	0.00381	0.00329	0.00000	0.00000	0.00000
Carcinogenic HP7 Unknown TPH with ID	≥1,000mg/kg		88.66	32.14	18.19	**1391.52**	156.56	46.26	0.00	0.00	0.00
Carcinogenic HP7 b(a)p marker test (Unknown TPH with ID only) Cell only applicable if TPH >1,000mg/kg	≥0.01%		0.10991	0.14790	0.45109	**0.50089**	0.25154	0.17990	#DIV/0!	#DIV/0!	#DIV/0!
pH Corrosive HP8 pH (soil or leachate)	H8 ≥11.5		8.00	7.92	7.73	8.03	7.72	7.52	0.00	0.00	0.00
pH Corrosive HP8 pH (soil or leachate)	H8 ≤2		8.00	7.92	7.73	8.03	7.72	7.52	0.00	0.00	0.00
Toxic for Reproduction HP10	≥0.3%		0.00330	0.00346	0.00347	0.00500	0.00283	0.00362	0.00000	0.00000	0.00000
Toxic for Reproduction HP10	≥3%		0.00887	0.00367	0.00353	0.13915	0.01566	0.00463	0.00000	0.00000	0.00000
Mutagenic HP11	≥0.1%		0.00015	0.00016	0.00016	0.00078	0.00016	0.00015	0.00000	0.00000	0.00000
Mutagenic HP11 Unknown TPH with ID	≥1,000mg/kg		88.66	32.14	18.19	**1391.52**	156.56	46.26	0.00	0.00	0.00
Mutagenic HP11 b(a)p marker test (Unknown TPH with ID only) Cell only applicable if TPH >1,000mg/kg	≥0.01%		0.10991	0.14790	0.45109	**0.50089**	0.25154	0.17990	#DIV/0!	#DIV/0!	#DIV/0!
Mutagenic HP11	≥1%		0.00344	0.00367	0.00353	0.00413	0.00381	0.00329	0.00000	0.00000	0.00000
Produces Toxic Gases HP12 Sulphide	≥1,400mg/kg		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Produces Toxic Gases HP12 Cyanide	≥1,200mg/kg		0.8	0.8	0.8	0.9	0.8	0.8	0.0	0.0	0.0
Produces Toxic Gases HP12 Thiocyanate	≥2,600mg/kg		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HP13 Sensitising	≥10%		0.00326	0.00333	0.00267	0.00342	0.00283	0.00280	0.00000	0.00000	0.00000

Table 3 of the CLP, CL Inventory, ATPs, IARC, Concawe, MSDSs, REACH + Pesticide Properties databases. Worst case REACH + MSDS's used for "*" STOT + Acute Toxicity.

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If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

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TP/WS/BH			WS01	WS01	WS02	WS04	WS04	WS05			
Depth (m)			0.30	0.70	0.60	0.30	0.80	0.20			
Date			27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21	27-Mar-21			
Ecotoxic HP14 amended v6	≥25%	<0.1%	0.01705	0.01671	0.01570	0.02631	0.01289	0.01607	0.00000	0.00000	0.00000
Ecotoxic HP14 amended v6	≥25%	<0,1% (except Be, V, Te, Tl, Petrol, Diesel, Crude Oil, Kerosene, White Spirit, Crosote, TPH, TPHCWG, Phenol, Cresols, Xylenols, T-Phenols, CompCN, Thiocyanate, Toluene, Ethylbenzene, Xylene + BTEX 1%).	0.02936	0.02359	0.02105	0.16959	0.03236	0.02399	0.00000	0.00000	0.00000
Ecotoxic HP14 amended v6	≥25%	<0.1% (except Be, V, Te, Tl, Petrol, Diesel, Crude Oil, Kerosene, White Spirit, Crosote, TPH, TPHCWG, Phenol, Cresols, Xylenols, T-Phenols, CompCN, Thiocyanate, Toluene, Ethylbenzene, Xylene + BTEX 1%).	1.82649	1.73872	1.62209	4.06242	1.48203	1.68457	0.00000	0.00000	0.00000
Persistent Organic Pollutant (PCB, PBB or POP Pesticides)	>0.005%		0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000
Persistent Organic Pollutant (Total Dioxins+Furans)	>0.0000015%		0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000
Persistent Organic Pollutant (Individual Dioxins+Furans)	>0.0000015%		0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000	0.0000000000

APPENDIX 05

Site Specific Acceptance Criteria

Screening Levels for "Commercial" end use assuming a 2.5% SOM for Hydrocarbons.

Contaminant	Screening Levels for Commercial End Use (mg/kg)
Metals	
Arsenic	640
Boron	240,000
Cadmium	190
Chromium III	8,600
Chromium VI	33
Copper	68,000
Lead*	2330
Mercury	58
Nickel	980
Selenium	12,000
Vanadium	9,000
Zinc	730,000
Non Metals	
Phenol	690
Polyaromatic Hydrocarbons (PAHs)	
Benz[a]anthracene	170
Benzo[a]pyrene	35
Benzo[b]fluoranthene	44
Benzo[ghi]perylene	4,000
Benzo[k]fluoranthene	1,200
Chrysene	350
Dibenz[ah]anthracene	3.6
Fluoranthene	23,000
Indeno[123-cd]pyrene	510
Naphthalene	460^{f} $(183)^{sol}$
Pyrene	54,000

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* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

Contaminant	Screening Levels for Commercial End Use (mg/kg)
Volatile Organic Compounds	
Benzene	47
Ethylbenzene	13,000[vap] (1220)
Toluene	110,000[vap] (1920)
M - Xylene	14,000
O - Xylene	15,000
P - Xylene	14,000
Total Petroleum Hydrocarbons	
Aliphatic C5-6	5,900
Aliphatic C6-8	17,000
Aliphatic C8-10	4,800
Aliphatic C10-12	23,000
Aliphatic C12-16	82,000
Aliphatic C16-35	1,700,000
Aliphatic C35 - 44	1,700,000
Aromatic C5 - 7	46,000
Aromatic C7 - 8	110,000
Aromatic C8-10	8,100
Aromatic C10-12	28,000
Aromatic C12-16	37,000
Aromatic C16-21	28,000
Aromatic C21-35	28,000
Aromatic C35 - 44	28,000

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* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

The GAC's for the assessment of potential groundwater contamination have been derived from very conservative guidelines protective of drinking water and environmental quality, namely:

- UK Environmental Quality Standards (EQS) for Freshwater, 2000;
- Petroleum Products in Drinking-water, Background document for development of WHO Guidelines for Drinking-water Quality, 2011.

Table 1: Inorganic Tier 1 Water Environment Screening Criteria

Contaminant	Units	Hardness Banding (CaCO3 mg/l)	EQS /WFD (Freshwater)	UK DWS
Arsenic	µg/l	-	50	10
Ammonia	mg/l	-	0.2	0.5
Boron	µg/l	-	2000	1000
Cadmium	µg/l	-	5	5
Chromium	µg/l	0-50	2	50
		50-100	10	
		100-150	10	
		150-200	20	
		200-250	20	
Copper	µg/l	0-10	0.5	2000
		10-50	0.5	
		50-200	3	
		200-250	8	
		>250	12	
Cyanide (Free)	µg/l	-	1	-
Cyanide		-	-	50
Iron	µg/l	-	1000	200
Lead	µg/l	0-50	4	10
		50-150	10	
		150-250	20	
		>250	20	
Mercury	µg/l	-	1	1
Nickel	µg/l	0-50	8	20
		50-100	20	
		100-150	20	
		150-250	40	
		>250	40	
Selenium	µg/l	-	-	10
Sulphate (SO4)	mg/l	-	400	250
Zinc	µg/l	0-50	8	5000
		50-150	15	
		150-250	50	
		>250	50	
pH	-	-	6-9	-

Table 2: Organic Tier 1 Water Environment Screening Criteria

Contaminant	Units	UK DWS	WHO
PAHs - The sum of • Benzo(b)fluoranthene, • Benzo(ghi)perylene, • Benzo(k)fluoranthene, • indeno(1,2,3-c,d)pyrene)	µg/l	0.1	-
Phenol (total)	µg/l	0.5	-
MTBE	µg/l	-	15
Aliphatic C5-C6	µg/l	-	15,000
Aliphatic C6-C8	µg/l	-	15,000
Aliphatic C8-C10	µg/l	-	300
Aliphatic C10-C12	µg/l	-	300
Aliphatic C12-C16	µg/l	-	300
Aliphatic C16-21	µg/l	-	(300) *
Aliphatic C21-35	µg/l	-	(300)*
Aromatic C6-C7	µg/l	1 (benzene)	10 (benzene)
Aromatic C7-C8	µg/l	-	700 (toluene)
Aromatic C8-C10	µg/l	-	300 (ethylbenzene)
Aromatic C10-12	µg/l	-	100
Aromatic C12-C16	µg/l	-	100
Aromatic C16-C21	µg/l	-	90
Aromatic C21-C35	µg/l	-	90

Notes

The WHO Guideline Values for petroleum products in drinking water have been applied in the absence of current TPH water quality standards. However, for the aromatic TPH bandings of C6-C7, C7-C8 and C8-C10, the more conservative UK specific WQS for benzene, toluene and ethylbenzene have been used.

In the absence of specific WHO Guideline Values for the aliphatic ranges C16-C21 and C21-C35, the guideline values for the aliphatic C8-C10 through to C12-C16 ranges of 300µg/l have been used. This is however considered conservative due to the increased stability and lower volatility of the longer chain aliphatics.