



Phase II Geoenvironmental Site Investigation Report

Dixons Manchester Academy, Greenbrow Road, Manchester, M23 2SX

Client Name: Arcadis LLP

Project Number: P4436.4.1

Date: 20 September 2022

ENABLING DEVELOPMENT

Client:	Arcadis LLP
Site:	Dixons Manchester Academy, Greenbrow Road, Manchester, M23 2SX
Report ref.:	P4436.4.1
Prepared:	N. Masich BSc FGS
Reviewed:	G. Dowlen MSc CGeol FGS RoGEP EurGeol
Approved:	S. Pike MSc MEnvSc
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1, The Mill, Copley Hill Business Park, Babraham Road, Cambridge, CB22 3GN

Tel: 01223 776 117

www.agbenvironmental.co.uk

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.0	Final	06 September 2022
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agb Environmental Ltd

Executive Summary

Client and Site Location

The client, Arcadis LLP, commissioned agb Environmental to complete a Phase II ground investigation of a plot of land known as the Dixons Manchester Academy, Greenbrow Road, Manchester, M23 2SX.

Development Proposals

Development proposals are understood to be at the feasibility stage, but are considered likely to include replacement or refurbishment of the current school buildings.

Summary of Encountered Ground Conditions

Made ground was encountered to a maximum depth of 0.80m bgl. Underlying this natural bedrock geology of the Bollin Mudstone Member was encountered to a maximum depth of 3.70m bgl. The bedrock comprised very stiff clays and dense sands grading to very weak to weak mudstone at depth.

Summary of Analysis, Screening and Monitoring Results

Analysis of recorded concentrations in soils of contaminants of concern were below their respective screening values for all samples.

Elevated concentrations of metals have been identified in the groundwater underlying the site. These concentrations have not been considered to represent an unacceptable risk to controlled waters and the remediation of groundwater underlying the site is not considered to be required.

Ground gas monitoring results and subsequent classification indicate CIRIA 665 Characteristic Situation CS-1 is appropriate for the site based on monitoring undertaken.

Geoenvironmental Conclusions and Recommendations

Based on the conceptual site model and risk assessment there is a considered low risk to site workers, end users and environmental receptors. It is recommended that a watching brief be maintained on site, particularly during the groundwork stage.

Geotechnical Comments

It is anticipated that finished ground levels will be at, or close to, existing ground levels. Should this not be the case then this assessment may need to be reviewed.

Based on the encountered ground conditions an allowable net bearing capacities of 275kN/m² should be applicable for a 1.0m wide strip/trench fill foundation at 1.0m below ground level. The above values should result in total settlements of not more than 25mm, keeping differential settlements within acceptable limits.

Due to the variable depth of made ground and the presence of low volume change potential soils underlying the site it is recommended that all floor slabs are fully suspended.

A CBR value of 2% would be considered applicable for the Made Ground following treatment or 3% where natural soils are encountered at subgrade level.

Soil and groundwater testing and analysis indicates an ACEC Class of DS-1 / AC-1.

Further comments and details are provided in the report.

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1 Introduction

The client commissioned agb Environmental to complete a Phase II Ground Investigation of a plot of land at the Dixons Manchester Academy, Greenbrow Road, Manchester, M23 2SX.

1.1 Development Proposals

Development proposals are understood to be at the feasibility stage, but are considered likely to include replacement or refurbishment of the current school buildings. Available plans are included in **Appendix 1**.

1.2 Previous Reports

A Phase I geoenvironmental desk study for the site and the surrounding area was completed by agb Environmental Ltd, report reference P4436.1.0, dated 26th May 2022, and should be read in conjunction with this report.

1.3 Purpose of Investigation

The principal technical objectives of the report were as follows:

- Review of desk study information,
- Establish the ground conditions,
- Undertake analysis of selected soil samples and groundwater samples,
- Provide a Conceptual Site Model (CSM) and risk assessment,
- Provide geoenvironmental recommendations, and
- Provide geotechnical recommendations for foundation design, floor slabs, pavements, excavations, groundwater control and chemical attack.

The report has been formulated in general accordance with BS10175:2011+A2:2017 Investigation into Potentially Contaminated Sites – Code of Practice, Environment Agency LCRM guidance, BS5930:2015 Code of Practice for Site Investigations, and guidance from the National Planning Policy Framework.

2 Site Details

Details regarding the site and anticipated ground conditions extracted from the desk study are provided below.

2.1 Location and Topography

The irregularly shaped site is located in the Wythenshawe Borough of Manchester, approximately 300m south of Wythenshawe Hospital and 1.1km north of Manchester Airport. The site covers an area of approximately 7.36ha and is centred at National Grid Reference 380801 387479. The site is at an elevation of approximately 60mOD, and the surrounding land slopes gently down to the north-west. A location plan is presented in **Appendix 1**.

2.2 Site Description

2.2.1 Access

Clay Lane transects the site from north to south; there is vehicle and pedestrian access from Clay Lane via locked metal gates into the south-western and north-eastern halves of site.

There is vehicle and pedestrian access to the school complexes on the south-eastern site boundary, via locked gates on Greenbrow Road.

At the time of the walkover, an asphalt parking area located south-east of the Newall Green buildings was blocked using concrete traffic control security blocks.

2.2.2 Overview and vegetation

The north-eastern half of site is formed of facilities associated with Newall Green High School and Piper Hill School / Sixth Form Centre: predominantly buildings and asphalt surface covering with peripheral soft landscaping. The soft landscaping consists of grass with sparse hedgerow and trees. The south-western half of site is a field of long grass with an asphalt surface in the eastern corner.

Due to access restrictions at the time of the walkover, entry to the Piper Hill facilities in the north-east of site and the interior of the Newall Green High School buildings was not possible; entry was possible to the outdoor areas located south and east of Newall Green High School and to the playing field south-west of Clay Lane.

The Newall Green and Piper Hill buildings were two storey white-painted or brick buildings with large glass windows.

There was asphalt hardstanding – parking and pedestrian routes – located south-east of the Newall Green school buildings and a green artificial turf play area to the north-west of the school buildings.

Internet researches indicates that the school appears to have been in use up to mid-2019 but since then disused and currently secured to prevent access.

2.2.3 Surrounds

The surrounding land use was predominantly residential dwellings to the north, south and east of the school blocks. North of the playing fields was a large car park serving Wythenshawe Hospital, which is located approximately 500m north. To the west of the playing fields is undeveloped land, and to the south is Newall Green Farm.

3 Summary of Desk Study Information

Salient information extracted from the desk study report is provided below.

3.1 Anticipated Ground Conditions and Permeability

The superficial geology on site is recorded as Till, Devensian (Diamicton). Underlying the superficial geology, the bedrock on site is recorded as the Bollin Mudstone Member, predominantly comprising mudstones with subordinate siltstones.

The British Geological Survey hold confidential records for a previous ground investigation undertaken in 1985 at the site comprising trial pits and boreholes. Available borehole records in the vicinity of the site indicate in excess of 25m depth of mudstones beneath this general area of Manchester.

3.2 Geological and Engineering Hazards and Radon

Based on information provided by the British Geological Survey (BGS), the highest geological hazard risk on site is a very low risk from shrink swell clays, running sands, collapsible deposits and landslides. There is a negligible risk identified on site and within 250m from compressible deposits and the ground dissolution of soluble rocks.

The study site is not located within a Radon Affected Area, as less than 1% of properties are above the Action Level. Therefore, no radon protective measures are necessary for new properties or extensions to existing ones as defined by the Health Protection Agency (HPA).

3.3 Hydrogeology and Hydrology

The superficial geology is classified as a Secondary (Undifferentiated) Aquifer. The bedrock is classed as a Secondary (Undifferentiated) Aquifer. The study site is not located within a source protection zone designation. There are no historical or active groundwater abstractions, surface or potable water abstractions within 1km.

There are 11 records of water network features within 250m; these are all for inland rivers on the ground surface, which contain water year round in normal circumstances. The closest feature is 3m north-west.

There are no recorded flood defences, areas benefitting from flood defences, historical flood events or flood storage areas within 250m of the site. The highest risk from surface water flooding on site and within 50m is 1 in 30 year, greater than 1.0m. The risk from groundwater flooding on site and within 50m is low.

3.4 Summary of Site History

Historic mapping suggests that the school has been in the current layout since the 1970s. Prior to this the site was used as a brick works and residential developments from the late 1800s to 1930s. A garage was observed in the 1960s in the north of the site but was removed when the school was developed.

Surrounding land currently consists of Kingsbury Park to the south and a mixture of residential and commercial properties to the north, east and west. The historical mapping suggests that there have been factories, garages, works, and brick pits locally in the surrounding land, and current records suggest that there are multiple vehicle repair workshops within the local vicinity.

3.5 Environmental Information

Salient environmental information is summarised below.

3.5.1 Historical Land Uses

There are two records of a hospital, the closest being 62-81m north-west (1938-1975) and furthest 129-178m north (1967-1995). There is a record of a Sanatorium (1907-1954) 153-185m north-west, two unspecified tanks, 186m north (1954) and 222-223m north (1907, 1907-1938).

There are three records of electricity substations, 0m north-west (1985-1996), 16m north-west (1984), 235m south-east (1960-1995).

3.5.2 Current Land Uses

There is one record of an electricity substation on site and 3m north-west, 194m north-west, 208m east, 245m south-east of site. There is a gas governor station 5m south-west of site, pylons 99m south and 196m south-west of site. There is a mast 196m south-east, and a Riley electrical installation 106m north.

There are no further potentially contaminative land uses listed within 250m. However, there are radioactive substance authorisations located 461-468m north-west and pollution inventory radioactive waste releases 462m north-west (via wastewater) associated with the Hospital.

3.5.3 Landfill and Other Waste Sites

There are no details of Environment Agency historical or current landfill sites, BGS/DoE non-operational landfill sites, Local Authority Landfill sites or other waste treatment, transfer or disposal sites within 250m of the site. There is one record of a waste exemption 171m north-east of site. The address is 57 Wastdale Road for sorting and denaturing of controlled drugs for disposal.

3.5.4 Mining, Ground Working and Natural Cavities

There are no details of mining records within 500m of site

3.5.5 Railways

The current preferred consultation route for a HS2 rail network tunnel is located 229m south-east of site. There are no records of existing or historical railways, railway tunnels or railway features within 500m.

3.5.6 Environmental and Visual or Cultural Designations

There are three listed buildings located 30-55m south-east of site.

4 Preliminary Conceptual Site Model and Risk Assessment

An initial CSM and preliminary assessment of plausible contaminant source-pathway-receptor linkages is presented in this section. It is aimed at identifying possible risks, if any, arising from substances used or deposited on-site, or from other sources of land contamination. Both past and current potentially contaminative land uses have been considered.

4.1 Potential Contaminant Sources

Based on the site walkover and desk study research, the identified potentially contaminative land uses on or within the vicinity of the site are summarised in **Table 4.1**.

Table 4.1 Potential Contaminant Sources

Identified Potentially Contaminative Land Uses / Sources	Distance From Site (approx.)	Potential Contaminants Associated with Identified Sources	Plausible Source-Pathway-Receptor Linkage
Made Ground (as a result of structures)	On site	Metals, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), asbestos containing materials (ACMs) and ground gases/vapour.	Yes – potential source is present with potential to impact the study site.
Electricity substation	On site, 0-16m north-west	PCBs.	Yes – potential source is present with potential to impact the study site.
Infilled ponds	On site, 5m north west	Metals, TPH, PAHs, Ground gases/vapour	Yes – potential source is present with potential to impact the study site.
Gas Governor Station	5m south-east	VOCs	Yes – potential source is present with potential to impact the study site.
Hospital	62m north-west	Metals, TPH, PAHs, ACMs and ground gases/vapour.	Yes – potential source is present with potential to impact the study site.
Historical Tanks	222m – 227m north	TPH	Yes – potential source is present with potential to impact the study site.

4.2 Pathways

For this assessment, the principal potential pathways for contaminant migration are provided in **Table 4.2**.

Table 4.2 Pathways

Source	Pathway
Soil / dust / fibres	Dermal contact, ingestion and inhalation.
Soil	Permeation through water pipework.
Soil	Plant uptake.
Liquid (including surface water / groundwater)	Dermal contact, ingestion. Leaching, infiltration and migration through groundwater. Preferential pathways such as service trenches.
Harmful ground gases / vapour	Migration through permeable geological strata and preferential pathways. Inhalation, accumulation within confined spaces with subsequent asphyxiation or explosion.

4.3 Receptors

Based on the proposals and the findings of the desk study the identified receptors are described in **Table 4.3**.

Table 4.3 Receptors

Receptor	Detail
Site workers	Site workers are anticipated to include those involved with the refurbishment works at the site.
End users	Residents and visitors.
Neighbouring sites	Residents and workers.
Controlled Waters	The underlying the superficial geology is classified as a Secondary (Undifferentiated) Aquifer. The bedrock geology is classified as Secondary (B) Aquifer. There are 11 records of water network features within 250m; these are all for inland rivers on the ground surface, which contain water year round in normal circumstances. The closest feature is 3m north-west.
Flora and fauna	Plants and animals that may be affected by proposed development. No Environmentally Sensitive Sites are recorded within 250m of the site. No soft landscaped areas are planned as part of the development.
Buildings	The completed building.
Buried services	Potable water pipes are anticipated as part of proposals.

4.4 Preliminary Conceptual Site Model

The preliminary conceptual site model presented in **Table 4.4** has been derived using the findings of the desk study. The risk evaluation methodology is presented in **Appendix 4**.

Table 4.4 Preliminary Conceptual Site Model

Source	Pathway	Receptor	Consequence	Probability	Potential Risk	Detail
On site Made Ground (as a result of historical structures) Historical infilled pits Electrical substation <i>(Metals, TPH, PAHs, ACMS, PCBs and ground gases/vapour).</i>	Dermal contact, ingestion and inhalation of contaminated soil, dust and/or fibres	End users	Medium	Likely	Moderate	Contact is likely between future users in shallow soils in the proposed soft landscaping of the site, soil/dust tracked back into premises. Construction workers are likely to come into direct contact during groundworks. Safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk.
		Construction workers	Medium	Likely	Moderate	
		Adjacent users	Medium	Unlikely	Low	
	Leaching / infiltration through soils and migration via groundwater or soil pore moisture.	Controlled waters	Medium	Likely	Moderate	There is no current evidence to suggest that groundwater quality beneath the site has been affected by contaminant leaching. The underlying the superficial geology is classified as a Secondary (Undifferentiated) Aquifer. The bedrock geology is classified as Secondary (B) Aquifer. The nearest surface water feature is recorded as 3m, and therefore could also be impacted by the contaminants currently associated with the site's history.
	Permeation of water pipes.	Construction materials, future end users	Medium	Likely	Moderate	Contact is likely between future users in shallow soils in the proposed soft landscaping of the site, soil/dust tracked back into premises. Construction workers are likely to come into direct contact during groundworks. Safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk.
	Gas migration and build up within buildings.	Future end users and building structures	Severe	Low likelihood	Moderate	A moderate risk is considered appropriate given the uncertain composition and structure of Made Ground associated with the infilled ponds and former structures. It is noted there has been considerable time since the ponds were infilled, but there is a lack of knowledge of the materials used to backfill the ponds.
	Plant Uptake	Flora and Fauna	Mild	Unlikely	Very low	The current vegetation on site does not show obvious signs of impacts from contaminants.

Source	Pathway	Receptor	Consequence	Probability	Potential Risk	Detail
Off site Hospital, infilled ponds, historical infilled pits, electrical substations and historical tanks. <i>(Metals, TPH, PAHs, ACMs, PCBs and ground gases/vapour).</i>	Dermal contact, ingestion and inhalation of contaminated soil, dust and/or fibres	End users	Medium	Likely	Moderate	Contact is possible between future users in shallow soils in the proposed soft landscaping of the site, soil/dust tracked back into premises from off site sources. Construction workers are likely to come into direct contact with soils during demolition works and groundworks. Safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk.
		Construction workers	Medium	Likely	Moderate	
	Leaching / infiltration through soils and migration via groundwater or soil pore moisture.	Controlled waters	Medium	Likely	Moderate	There is no current evidence to suggest that groundwater quality beneath the site has been affected by contaminant leaching. The underlying the superficial geology is classified as a Secondary (Undifferentiated) Aquifer. The bedrock geology is classified as Secondary (B) Aquifer. Therefore contaminant migration beneath site is plausible. The nearest surface water feature is recorded as 3m, and therefore could also be impacted by the contaminants currently associated with the site's history.
	Permeation of water pipes.	Construction materials, future end users	Medium	Likely	Moderate	Hydrocarbons, especially aromatics and chlorinated solvents, are known to permeate plastic pipes. Provision of water supply pipes and connectors formed from proprietary "barrier pipe" materials (e.g. polyethylene aluminium-polyethylene) may be required by the water supply company.
	Gas Migration and build up within buildings.	Future end users and building structures	Severe	Low likelihood	Moderate	A moderate risk is considered appropriate given the nature of the off site current/historical land uses/activities identified. Likewise with the on site backfilling of ponds, no records are available as to the material used to backfill ponds off site.
	Plant Uptake	Flora and Fauna	Mild	Unlikely	Very low	The current vegetation on site does not show obvious signs of impacts from contaminants.

5 Fieldwork and Analysis

The works undertaken as part of the site investigation and subsequent analysis of selected samples is summarised below.

5.1 Site Investigation

The locations of investigative positions were selected, based on the objectives of the investigation, including the client's requirements, and available access.

Buried service plans were provided by the client. Prior to breaking ground, a cable avoidance tool and signal generator were used to confirm each location was clear of detectable services.

The exploratory hole location plan and fieldwork records are presented in **Appendix 2**. The exploratory holes completed as part of the investigation are detailed below.

5.1.1 Cable Percussive Boreholes

Four cable percussive boreholes, referenced CP01 to CP04, were drilled between 5th and 7th July 2022.

Prior to boring, a service inspection pit was excavated to a depth of 1.20 metres below ground level (mbgl) using hand tools to confirm the absence of services. The boreholes were advanced using cable percussive tooling in 150mm diameter casing to a maximum depth of 3.70mbgl.

Small or bulk disturbed, and undisturbed samples were taken at regular intervals. Standard Penetration Tests (SPTs) were undertaken at intervals to provide an indication of the strength or density of the soil, the results are presented as 'N' values on the borehole logs. Excess spoil was stored in a skip prior to transfer and disposal off site by a licensed waste carrier.

5.1.2 Hand Excavated Pits

Four hand excavated foundation inspection pits, referenced TP01 to TP04, were completed on the 4th July 2022. The pits were completed at depths between 0.70mbgl and 1.20mbgl.

A small or bulk disturbed sample was taken.

5.1.3 Standpipe Installations and Monitoring

Single standpipe installations were placed in each borehole. Each standpipe comprised 50mm diameter PTFE piping. It was slotted below 0.50mbgl to depth at CP02 and CP04 and 1.00mbgl to depth at CP01 and CP03. Once introduced into the ground the slotted section was surrounded by suitable gravel pack, above which a sealing material (bentonite) was used. A rubber bung with a gas tap was placed at the top of the pipework and a flush cover concreted at surface to protect the installation from damage.

The standpipes were monitored on six occasions: 15th July, 8th and 15th August, and 1st, 7th and 14th September. The ground gas flow was monitored for a period of up to two minutes, the concentration of volatile organic compounds (VOCs) was monitored for a period of up to eight minutes and the concentrations of ground gases including methane, carbon dioxide, hydrogen sulphide and carbon monoxide were monitored for up to five minutes. The monitoring results are presented in **Appendix 3**.

5.2 Laboratory Analysis

The scheduled chemical analysis and geotechnical testing, and number of samples tested is summarised in **Table 5.1**. The scheduled geotechnical testing is summarised in **Table 5.2**. The laboratory certificates are presented in **Appendix 4**.

Table 5.1 Summary of Scheduled Contamination Testing

Chemical Analysis	Number of Samples Tested	
	Soil	Water
Metals	8	4
Speciated polycyclic aromatic hydrocarbons (PAHs)	10	-
Speciated petroleum hydrocarbons	10	4
Benzene toluene ethyl xylene (BTEX) and methyl tertiary butyl ether (MTBE)	10	4
Asbestos screen	8	-
pH	10	4
Soil organic matter (SOM)	8	-
Total organic content (TOC)	-	4
Soil Moisture Content	8	-
Total Sulphate	6	-
Water Soluble Sulphate (SO ₄)	6	4

Table 5.2 Summary of Scheduled Geotechnical Testing

Geotechnical Test	No. of Samples Tested
	Soil
Moisture content	8
Liquid / Plastic Limits	8

6 Ground Conditions

The encountered ground conditions are summarised below.

6.1 Encountered Ground Conditions

The ground conditions encountered are summarised in **Table 6.1** and discussed below.

Table 6.1 Summary of Encountered Ground Conditions

Stratum	Location	Surface Depth (mbgl)	Base Depth (mbgl)	Thickness (m)
Made Ground	All locations	0.00	0.20 to 0.80	0.20 to 0.80
Bollin Mudstone Member	All locations except TP01	0.20 to 0.80	>1.05 to >3.70	0.65 - >3.50
Groundwater	Groundwater was not encountered during fieldwork. During subsequent monitoring the groundwater levels were as summarised below.			
	Location	Minimum groundwater depth (mbgl)	Maximum groundwater depth (mbgl)	
	CP01	1.30	1.80	
	CP02	2.15	2.50	
	CP03	2.20	2.30	
	CP04	2.20	2.35	

6.1.1 Made Ground

Made Ground was encountered in all exploratory hole positions from surface level and to a maximum depth of 0.80m bgl at location CP04 in the west of site. Hardstanding macadam was encountered at the surface at locations CP01, CP03, CP04, TP01 and TP02 to 0.20mbgl. At TP03 and TP04 paving slabs to 0.10mbgl were present. At CP02 loose dark brown sandy silt to 0.20mbgl directly underlain by the Bollin Mudstone Member was encountered.

Underlying the surface materials at CP01, CP03, CP04 and TP03 the Made Ground was noted to be mixed, encountered as grey, pink and beige, medium and coarse, angular limestone gravel and fine sand Hardcore MOT. This was between depths of 0.10mbgl and 0.80mbgl. At location CP04, there was 0.15m of loose black to brown silty sand with fine to medium brick, asphalt and concrete, from 0.15mbgl to 0.30mbgl.

At TP01 and TP02, underlying the macadam surfacing was light brown gravelly sand, with coarse to fine brick and concrete fragments. Gravel is fine to medium flint. This was encountered to a maximum depth of 0.70m and 0.25m bgl, respectively. At TP04, beneath the macadam the Made Ground was encountered as coarse brick with fine yellow sand, to a depth of 0.25m bgl.

The base of the Made Ground was proven to depths between 0.20mbgl to 0.80mbgl. The base was not encountered in TP01.

6.1.2 Bollin Mudstone Member

Beneath the Made Ground at all locations except TP01, bedrock geology interpreted to represent the Bollin Mudstone Member was encountered. This was described as firm to stiff or dense, fine reddish brown very clayey or slightly clayey sand, with occasional mudstone fragments in CP01, TP02, TP03 and TP04, between depths of 0.25mbgl to 1.50mbgl, with a maximum thickness of 0.90m. At CP02 these soils were described as firm to stiff reddish brown very sandy clay, with occasional mudstone fragments.

At depth in CP01 and CP02, or beneath the Made Ground at CP03 and CP04, the Bollin Mudstone Member was described as very weak to weak reddish brown or grey slightly sandy cemented mudstone.

The base of the Bollin Mudstone Member was not proven, with drilling progress limited at all locations due to the strength of the underlying bedrock encountered on site.. A maximum depth of 3.70mbgl was achieved CP02.

6.1.3 Groundwater

Groundwater was not struck in any of the boreholes during fieldwork.

During subsequent monitoring, groundwater levels were encountered between 1.70m and 2.50mbgl.

6.1.4 Visual and Olfactory Evidence

During the site investigation works and subsequent monitoring there were no visual or olfactory indications of gross contamination in soils or groundwater. The presence of made ground soils could potentially indicate that contaminants could be present on site.

7 Chemical Laboratory Test Results and Monitoring

The results of chemical laboratory testing and ground gas monitoring are detailed in the following section.

7.1 Soil Analysis

Based on the proposed end use, the results of chemical laboratory testing of soil samples for inorganic and organic compounds were initially compared to residential without plant uptake scenario screening values with a soil organic matter of 1%. The screening criteria hierarchy used is as follows:

- Chartered Institute of Environmental Health (CIEH) and Land Quality Management Ltd (LQM) Suitable for Use Levels (S4ULs).
- Department for Environment Food and Rural Affairs (Defra) Category 4 Screening Levels (C4SLs).
- Contaminated Land: Applications in Real Environments (CL:AIRE) soil generic assessment criteria (GACs).
- Environment Agency: Soil Guideline Values (SGVs).

An SOM of 1% has been used for certain screening levels as this is the most stringent criteria. The blacktop suite samples have not been compared to the above screening criteria.

7.2 Groundwater Analysis

The results of groundwater analysis have been compared to:

- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (WFD, 2015).
- The Water Supply (Water Quality) Regulations 2016 (WSR).
- WHO - Guidelines for Drinking-Water Quality, Fourth Edition Incorporating the First Addendum (WHO, 2017).

7.3 Aggressive Ground

The results of testing for aggressive ground conditions have been classified using values provided in BRE Special Digest 1:2005: Concrete in aggressive ground.

7.4 Ground Gas Monitoring

Where applicable the results of ground gas and volatile organic compound (VOC) monitoring have been compared to:

- CIRIA 665: Assessing risks posed by hazardous ground gases to buildings.
- BS 8485:2015: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
- HSE EH40/2005 Workplace exposure limits.

7.5 Soil Analysis and Screening Results

Table 7.1 Results of Laboratory Analysis for Metals

Determinand <i>Metals</i>	Determinand Concentration Range (mg/kg)		Screening Values for Proposed Land Use (mg/kg)		No. of Samples with Elevated Concentrations	Samples with Elevated Concentrations
	Minimum	Maximum	S4ULs	C4SLs		
Arsenic	<2	10	40	-	0	-
Cadmium	<0.2	0.6	85	-	0	-
Chromium (III)	4	41	910	-	0	-
Chromium (VI)	<2	<2	6	-	0	-
Copper	4	26	7,100	-	0	-
Lead	7	42	-	330	0	-
Mercury	<1	<1.2	56	-	0	-
Nickel	5	43	180	-	0	-
Selenium	<3	<3	430	-	0	-
Zinc	13	80	40,000	-	0	-

Table 7.2 Results of Laboratory Analysis for Polycyclic Aromatic Hydrocarbons

Determinand <i>PAHs</i>	Concentration Range (mg/kg)		Screening Values for Existing Land Use (mg/kg)		No. of Samples with Elevated Concentrations	Samples with Elevated Concentrations
	Minimum	Maximum	S4ULs	C4SLs		
			1% som			
Naphthalene	<0.1	1.73	2.3	-	0	-
Acenaphthylene	<0.1	<0.1	2,900	-	0	-
Acenaphthene	<0.1	1.39	3,000	-	0	-
Fluorene	<0.1	0.97	2,800	-	0	-
Phenanthrene	<0.1	6.24	1,300	-	0	-

Determinand PAHs	Concentration Range (mg/kg)		Screening Values for Existing Land Use (mg/kg)		No. of Samples with Elevated Concentrations	Samples with Elevated Concentrations
	Minimum	Maximum	S4ULs	C4SLs		
			1% som			
Anthracene	<0.1	1.48	31,000	-	0	-
Fluoranthene	<0.1	6.15	1,500	-	0	-
Pyrene	<0.1	5.31	3,700	-	0	-
Benzo[a]anthracene	<0.1	2.35	11	-	0	-
Chrysene	<0.1	2.58	30	-	0	-
Benzo[b]fluoranthene	<0.1	2.34	3.9	-	0	-
Benzo[k]fluoranthene	<0.1	0.89	110	-	0	-
Benzo[a]pyrene	<0.1	2.13	3.2	5.3	0	-
Indeno[123-cd]pyrene	<0.1	0.84	45	-	0	-
Dibenzo[ah]anthracene	<0.1	0.19	0.31	-	0	-
Benzo[ghi]perylene	<0.1	0.70	360	-	0	-
Total PAH	<1.6	35.3	-	-	-	-

Table 7.3 Results of Laboratory Analysis for Speciated Total Petroleum Hydrocarbons

Determinand <i>Petroleum Hydrocarbons</i>	Determinand Concentration Range (mg/kg)		Screening Values for Existing Land Use (mg/kg)	No. of Samples with Elevated Concentrations	Location of Samples with Elevated Concentrations
			<i>S4ULs</i>		
Speciated - Aliphatic	<i>Minimum</i>	<i>Maximum</i>	<i>1% som</i>		
>C5-C6	<0.01	<0.01	42	0	-
>C6-C8	<0.05	<0.05	100	0	-
>C8-C10	<2	<2	27	0	-
>C10-C12	<2	19	130	0	-
>C12-C16	<3	233	1,100	0	-
>C16-C34	<10	4584	65,000	0	-
Aliphatic C5-C34	<21	4945	-	-	-
Speciated - Aromatic	<i>Minimum</i>	<i>Maximum</i>	<i>1% som</i>		
>C5-7	<0.01	<0.01	370	0	-
>C7-8	<0.05	<0.05	860	0	-
>C8-10	<2	<2	47	0	-
>C10-12	<2	19	250	0	-
>C12-16	<2	233	1,800	0	-
>C16-21	<3	622	1,900	0	-
>C21-35	<10	4584	1,900	0	-
Aromatic C5-35	<21	4945	-	-	-

Table 7.4 Results of Laboratory Analysis for BTEX and MTBE

Determinand <i>BTEX and MTBE</i>	Determinand Concentration Range (mg/kg)		Screening Values for Existing Land Use (mg/kg)	No. of Samples with Elevated Concentration	Location of Samples with Elevated Concentrations
			<i>S4ULs</i>		
	<i>Minimum</i>	<i>Maximum</i>	<i>1% som</i>		
Benzene	<2	<2	0.38	0	-
Toluene	<5	<5	880	0	-
Ethylbenzene	<2	<2	83	0	-
o-xylene	<2	<2	88	0	-
m- and p-xylene	<2	3	79	0	-
MTBE	<5	<5	-	0	-

Table 7.5 Asbestos Screening

Determinand	Screening Result	Asbestos Matrix	Asbestos Type	Quantification (%)	Location of Samples with Detected Asbestos
Asbestos	Not detected	-	-	-	-

Table 7.6 Summary of Aggressive Ground Analysis

Stratum	Determinand			DS / ACEC Class
	Total sulphate (%)	W/S sulphate SO ₄ (mg/l)	pH	
Made Ground	0.30 – 0.45	32 - 329	8.0 – 10.4	DS-1 / AC-1
Bollin Mudstone Member	0.03 – 0.07	17 – 140	8.1 – 8.8	DS-1 / AC-1
Groundwater	-	48 – 156	7.4 – 7.9	DS-1 / AC-1

7.6 Ground Gas Monitoring Results

Table 7.7 Summary of Ground Gas Monitoring Results

Date	Location	CO ₂ (%)		CH ₄ (%)		O ₂ (%)		Flow (Max. l/hr.)	Atmos. Pres. (mb)	Pressure trend
		Min	Max	Min	Max	Min	Max			
15/07/22	CP01	0.8	0.8	0.0	0.0	19.5	19.5	0.3	1023	Rising
	CP02	0.1	0.1	0.0	0.0	20.7	20.7	0.6	1023	Rising
	CP03	0.1	0.1	0.0	0.0	20.5	20.5	0.3	1023	Rising
	CP04	0.5	0.5	0.0	0.0	18.4	18.4	0.4	1023	Rising
05/08/22	CP01	0.5	0.5	0.1	0.1	19.5	19.5	0.3	1024	Rising
	CP02	1.0	1.0	0.1	0.1	21.0	21.0	0.1	1024	Rising
	CP03	0.4	0.4	0.1	0.1	19.4	19.4	0.2	1024	Rising
	CP04	0.8	0.8	0.1	0.1	16.8	16.8	0.3	1024	Rising
15/08/22	CP01	0.3	0.3	0.1	0.1	19.3	19.3	0.2	1001	Rising
	CP02	0.5	0.5	0.2	0.2	20.0	20.0	0.3	1001	Rising
	CP03	0.7	0.7	0.1	0.1	18.5	18.5	0.2	1001	Rising
	CP04	1.1	1.1	0.1	0.1	17.3	17.3	0.2	1001	Rising
01/09/22	CP01	0.7	0.7	0.2	0.2	19.9	19.9	0.2	1023	Falling
	CP02	0.7	0.7	0.1	0.1	20.2	20.2	0.4	1023	Falling
	CP03	0.9	0.9	0.1	0.0	17.9	17.9	0.3	1023	Falling
	CP04	1.0	1.0	0.0	0.0	19.2	19.2	0.3	1023	Falling
07/09/22	CP01	0.4	0.4	0.0	0.0	18.3	18.3	0.2	1007	Falling
	CP02	0.7	0.7	0.2	0.2	19.9	19.9	0.2	1007	Falling
	CP03	1.1	1.1	0.1	0.1	17.4	17.4	0.2	1007	Falling
	CP04	0.9	0.9	0.1	0.1	19.2	19.2	0.2	1007	Falling

Date	Location	CO ₂ (%)		CH ₄ (%)		O ₂ (%)		Flow (Max. l/hr.)	Atmos. Pres. (mb)	Pressure trend
		Min	Max	Min	Max	Min	Max			
14/09/22	CP01	0.3	0.3	0.1	0.1	19.0	19.0	0.3	1009	Rising
	CP02	0.8	0.8	0.1	0.1	19.6	19.6	0.2	1009	Rising
	CP03	1.1	1.1	0.1	0.1	15.2	15.2	0.1	1009	Rising
	CP04	1.2	1.2	0.0	0.0	17.9	17.9	3.7	1009	Rising

Table 7.8 Gas Screening Values for Carbon Dioxide and Methane

Peak Flow Rate (l/hr)	Worst Case CO ₂ (%)	CO ₂ GSV	Worst Case CH ₄ (%)	CH ₄ GSV	CIRIA 665 Characteristic Situation
3.7	1.2	0.0444/hr CO ₂	0.2	0.0074l/hr CH ₄	GSV = CS-1 Max recorded values = CS-1

Table 7.9 Workplace Exposure Limits

Location	Recorded Concentration (ppm)			
	Carbon monoxide		Hydrogen sulphide	
	Min	Max	Min	Max
All Boreholes	<1	7	<1	1
HSE Workplace Exposure Limits (ppm)	Long Term	Short Term	Long Term	Short Term
	30	200	5	10
Locations with Elevated Concentrations	None elevated.		None elevated.	

7.7 Groundwater Analysis

Table 7.10 Results of Groundwater Laboratory Analysis

Determinand	Determinand Concentration (ug/l)		Threshold Value (ug/l)			No. of Samples with Elevated Concentrations	Location of Samples with Elevated Concentrations
	Minimum	Maximum	Surface Water	Drinking Water	Odour or Taste Threshold		
Inorganic							
Arsenic	<5	7	50 ^a	10 ^g	-	0	-
Cadmium	<0.4	0.4	0.08 to 0.25 _{a,b}	5 ^g	-	0	Threshold value is less than limit of detection for surface water, but no indication of any contaminant impact of either soils or groundwaters.
Chromium (III)	<5	<5	4.7 ^a	50 ^g	-	1	Threshold value is less than limit of detection, but no indication of any contaminant impact of either soils or groundwaters.
Chromium (VI)	<20	<20	3.4 ^a	-	-	0	Threshold value is less than limit of detection, but no indication of any contaminant impact of either soils or groundwaters.
Copper	<5	20	1 ^{a, i}	2,000 ^g	5,000 ^l	0	CP01, CP02 & CP04. CPO3 was below laboratory limit of detection.
Lead	<5	29	1.2 ^{a,i}	10 ^g	-	0	CP01, CP02 & CP04. CPO3 was below laboratory limit of detection.
Mercury	0.09	0.14	0.07 ^b	1 ^g	-	0	CP01, CP02, CP03, CP04

Determinand	Determinand Concentration (ug/l)		Threshold Value (ug/l)			No. of Samples with Elevated Concentrations	Location of Samples with Elevated Concentrations
	Minimum	Maximum	Surface Water	Drinking Water	Odour or Taste Threshold		
Nickel	<5	<5	4 ^{a, i}	20 ^g	-	4	Threshold value is less than limit of detection, but no indication of any contaminant impact of either soils or groundwaters.
Selenium	<5	8		10 ^g	-	3	-
Zinc	6	58	10.9 ^{a, i, j}		-	4	CP01, CP02, CP04.
BTEX							
Benzene	<1	<1	10 ^a	1 ^g	-	0	-
Toluene	<5	<5	74 ^a	700 ^h	40 ⁱ	0	-
Ethylbenzene	<5	<5	-	300 ^h	72 ⁱ	0	-
Xylenes	<15	<15	30 ^f	500 ^h	300 ⁱ	0	-
MTBE	<10	<10	-	-	15 ^m	0	-
Petroleum Hydrocarbons							
Aliphatic >EC5-6	<10	<10	-	15000 ⁿ	-	0	-
Aliphatic>EC6-8	<10	<10	-	15000 ⁿ	-	0	-
Aliphatic>EC8-10	<10	<10	-	300 ⁿ	-	0	-
Aliphatic>EC10-12	<10	<10	-	300 ⁿ	-	0	-
Aliphatic>EC12-16	<10	<10	-	300 ⁿ	-	0	-
Aliphatic>EC16-35	<10	<10	-	-	-	0	-
Aromatic >EC5-7	<10	<10	-	10 ⁿ	-	0	-
Aromatic >EC7-8	<10	<10	-	700 ⁿ	-	0	-
Aromatic >EC8-10	<10	<10	-	300 ⁿ	-	0	-
Aromatic >EC10-12	<10	<10	-	90 ⁿ	-	0	-
Aromatic >EC12-16	<10	<10	-	90 ⁿ	-	0	-
Aromatic >EC16-21	<10	<10	-	90 ⁿ	-	0	-

Determinand	Determinand Concentration (ug/l)		Threshold Value (ug/l)			No. of Samples with Elevated Concentrations	Location of Samples with Elevated Concentrations
	Minimum	Maximum	Surface Water	Drinking Water	Odour or Taste Threshold		
Aromatic >EC21-35	<10	<10	-	90 ⁿ	-	0	-
TPH	<140	<140	-	-	10 ^{l, m}	0	-

a - Water Framework Directive (Standards and Classification), 2015 - EQS Value for Rivers based on long term mean or an annual average.

b - Water Framework Directive - Maximum Allowable Concentration for Rivers

c - Water Framework Directive - Groundwater value where end receptor is surface water

d - Water Framework Directive - Groundwater value where end receptor is drinking water supply

e - Water Framework Directive - General quality of groundwater value

f - Environment Agency "operational" target

g - Water Supply Regulations

h - WHO, 2017 - Drinking Water Standards

i - bioavailable component

j - plus Ambient Background Concentration (dissolved)

k - hardness dependant

l - WHO, 2017 - lower bound taste threshold

m - WHO, 2017 - lower bound odour threshold

n - WHO, 2008 Drinking Water Standards (adopted by CL:AIRE)

7.8 Discussion of Analysis

7.8.1 Soil Analysis

None of the concentrations of contaminants of concern exceeded the relevant screening value.

7.8.2 Water Sample Analysis

Analysis indicates elevated concentrations for 4no. metal determinands with respect to surface water and/or drinking water threshold screening values.

Concentrations of metal determinands, mercury, copper, lead and zinc, were observed to exceed the surface water quality standards.

Soil analysis does not provide evidence that an on site source is causing these increased values. There are no historical or active groundwater abstractions, surface or potable water abstractions within 1km of site, and the study site is not located within a source protection zone designation.

Although there are 11 records of water network features within 250m; all of which are for inland rivers on the ground surface, the closest location is 260m west of the closest borehole. The metals concerned have low mobility and therefore are not thought to pose a significant risk to the surface waters off site as they would not migrate the significant distance through the mudstone geology to the watercourse. No other concentrations of contaminants of concern exceeded the relevant screening value.

7.8.3 Ground Gas Monitoring Analysis

Ground gas monitoring results indicate CIRIA 665 Characteristic Situation CS-1 and concentrations below their respective HSE Workplace Exposure Limits. Volatile organic carbon (VOCs) concentrations have not been recorded during the monitoring visits, but are not considered to pose a significant risk as hydrocarbons were recorded below the limit of detection in both the soil and groundwater laboratory analysis.

8 Updated Conceptual Site Model and Qualitative Risk Assessment

The updated assessment of plausible contaminant linkages based on the results of the investigation and a summary of the potential geo-environmental risks associated with the site and in the context of the proposed development is provided in **Table 8.1**. The CSM risk evaluation methodology is presented in **Appendix 5**.

Table 8.1 Updated Qualitative Risk Assessment

Source	Pathway	Receptor	Consequence	Probability	Potential Risk	Detail
On site Made Ground (as a result of historical structures) Historical infilled pits Electrical substation Off site Hospital, infilled ponds, historical infilled pits, electrical substations and historical tanks. <i>(Metals, TPH, PAHs, ACMS, PCBs and ground gases/vapour).</i>	Dermal contact, ingestion and inhalation of contaminated soil, dust and/or fibres	End users	Medium	Unlikely	Low	Analysis has recorded concentrations of the various determinands that are below their respective screening values for the end use.
		Construction workers	Medium	Unlikely	Low	
		Adjacent users	Medium	Unlikely	Low	
	Leaching / infiltration through soils and migration via groundwater or soil pore moisture.	Controlled waters	Medium	Unlikely	Low	Analysis has recorded concentrations of the various determinands that are below their respective screening values for the end use or considered significantly low.
	Permeation of water pipes.	Construction materials, future end users	Medium	Unlikely	Low	Hydrocarbons were not observed above the limit of detection in soil samples.
	Gas migration and build up within buildings.	Future end users and building structures	Severe	Unlikely	Low / moderate	Ground gas monitoring results indicate CIRIA 665 Characteristic Situation CS-1 and concentrations below their respective HSE Workplace Exposure Limits. Therefore the residual risk is considered low.
	Plant Uptake	Flora and Fauna	Mild	Unlikely	Low	Potential contaminants present on site are considered unlikely to exhibit significant leachability.

9 Contamination Conclusion and Recommendations

The following recommendations are based on the results of the conceptual site model and risk assessment.

9.1 Conclusion

Based on the conceptual site model and risk assessment there is a considered a low risk to end users, site workers and other environmental receptors.

9.2 Recommendations

9.2.1 Protection of Ground Workers

Any risk to ground workers due to contaminant impacted soil should be mitigated upon implementation of suitable health and safety measures and should be completed by a suitably qualified and competent contractor with appropriate precautions in place following risk assessment. This should include the adoption of suitable safe systems of work, the provision and use of welfare facilities, and suitable protective measures.

9.2.2 Watching Brief

It is recommended that a watching brief be maintained on site, particularly during the groundwork stage. During any ground works a competent person should make an appraisal of the exposed soils. If any material is noted to show visual and/or olfactory signs of contamination it should be stockpiled separately and tested prior to its appropriate removal off-site or re-use. If soils suspected of being contaminated are encountered, it is recommended that a contaminated land specialist be consulted.

9.2.3 Buried Services

Potable water pipework shall comply with the Water Supply Regulations. The agreement of the water provider and Local Authority should be sought regarding the potable water pipework and fittings selected prior to commencement.

9.2.4 Soil Disposal

The client and contractors are advised to follow the process outlined in the Environment Agency's Technical Guidance Document WM3 '*Waste Classification – Guidance on the Classification and Assessment of Waste*', 1st edition 2021, v1.2 GB.

The developer has a statutory responsibility under the Duty of Care Regulations of the Environmental Protection Act 1990 to ensure that contaminated soil and water is disposed of off-site to a suitably licensed waste management facility in a safe and approved manner.

To comply with the Duty of Care all wastes taken off site, in solid or liquid form, must be handled by a registered waste carrier and be accompanied by a consignment note that describes the waste.

9.2.5 Importing and Re-Use of Soil and Materials Management Plan

It is not anticipated that excavated materials will be re-use on site. A material would not be considered a waste if it is uncontaminated soil and other naturally occurring material excavated in the course of construction activities, where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated.

Where the reuse of excavated material is intended, in accordance with the 'CL:AIRE Definition

of Waste: Development Industry Code of Practice', a MMP should be prepared. The Environment Agency should be consulted at an early stage in this process, and this should be overseen by a 'competent person' as defined by LCRM.

9.2.6 Statutory Authority Consultation

It is recommended that this report be sent to the statutory authorities including the Local Authority Environmental Health and Planning Departments prior to site works commencing to seek their comments. Where necessary, they will consult the Environment Agency or other relevant statutory authorities. If applicable to this project, this report should also be provided to the relevant building warranty provider.

10 Geotechnical Assessment

Comments regarding foundation design and construction taking into consideration the encountered ground conditions and proposals are provided below.

10.1 Summary of Proposals and Ground Conditions

10.1.1 Development Proposals

Development proposals are understood to be at the feasibility stage, but are considered likely to include replacement or refurbishment of the current school buildings. Available plans are included in **Appendix 1**.

10.1.2 Summary of Ground Conditions and Test Results

The encountered ground conditions and in-situ and geotechnical laboratory test results are summarised in **Table 10.1** to **Table 10.2**. It should be noted that the maximum depth of Made Ground encountered was 0.80mbgl in CP04. Underlying the Made Ground natural bedrock geology interpreted to represent the Bollin Mudstone Member was encountered to a maximum depth of 3.70m bgl. Available borehole records held by the BGS indicate in excess of 25m of mudstones to be present beneath this part of Manchester.

Table 10.1 Summary of Encountered Ground Conditions

Stratum	Location	Surface Depth (mbgl)	Base Depth (mbgl)	Thickness (m)
Made Ground	All locations	0.00	0.20 to 0.80	0.20 to 0.80
Bollin Mudstone Member	All locations except TP01.	0.20 to 0.80	>1.05 to >3.70	0.65 - >3.50
Groundwater	Groundwater was encountered during fieldwork. During monitoring the groundwater levels were as summarised below.			
	Location	Minimum groundwater depth (mbgl)		Maximum groundwater depth (mbgl)
	CP01	1.30		1.80
	CP02	2.15		2.50
	CP03	2.20		2.30
	CP04	2.20		2.35

Table 10.2 Summary of Test Results

Stratum	Corrected SPT 'N60' Value	Moisture Content (%)	Corrected Moisture Content (%)	Plasticity Index (%)		c _u (kPa)
				PI	Modified PI	
Bollin Mudstone Member	15 - >54	9.4 – 26.7	12 - 34	12 – 16	10 – 15	105 - >374

The SPT N60 values have been calculated using an energy ratio of 65% from the cable percussive drilling rig. The uncorrected values are presented on the engineers logs included as part of **Appendix B**. An f1 value of 6.9 has been calculated based on laboratory plasticity testing.

The ground conditions encountered on site have been noted to be high strength mudstone bedrock deposits, with consistent refusals (blows greater than 50) noted during the SPT testing undertaken at 1.0m intervals. The high strength nature of the ground conditions encountered limited the maximum depth of the cable percussive boreholes to 3.70m bgl at location CP02. Despite chiselling at all borehole locations no further progress was made.

Given the high strength of the deposits encountered, particularly at depth, these deposits have been considered to represent a very weak to weak mudstone. It should be noted that sample recovered from the cable percussive boreholes will have been significantly disturbed by the drilling method and accurate logging of the rock type would not be possible based on the arisings recovered during drilling.

10.2 Foundations

The following assessment is based on the ground conditions encountered and parameters determined from the intrusive site investigation, including the results of laboratory analysis. At the time of writing detailed design information and structural loads of the proposed building were not available, however it is assumed that the proposed structure will form new school buildings.

It is assumed that finished ground levels will be at or close to current ground levels, if this is not the case then this assessment will need to be reviewed.

Depending on the proposed structural loads, the ground conditions encountered on site may be considered appropriate for traditional trench fill/pad foundations bearing on the underlying natural mudstone bedrock deposits of the Bollin Mudstone Member.

Testing undertaken on the Bollin Mudstone Member bedrock geology indicates soils with a low volume change potential.

Trees have been noted on site and in the surrounding area, foundations constructed within the influencing distance of trees (whether on or off site and whether to remain, be removed or planted), should have the foundations locally deepened based on appropriate industry guidance, such as NHBC Standards Chapter 4.2 and will require heave protection. This should be based on the mature height of the tree. Where foundations are to be stepped this should be in accordance with good building practice. It is also recommended that the foundation excavation is carefully inspected for desiccation or presence of roots and rootlets.

Any made ground or reworked soils encountered within the proposed building footprint are considered unsuitable as a founding stratum and all foundations will need to fully penetrate any made ground, low strength or otherwise unsuitable soils and be founded a minimum of 150mm into the natural founding stratum; it is recommended that all foundations are extended down into intact mudstone, generally encountered between 0.5m and 1.5m depth. A competent person should inspect foundation excavations to ensure they comply with design assumptions. Made ground has been encountered to a maximum depth of 0.80m bgl during the intrusive site investigation, however it should be noted that deeper made ground may be present on site surrounding current buildings or following any demolition works.

Based on the site investigation data and testing, for foundations bearing on the underlying Bollin Mudstone Member at a depth of 1.00m bgl, preliminary calculations indicate that for a strip/trench fill foundation up to 1.0m wide, a design bearing capacity of 275kN/m² should be applicable.

The above is only applicable for foundations with loads that are applied vertically and centrally and should result in total settlements of not more than 25mm, keeping differential settlements within acceptable limits.

In the absence of design loads the bearing capacity assessment has been undertaken for Design Approach 1, Combination 2 only, and a further assessment taking account of anticipated loadings will be required during detailed design in order to confirm the limit states are satisfied.

If the design bearing capacities noted above are considered inadequate, then consideration should be given to the use of a piled foundation solution. The choice of piling system and detailed design of piles are beyond the scope of this report and should be undertaken by a specialist piling contractor. Rotary boreholes would be required to investigate the underlying Bollin Mudstone Member to greater depth.

10.3 Stability of Excavations and Dewatering Considerations

The sides of excavations through Made Ground would not be expected to remain stable and may require temporary support with appropriate shoring to prevent excavation collapse during construction.

Instability is more likely where excavations are left open for longer periods and during inclement weather and may require temporary support with appropriate shoring to prevent excavation collapse during construction.

Where support systems are required, this must be designed by a suitably qualified engineer. Precautionary measures should be adopted should excavations be expected to remain open for an extended period and must be installed if personnel are to enter.

No groundwater was encountered within typical excavation depth during the intrusive site investigation and it is considered that should groundwater be encountered at shallow depths it will likely be suitably controlled using sump pumps.

10.4 Floor Slabs

Due to the variable depth of made ground and the presence of low volume change potential soils underlying the site, it is recommended that all floor slabs are fully suspended.

10.5 Hardstanding

Following site preparation and regrading it is considered that the subgrade will comprise made ground.

The made ground on site is likely to be variable and for preliminary design purposes is considered to have a CBR of 2%. It is recommended that once the site has been graded to the appropriate pavement formation level, it is inspected and, if necessary, in situ CBR testing be conducted on the subgrade to confirm the appropriate pavement design (i.e. to determine the subbase and capping thickness). In addition, the formation should be proof-rolled and any soft/loose pockets encountered should be excavated and replaced with well-compacted granular fill prior to pavement construction. Additional guidance is provided in BS7533-10:2010.

Where natural fine soils are encountered on site and based on a plasticity of approximately 12 to 16% as reported by the laboratory testing, Table 5.1 of the Highways Agency Interim

Advice Note 73/06 recommends a design CBR of 3%.

10.6 Chemical Attack on Buried Concrete

The results of testing for aggressive ground conditions have been summarised below in **Table 10.3**, the design sulphate class (DS) and aggressive chemical environment for concrete (ACEC) has also been provided.

Table 10.3 Summary of Test Results

Stratum	Determinand			DS / ACEC Class
	Total sulphate (%)	W/S sulphate SO ₄ (mg/l)	pH	
Made Ground	0.30 – 0.45	32 - 329	8.0 – 10.4	DS-1 / AC-1
Bollin Mudstone Member	0.03 – 0.07	17 – 140	8.1 – 8.8	DS-1 / AC-1
Groundwater	-	48 – 156	7.4 – 7.9	DS-1 / AC-1

11 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the research carried out. The results of the research should be viewed in the context of the work that has been carried out and no liability can be accepted for matters outside the stated scope of the research. Any comments made on the basis of information obtained from third parties are given in good faith on the assumption that the information is accurate. No independent validation of third party information has been made by agb Environmental Ltd.

Should any changes to the development be proposed, including changes to the proposed landscaping, then the risks will need to be reassessed. This may require additional site investigation work and may result in the need for alteration of the remedial works.

Advice provided within this report is based on current guidelines available at the time of writing. This report is subject to amendment in light of additional information becoming available or statutory consultee review, including the Environment Agency and Local Authority and the NHBC.

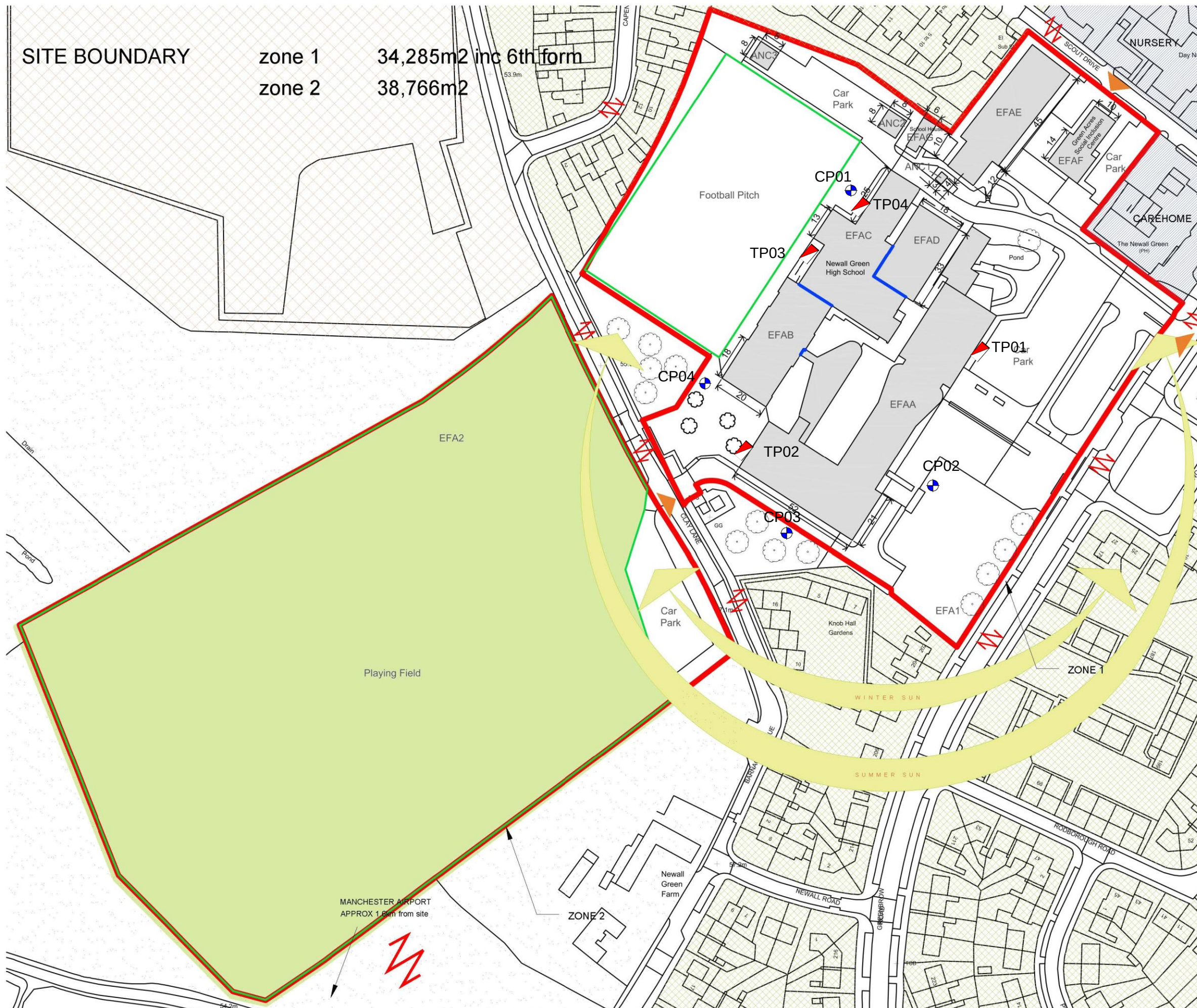
It is possible the conditions observed during the site investigation may change. This may result in changes to sources, pathways or receptors that were unforeseen and unexpected. Statements relating to ground gas or groundwater conditions are based on observations made at the time of the site investigation (unless otherwise stated). Ground gas or groundwater conditions may vary as a result of seasonal fluctuations or other effects.

Ground contamination can exist as small discrete areas of contamination and there can be no certainty that any or all such areas have been sampled or identified. This is particularly significant for an investigation by exploratory holes (as used in this site investigation) as a relatively small sample of soil is extracted, which may not be entirely representative of the surrounding ground conditions.

The geotechnical advice given in this report seeks to provide foundation design guidelines for the proposed building(s). The recommendations/advice given is based on the available information obtained during the investigation. Should any unusual ground conditions be encountered that differ from those proved in the exploratory holes further advice should be sought from agb Environmental Ltd.

This report is written in the context of an agreed scope of work between agb Environmental Ltd and the Client and should only be used in this specific context. Re-interpretation of the Site Investigation and/or this report in whole or part may become necessary if additional information becomes available or practices or legislation changes. agb Environmental Ltd does not provide legal advice; the advice of the Client's legal advisors may also be required. agb Environmental Ltd Terms and Conditions apply.

Appendix 1 Plans



Legend

-  Hand Dug Pit
-  Borehole

Project
Dixons Academy, Manchester

Title
Exploratory Hole Location Plan

Client
Arcadis LLP



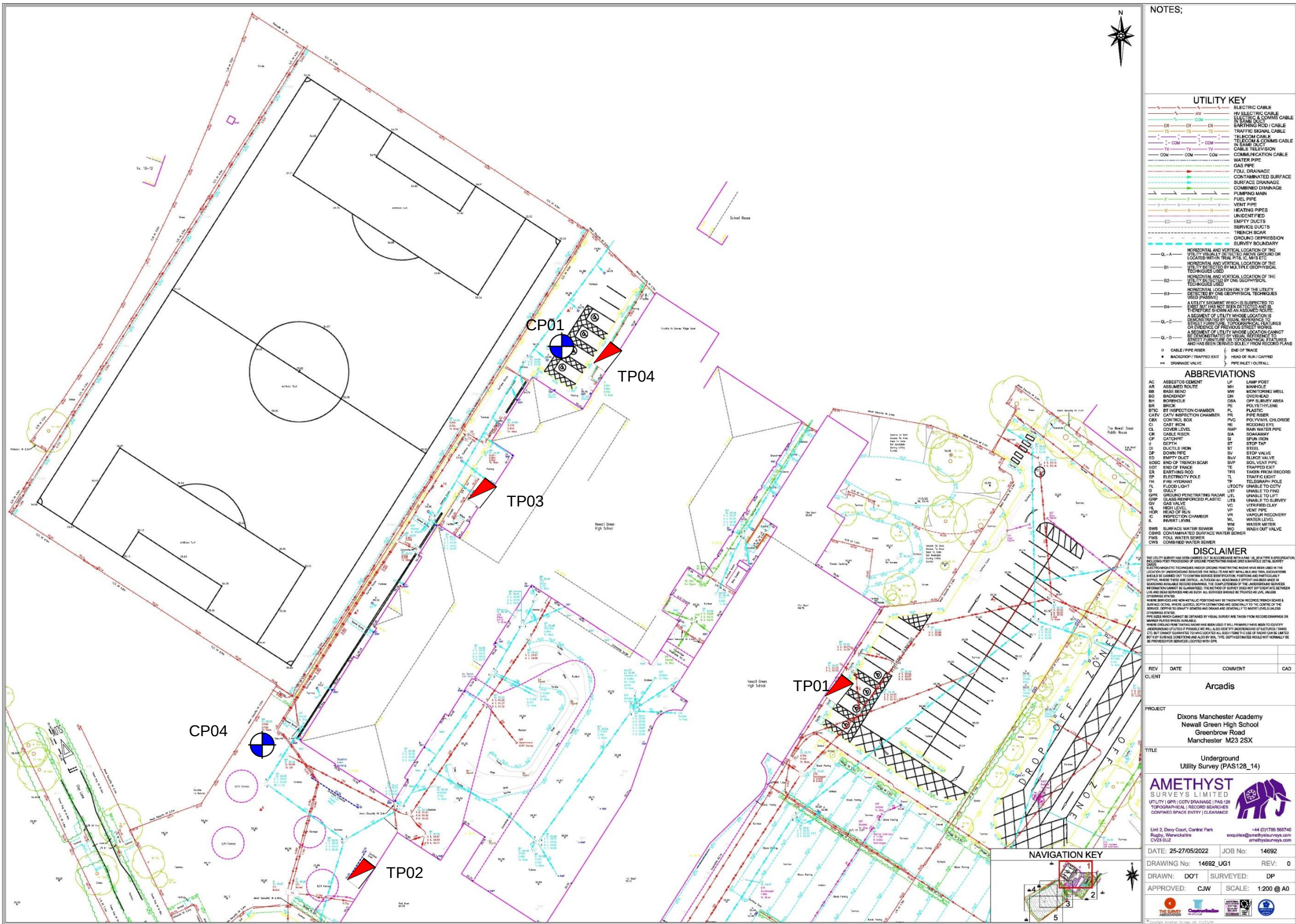
agb Environmental Ltd
1, The Mill, Copley Hill Business Park,
Babraham Road, Cambridge, CB22 3GN
Tel: 01223 776117
Email: Info@agbenvironmental.co.uk
Web: www.agbenvironmental.co.uk

Date 5th September 2022

Scale NTS

Project number . Drawing number
P4436.4.001

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Legend



Hand Dug Pit



Borehole

Project

Dixons Academy, Manchester

Title

Exploratory Hole Location Plan

Client

Arcadis LLP



agb Environmental Ltd
1, The Mill, Copley Hill Business Park,
Babraham Road, Cambridge, CB22 3GN
Tel: 01223 776117
Email: Info@agbenvironmental.co.uk
Web: www.agbenvironmental.co.uk

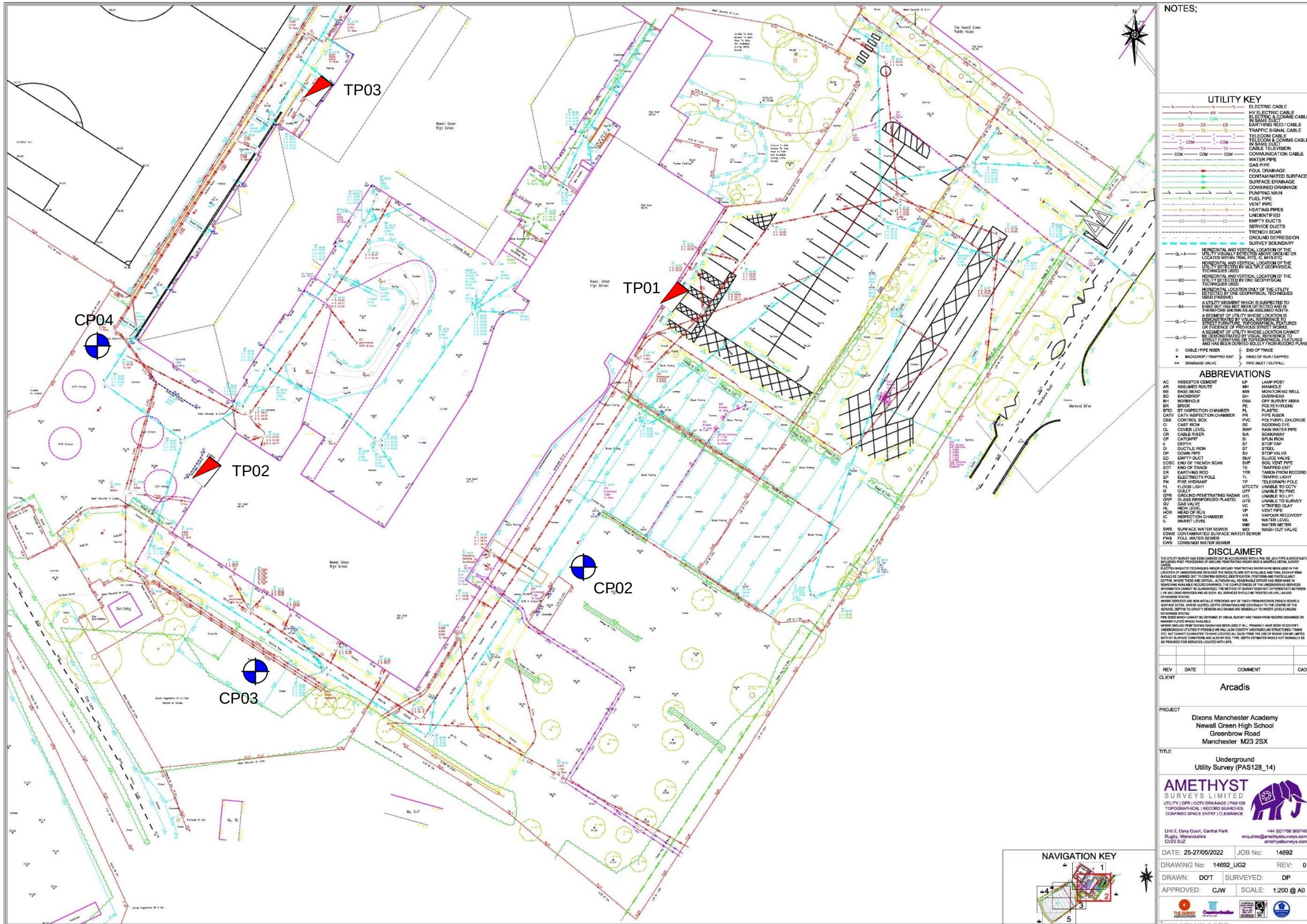
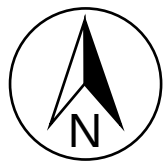
Date 5th September 2022

Scale NTS

Project number . Drawing number

P4436.4.001

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Legend



Hand Dug Pit



Borehole

Project

Dixons Academy, Manchester

Title

Exploratory Hole Location Plan

Client

Arcadis LLP



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Date 5th September 2022

Scale NTS

Project number . Drawing number

P4436.4.001

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Appendix 2 Fieldwork Records

BOREHOLE LOG

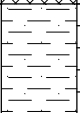
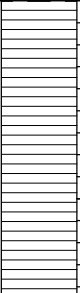
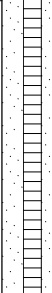
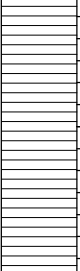
Project Dixons Academy Manchester				BOREHOLE No CP01	
Job No P4436	Date 05-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Agb Environmental Ltd				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.30	ES	N21				0.20	MADE GROUND: Macadam.		
						(0.30) 0.50	MADE GROUND: Medium angular limestone gravel and fine sand grey Hardcore MOT.		
						0.60	MADE GROUND: Coarse angular beige limestone gravel Hardcore MOT.		
1.20	ES	N50/ 125mm				(0.90)	Dense fine reddish brown very clayey SAND, with occasional mudstone fragments. BOLLIN MUDSTONE MEMBER		
				1.50		Very weak to weak reddish brown slightly sandy cemented MUDSTONE. BOLLIN MUDSTONE MEMBER			
									
1.80	ES	N50/ 85mm				(2.10)			
2.00									
3.00									
3.60	ES	N50/ 210mm				3.60			
									
									

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Groundwater was not encountered during drilling. Drilling refused at 3.6m and was chiselled for half an hour with no progress made. No olfactory or visual evidence of significant contamination.
All dimensions in metres Scale 1:34.375			Client Arcadis LLP			Method/ Plant Used			Logged By RG		

BOREHOLE LOG

Project Dixons Academy Manchester				BOREHOLE No CP02	
Job No P4436	Date 06-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Agb Environmental Ltd				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.50	ES					0.20	MADE GROUND: Loose dark brown sandy SILT.		
						(0.90)	Firm to stiff reddish brown very sandy CLAY, with occasional mudstone fragments. BOLLIN MUDSTONE MEMBER		
1.20		N32				1.10	Very weak to weak reddish brown slightly sandy cemented MUDSTONE. BOLLIN MUDSTONE MEMBER		
2.00		N50/ 220mm				(2.60)			
3.00		N50/ 50mm				3.70			
3.70		N50/ 10mm							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Groundwater was not encountered during drilling. Drilling refused at 3.7m and was chiselled for half an hour with no progress made. No olfactory or visual evidence of significant contamination.
All dimensions in metres Scale 1:34.375			Client Arcadis LLP			Method/ Plant Used			Logged By RG		

BOREHOLE LOG

Project Dixons Academy Manchester				BOREHOLE No CP03
Job No P4436	Date 06-07-22	Ground Level (m)	Co-Ordinates ()	
Contractor Agb Environmental Ltd				Sheet 1 of 1

SAMPLES & TESTS			STRATA						
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Geology	Instrument/ Backfill
0.30	ES					0.15	MADE GROUND: Macadam.		
						0.40	MADE GROUND: Medium angular limestone gravel and fine sand grey Hardcore MOT.		
						0.50	MADE GROUND: Coarse angular beige gravel Hardcore MOT.		
1.20 1.20	ES	N50				(3.10)	Very weak to weak reddish brown slightly sandy cemented MUDSTONE. BOLLIN MUDSTONE MEMBER		
2.00		N50/ 200mm							
3.00		N50/ 145mm							
3.60		N50/ 125mm							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Groundwater was not encountered during drilling. Drilling refused at 3.6m and was chiselled for half an hour with no progress made. No olfactory or visual evidence of significant contamination.
All dimensions in metres Scale 1:34.375			Client Arcadis LLP			Method/ Plant Used					Logged By RG

BOREHOLE LOG

Project Dixons Academy Manchester				BOREHOLE No CP04	
Job No P4436	Date 07-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Agb Environmental Ltd				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		
0.30	ES					0.10	MADE GROUND: Macadam.	
						0.15	MADE GROUND: Red medium angular limestone gravel and fine sand Hardcore MOT.	
						0.30	MADE GROUND: Loose black to brown silty SAND with fine to medium brick, asphalt and concrete.	
					(0.50)	MADE GROUND: Grey medium angular gravel and fine sand Hardcore MOT.		
1.20	N14					0.80	Very weak to weak grey slightly sandy cemented MUDSTONE. BOLLIN MUDSTONE MEMBER	
2.00	N50/ 115mm				(2.80)			
3.00	N50/ 135mm							
3.60	N50/ 40mm				3.60			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Groundwater was not encountered during drilling. Drilling refused at 3.6m and was chiselled for half an hour with no progress made. No olfactory or visual evidence of significant contamination.
All dimensions in metres Scale 1:34.375			Client Arcadis LLP			Method/ Plant Used			Logged By RG		

BOREHOLE LOG

Project Dixons Academy Manchester				BOREHOLE No TP01
Job No P4436	Date 04-07-22	Ground Level (m)	Co-Ordinates ()	
Contractor Agb Environmental Ltd				Sheet 1 of 1

[illegible]

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Groundwater was not encountered. No olfactory or visual evidence of significant contamination.
All dimensions in metres Scale 1:34.375			Client Arcadis LLP			Method/ Plant Used			Logged By RG		

BOREHOLE LOG

Project Dixons Academy Manchester				BOREHOLE No TP02	
Job No P4436	Date 04-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Agb Environmental Ltd				Sheet 1 of 1	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
0.10	ES					0.15		
						0.25		
						(0.35)		
0.70	ES					0.60		
						(0.60)		
						1.20		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Groundwater was not encountered. No olfactory or visual evidence of significant contamination.
All dimensions in metres Scale 1:34.375			Client Arcadis LLP			Method/ Plant Used			Logged By RG		

BOREHOLE LOG

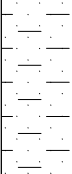
Project Dixons Academy Manchester				BOREHOLE No TP03	
Job No P4436	Date 04-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Agb Environmental Ltd				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION		
0.40	ES					0.05	MADE GROUND: Patio slab.		
						0.20	MADE GROUND: Grey medium angular limestone gravel and fine sand Hardcore MOT.		
						0.40	MADE GROUND: Pink medium angular limestone gravel and fine sand Hardcore MOT.		
						(0.65)	MADE GROUND: Pink medium angular limestone gravel and fine sand Hardcore MOT.		
							Fine reddish brown very clayey SAND, with occasional mudstone fragments. BOLLIN MUDSTONE MEMBER		
					1.05				

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Groundwater was not encountered. No olfactory or visual evidence of significant contamination.
All dimensions in metres Scale 1:34.375			Client Arcadis LLP			Method/ Plant Used			Logged By RG		

BOREHOLE LOG

Project Dixons Academy Manchester				BOREHOLE No TP04	
Job No P4436	Date 04-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Agb Environmental Ltd				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)		
0.30	ES					0.10	MADE GROUND: Patio slab.	
						0.25	MADE GROUND: Coarse brick with fine yellow sand.	
						(0.85)	Fine reddish brown very clayey SAND, with occasional mudstone fragments. BOLLIN MUDSTONE MEMBER	
						1.10		
				</				

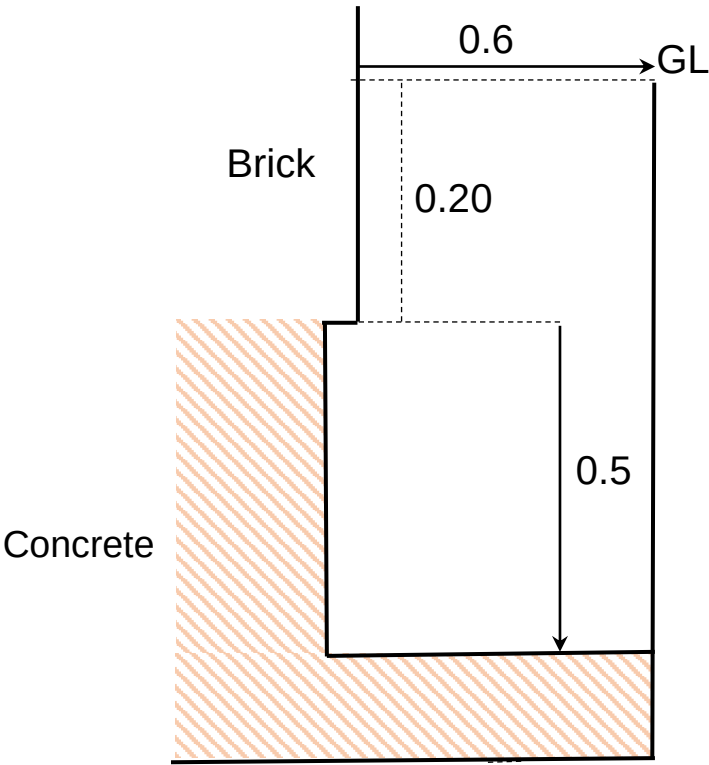
Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Groundwater was not encountered. No olfactory or visual evidence of significant contamination.
All dimensions in metres Scale 1:34.375			Client Arcadis LLP			Method/ Plant Used			Logged By RG		

Pit Summary

TP01:

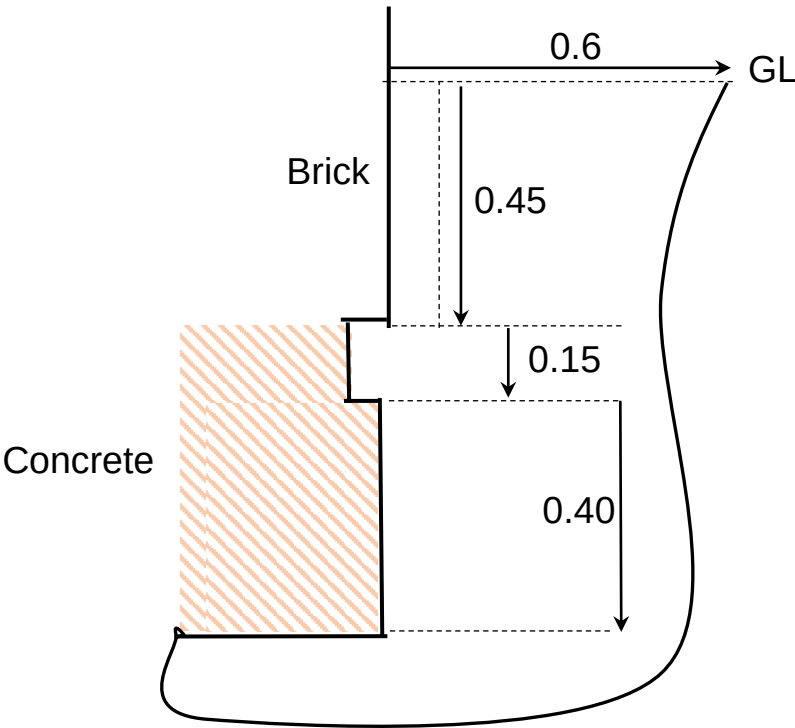
Concrete base not identified, but >0.70mbgl.

Side View



TP02:

Concrete base identified at 0.85mbgl.



Legend



Concrete Footing

GL

Ground Level

Project

Dixons Academy, Greenbrow Road,
Manchester, M23 2SX

Title

Foundation Inspection Pits

Client

Arcadis LLP



agb Environmental Ltd

1, The Mill, Copley Hill Business Park,
Babraham Road, Cambridge, CB22 3GN
Tel: 01223 776117
Email: Info@agbenvironmental.co.uk
Web: www.agbenvironmental.co.uk

Date

19th July 2022

Scale

Dimensions marked in metres

Project number . Drawing number

P4436.4

4.001

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Pit Summary

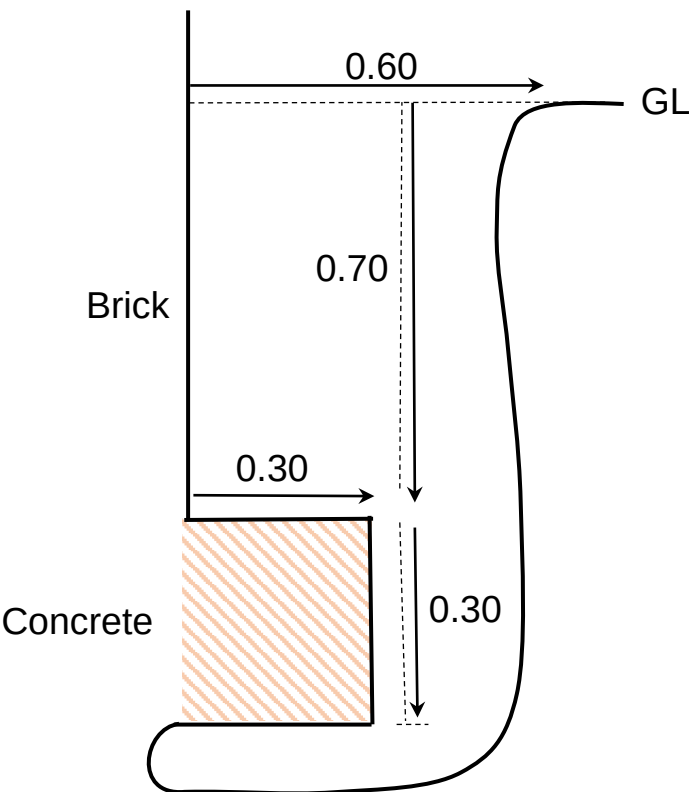
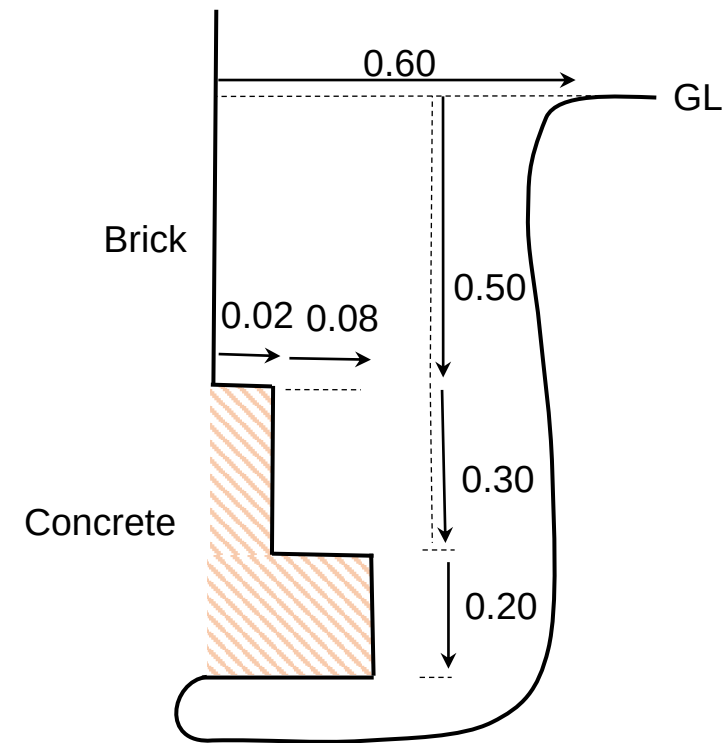
TP03:

Concrete base
identified at
0.16mbgl.

TP04:

Concrete base
identified at
0.14mbgl.

Side View



Legend

-  Concrete Footing
- GL Ground Level

Project

Newall Green High School, Greenbrow Road,
Manchester, M23 2SX

Title

Foundation Inspection Pits

Client

Arcadis LLP



agb Environmental Ltd
1, The Mill, Copley Hill Business Park,
Babraham Road, Cambridge, CB22 3GN
Tel: 01223 776117
Email: Info@agbenvironmental.co.uk
Web: www.agbenvironmental.co.uk

Date 19th July 2022

Scale Dimensions marked in metres

Project number . Drawing number

P4436.4 4.001

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Appendix 3 Monitoring Results

JOB DETAILS:

Site: Newhall High School
Date: 15/07/2022

Operator:

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Worst-credible GSVs		WELL AND WATER DATA						Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone		
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady											
CP01	0.0	0.0	0.0	0.0	0.8	0.8	0	0	1	1	19.5	19.5	NR	NR	0.3	0.3	<1	60			1.80	3.70					
CP02	0.0	0.0	0.0	0.0	0.1	0.1	0	0	0	0	20.7	20.7	NR	NR	0.6	0.6	<1	60			2.50	3.80					
CP03	0.0	0.0	0.0	0.0	0.1	0.1	0	0	0	0	20.5	20.5	NR	NR	0.3	0.3	<1	60			2.20	3.70					
CP04	0.0	0.0	0.0	0.0	0.5	0.5	0	0	0	0	18.4	18.4	NR	NR	0.4	0.4	<1	60			2.20	3.70					
Max	0.0	0.0	0.0	0.0	0.8	0.8	0	0	1	1	20.7	20.7	ND	ND	0.6	0.6	ND	60	NA	NA	2.50	3.80	NR	NR			
Min	0.0	0.0	0.0	0.0	0.1	0.1	0	0	0	0	18.4	18.4	0.0	0.0	0.3	0.3	0.0	60	0.0000	0.0000	1.80	3.70	0.00	0.00			

[illegible]

G - Granular

Where no flow (ND) recorded, GSVs are calculated using equipment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of GSVs.

(Select correct box with X or enter data, as applicable)

☐ Frozen

	Strong
--	--------

	Overcast
--	----------

	Overhead
	Heavy

08:30	End
-------	-----

1023	End
------	-----

x	Rising
---	--------

16 After

JOB DETAILS:

Site: Newhall High School
Date: 05/08/2022

Visit No: 2 of 6

Project Manager:

Worst-possible GSVs	
0.0003	0.003

MG - Made ground
NAT - Natural
C - Cohesive
G - Granular

NB: Where no flow (ND) recorded, GSVs are calculated using equipment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of GSVs.

METEOROLOGICAL AND SITE INFORMATION:

State of ground:	☒ Dry	☐ Moist	☐ Wet	☐ Snow	☐ Frozen
Wind:	☒ Calm	☐ Light	☐ Moderate	☐ Strong	☐ Overcast
Cloud cover:	☒ None	☐ Slight	☐ Cloudy	☐ Heavy	☐ End
Precipitation:	☒ None	☐ Slight	☐ Moderate	☐ End	☐ End
Time monitoring performed:		09:00 Start		09:30 End	
Barometric pressure (mbar):		1024 Start		1024 End	
Pressure trend (Daily):		Falling	☐ Steady	x Rising	
Source:					
Air Temperature (Deg. C):		17		17	

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:	GA5000					
Gas Range:	CH ₄	0 - 100%	CO ₂	0 - 100%	O ₂	0 - 25%
Gas Flow range:						
Differential Pressure:	+/- 500mbar					
Date of last calibration:						
Date of next calibration:						

JOB DETAILS:

Client:

Site: Newhall High School
Date: 07/09/2022

Job No:

Visit No: 5 of 6

Operator:

Project Manager:

NB: Where no flow (ND) recorded, GSVs are calculated using equipment limit of detection (0.1/l/hr). Where negative flows recorded, these are converted to positive values for calculation of GSVs.

METEOROLOGICAL AND SITE INFORMATION:

State of ground:

Wind:

Cloud cover:

Precipitation:

Time monitoring performed:

Barometric pressure (mbar):

Pressure trend (Daily):

Source:

Air Temperature (Deg. C):

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GA5000

Gas Range: **CH₄** 0 - 100% **CO₂** 0 - 100% **O₂** 0 - 25%

Gas Flow range: +/-

Differential Pressure: +/- 500mbar

Date of last calibration:

Date of next calibration:

JOB DETAILS:

Site: Newhall High School
Date: 14/09/2022

Operator:

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Worst-credible GSVs		WELL AND WATER DATA						Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone		
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady											
CP01	0.1	0.1	2.0	2.0	0.3	0.3	7	0	0	0	19.0	19.0	NR	NR	0.3	0.3	<1	60			1.40	3.70					
CP02	0.1	0.1	2.0	2.0	0.8	0.8	0	0	0	0	19.6	19.6	NR	NR	0.2	0.2	<1	60			2.15	3.80					
CP03	0.1	0.1	2.0	2.0	1.1	1.1	0	0	0	0	15.2	15.2	NR	NR	0.1	0.1	<1	60			2.20	3.70					
CP04	0.0	0.0	0.0	0.0	1.2	1.2	0	0	0	0	17.9	17.9	NR	NR	3.7	3.7	<1	60			2.25	2.25					
Max	0.1	0.1	2.0	2.0	1.2	1.2	7	0	0	0	19.6	19.6	ND	ND	3.7	3.7	ND	60	NA	NA	2.25	3.80	NR	NR			
Min	0.0	0.0	0.0	0.0	0.3	0.3	0	0	0	0	15.2	15.2	0.0	0.0	0.1	0.1	0.0	60	0.0000	0.0000	1.40	2.25	0.00	0.00			

ND - Not detected
NR - Not recorded
NA - Non applicable

Worst-possible GSVs	
0.0037	0.0444

MG - Made ground
NAT - Natural
C - Cohesive
G - Granular

NB: Where no flow (ND) recorded, GSVs are calculated using equipment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of GSVs.

State of ground:	☒ Dry	☐ Moist	☐ Wet	☐ Frozen
Wind:	☒ Calm	☐ Light	☐ Moderate	☐
Cloud cover:	☐ None	☒ Slight	☐ Cloudy	☐
Precipitation:	☒ None	☐ Slight	☐ Moderate	☐
Time monitoring performed:		☐ 10:00 Start		☐ 10:30
Barometric pressure (mbar):		☐ 1009 Start		☐ 1009
Pressure trend (Daily):		☐ Falling	☐ Steady	☒ Rising
Source:				
Air Temperature (Deg. C):		☐ 17		☐ 17

Ground gas meter:	GA5000					
Gas Range:	CH ₄	0 - 100%	CO ₂	0 - 100%	O ₂	0 - 25%
Gas Flow range:						
Differential Pressure:	+/- 500mbar					
Date of last calibration:						
Date of next calibration:						

Appendix 4 Laboratory Results



Rory Griggs
AGB Environmental Ltd
1 The Mill
Copley Hill Business Park
Abraham Road
Cambridge
CB22 3GN

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 22-05911

Site Reference: Dixons Academy

Project / Job Ref: P4436

Order No: 009251

Sample Receipt Date: 08/07/2022

Sample Scheduled Date: 11/07/2022

Report Issue Number: 1

Reporting Date: 19/07/2022

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate						
DETS Report No: 22-05911	Date Sampled	04/07/22	04/07/22	04/07/22	04/07/22	04/07/22
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Dixons Academy	TP / BH No	TP01	TP01 - Blacktop	TP02	TP02 - Blacktop	TP03
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 009251	Depth (m)	0.50	GL - 0.10	0.70	GL - 0.10	0.40
Reporting Date: 19/07/2022	DETS Sample No	604392	604393	604394	604395	604396

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected		Not Detected	
pH	pH Units	N/a	MCERTS	10.4		8.5	9.0
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	4491		690	613
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.45		0.07	0.06
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	329		140	113
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.33		0.14	0.11
Total Sulphur	%	< 0.02	NONE	1.54		0.07	0.06
Organic Matter (SOM)	%	< 0.1	MCERTS	3.4		1.2	6.2
Arsenic (As)	mg/kg	< 2	MCERTS	8		6	3
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4		< 0.2	0.5
Chromium (Cr)	mg/kg	< 2	MCERTS	12		25	6
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	26		11	6
Lead (Pb)	mg/kg	< 3	MCERTS	42		11	7
Mercury (Hg)	mg/kg	< 1	MCERTS	1.2		< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	11		26	6
Selenium (Se)	mg/kg	< 2	MCERTS	< 3		< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	56		55	18
Total Phenols (monohydric)	mg/kg	< 2	NONE		< 2		2.2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate						
DETS Report No: 22-05911	Date Sampled	04/07/22	04/07/22	04/07/22	05/07/22	05/07/22
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Dixons Academy	TP / BH No	TP04	CP01	CP01	CP02	CP03
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 009251	Depth (m)	0.30	0.30	1.80	0.50	0.30
Reporting Date: 19/07/2022	DETS Sample No	604397	604398	604399	604400	604401

Determinand	Unit	RL	Accreditation	(n)		(n)	
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	8.6	8.6	8.1	10.6
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS			299	2953
Total Sulphate as SO ₄	%	< 0.02	MCERTS			0.03	0.30
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS			17	32
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS			0.02	0.03
Total Sulphur	%	< 0.02	NONE			0.03	0.31
Organic Matter (SOM)	%	< 0.1	MCERTS	1	8.4	0.9	6.4
Arsenic (As)	mg/kg	< 2	MCERTS	6	< 2	10	5
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.6	< 0.2	0.6
Chromium (Cr)	mg/kg	< 2	MCERTS	31	4	41	12
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	11	4	12	19
Lead (Pb)	mg/kg	< 3	MCERTS	8	11	8	31
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	1	1.1
Nickel (Ni)	mg/kg	< 3	MCERTS	32	5	43	9
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	57	13	80	59
Total Phenols (monohydric)	mg/kg	< 2	NONE				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 22-05911	Date Sampled	05/07/22	06/07/22			
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Dixons Academy	TP / BH No	CP03	CP04			
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied			
Order No: 009251	Depth (m)	1.20	0.30			
Reporting Date: 19/07/2022	DETS Sample No	604402	604403			

Determinand	Unit	RL	Accreditation	(n)		
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected		
pH	pH Units	N/a	MCERTS	8.8	8.0	
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	484		
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.05		
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	51		
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.05		
Total Sulphur	%	< 0.02	NONE	0.05		
Organic Matter (SOM)	%	< 0.1	MCERTS		10.4	
Arsenic (As)	mg/kg	< 2	MCERTS	< 2		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS		0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS		13	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS		10	
Lead (Pb)	mg/kg	< 3	MCERTS		9	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS		11	
Selenium (Se)	mg/kg	< 2	MCERTS	< 3		
Zinc (Zn)	mg/kg	< 3	MCERTS		42	
Total Phenols (monohydric)	mg/kg	< 2	NONE			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 22-05911	Date Sampled	04/07/22	04/07/22	04/07/22	04/07/22	04/07/22
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Dixons Academy	TP / BH No	TP01	TP02	TP03	TP04	CP01
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 009251	Depth (m)	0.50	0.70	0.40	0.30	0.30
Reporting Date: 19/07/2022	DETS Sample No	604392	604394	604396	604397	604398

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	(n)
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.24	0.19	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.55	0.33	< 0.1	< 0.1	0.12
Pyrene	mg/kg	< 0.1	MCERTS	0.58	0.35	< 0.1	< 0.1	0.16
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.36	0.24	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	0.29	0.17	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.32	0.18	< 0.1	< 0.1	0.14
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.28	0.16	< 0.1	< 0.1	0.11
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	2.9	1.6	< 1.6	< 1.6	< 1.6

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 22-05911	Date Sampled	05/07/22	05/07/22	06/07/22		
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Dixons Academy	TP / BH No	CP02	CP03	CP04		
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 009251	Depth (m)	0.50	0.30	0.30		
Reporting Date: 19/07/2022	DETS Sample No	604400	604401	604403		

Determinand	Unit	RL	Accreditation	(n)	(n)		
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	1.73	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	1.39	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	0.97	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	6.24	0.19	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	1.48	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	6.15	0.50	
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	5.31	0.62	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	2.35	0.19	
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	2.58	0.25	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	2.34	0.25	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.89	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	2.13	0.20	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.84	0.16	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.19	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.70	0.22	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	35.3	2.6	



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 22-05911	Date Sampled	04/07/22	04/07/22			
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Dixons Academy	TP / BH No	TP01 - Blacktop	TP02 - Blacktop			
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied			
Order No: 009251	Depth (m)	GL - 0.10	GL - 0.10			
Reporting Date: 19/07/2022	DETS Sample No	604393	604395			

Determinand	Unit	RL	Accreditation	(n)	(n)			
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.12			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	0.12			
Acenaphthene	mg/kg	< 0.1	MCERTS	0.21	0.63			
Fluorene	mg/kg	< 0.1	MCERTS	0.27	0.21			
Phenanthrene	mg/kg	< 0.1	MCERTS	3.94	15.80			
Anthracene	mg/kg	< 0.1	MCERTS	0.90	2.46			
Fluoranthene	mg/kg	< 0.1	MCERTS	6.28	20.40			
Pyrene	mg/kg	< 0.1	MCERTS	5.98	16.70			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	3.37	10.50			
Chrysene	mg/kg	< 0.1	MCERTS	3.52	7.50			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	3.55	9.31			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	1.15	2.81			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	3.16	7.33			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	1.52	3.57			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.88			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	1.49	2.98			
Coronene	mg/kg	< 0.1	NONE	0.92	1.37			
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	16.3	41.9			
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	25.3	73.4			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	35.4	101			
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	36.3	103			

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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 22-05911	Date Sampled	04/07/22	04/07/22	04/07/22	04/07/22	04/07/22
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Dixons Academy	TP / BH No	TP01	TP01 - Blacktop	TP02	TP02 - Blacktop	TP03
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 009251	Depth (m)	0.50	GL - 0.10	0.70	GL - 0.10	0.40
Reporting Date: 19/07/2022	DETS Sample No	604392	604393	604394	604395	604396

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Aliphatic >C5 - C6 : HS 1D MS AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS 1D MS AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH 1D FID AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH 1D FID AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH 1D FID AL	mg/kg	< 3	MCERTS	< 3	39	< 3	< 3
Aliphatic >C16 - C21 : EH 1D FID AL	mg/kg	< 3	MCERTS	< 3	321	< 3	74
Aliphatic >C21 - C34 : EH 1D FID AL	mg/kg	< 10	MCERTS	44	4584	< 10	2626
Aliphatic (C5 - C34) : EH 1D FID MS HS AL	mg/kg	< 21	NONE	44	4945	< 21	2700
Aromatic >C5 - C7 : HS 1D MS AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS 1D MS AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH 1D FID AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH 1D FID AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C12 - C16 : EH 1D FID AR	mg/kg	< 2	MCERTS	< 2	8	< 2	5
Aromatic >C16 - C21 : EH 1D FID AR	mg/kg	< 3	MCERTS	< 3	275	< 3	158
Aromatic >C21 - C35 : EH 1D FID AR	mg/kg	< 10	MCERTS	< 10	4090	38	1844
Aromatic (C5 - C35) : EH 1D FID MS HS AR	mg/kg	< 21	NONE	< 21	4373	38	2007
Total >C5 - C35 : EH_1D_FID_MS_HS_Total	mg/kg	< 42	NONE	44	9317	< 42	4707

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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 22-05911	Date Sampled	04/07/22	04/07/22	05/07/22	05/07/22	06/07/22
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Dixons Academy	TP / BH No	TP04	CP01	CP02	CP03	CP04
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 009251	Depth (m)	0.30	0.30	0.50	0.30	0.30
Reporting Date: 19/07/2022	DETS Sample No	604397	604398	604400	604401	604403

Determinand	Unit	RL	Accreditation	(n)		(n)		(n)
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	19	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	233	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	622	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	40	< 10	1312	290
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	40	< 21	2186	290
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	14	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	108	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	900	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	36	< 10	799	525
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	36	< 21	1821	525
Total >C5 - C35	mg/kg	< 42	NONE	< 42	76	< 42	4007	815



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Maidstone
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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 22-05911	Date Sampled	04/07/22	04/07/22	04/07/22	04/07/22	04/07/22
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Dixons Academy	TP / BH No	TP01	TP01 - Blacktop	TP02	TP02 - Blacktop	TP03
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 009251	Depth (m)	0.50	GL - 0.10	0.70	GL - 0.10	0.40
Reporting Date: 19/07/2022	DETS Sample No	604392	604393	604394	604395	604396

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 22-05911	Date Sampled	04/07/22	04/07/22	05/07/22	05/07/22	06/07/22
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Dixons Academy	TP / BH No	TP04	CP01	CP02	CP03	CP04
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 009251	Depth (m)	0.30	0.30	0.50	0.30	0.30
Reporting Date: 19/07/2022	DETS Sample No	604397	604398	604400	604401	604403

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	3	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5



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Unit 1, Rose Lane Industrial Estate
Rose Lane
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Tel : 01622 850410



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 22-05911	
AGB Environmental Ltd	
Site Reference: Dixons Academy	
Project / Job Ref: P4436	
Order No: 009251	
Reporting Date: 19/07/2022	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
604392	TP01	None Supplied	0.50	11.5	Brown sandy gravel with stones and concrete
604393	TP01 - Blacktop	None Supplied	GL - 0.10	< 0.1	Black tar
604394	TP02	None Supplied	0.70	11	Brown sandy clay with stones
604395	TP02 - Blacktop	None Supplied	GL - 0.10	0.3	Black tar
604396	TP03	None Supplied	0.40	3.7	Brown sandy gravel with stones and concrete
604397	TP04	None Supplied	0.30	16.6	Brown sandy clay
604398	CP01	None Supplied	0.30	3.2	Brown sandy gravel with stones
604399	CP01	None Supplied	1.80	17.2	Light brown sandy clay
604400	CP02	None Supplied	0.50	18.9	Light brown clay
604401	CP03	None Supplied	0.30	8.5	Brown sandy gravel with stones and concrete
604402	CP03	None Supplied	1.20	16.2	Light brown sandy clay with stones
604403	CP04	None Supplied	0.30	8.7	Black sandy gravel with brick and tar

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{4/5}



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 22-05911

AGB Environmental Ltd

Site Reference: Dixons Academy

Project / Job Ref: P4436

Order No: 009251

Reporting Date: 19/07/2022

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym

Benzene - HS_1D_MS
 Ethylbenzene - HS_1D_MS
 MTBE - HS_1D_MS
 TPH CWG - Aliphatic >C10 - C12 - EH_1D_FID_AL
 TPH CWG - Aliphatic >C12 - C16 - EH_1D_FID_AL
 TPH CWG - Aliphatic >C16 - C21 - EH_1D_FID_AL
 TPH CWG - Aliphatic >C21 - C34 - EH_1D_FID_AL
 TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
 TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
 TPH CWG - Aliphatic >C8 - C10 - EH_1D_FID_AL
 TPH CWG - Aliphatic C5 - C34 - EH_1D_FID_MS_HS_AL
 TPH CWG - Aromatic >C10 - C12 - EH_1D_FID_AR
 TPH CWG - Aromatic >C12 - C16 - EH_1D_FID_AR
 TPH CWG - Aromatic >C16 - C21 - EH_1D_FID_AR
 TPH CWG - Aromatic >C21 - C35 - EH_1D_FID_AR
 TPH CWG - Aromatic >C5 - C35 - EH_1D_FID_MS_HS_AR
 TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
 TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
 TPH CWG - Aromatic >C8 - C10 - EH_1D_FID_AR
 TPH CWG - Total >C5 - C35 - EH_1D_FID_MS_HS_Total
 Toluene - HS_1D_MS
 m & p-xylene - HS_1D_MS
 o-Xylene - HS_1D_MS



Rory Griggs
AGB Environmental Ltd
1 The Mill
Copley Hill Business Park
Abraham Road
Cambridge
CB22 3GN

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 22-07040

Site Reference: Dixons Academy

Project / Job Ref: P4436

Order No: 009308

Sample Receipt Date: 17/08/2022

Sample Scheduled Date: 18/08/2022

Report Issue Number: 1

Reporting Date: 24/08/2022

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Water Analysis Certificate						
DETS Report No: 22-07040	Date Sampled	12/08/22	12/08/22	12/08/22	12/08/22	
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Dixons Academy	TP / BH No	CP01	CP02	CP03	CP04	
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: 009308	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 24/08/2022	DETS Sample No	609659	609660	609661	609662	

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)
pH	pH Units	N/a	ISO17025	7.9	7.8	7.5	7.4
Sulphate as SO ₄	mg/l	< 1	ISO17025	48	156	91	67
Total Sulphur ^(S)	mg/l	< 0.01	NONE	19.80	52.90	31.90	24.90
Total Organic Carbon (TOC)	mg/l	< 0.1	NONE	11.4	15.3	26.3	27.2
Arsenic (dissolved)	ug/l	< 5	ISO17025	7	6	< 5	< 5
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	0.5	0.5	< 0.4	< 0.4
Chromium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5
Chromium (hexavalent)	ug/l	< 20	NONE	< 20	< 20	< 20	< 20
Copper (dissolved)	ug/l	< 5	ISO17025	15	15	< 5	20
Lead (dissolved)	ug/l	< 5	ISO17025	13	29	< 5	7
Mercury (dissolved)	ug/l	< 0.05	ISO17025	0.14	0.12	0.11	0.09
Nickel (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5	8	< 5	< 5
Zinc (dissolved)	ug/l	< 2	ISO17025	58	74	6	34

Subcontracted analysis ^(S)

Insufficient sample ^{I/S}

Unsuitable Sample ^{U/S}

(hs) Please note deviating sample due to head space in container



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Water Analysis Certificate - Speciated PAH						
DETS Report No: 22-07040	Date Sampled	12/08/22	12/08/22	12/08/22	12/08/22	
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Dixons Academy	TP / BH No	CP01	CP02	CP03	CP04	
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: 009308	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 24/08/2022	DETS Sample No	609659	609660	609661	609662	

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)
Naphthalene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008
Total EPA-16 PAHs	ug/l	< 0.16	NONE	< 0.16	< 0.16	< 0.16	< 0.16



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Water Analysis Certificate - TPH CWG Banded						
DETS Report No: 22-07040	Date Sampled	12/08/22	12/08/22	12/08/22	12/08/22	
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Dixons Academy	TP / BH No	CP01	CP02	CP03	CP04	
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: 009308	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 24/08/2022	DETS Sample No	609659	609660	609661	609662	

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)
Aliphatic >C5 - C6 : HS_1D_MS_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aliphatic >C6 - C8 : HS_1D_MS_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aliphatic >C8 - C10 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aliphatic >C10 - C12 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aliphatic >C12 - C16 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aliphatic >C16 - C21 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aliphatic >C21 - C34 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	ug/l	< 70	NONE	< 70	< 70	< 70	< 70
Aromatic >C5 - C7 : HS_1D_MS_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aromatic >C7 - C8 : HS_1D_MS_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aromatic >C8 - C10 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aromatic >C10 - C12 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aromatic >C12 - C16 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aromatic >C16 - C21 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aromatic >C21 - C35 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	ug/l	< 70	NONE	< 70	< 70	< 70	< 70
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	ug/l	< 140	NONE	< 140	< 140	< 140	< 140

(hs) Please note deviating sample due to head space in container



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Water Analysis Certificate - BTEX / MTBE						
DETS Report No: 22-07040	Date Sampled	12/08/22	12/08/22	12/08/22	12/08/22	
AGB Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Dixons Academy	TP / BH No	CP01	CP02	CP03	CP04	
Project / Job Ref: P4436	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: 009308	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 24/08/2022	DETS Sample No	609659	609660	609661	609662	

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)
Benzene : HS_1D_MS	ug/l	< 1	ISO17025	< 1	< 1	< 1
Toluene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	< 5
p & m-xylene : HS_1D_MS	ug/l	< 10	ISO17025	< 10	< 10	< 10
o-xylene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	< 5
MTBE : HS_1D_MS	ug/l	< 10	ISO17025	< 10	< 10	< 10

(hs) Please note deviating sample due to head space in container



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Water Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 22-07040	
AGB Environmental Ltd	
Site Reference: Dixons Academy	
Project / Job Ref: P4436	
Order No: 009308	
Reporting Date: 24/08/2022	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Aromatic C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS



TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD
DATE ISSUED: 26/07/2022



Contract		Newall Green High School	
Serial No.		41068_1	
Client: AGB Environmental Ltd 341 Exning Road Newmarket Suffolk CB8 0AT		Soil Property Testing Ltd 15, 16, 18 Halcyon Court, St Margaret's Way, Stukeley Meadows, Huntingdon, Cambridgeshire, PE29 6DG Tel: 01480 455579 Email: enquiries@soilpropertytesting.com Website: www.soilpropertytesting.com	
Samples Submitted By: AGB Environmental Ltd Samples Labelled: Newall Green High School		Approved Signatories: ☒ J.C. Garner B.Eng (Hons) FGS Technical Director & Quality Manager ☐ W. Johnstone Materials Lab Manager 	
Date Received: 13/07/2022		Samples Tested Between: 13/07/2022 and 26/07/2022	
Remarks: For the attention of Rory Griggs Your Reference No: P4436 Your Order No: PO 009262			
Notes: 1 All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary. 2 Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. 3 Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory. 4 This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory. 5 The results within this report only relate to the items tested or sampled.			



TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD
DATE ISSUED: 26/07/2022



0998

Contract		Newall Green High School																						
Serial No.		41068_1										Target Date		27/07/2022										
Scheduled By		AGB Environmental Ltd																						
Schedule Remarks																								
Bore Hole No.	Type	Sample Ref.	Top Depth	Water Content (BS EN) Liquid Plastic Limits Wet Sieve Preparation																				Sample Remarks
CP01	B	2	1.20	1	1	1																		
CP01	SD	3	2.00	1	1	1																		
CP02	SD	1	1.20	1	1	1																		
CP02	B	4	3.00	1	1	1																		
CP03	SD	3	2.00	1	1	1																		
CP04	B	2	1.20	1	1	1																		
CP04	SD	3	2.00	1	1	1																		
CP04	SD	5	3.60	1	1	1																		
Totals				8	8	8													End of Schedule					



TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD
DATE ISSUED: 26/07/2022



0998

Contract		Newall Green High School												
Serial No.		41068_1												
SUMMARY OF WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX														
Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti- city Index (%)	Liquid- ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
CP01	1.20	B	2	21.0	34	18	16	0.19	Wet Sieved	5 (M)	22.1*	66	Soft reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	CL
CP01	2.00	SD	3	9.4	32	18	14	-0.62	Wet Sieved	24 (M)	12.3*	71	Reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	CL
CP02	1.20	SD	1	10.0	27	15	12	-0.42	Wet Sieved	14 (M)	11.6*	72	Reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	CL
CP02	3.00	B	4	26.7	29	16	13	0.82	Wet Sieved	22 (M)	34.2*	69	Very soft reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	CL
CP03	2.00	SD	3	14.7	33	19	14	-0.31	Wet Sieved	25 (M)	19.6*	71	Light brownish grey friable thinly laminated slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	CL
CP04	1.20	B	2	20.6	34	18	16	0.17	Wet Sieved	19 (M)	25.5*	66	Very soft light greenish grey slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	CL
CP04	2.00	SD	3	11.9	35	19	16	-0.44	Wet Sieved	17 (M)	14.3*	69	Light greenish grey friable thinly laminated slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	CL/CI
CP04	3.60	SD	5	22.2	31	16	15	0.41	Wet Sieved	42 (M)	38.3*	72	Very soft reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size and rare bluish grey mottling	CL
Method Of Preparation:				BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2										
Method of Test:				BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.4, 5.3, 5.4										
Type of Sample Key:				U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter										
Comments:				*Corrected water content assume material greater than 0.425mm is non-porous. See BS1377: Part 2: 1990 Clause 3 Note 1.										
Table Notation:				Ret'd 0.425mm: (A) = Assumed, (M) = Measured										



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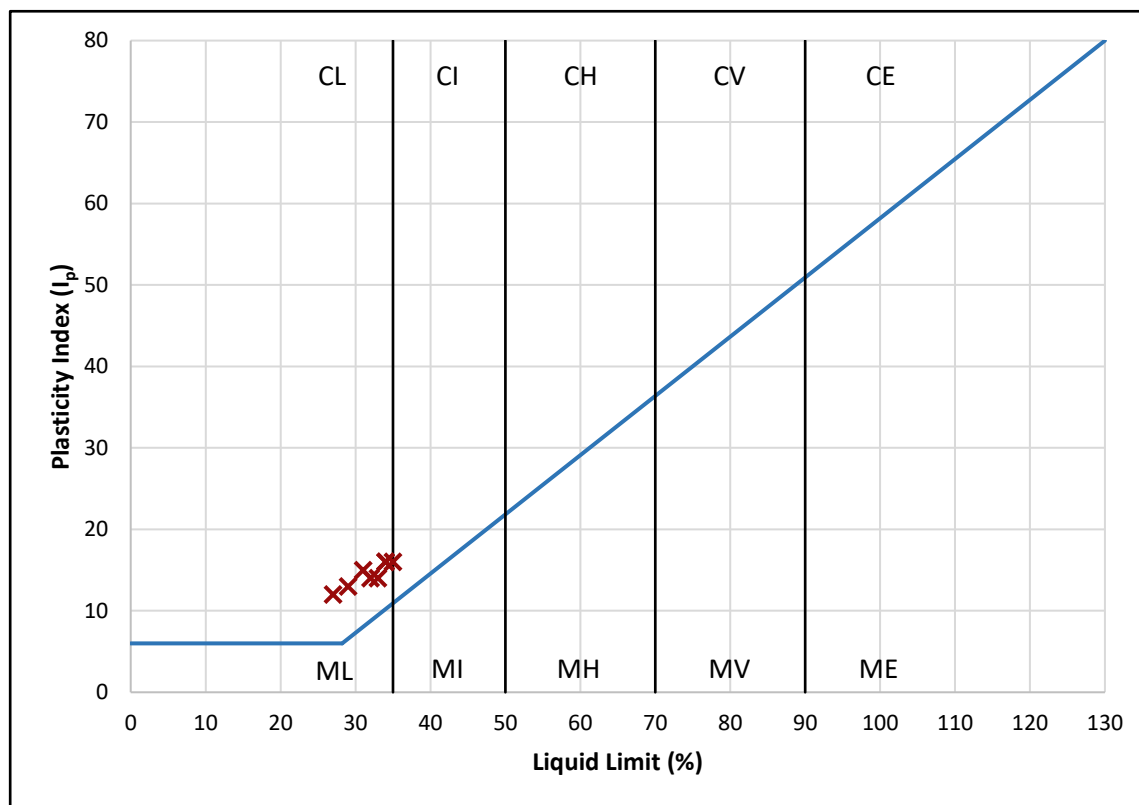


0998

Contract	Newall Green High School
Serial No.	41068_1

PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART

Plasticity				
Low	Medium	High	Very High	Extremely High



Plasticity Chart BS5930: 2015: Figure 8

High	NHBC Volume Change Potential
Medium	
Low	

Method of Preparation:	BS 1377: Part 2: 1990: 4.2
Method of Test:	BS1377: Part 2: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index



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Contract		Newall Green High School					
Serial No.		41068_1					
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX							
Borehole / Pit No.	Depth m	Sample		Water Content (W) %	Description	Remarks	
		Type	Reference				
CP01	1.20	B	2	21.0	Soft reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size		
PREPARATION					Liquid Limit	34 %	
Method of preparation					Wet sieved over 0.425mm sieve	Plastic Limit	18 %
Sample retained 0.425mm sieve (Measured)					5 %	Plasticity Index	16 %
Corrected water content for material passing 0.425mm					22.1 %	Liquidity Index	0.19
Sample retained 2mm sieve (Measured)					3 %	NHBC Modified (I'p)	15 %
Curing time			66 hrs	Clay Content	Not analysed	Derived Activity	Not analysed
C=CLAY Plasticity Index % (Ip) M=SILT High Medium Low NHBC Volume Change Potential Liquid Limit % Plasticity Chart BS5930: 2015: Figure 8							
Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2 Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4 Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter Comments: Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)							



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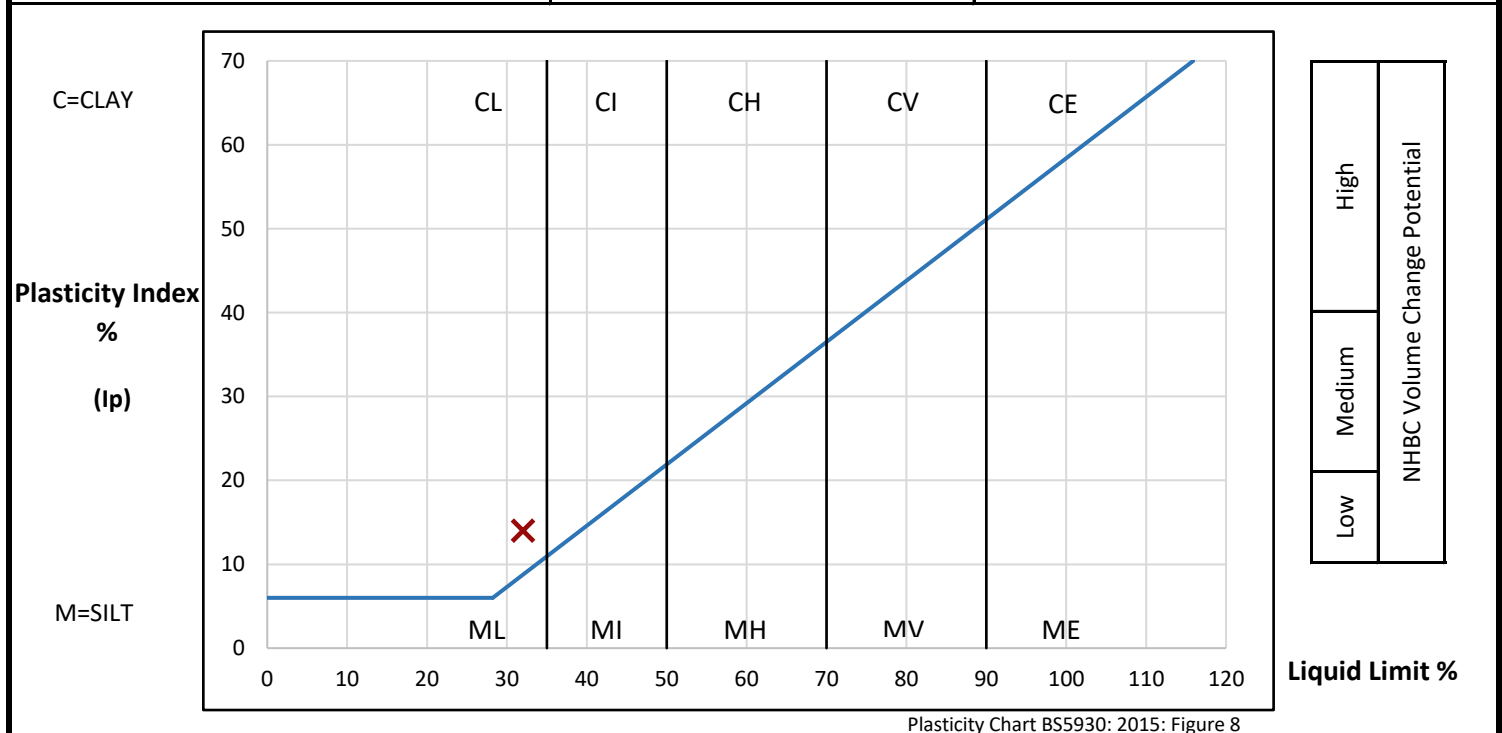
0998

Contract	Newall Green High School
Serial No.	41068_1

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample		Water Content (W) %	Description	Remarks
		Type	Reference			
CP01	2.00	SD	3	9.4	Reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	

PREPARATION				Liquid Limit	32 %	
Method of preparation				Wet sieved over 0.425mm sieve	Plastic Limit	18 %
Sample retained 0.425mm sieve		(Measured)	24 %	Plasticity Index		14 %
Corrected water content for material passing 0.425mm				12.3 %	Liquidity Index	-0.62
Sample retained 2mm sieve		(Measured)	20 %	NHBC Modified (I'p)		11 %
Curing time		71 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments: Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1
Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)



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Contract		Newall Green High School					
Serial No.		41068_1					
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX							
Borehole / Pit No.	Depth m	Sample		Water Content (W) %	Description	Remarks	
		Type	Reference				
CP02	1.20	SD	1	10.0	Reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size		
PREPARATION					Liquid Limit	27 %	
Method of preparation					Wet sieved over 0.425mm sieve	Plastic Limit	15 %
Sample retained 0.425mm sieve (Measured)					14 %	Plasticity Index	12 %
Corrected water content for material passing 0.425mm					11.6 %	Liquidity Index	-0.42
Sample retained 2mm sieve (Measured)					11 %	NHBC Modified (I'p)	10 %
Curing time		72 hrs		Clay Content	Not analysed	Derived Activity	Not analysed

C=CLAY

Plasticity Index
%

(Ip)

M=SILT

High

Medium

Low

NHBC Volume Change Potential

Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)



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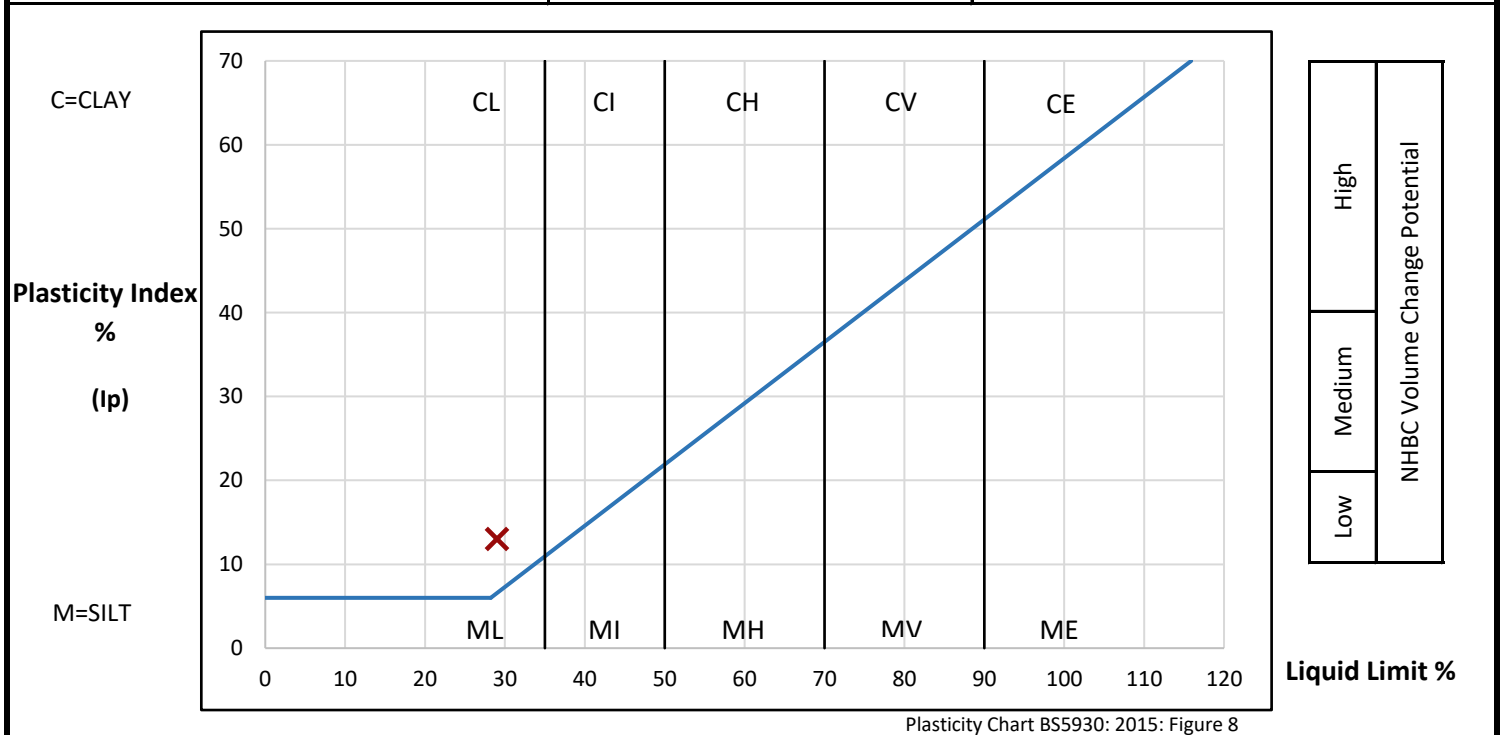
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Contract	Newall Green High School
Serial No.	41068_1

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Reference	Water Content (W) %	Description	Remarks
CP02	3.00	B	4	26.7	Very soft reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	

PREPARATION				Liquid Limit 29 %	
Method of preparation Wet sieved over 0.425mm sieve				Plastic Limit 16 %	
Sample retained 0.425mm sieve (Measured) 22 %				Plasticity Index 13 %	
Corrected water content for material passing 0.425mm 34.2 %				Liquidity Index 0.82	
Sample retained 2mm sieve (Measured) 16 %				NHBC Modified (I'p) 10 %	
Curing time 69 hrs		Clay Content Not analysed		Derived Activity Not analysed	



Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments: Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1
Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)



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Contract		Newall Green High School						
Serial No.		41068_1						
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX								
Borehole / Pit No.	Depth m	Sample		Water Content (W) %	Description	Remarks		
		Type	Reference					
CP03	2.00	SD	3	14.7	Light brownish grey friable thinly laminated slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size			
PREPARATION					Liquid Limit	33 %		
Method of preparation					Wet sieved over 0.425mm sieve	Plastic Limit	19 %	
Sample retained 0.425mm sieve (Measured)					25 %	Plasticity Index	14 %	
Corrected water content for material passing 0.425mm					19.6 %	Liquidity Index	-0.31	
Sample retained 2mm sieve (Measured)					18 %	NHBC Modified (I'p)	11 %	
Curing time				71 hrs	Clay Content	Not analysed	Derived Activity	Not analysed

C=CLAY

Plasticity Index %
(Ip)

M=SILT

High

Medium

Low

NHBC Volume Change Potential

Liquid Limit %

Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)



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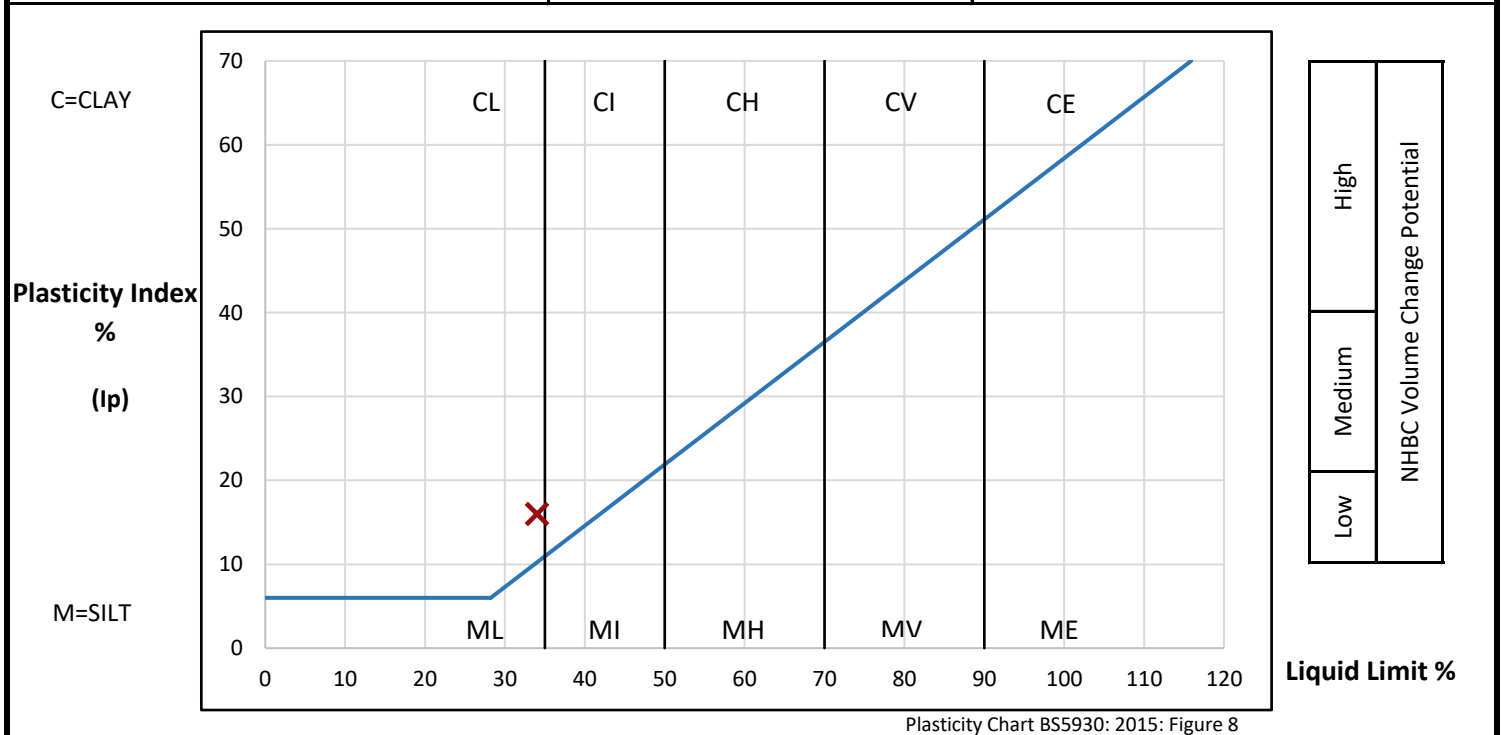
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Contract	Newall Green High School
Serial No.	41068_1

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample		Water Content (W) %	Description	Remarks
		Type	Reference			
CP04	1.20	B	2	20.6	Very soft light greenish grey slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size	

PREPARATION			Liquid Limit	34 %	
Method of preparation		Wet sieved over 0.425mm sieve	Plastic Limit	18 %	
Sample retained 0.425mm sieve	(Measured)	19 %	Plasticity Index	16 %	
Corrected water content for material passing 0.425mm			Liquidity Index	0.17	
Sample retained 2mm sieve	(Measured)	14 %	NHBC Modified (I'p)	13 %	
Curing time	66 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments: Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1
Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)



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0998

Contract		Newall Green High School						
Serial No.		41068_1						
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX								
Borehole / Pit No.	Depth m	Sample		Water Content (W) %	Description	Remarks		
		Type	Reference					
CP04	2.00	SD	3	11.9	Light greenish grey friable thinly laminated slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size			
PREPARATION					Liquid Limit	35 %		
Method of preparation					Wet sieved over 0.425mm sieve	Plastic Limit	19 %	
Sample retained 0.425mm sieve (Measured)					17 %	Plasticity Index	16 %	
Corrected water content for material passing 0.425mm					14.3 %	Liquidity Index	-0.44	
Sample retained 2mm sieve (Measured)					11 %	NHBC Modified (I'p)	13 %	
Curing time				69 hrs	Clay Content	Not analysed	Derived Activity	Not analysed

C=CLAY

Plasticity Index %
(Ip)

M=SILT

High

Medium

Low

NHBC Volume Change Potential

Liquid Limit %

Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)



TEST REPORT

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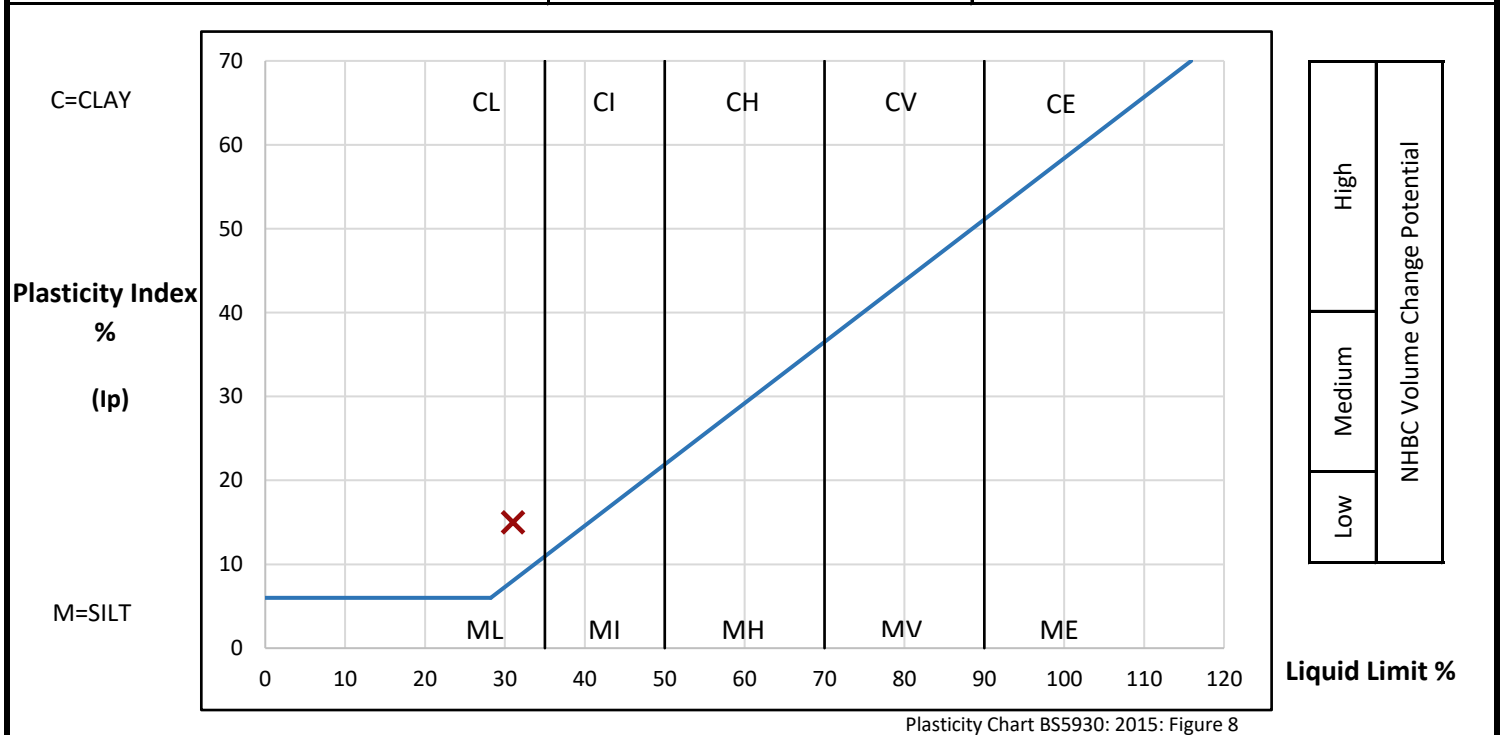
0998

Contract	Newall Green High School
Serial No.	41068_1

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample		Water Content (W) %	Description	Remarks
		Type	Reference			
CP04	3.60	SD	5	22.2	Very soft reddish brown slightly sandy silty CLAY with occasional lithorelicts of fine and medium gravel size and rare bluish grey mottling	

PREPARATION			Liquid Limit	31 %	
Method of preparation		Wet sieved over 0.425mm sieve	Plastic Limit	16 %	
Sample retained 0.425mm sieve	(Measured)	42 %	Plasticity Index	15 %	
Corrected water content for material passing 0.425mm			Liquidity Index	0.41	
Sample retained 2mm sieve	(Measured)	37 %	NHBC Modified (I'p)	9 %	
Curing time	72 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments: Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1
Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index
Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

Appendix 5 Updated CSM Risk Evaluation Methodology

Classification of Consequence

The classifications of consequence (severity) are taken from R&D Publication 66 (NHBC and Environment Agency, 2008). agb Environmental has chosen to apply the classifications to a broad range of development scenarios.

It should be noted that the categories of pollution incident have no relation to the categories of significant possibility of significant harm to human health or significant possibility of significant pollution of controlled waters in respect of the Part 2A Statutory Guidance.

Classification	Definition
Severe	Highly elevated concentrations likely to result in “significant harm” to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations which could result in “significant harm” to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.
Mild	Exposure to human health unlikely to lead to “significant harm”. Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structure and services.

Classification of Probability

The classifications of probability are taken from R&D Publication 66 (NHBC and Environment Agency, 2008). agb Environmental has chosen to apply the classifications to a broad range of development scenarios.

It should be noted that the categories of pollution incident have no relation to the categories of significant possibility of significant harm to human health or significant possibility of significant pollution of controlled waters in respect of the Part 2A Statutory Guidance. Also, in the Part 2A Statutory Guidance “pollutant linkage” is now termed “contaminant linkage”, although it is noted that the terms are effectively synonymous.

Category	Definition
High Likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Categorisation of Risk

		Consequence (Severity)			
		Severe	Medium	Mild	Minor
Probability (Likelihood)	High Likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low Likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Description of Risk Levels and Likely Action Required

Term	Description
Very high risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action <u>or</u> there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High risk	Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action. Realisation of the risk is likely to present a substantial liability to the site owner or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate risk	It is possible that without appropriate remediation action, harm would arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low risk	It is possible that harm could arise to a designated receptor from identified hazard. It is likely that, at worst, if any harm was realised any effects would be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very low risk	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

Summary of Definitions

Term	Description
Hazard	A property or situation which in certain circumstances could lead to harm. (The properties of different hazards must be assessed in relation to their potential to affect the various different receptors).
Consequences	The adverse effects (or harm) arising from a defined hazard which impairs the quality of the environment or human health in the short or longer term.
Probability	The mathematical expression of the chance of a particular event in a given period of time (e.g. probability of 0.2 is equivalent to 20% or a 1 in 5 chance).
Likelihood	Probability; the state of face of being likely.
Risk	A combination of the probability or frequency of the occurrences of a defined hazard AND the magnitude of the consequences of that occurrence.
Contaminant linkage	An identified pathway is capable of exposing a receptor to a contaminant and that contaminant is capable of harming the receptor. In the Part 2A Statutory Guidance the terms "contaminant", "pollutant" and "substance" have the same meaning, and some non-statutory technical guidance relevant to land contamination uses alternative terms such as "pollutant", "substance" and associated terms in effect to mean the same thing.