Supplementary Site Investigation and Generic Quantitative Risk Assessment

Residential Development

Report prepared at
Yiewsley Library and Car Park
Falling Lane/High Street
Hillingdon
UB7 7BE

On behalf of
Bugler Developments Limited

Report reference
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Aviron Associates Limited

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1.0 PROJECT AND SITE INFORMATION

1.1 APPOINTMENT

Aviron Associates Limited (Aviron) was retained by Bugler Developments Limited (the "Client") to prepare and complete a Supplementary Site Investigation (SI) leading towards a tier 2 Generic Quantitative Risk Assessment (GQRA) of the following premises:

Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE (hereafter referred to as the "site").

A PRA will also be completed which forms a tier 1 assessment by completing a desk-based study with site walkover to identify potential areas of contaminative concern associated with the proposed development of the site. The PRA will then form a preliminary Conceptual Site Model (CSM) with recommendations for any further investigation or risk assessment.

The PRA will be produced using data included in the following reports supplied by the Client:

1. Report 1. Phase I Preliminary Risk Assessment. Report ref. CGK00151. Dated November 2021. Prepared by Card Geotechnics Limited (CGL)

2. Report 2. Phase II Generic Risk Assessment. Report ref. CGK00151. Dated December 2021. Prepared by CGL.

This Supplementary SI will investigate the pollutant linkages established and then investigated within the Phase I and II reports, whilst providing further data to refine the CSM. The Supplementary SI may, if necessary, also provide recommendations for any further investigation or tier 3 Detailed Quantitative Risk Assessment (DQRA). Alternatively, it may be possible to make remediation recommendations immediately following the GQRA.

In addition, geotechnical issues shall be investigated to provide recommendations for new foundations and pavement design.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

1.2 THE SITE

Table 1.2 provides a summary of site details and surrounding area, as presented in the previous reports, supplemented with additional information where necessary.

Table 1.2: Site Details	
Site Location	The site is located at the corner of Falling Lane and the High Street, in Yiewsley, UB7 7BE. The site is centred on what3Words location ///buck.tides.noises and has an area of 0.24Ha. **Figure 1** is presented as the Site Location Plan.
National Grid Ref.	Centred at approximately TQ060807.
Current Land Use	At the time of the investigation the site comprised the Yiewsley library building in the west of the site, as well as grass verges and a car parking area. Other features noted on the site are the same as those noted during the previous investigation in December 2021, namely the remains of a concrete pad to a former building, understood to have been a bowls clubhouse, an electricity sub-station, a small brick building, bins and lampposts. **Figure 2** presents the Existing Site Layout Plan. **Figures 3** and **4** present the Site Photographs.
Surrounding Land Use	The site is surrounded by the local roads and commercial development to the north and west, commercial development to the south and recreational ground to the south-east and east.
Proposed Land Use	It is understood that the library will be demolished, and the site will be cleared and redeveloped with a four to five storey residential block of apartments with associated undercroft parking at ground floor level, and landscaped areas. **Figure 5** presents the Proposed Development Plan.

1.3 SITE WALKOVER SURVEY

A site walkover survey was undertaken on 21 February 2025 and included an inspection of the site and surrounding area, where safe and accessible. The purpose of the survey is to identify any potential on-site or nearby contaminative activities or potential sources of land contamination.

Additionally, as part of the survey any features which may affect site re-development in terms of physical site and ground conditions were noted.

Table 1.3 provides a description of site features observed during the walkover survey and also current Ordnance Survey maps made available at the time of report writing.

Table 1.3: Summary of Site Walkover Survey	
Physical Site Characteristics	
Existing Structures	Two-storey library building of concrete and brick construction in the west of the site, under a flat roof. Small brick building in the north-east of the site, with a 'pesticide' warning on the door. Brick built compound in the south-west housing a substation.
Basements	None observed.
Visual Topography and Site Surfacing	The topography of the site is generally level at approximately 31 metres (m) above Ordnance Datum (AOD) as shown on a topographical survey drawing produced by Hywel John Surveys Ltd (ref. 2319, dated 07/03/19) and with the exception of the grass verges locally is almost entirely covered in the buildings and hardstanding.
Retaining Structures and Slopes	None observed.
Drainage Issues	None observed.
Surface Waters	None observed.
Trees and Hedges	Mature trees and hedges around its perimeter and locally within the site.
Made and Infilled Ground	None observed, however should be expected beneath the buildings and hardstanding across the site.
Contaminative Characteristics	
Above or Underground Storage Tanks and Drums	None observed.
Fuel Interceptors	None observed.
Waste Storage and Disposal	None observed.
Hazardous Material Storage and Use	Possible pesticide storage in the small brick building in the east of the site (see photos 6 and 7, Figures 3 and 4).
Asbestos Containing Materials (ACMs)	None observed. An asbestos survey is recommended prior to the redevelopment works.
Boiler Houses	None observed.
Sub-stations	An electricity substation (ESS) is located on site within a brick compound (see photo 9, Figure 4).
Surface Staining	None observed.
Potentially Contaminative Activities	ESS noted in the south-west of the site and possible pesticide storage in the small brick building in the east.

1.3.1 Summary of Physical Site Characteristics

The site is generally level and consists of a library and a car park, with grass verges locally. Remnants of a former building are evident in the east of the site.

Consideration should be made towards the make-up and competency of the underlying strata and the influence of trees on any proposed buildings.

1.3.2 Summary of Contaminative Site Characteristics

An electricity substation was observed in the south-west of the site and possible pesticide storage in the small brick building in the east.

2.0 DESK STUDY REVIEW

The historical Ordnance Survey (OS) maps that were included in the Phase I report by CGL were reviewed for the Site. The maps and environmental data were originally supplied by Groundsure report which is included as Appendix C in the Phase I Report. The pertinent information from the Groundsure Report and Phase I is replicated below.

2.1 SUMMARY OF SITE HISTORY

A summary of the pertinent site history and that of the surrounding area is provided in table 2.1.

Table 2.1: History of the Site and Surrounding Land

Date (scale)	Site History	Surrounding Land History
1866 (1:2,500) 1868 (1:10,560) 1881 (1:10,560) 1895-1896 (1:2,500) 1894-1897 (1:10,560) 1895-1897 (1:10,560) 1898-1900 (1:10,560) 1899 (1:2,500)	The site is shown as being divided into 3 plots with small structures located near the western and northern site boundary.	The site is part of an agricultural landscape. A road is located immediately to the north-west and west. Beyond the roads are a farm and apparent residential buildings respectively. To the south are additional buildings and open ground and to the east is further open ground. North-east and east: Gravel pits (500m NE, 240m E). South-east: Brickfield (750m), Otter Dock (350m), gravel pits (600m), chemical works, printing works, gear works (800-900m). South: Railway (600m S). South-west: Para Rubber Mills (200m), railway (500m). North-west: chair factory (600m), disused cement works (1000m), dock (1000m).
1913 (1:10,560) 1914 (1:2,500)	The central part of the site appears to have been altered, perhaps associated with ground works. The previously mentioned buildings are still apparent.	No notable changes identified.
1932 (1:2,500) 1932 (1:10,560) 1935 (1:10,560) 1934-1935 (1:2,500) 1938 (1:10,560)	No apparent change at the site.	No notable changes identified.
1960-1965 (1:10,560) 1964-1965 (1:1,250) 1964-1966 (1:2,500)	A car park is labelled in the central part. GP is marked on the northern boundary and a structure labelled 'lavs' in the north-eastern corner indicating lavatories.	Notable landuses include: Fire station (50m NW), builders yard (200n NW), garage (200m NW), works (150m NW), factory (200m NW), abattoir (100m S), warehouses (30m

Table 2.1: History of the Site and Surrounding Land		
Date (scale)	**Site History**	**Surrounding Land History**
1964-1969 (1:2,500)	Glasshouses are located in the eastern part of the site.	and 50m SW), factory (100m SW), garage (100m SW), warehouses (100m SW), joinery works (90m SW), motor repair works, printing works and engineering works (all between 110m – 160m SW), garage (80m W).
1970 (1:10,560) 1968-1973 (1:1,250) 1973-1975 (1:10,000) 1975 (1:1,250) 1970	Between 1971 and 1975 a library was constructed in the west of the site replacing the previous structure at this location.	The surrounding area is becoming increasingly developed in the east with large residential areas, located from 200m from the site. There are numerous works buildings (80-500m SW and W), a piggery (500m SW), coal depot (500m SW), a scrap metal yard (750m W).
1982-1987 (1:1,250) 1986 – 1990 (1:1,250) 1987 (1:1,250) 1987-1992 (1:1,250) 1990 (1:1,250) 1992 (1:1,250)	The glasshouses in the eastern part of the site appear to have been mostly demolished. An electrical substation in marked on the south-western boundary, adjacent to the library.	No notable change in the surrounding area.
1987-1990 (1:10,000)	No apparent change at the site.	There are fewer buildings associated with heavy industry, although there are still numerous works buildings to the W, SW and NW. No notable change in the surrounding area.
2001 (1:10,000) 2003 (1:1,250) 2010 (1:10,000)	No apparent change at the site.	Nearest notable landuses include a garage (30m N) including forecourt canopy suggesting fuel sales, and an electrical substation (80m SW).
2021 (1:10,000)	No apparent change at the site.	No notable changes identified.
Note: All distances are approximate.		

2.2 SUMMARY OF HISTORICAL LAND USES FROM THE MAPS

The earliest available map, dated 1866, showed much of the site as undeveloped land, with two unknown buildings on the site. Residential buildings in the surrounding area developed alongside commercial land uses such as garages, factories, warehouses, works, bowling green and tennis courts. One area of the site became a car park by 1964-1965, with public convenience buildings and glasshouses in other areas of the site. The existing library building is evident from 1975.

The surrounding area was initially agricultural and open land, with gradual development over time, including residential expansion, a numerous commercial industrial landuses. Within 250m of the site have been works, garages, electrical substations, docks, gravel pits, rubber works.

2.3 SUMMARY OF HISTORICAL USES FROM THE GROUNDSURE REPORT

A range of historical and recent industrial and infrastructure features have been identified within the vicinity of the site. Within 250m of the site, seventeen historical industrial land uses were noted, including six "unspecified works," six rubber mills (the closest 153m south-west in 1932), two docks, two unspecified factories, and a gravel pit (241 m east in 1898). Thirteen historical tanks were also recorded in the Groundsure report, the nearest located 149m south-west in 1986. Three electricity substations were historically present on-site (1986 and 1996), with an additional twenty-three recorded within 250m. Twenty-six historical garages were identified nearby, the closest only 23m to the north-west. A recent electricity substation is present on-site, with nineteen additional recent industrial uses noted within 250m, including vehicle hire/repair services, tanks, public transport infrastructure, and unspecified works.

Beyond 250m of the site, evidence of surface mineral extraction was recorded approximately 300m to the east. Two unspecified factories were mapped at around 293m to the north-west in 1970 and 1989. Two petrol stations were identified within 500m; the nearest, located 36m north-west of the site, is now obsolete, while the closest operational fuel station lies 193m to the north-west.

2.4 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

The following information was obtained from the Phase I report and supplemented with review of online resources where relevant.

2.2.1 Anticipated Geology

The British Geological Survey (BGS) indicates that the site is located on a bedrock of London Clay Formation – Clay, Silt and Sand. Superficial deposits of both Lynch Hill Gravel Member – Gravel and Langley Silt Member – Silt are also recorded across the site. The Langley Silt member typically overlies River Terrace Deposits with a sharp base.

The Groundsure report states there is an area of worked ground – void, located across the east of the site. This concurs with the mapped location of the superficial Lynch Hill Gravel and may be related to historical extraction of gravel and backfill with loose or spoil material.

Relevant geological information on the natural geology obtained from the BGS has been summarised in table 2.1.1.

Table 2.2.1: Anticipated Geology				
Stratum	**Age or Period**	**Possible Thickness (m)**	**Typical Description**	**Aquifer Status**
Artificial/Made Ground *Shown across the east of the site*	-	-	Made Ground (undivided) – artificial deposit	-
Superficial *Langley Silt Member (SW and W)*	Quaternary	Average 3m, range 1-5m	Varies from silt to clay, commonly yellow-brown and massively bedded	Unproductive strata
Lynch Hill Gravel Member (E, possibly extracted from the site).	Quaternary	Average 7m, range 1-12m	Sand and gravel, locally with lenses of silt, clay or peat	Principal aquifer
Bedrock *London Clay Formation*	Palaeogene period	Up to 150m	Clay, silt and sand. Sedimentary bedrock	Unproductive strata

2.2.2 BGS Borehole Records

Information on local boreholes completed in the area was obtained from the Groundsure report and British Geological Survey (BGS) Website accessible at the time of this report. The details of the borehole are summarised in Table 2.2.2 below.

Table 2.2.2 BGS Borehole Records			
BGS Reference	**Distance from Site (Direction)**	**Geology (Depth to base, metres (m) below ground level (bgl))**	**Groundwater (m bgl)**
ID: 576530. Yiewsley Bypass 1. May 1979	98m (NE)	Topsoil to 0.25m Sandy Clay to 2.0m Depth to base 2.0m	Not recorded.

2.2 HYDROGEOLOGY

Langley Silt Member (SW and W) in the western part of the site is classified as “unproductive” strata by the Environment Agency whereas Lynch Hill Gravel Member in the east (possibly extracted from the site) is classified as a “principal” aquifer.

Principal aquifers are described as “geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale.”

Unproductive strata are described as “rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow”.

The Phase I Environmental Assessment confirmed that the site does not lie within a groundwater Source Protection Zone (SPZ). Additionally, there are no recorded groundwater or surface water abstractions within a 1 km radius of the site.

One surface water feature, the Grand Union Canal, is located within 250m of the site boundary, with the closest point approximately 245m to the west. However, due to the limited availability of local borehole data, understanding of the groundwater conditions in the immediate area remains poor.

The site is not shown to be within Environment Agency Flood Zones 2 or 3, and the risk of groundwater flooding has been assessed as moderate.

2.3 RECORDS OF LANDFILLS, WASTE MANAGEMENT FACILITIES, INFILLED GROUND

Two historical landfills have been identified within 500m of the site boundary. The nearest, recorded as a refuse tip on 1987 mapping, is situated approximately 425m to the west. No currently operational or recently closed landfill sites are recorded within this distance. A historical waste transfer facility was also identified approximately 477m south-west of the site, with a planning application submitted in 1998.

Additionally, two licensed waste management facilities are located within 500m of the site. The closest, which issued a licence in 2017, lies around 423m to the north-west.

A total of twenty-four waste exemptions have been recorded within 500m of the site. The two nearest exemptions, associated with SAZ Corporation Ltd and located 61m to the north-west, relate to the storage and treatment of waste. All recorded exemptions specify use for “non-agricultural waste only” or state that the activity is “not on a farm.”

No sites subject to Control of Major Accident Hazards (COMAH) regulations or Notifications of Installations Handling Hazardous Substances (NIHHS) have been identified within a 1km radius of the site.

Table 4.2 summarises the gas risk for the site, based on the above information gained through the desk-based research. In accordance with current guidance (CIRIA C665), the gas generation potential for each source has been individually assessed, with references to potential gassing risk made according to the following definitions: Negligible, Very Low, Low, Moderate, High and Very High. The definitions are explained in Section 10.0 of the guidance.

The objective of this exercise is to determine if potentially unacceptable bio-ground gas risks exist, and whether further investigation and assessment is necessary.

Table 4.2: PRA – Bio-Ground Gas			
Potential Source	**Risk**	**Risk Rating**	**Rationale**
Made Ground (CO_2 + CH_4)	Human health Explosion	Low	Made Ground is present across the site to depths of between 0.7m and in excess of 1.85m.
Alluvial Strata (CO_2 + CH_4)	Human health Explosion	Very Low	Alluvial stratum has not been identified at the site, therefore limited potential for degradable organic soils identified from this potential risk.
Landfills (CO_2 + CH_4)	Human health Explosion	Very Low	No landfills within 250m of the site.
Infilled Ground + Burial Sites (CO_2 + CH_4)	Human health Explosion	Low	No infilled within 250m of the site, closet record being 300m east.
Coal and Mining (CO_2 + CH_4)	Human health Explosion	Negligible	The Coal Authority interactive map viewer confirmed that the site is not in an area of underground coal mining.
Soil Vapours	Human health Explosion	Very Low	No hazardous ground gas monitoring data. Soil vapour risks associated with potential organic waste. Previous investigation did not identify a significant risk.
Radon	Human Health	Very Low	The site is noted to be in an area where the maximum radon potential is less than 1% and is therefore below the Action level.
COMBINED RISK RATING = LOW			

A low combined risk from ground gas ingress and explosion is considered. Gas monitoring is recommended to quantify the ground gas risk assessment.

2.4 RADON GAS

The previous desk study report notes that radon protection measures are not required for the proposed residential development.

The radon atlas published by the UK Health Security Agency (HSA) has published was reviewed online. The UKHSA recommends that radon levels should be reduced in homes where the annual average is at or above 200 becquerels per cubic metre (200 Bq m^{-3}) Action level. Affected Areas are defined as those with 1% chance

or more of a house having a radon concentration at or above the Action Level.

The site is noted to be in an area where the maximum radon potential is less than 1 % and is therefore below the Action level.

2.5 POLLUTION INCIDENTS AND DISCHARGE CONSENTS

There have been seven recorded pollution incidents within 500m of the site. The closest was located 270m to the south-west in 2003, with the pollution not identified. The incident was further described as having no impact on land or air with minor impact on water.

Nine licenced discharges to controlled waters are recorded within 500m of the site. The closest was 307m west of the site relating to "trade discharges – cooling water".

Eight licensed pollutant releases were recorded within 500m of the site. The closest release was at Falling Lane service station for petrol vapour recovery, located 44m north-west of the site.

2.6 ENVIRONMENTAL PROTECTIONS

The site is not located within a Nitrate Vulnerable Zone. The site is located within a Site of Special Scientific Interest (SSSI) impact risk zone meaning a wide range of developments require consultation.

3.0 REVIEW OF PREVIOUS INVESTIGATIONS

The following sections provide a review of the investigation within the following report.

1. Phase II Generic Risk Assessment. Report ref. CGK00151. Dated December 2021. Prepared by Card Geotechnics Limited (CGL).

3.1 SUMMARY OF INVESTIGATIONS

The ground investigation was undertaken by CGL in November 2021 at five locations across the site. The locations of all the previous exploratory positions are shown in **Figure 6.**

The investigation comprised the following scope:

- Five hand auger boreholes to depths from 1.6m to 2.0m below ground level (bgl).
- Recording the description of the soils encountered in borehole logs.
- Twelve samples of materials with various chemical analysis, and six samples were analysed for Waste Acceptance Criteria (WAC) to determine the likely waste category for disposal purposes.
- Review of soil results and comparison with Suitable for Use Levels (S4ULs) for residential with plant uptake end uses.

3.2 PREVIOUSLY REPORTED GROUND CONDITIONS

Table 3.2 provides a summary of the ground conditions at the site, or immediately adjacent the site, as noted in the Phase II Generic Risk Assessment (December 2021) by CGL.

Table 3.2: Summary of Ground Conditions - Previous Site Investigation

Unit	Description	From (m bgl)	To (m bgl)
Made Ground	Varying depths of topsoil (dark brown, slightly sandy, gravelly clay), asphalt, concrete, potential engineered fill. Boreholes HA04 and HA05 are terminated in the Made Ground strata.	0.0	0.7 – 1.85+
Langley Silt Member	Orange, brown fine sandy, silty CLAY becoming slightly gravelly from 1.8m. Boreholes HA01, HA02 and HA03 were terminated in the Langley Silt Member	0.7 – 1.4	1.8 – 2.0+

Table 3.2: Summary of Ground Conditions - Previous Site Investigation			
Unit	**Description**	**From (m bgl)**	**To (m bgl)**
The Lynch Hill Gravel member	The Lynch Hill Gravel member is expected to be present underlying the Langley Silt Member; however, this was not proven in the shallow boreholes.	2m+	-
Groundwater	Groundwater was not encountered in any of the exploratory boreholes.		
Notes	Visual and olfactory evidence of potential significant contamination was not recorded during the investigation.		

The ground conditions encountered on the site comprised a variable thickness of asphalt, concrete, possible Engineered Fill and Made Ground overlying the Langley Silt Member. Groundwater was not encountered in any of the five boreholes.

Environment Agency data show that the superficial geology has a groundwater vulnerability ranging from high (Lynch Hill Gravel) to unproductive (Langley Silt) across the site whilst the bedrock geology (London Clay) has a groundwater vulnerability designated as unproductive.

3.3 PREVIOUSLY REPORTED SOIL CONTAMINATION

A summary of the analytical results of the twelve soil samples retrieved from the exploratory holes during the investigation that were submitted for chemical testing is shown in table 3.3.

Table 3.3: Summary of Soil Analytical Results - Site Investigation				
Contaminant of Concern	**Measured Concentration***		**SGV/GAC/SSV***	**Number of results above SGV/GAC/SSV**
	Min	**Max**		
Arsenic	6	26	37	0 (12)
Boron (water sol)	<0.1	<0.1	290	0 (12)
Cadmium	<0.1	9.9	11	0 (12)
Chromium	5	101	910	0 (12)
Copper	12	195	2400	0 (12)
Cyanide (free)	<1	<1	3.4	0 (12)
Lead	8	265	200	3 (12)
Mercury	<0.1	<0.1	40	0 (12)

Table 3.3: Summary of Soil Analytical Results - Site Investigation				
Contaminant of Concern	**Measured Concentration***		**SGV/GAC/SSV***	**Number of results above SGV/GAC/SSV**
	Min	**Max**		
Nickel	<0.1	41	130	0 (12)
Phenol	<1.0	<1.0	280	0 (12)
Selenium	<1.0	<1.0	250	0 (12)
Zinc	26	416	3700	0 (12)
Acenaphthene	<0.05	2.6	210	0 (12)
Acenaphthylene	<0.05	0.16	170	0 (12)
Anthracene	<0.05	10.6	2400	0 (12)
Benzo(a)anthracene	<0.05	21.1	7.2	1 (12)
Benzo(a)pyrene	<0.05	16.4	2.2	3 (12)
Benzo(b)fluoranthene	<0.05	22.4	2.6	2 (12)
Benzo(ghi)perylene	<0.05	6.01	320	0 (12)
Benzo(k)fluoranthene	<0.05	7.65	77	0 (12)
Chrysene	<0.05	21.1	15	1 (12)
Dibenz(ah)anthracene	<0.05	1.59	0.24	2 (12)
Fluoranthene	<0.05	57.2	280	0 (12)
Fluorene	<0.05	1.83	170	0 (12)
Indeno(123-cd) pyrene	<0.05	7.51	27	0 (12)
Naphthalene	<0.05	0.12	2.3	0 (12)
Phenanthrene	<0.05	40.9	95	0 (12)
Pyrene	<0.05	46.6	620	0 (12)
TPH Aliphatic Fraction				
C5-C6	<42 (LOD)	<42 (LOD)	42	0 (12)
>C6-C8			100	0 (12)
>C8-C10			27	0 (12)
>C10-C12			130	0 (12)

Table 3.3: Summary of Soil Analytical Results - Site Investigation				
Contaminant of Concern	**Measured Concentration***		**SGV/GAC/SSV***	**Number of results above SGV/GAC/SSV**
	Min	**Max**		
>C12-C16			1100	0 (12)
>C16-C35			65000	0 (12)
TPH Aromatic Fraction				
C5-C7	<42 (LOD)	<42 (LOD)	70	0 (12)
>C7-C8			130	0 (12)
>C8-C10			34	0 (12)
>C10-C12			74	0 (12)
>C12-C16	<42 (LOD)	22	140	0 (12)
>C16-C21	<42 (LOD)	237	260	0 (12)
>C21-C35	<10.0	242	1100	0 (12)

*Concentrations expressed in mg/kg except where stated.

SGV/GAC/SSV* Soil Guideline Values (SGV) Generic Assessment Criteria (GAC) using Suitable 4 Use Levels (S4UL) developed by LQM/CIEH (2015) and C4SL (in the absence of other assessment criteria) and Soil Screening Values (SSV) developed by Atkins ATRISKsoil (in the absence of other assessment criteria).

Of the twelve samples submitted for analysis, three samples recorded concentrations of heavy metals elevated above the relevant assessment criteria. Concentrations of lead were recorded within the sample from HA01 (0.30m), HA03 (0.2m), and HA03 (3.1m) contained lead above the assessment criteria. The material in these samples comprised Made Ground.

Samples of Made Ground were tested for the presence of organic parameters (e.g. PAH, TPH). Benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(ah)anthracene were detected above guidance values in one of more of the following samples. HA01 (0.3m), HA02 (0.4m), HA03 (0.2m, 0.5m), HA03 (1.0m) and HA04 (0.2m and 0.5m).

The locations of the suspected and identified contamination in the investigation are also shown in **Figure 6.**

3.6 PREVIOUSLY REPORTED GROUNDWATER CONTAMINATION

Groundwater contamination was assessed based on the leachate analysis on selected soil samples that were subject to Waste Acceptance Criteria (WAC).

The samples from HA01 (0.3m, 0.5m and 1.5m), HA04 (0.2m, 0.5), HA05 (0.5m) were submitted for WAC testing.

The results were compared with appropriate target concentrations and are reproduced in Table 3.6.

Table 3.6: Risk Assessment of Soil Leachate Analytical Results - WAC

Contaminant of Concern	Measured Concentration*		Water Quality Standard or other standard*	Number of results above the Water Quality Standard
	Min	Max		
Arsenic	<10	<10	50	0
Barium	<20	<20	2000	0
Cadmium	<5	<5	5	0
Chromium	<5	<5	50	0
Copper	<5	<5	40	0
Lead	<5	<5	300	0
Mercury	<0.5	<0.5	1	0
Molybdenum	10	10	70	0
Nickel	<7	<7	50	0
Selenium	<5	<5	10	0
Zinc	40	80	250	0
pH	4.2	8.2	6-9	5
Phenol	<5	<0.01	0.5	0
Total PAH	3600	9700	0.10 (sum of 4 PAH)	0
Sum of PCBs	<100	100	0.0005	0

* concentration expressed in µg/L
Water Quality Standard* using Environmental Quality Standard (EQS) or
UK Drinking Water Standards (UKDWS) as set out in the Water Supply (Water Quality) Regulations 1989 and 2000 are applicable. pH guidance values calculated using EA guidance documents - Land Contamination: Risk Management pH range of 6–9 is typically seen as "normal" or "background" in such contexts - used to assess whether groundwater chemistry has been altered by contamination.

With the exception of pH, none of the parameters exceeded UKDWS and EQS water standard thresholds. Five of the six pH values are below the assessment guidance and indicative of an acidic environment.

3.7 SUMMARY OF PREVIOUS INVESTIGATION

Chemical analysis of soil samples collected from the site indicates that the underlying soils pose a potential risk to human health under a residential with plant uptake land use scenario, due to elevated concentrations of lead and PAH identified across the site. No asbestos was detected in any of the samples.

The risk to buildings and buried services is considered to be moderate, based on the presence of lead, arsenic, and PAHs in multiple samples. It is recommended that a pipe selection risk assessment be undertaken in accordance with UKWIR guidance.

Further ground investigation is advised to evaluate risks to structures and to determine whether ground gas monitoring is necessary, particularly as boreholes HA04 and HA05—both located in an area of anticipated worked ground—were terminated within Made Ground.

3.8 CONSIDERATIONS FOR THE SUPPLEMENTARY SITE INVESTIGATION

Further site investigation should comprise the following:

1. **Investigation of soil contamination.** This should be completed on both a spatial and targeted basis. Spatial coverage should be achieved in order to target areas of the site where potential sources of contamination may exist (fill material) and ideally where these sources overlay a pathway for risk to exist (i.e. within proposed garden areas).

2. **Investigation of hazardous bio-ground gases and soil vapours.** Monitoring wells should be installed to enabling bio-ground gas and vapour monitoring.

The listed suite of analysis is considered suitable and will provide a screening for the majority of commonly found soil contaminants, which shall be followed through into the site investigation.

- Aviron's "**ES-1**" of laboratory analysis shall be applied to future site investigations which includes: arsenic, barium, cadmium, total chromium, copper, nickel, zinc, lead, mercury, selenium, water soluble boron, total cyanide, total sulphate, water soluble sulphide, speciated Polycyclic Aromatic Hydrocarbons (PAH), speciated Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and Methyl Tert-Butyl Ether (MTBE), organic matter, total phenols, pH and asbestos. **Provides broad analysis of common soil contaminants.**

- Polychlorinated biphenyls (**PCBs**) to assess potential contamination associated with the on-site electrical substation, a known historical source of PCB use.

The listed suite of analysis is considered suitable and will provide a screening for the majority of commonly found soil contaminants, which shall be followed through into the site investigation.

In addition to the above analysis to characterise the nature of contamination there is also the need to characterise soils intended for off-site disposal. Separate samples of soil will be submitted for WAC analysis. Further details of the soil analysis undertaken in the investigation is provided in section 5.1.

4.0 SUPPLEMENTARY SITE INVESTIGATION WORK

4.1 METHOD STATEMENT AND SITE INVESTIGATION APPROACH

A method statement detailing how the site investigation was to be conducted was produced in accordance with current statutory guidance, best practices and the Client's instructions. A health and safety plan was completed before site work commenced. Site investigation staff were briefed on the potential contaminants likely to be encountered, and the appropriate personal protective equipment (PPE) to be adopted for this type of investigation.

The site investigation was conducted in accordance with British Standards; BS5930:2015+A1 'Code of Practice for Ground Investigation', BS1377-1:2016 'Methods of test for soils for Civil Engineering Purposes', BS EN ISO 17892 Parts 1-12, 'Geotechnical investigation and testing. Laboratory testing of soil', and BS10175:2011+A2:2017 'Investigation of Potentially Contaminated sites'.

4.2 SITE INVESTIGATION METHODS

Table 4.2 presents the rationale behind the investigation, completed on 19 to 21 May 2025, and summarises the wells that were installed. The window sample boreholes complement the previous Phase II Generic Risk Assessment by CGL and the cable and percussion boreholes were drilled to enable piled foundations design.

Table 4.2: Rationale of Site Investigation Positions

Locations	Rationale	Monitoring Well
Cable and Percussion Boreholes (BH)		
BH1	Spatially positioned in the south-west of the site to enable sampling and in-situ testing at increased depth to enable piled foundation design.	Not installed.
BH2	Spatially positioned in the centre-east of the site to enable sampling and in-situ testing at increased depth to enable piled foundation design.	Not installed.
Window Sample (WS) Boreholes		
WS1	Spatially positioned in the north-west of the site to enable shallow sampling and laboratory testing for soil screening.	Gas monitoring well installed.
WS2	Spatially positioned in the south-west corner of the site to enable shallow sampling and laboratory testing for soil screening.	Gas monitoring well installed.
WS3	Spatially positioned in the northern centre part of the site to enable shallow sampling and laboratory testing for soil screening.	Not installed.
WS4	Spatially positioned in the centre-east of the site targeting an area previously occupied by a clubhouse, to enable shallow sampling and laboratory testing for soil screening.	Not installed.

WS5	Targeted in the north-east corner of the site targeting the small building potentially used for pesticides storage, to enable shallow sampling and laboratory testing for soil screening.	Gas monitoring well installed.

The Exploratory Hole Location Plans are enclosed as **Figures 7** and **8**.

All intrusive locations were pre-cleared prior to the ground investigation works using a Ground Penetrating Radar, (GPR) and a Cable Avoidance Tool (CAT) and tracing of manhole covers, which was completed to endeavour service avoidance during this exercise.

4.2.1 Cable and Percussion Drilling

Cable and percussion boreholes BH1 and BH2 were drilled using a Dando 150 drilling rig to depths of 30.5m bgl.

The purpose of the cable and percussion boreholes was to evaluate ground conditions to depths suitable to enable piled foundation design, collect soil samples for geochemical and geotechnical laboratory analysis and to determine soil strength by means of Standard Penetration Testing (SPTs).

Standard Penetration Tests were undertaken at 1m and 2m intervals to depths of up to 30m bgl within the boreholes in accordance with BS EN SO 22476-3 “Standard Penetration Test 2005”.

Disturbed and undisturbed soil samples were also collected from bored arisings for geochemical and geotechnical laboratory tests.

4.2.2 Window Sample Drilling

Window sample boreholes WS1 to WS5 were drilled to depths of 2m bgl using an Archway Dart drilling rig. The purpose of the window sampling was to evaluate ground conditions at shallow depths, collect soil samples for geochemical laboratory analysis and screening using human health risk assessment tools.

Standard penetration tests (SPTs) were also undertaken in accordance with BS EN SO 22476-3 “Standard Penetration Test 2005”. Drilling refusal (SPT N>50) occurred routinely at 2.0m bgl where the boreholes were terminated to prevent damage to the rig and tool and to void ‘jamming’ of the tooling during removal.

The action of window sample drilling also enables the installation of monitoring wells to determine standing groundwater levels and ground gas testing.

4.2.3 Dynamic Cone Penetrometer (DCP/TRL)

Six Dynamic Cone Penetrometer (DCP) tests (DCP1-DCP6) were undertaken to determine design parameters (California Bearing Ratio, or CBR) for road pavement construction in accordance with the Transport Research Laboratory (TRL), commencing at ground level, to a depth of 0.9 m bgl.

The tests were undertaken at the locations included in **Figures 7** and **8**.

4.3 GROUND CONDITIONS

The exploratory hole logs and photographs are presented within **Appendix I**. Detailed strata descriptions are shown on the respective exploratory hole logs. A summary of the ground conditions generally encountered is presented within table 4.3.

Table 4.3: Summary of Ground Conditions - Aviron Site Investigation

Unit	Description	From (m bgl)	To (m bgl)
Made Ground (MG)	Dark brown, silty sandy gravelly clay with asphalt and locally concrete at surface.	0.0	0.7-1.9
Langley Silt Member (LASI)	Soft, firm and stiff light brown and brown silty sandy locally gravelly CLAY.	0.7 – 1.4	1.5 – 2.3
Lynch Hill Gravel Member (LHGR)	Predominantly medium dense and dense slightly silty sandy GRAVEL. Overlying horizon of stiff sandy very gravelly CLAY locally in BH1 to 3.2m.	1.5 – 2.3	5.6 – 5.7
London Clay Formation (LC)	Stiff becoming very stiff and fissured CLAY and silty CLAY	5.6 – 5.7	30.5
Groundwater	Groundwater was not encountered in any of the exploratory boreholes.		
Field Observations	No significant visual and olfactory evidence of potential contamination noted during the site investigation. Interface between natural and possible Made Ground material not discernible. Widespread potential for reworking of discarded excavated arisings and subsequent replacement. Root/rootlets noted locally to depths of between 1.0m and 1.6m.		

4.4 GROUNDWATER AND GAS MONITORING WELLS

Selected boreholes were converted to monitoring wells to enable the standing groundwater level (if present) to be checked and enable ground gas monitoring. The wells were installed into diameter window samples using 63mm external diameter and 50mm internal diameter HDPE standpipe. Table 4.4 describes the construction of the wells.

Table 4.4: Monitoring Well Construction			
Location	**Depth of plain pipe and bentonite seal (m)**	**Response zone; depth of slotted pipe with gravel screen (m)**	**Depth of install (m)**
WS1	GL-1.0	1.0-1.9	1.9
WS2	GL-1.0	1.0-1.9	1.9
WS5	GL-1.0	1.0-2.0	2.0

Three monitoring wells were installed to provide robust spatial coverage.

4.5 GROUNDWATER AND GAS POST-INVESTIGATION MONITORING

In all instances, and prior to completing groundwater monitoring and field measurements, bulk ground gases and soil vapours were monitored using a GFM 435 Gas Analyser and miniRAE Photon-Ionisation Detector (PID) on the dates shown in table 4.5, which also provides standing level groundwater 'dips' during post-investigation monitoring.

Table 4.5: Groundwater Monitoring Depths			
Location / Date	**Depth – bgl WS1**	**Depth – bgl WS2**	**Depth – bgl WS5**
9 June 2025	Dry to 1.95m	1.83m	Dry to 1.32m
17 June 2025	Dry to 1.95m	Dry to 1.94m	Dry to 1.32m

Further to comments made regarding the groundwater within table 3.3, the water encountered during the return monitoring is expected to be locally perched within the overlying fine soils.

Field monitoring sheets are enclosed in **Appendix II**.

Ground gas monitoring is discussed in section 9.0 of this report.

5.0 LABORATORY ANALYSIS

5.1 SOIL GEOCHEMICAL TESTING

The analytical suites were chosen to provide a suitable screening in accordance with the potential contaminants identified within the site conceptualisation. Table 5.1 summarises the samples that were taken for analysis and which strata they relate to.

Table 5.1: Soil Geochemical Testing

Objective and Strata Sampled	Samples	Analysis	No. Tests
Non-targeted/spatial coverage basis to provide baseline chemical concentrations of the material			
To obtain samples of **Shallow Made Ground** (<1m deep) across the site. At a shallow depth this material will present the greatest risk to human health via the dermal contact, ingestion and inhalation pathways and thus is the most intensely assessed stratum.	WS1 (0.5m), WS3 (0.3m), WS4 (0.2m), WS4 (0.8m)	ES-1	4
To obtain samples of **Shallow Made Ground** (<1m deep) adjacent the ESS in the south-west of the site.	WS2 (0.2m), BH1 (0.6m)	PCB	2
To obtain samples of **Deeper Ground** (>1m deep) across the site.	WS1 (1.2m), WS5 (1.3m)	ES-1	2
Sampling for off-site soil disposal purposes			
To obtain a composite sample of **Shallow Made Ground** (<1m deep) to classify for off-site soil disposal purposes	COMP1 (0.3-0.5m)	WAC	1

The analytical suites were chosen to provide a suitable screening in accordance with the potential contaminants identified within the site conceptualisation presented within section 3.6. It is considered the frequency of exploratory holes and laboratory testing provides a robust assessment of ground conditions when complimented with the previous assessments.

Soil samples for environmental quality analysis were sent to i2 Analytical Limited.

5.2 SOIL SAMPLING PROTOCOL

All soil samples were collected from bored arisings using a trowel and following Aviron's standard protocols for soil sampling. To avoid cross contamination, the sampling equipment was cleaned using de-ionised water after each sample was retrieved. Clean latex gloves were used each time a soil sample was collected, and all samples were placed into clean sterilised jars for submission to the UKAS/MCERTS accredited laboratory.

All sample containers were labelled on-site immediately prior to filling. These samples were identified by a label placed on the body of each container and the following information was recorded; site name, date collected, unique sample number, soil sample depth.

Samples for geochemical analysis were then placed into a cool box containing ice packs to maintain refrigerated conditions following collection and transport to the laboratory. Ice packs were changed every twenty-four hours where necessary to maintain cool conditions and suppression of volatiles.

A clean bailer was used to obtain a groundwater sample from each well to avoid cross contamination between wells; and using clean latex gloves the sample was transferred into pre-labelled bottles and vials.

5.3 SOIL GEOTECHNICAL TESTING

A programme of geotechnical laboratory testing was undertaken at Geo Site and Testing Laboratories (GSTL) and i2 Analytical Limited (i2). Testing was completed on the fine (clay) and coarse (gravel) soils encountered beneath the site. The test procedures used were generally in accordance with the methods described in BS1377-1:2016 and/or BS EN ISO 17892. Details of testing used are provided in table 5.3.

Table 5.3: Soil Geotechnical Testing

Test	Standard	Number of Samples
GSTL Atterberg Limits (and Moisture Content) *To determine the material properties and volume change potential of fine soils.*	BS EN ISO 17892 Part 1: 2014+A1:2022 Water content Part 12: 2018 +A2:2022 Liquid & plastic limit	14 (14)
GSTL Particle Size Distribution (PSD) *To determine grading of coarse (sand and gravel) soils*	BS EN ISO 17892 Part 4: 2016	3
GSTL Undrained Triaxial (TXL) Compression *To determine the undrained shear strength of fine soils.*	BS EN ISO 17892-8:2018	6
i2 Aviron LC Suite - pH, water soluble sulphate, total sulphate & total sulphur *Completed to enable classification of buried concrete*	UKAS accredited	15 (incl. 7no. within the ES-1 suite of analysis)

6.0 ENVIRONMENTAL INTERPRETATIVE GUIDANCE

6.1 GENERIC QUANTITATIVE RISK ASSESSMENT

The purpose of a tier 2 GQRA is to determine the suitability of the site for proposed development and end use.

The site investigation shall collect soil samples whereby determinand chemistry measured in the soil through laboratory analysis have been compared with guidance values which are appropriate to the receptor under consideration. The guidance values or screening criteria applied shall be industry adopted generic values which, following a screening of the laboratory analysis, shall determine whether or not a site is contaminated, as defined under Part IIA of the EPA 1990 and specification in regard of the proposed development and identified receptors.

Where exceedances of guidance values or recorded a GQRA can be used to appraise risk and make recommendations in regard of further investigation, remediation and/or tier 3 Detailed Quantitative Risk Assessment (DQRA).

6.2 GUIDANCE USED FOR ASSESSING SOIL CONTAMINATION

Aviron has followed the technical approach on Land Contamination Risk Management (LCRM), accessed on gov.uk website and other available guidance to assess contaminant concentrations.

Details of the methodology and Aviron's position on the adoption of guidance values is outlined below.

The available chemical data, from soil samples tested, is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial GQRA is completed using the relevant and industry available screening criteria and where appropriate, statistical modelling. Risks to human health shall be initially assessed by comparing soil chemical data against various published screening criteria. These have been sourced from the following and in order of preference:

- Category 4 Screening Levels (C4SLs) prepared by the Department of Environmental Food and Rural Affairs (DEFRA) and published March 2014.
- Phase 2 C4SLs prepared by CL:AIRE and published May 2021.
- Suitable 4 Use Levels (S4ULs) prepared by Land Quality Management/Chartered Institute of Environmental Health (LQM/CEIH) and published December 2014. LQM acknowledgement for use of S4ULs. *"Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3275. All rights reserved".*

- Soil Guidance Values (SGVs) prepared by the Environment Agency (EA)/DEFRA and published 2009.
- Soil Generic Assessment Criteria (GAC) prepared by Environment Industries Commission (EIC)/Association of Geotechnical and Geoenvironmental Specialists (AGS)/Contaminated Land: Application In Real Environments (CL:AIRE) and published 2010.

Aviron has adopted the above hierarchy in response to LCRM recommendations.

6.3 GUIDANCE USED FOR THE ASSESSMENT OF HAZARDOUS GROUND GAS

The principal influence for causing the migration of landgas in the ground is changes to barometric pressure. The most onerous landgas emission conditions on a site are usually observed following days of low or rapidly falling barometric pressure below 1000 millibars (mb).

Monitoring is usually performed over a period of several weeks or months in order to increase the chances of visiting the site on days when the conditions for monitoring worst-case results are correct. Gas monitoring results collected solely during high pressure conditions (>1000mb) may not provide a true value for worst case emission rates from the site.

Methane is produced by a number of processes, which can be biological or chemical in nature. The principal process is from the biogenic decay of organic material and is commonly found associated with landfill and organic marsh deposits or river silts. Methane can also be found associated with coal workings. It is explosive at concentrations of between 5 and 15%, with 5% being termed the lower explosive limit (LEL).

In assessing the risks from hazardous ground gas, reference has been made to the guidance from BS 8485:2015 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' and CIRIA Report C665 'Assessing risks posed by hazardous ground gases to buildings' 2007 which adopts a risk characterisation strategy based on the maximum flow (L/hour) and maximum steady stated concentration (% v/v) of methane and carbon dioxide from a site to derive gas screening values (GSV) in litres/hour which are comparable with the Modified Wilson and Card classification (shown in Table 8.5 of C665) for any site which isn't intended to be developed as low-rise housing with vented underfloor void.

7.0 ASSESSMENT OF GEOCHEMICAL SOIL RESULTS

Development proposals comprise the construction of a residential dwellings with private gardens. The most appropriate guidance for evaluating the laboratory results was considered to be 'the residential (with plant uptake)' end use values from the guidance listed in section 6.2. To allow for conservative assessment, the Soil Organic Matter (SOM) value for appraisal of PAH and TPH, is assumed to be 1%.

Laboratory certificates of chemical analysis are presented in **Appendix III** along with the chemical assessment criteria.

7.1 ASSESSMENT OF SOIL GEOCHEMICAL RESULTS

Table 7.1 provides a summary of the results for each determinand analysed when compared to the relevant assessment criteria.

Table 7.1: Summary of Soil Geochemical Results

Determinand	Generic Assessment Criteria (mg/kg)	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Number of Exceedances?
pH	6-9	7.8	9.0	0(6) All values in acceptable range
Arsenic	37	11	29	0(6) All concentrations acceptable
Boron (water sol)	290	1.0	1.7	0(6) All concentrations acceptable
Cadmium	11	<0.2	0.8	0(6) All concentrations acceptable
Chromium (III)	910	24	37	0(6) All concentrations acceptable
Copper	2,400	23	90	0(6) All concentrations acceptable
Cyanide (total)	3.4	<1.0	<1.0	0(6) All concentrations acceptable
Mercury (Inorganic)	40	<0.3	0.4	0(6) All concentrations acceptable
Nickel	130	30	37	0(6) All concentrations acceptable
Lead	200	13	320	1(6) WS5 at 1.3m 320mg/kg
Selenium	250	<1	1.6	0(6) All concentrations acceptable
Zinc	3,700	55	120	0(6) All concentrations acceptable
Acenaphthene	210	<0.05	<0.4	0(6) All concentrations acceptable
Acenaphthylene	170	<0.05	0.29	0(6) All concentrations acceptable

Table 7.1: Summary of Soil Geochemical Results				
Determinand	**Generic Assessment Criteria (mg/kg)**	**Min. Conc. (mg/kg)**	**Max. Conc. (mg/kg)**	**Number of Exceedances?**
Anthracene	2,400	<0.05	1.1	0(6) All concentrations acceptable
Benzo(a)anthracene	7.2	<0.05	3.8	0(6) All concentrations acceptable
Benzo(a)pyrene	2.2	<0.05	5.3	1(6) WS1 at 0.5m 5.3mg/kg
Benzo(b)fluoranthene	2.6	<0.05	5.7	1(6) WS1 at 0.5m 5.3mg/kg
Benzo(ghi)perylene	320	<0.05	3.4	0(6) All concentrations acceptable
Benzo(k)fluoranthene	77	<0.05	2.7	0(6) All concentrations acceptable
Chrysene	15	<0.05	4.1	0(6) All concentrations acceptable
Dibenz(ah)anthracene	0.24	<0.05	0.68	1(6) WS1 at 0.5m 0.68mg/kg
Fluoranthene	280	<0.05	8.1	0(6) All concentrations acceptable
Fluorene	170	<0.05	0.41	0(6) All concentrations acceptable
Indeno(123-cd)pyrene	27	<0.05	2.9	0(6) All concentrations acceptable
Naphthalene	2.3	<0.05	0.2	0(6) All concentrations acceptable
Phenanthrene	95	<0.05	3.5	0(6) All concentrations acceptable
Pyrene	620	<0.05	7.1	0(6) All concentrations acceptable
Phenols	280	<1.0	<1.0	0(6) All concentrations acceptable
Benzene	0.87	<0.005	<0.005	0(6) All concentrations acceptable
Toluene	290	<0.005	<0.005	0(6) All concentrations acceptable
Ethylbenzene	110	<0.005	<0.005	0(6) All concentrations acceptable
Xylenes	240	<0.005	<0.005	0(6) All concentrations acceptable
Aliphatic C>5-6	42	<0.010	<0.010	0(6) All concentrations acceptable
Aliphatic C>6-8	100	<0.010	0.024	0(6) All concentrations acceptable
Aliphatic C>8-10	27	<0.010	0.015	0(6) All concentrations acceptable
Aliphatic C>10-12	130	<1.0	<1.0	0(6) All concentrations acceptable
Aliphatic C>12-16	1100	<2.0	2.2	0(6) All concentrations acceptable
Aliphatic C>16-21	65000	<8.0	<8.0	0(6) All concentrations acceptable

Table 7.1: Summary of Soil Geochemical Results				
Determinand	**Generic Assessment Criteria (mg/kg)**	**Min. Conc. (mg/kg)**	**Max. Conc. (mg/kg)**	**Number of Exceedances?**
Aliphatic C>21-35	65000	<8.0	56	0(6) All concentrations acceptable
Aromatic C 5-7 (benzene)	70	<0.010	<0.010	0(6) All concentrations acceptable
Aromatic C>7-8 (toluene)	130	<0.010	<0.010	0(6) All concentrations acceptable
Aromatic C>8-10	34	<0.020	<0.020	0(6) All concentrations acceptable
Aromatic C>10-12	74	<1.0	1.4	0(6) All concentrations acceptable
Aromatic C>12-16	140	<2.0	4.9	0(6) All concentrations acceptable
Aromatic C>16-21	260	<10	33	0(6) All concentrations acceptable
Aromatic C>21-35	1100	<10	150	0(6) All concentrations acceptable
Asbestos	ND	ND	<0.001%	0(6) Not detected - acceptable
PCBs	1.2	<LOD	0.09	Five out of seven PCB congeners recorded above Laboratory Method Limit of Detection (LOD) in sample from WS2 (0.2m) but none were above guidance.

Notes:

Chromium is assumed to be chromium III (not chromium IV).

Cyanide GAC is 'free' cyanide

ND – Not Detected.

UK Drinking Water Standards (UKDWS) as set out in the Water Supply (Water Quality) Regulations 1989 and 2000 are applicable. pH guidance values calculated using EA guidance documents - Land Contamination: Risk Management pH range of 6–9 is typically seen as "normal" or "background" in such contexts - used to assess whether groundwater chemistry has been altered by contamination.

7.2 DISCUSSION OF SOIL GEOCHEMICAL RESULTS

A plan showing the location of the contamination identified is enclosed as **Figure 9**. The plan has been prepared by interpretation of the soil chemical results from the two investigations undertaken.

Of the six samples analysed during the recent Aviron investigation two samples collected from WS1 and WS5 recorded soil contamination, in the form of lead and PAH within the overlying Made Ground. The results of the Aviron investigation concur with the results of the CGL investigation and it can be concluded the overlying unit of Made Ground contains elevated concentrations of PAH and Lead which are likely to present an

exposure risk to new site occupants.

It shall be necessary to construct a clean cover system to gardens and areas of soft landscaping across the site.

The clean cover system to private gardens should be 600mm thick comprising 'clean' imported sub-soil/Topsoil to a thickness of 600mm having been placed on a membrane. The cover system for communal gardens/frontages should be of similar design though 300mm thick. Such a cover system shall break the pollutant linkage pathway to the recorded lead and PAH.

7.3 WASTE MANAGEMENT

WAC test results are enclosed within **Appendix III** and indicate soils tested by Aviron are of an inert waste classification. However, the presence Made Ground nature of the soil may increase the waste soil classification along with examination of the results provided by CGL.

Formal waste classification should be completed by the appointed waste management contractor with the benefit of both WAC and soil chemical test results.

It is possible (likely) that unexpected contamination maybe encountered during the redevelopment.

8.0 HAZARDOUS GROUND GAS MONITORING

8.1 STRATEGY

As previously presented within table 4.4, monitoring well installations were constructed in order to provide ground gas monitoring following the recommendations of the preliminary ground gas assessment.

The installation of the monitoring wells monitoring wells across the site, which were designed to have suitable response zones to enable the capture of ground gases, is considered robust in the capture of ground gas data.

8.2 MONITORING

The presence of soil vapours was determined prior to bulk ground gas monitoring using a MiniRAE Photon Ionisation Detector (PID) from RAEs Systems. The presence of hazardous bio-gases including methane (CH4), carbon dioxide (CO_2) and oxygen (O_2) was determined using a GFM Infra-Red Gas Analyser from Ribble Enviro Limited. The flow rate and atmospheric pressure, in millibars (mb), was also measured during the monitoring process. Depth to groundwater was measured using an electronic dip meter.

Monitoring work was completed on the dates specified within table 8.2 which also summarises weather conditions and atmosphere pressure. To determine rising or falling pressures local 'online' weather trends from the Met Office and/or the monitoring apparatus were consulted.

Table 8.2: Background Gas Monitoring Data

Date	Atmospheric Pressure	Rising/Falling Pressure?	Worst Case Conditions?	Groundwater above response zone?
9 June 2025	1016mB	Falling	No	No
17 June 2025	1016mB	Falling	No	No

Note 2 of C665 indicates 'worst case' conditions occur during falling and sub-1000mB atmospheric pressures. Section 5.5.1 of C665 indicates 'worst case' conditions are likely to occur during weather conditions such as rainfall, frost or dry weather.

8.3 MONITORING

Table 8.3 summaries the results obtained which are enclosed in **Appendix II**.

Table 8.3: Summary of Monitoring Results

Gas	Measured Conc. Range (% v/v)		Comments
	Low	High	
CH_4	0.0 (<0.1)	0.0 (<0.1)	Methane was not detected (<0.1%) and thus is below the guidance value of 1% at which point the characteristic situation is advised to increase to CS2.
CO_2	0.5	6.5	Carbon dioxide has been detected at concentrations above the guidance value of 5% (in WS1) at which point the characteristic situation is advised to increase to CS2.
O_2	4.2	19.8	Depleted oxygen concentrations, below 16%, were recorded within (WS1) which correspond with the higher carbon dioxide concentrations listed above.
Vapour*	0.0 (<0.1)	0.8	Very low (PID) concentrations have been recorded. This concurs with the ground conditions and geochemical laboratory results suggesting the absence of soil vapour risk to new units.
Note: *vapour concentration in parts per million (ppm)			

It is considered the integrity of the monitoring wells has not been compromised as there is no evidence of surface damage which may affect the underlying installations. There is a bentonite seal within the bored annulus preventing escape of ground gases and entry of atmospheric gases. The gas valve remained closed prior to all monitoring occasions so passive venting of ground gas is unlikely to have occurred as site visits were unannounced.

8.4 INTERPRETATION OF AVIRON DATA

Under normal use of the site (i.e. above ground), the risk presented by methane and carbon dioxide is dependent on both the concentrations and the rate of flow. In accordance with Wilson and Card methodology specified in the CIRIA C655 document, Gas Screening Values (GSV) were determined using the formula below.

GSV (Gas Screening Value) =	(Maximum steady concentration / 100) x Flow rate
GSV measured in litres per hour (l/hr)	Maximum steady concentration measured in percent (%) Flow rate measured in l/hr.

Based on the maximum concentrations and flows recorded, the **GSV** for **methane** was **0.0 L/hr** and the **GSV** for **carbon dioxide** was **0.0 l/hr**.

However, maximum concentrations of carbon dioxide had been exceeded in one borehole (WS1) on the first monitoring occasion resulting in the recommendation to increase the classification is increased to CS2.

The source of the carbon dioxide is considered to be the thickening of Made Ground across the site, which may be degrading and producing concentrations above 5%. It is therefore recommended to install ground gas protection (to future proof design and occupancy of the homes) to CS2 in accordance with BS8485.

9.0 REVISED RISK ASSESSMENT

9.1 REVISED SOURCES OF CONTAMINATION

Table 9.1 summarises the sources of contamination identified following the site investigation and subsequent interpretation of results.

Table 9.1: Revised Sources		
Source	**Description**	**Key Contaminants of Concern and Comments**
1. Site-wide soil contamination	Limited soil contamination (lead) identified in previous investigation. No soil contamination identified in the supplementary assessment. PCB above method detection limit identified but not above guidance.	Metals, PAH, TPH and PCB were previously considered contaminants of concern. Soil contamination identified as PAH and Lead within the overlying Made Ground.
2. Ground gases/vapours	Maximum carbon dioxide concentrations are suggestive of CS2 and the presence of a thickened unit of Made Ground beneath the site is considered to be the source.	It would be suitable to install ground gas protection in accordance with CS2 (BS8485).
No longer considered to be sources of risk		
3. Asbestos	Risk of Asbestos Containing Soils (ACS) and Asbestos Containing Materials (ACMs) from former land uses.	Asbestos. Asbestos not detected in the soil samples.
4. Groundwater contamination	No groundwater encountered.	It is not considered that the site is impacted with groundwater contamination and this source can be omitted from the CSM.

9.2 REVISED CONCEPTUAL SITE MODEL

Following interpretation of the laboratory results, site dynamics and the revision of potential soil contaminants within table 9.1 a revised conceptual model has been prepared and is presented in table 9.2. Sources of risk no longer considered viable have been omitted from the revised CSM.

Table 9.2: Revised Conceptual Site Model (for plausible pollutant linkage pathways)						
Source	**Receptor**	**Pathway**	**Probability**	**Consequence**	**Risk & Justification**	**Linkage No.**
Source 1 Soil contamination	Construction workers	Direct contact	Likely	Mild	Low ***Note 1.*** Widespread PAH and Lead contamination identified. Advice. Ensure safe working practices for groundworkers and wear PPE.	1

Table 9.2: Revised Conceptual Site Model (for plausible pollutant linkage pathways)						
Source	**Receptor**	**Pathway**	**Probability**	**Consequence**	**Risk & Justification**	**Linkage No.**
	End users	Direct contact	Likely	Medium	Moderate *See Note 1.* Advice. Prepare a Remediation Action Plan (RAP) in regard of proposed cover system.	2
	Adjacent land users	Direct contact via run-off	Unlikely	Minor	Very Low ***Note 2.*** The site is level, limiting the viability of the pathway.	3
	Soft landscaping	Root uptake	Likely	Medium	Moderate ***Note 3***. Widespread contamination has been identified, although the concentrations identified were not considered to be phytotoxic. That being said the overlying Made Ground is not considered suitable for sustain new plant growth. Advice. Prepare a Remediation Action Plan (RAP) in regard of proposed cover system.	4
	Water supply pipes	Direct contact	Likely	Mild	Low *See Note 1.* Advice. Contact water company to check whether barrier pipe shall be required for new water main connections.	5
	Buildings & infrastructure	Direct contact	Low likelihood	Medium	Moderate ***Note 4.*** Refer to section 10.8.	6
	Groundwater	Vertical migration through hydrogeology	Low likelihood	Mild	Low ***Note 5***. According to the geological maps, half of the site was indicated to be underlain by a Principal Aquifer. No groundwater has been identified at the site and contamination is restricted to the Made Ground, beneath which is a Clay unit which shall perform	7

Table 9.2: Revised Conceptual Site Model (for plausible pollutant linkage pathways)						
Source	**Receptor**	**Pathway**	**Probability**	**Consequence**	**Risk & Justification**	**Linkage No.**
					and an aquitard.	
	Surface waters	Vertical migration through hydrogeology Run-off	Unlikely	Mild	Very Low *See Note 5.*	8
	Ecology	Vertical migration through hydrogeology	Unlikely	Mild	Very Low *See Note 5.*	9
Source 2 Ground gases and Soil vapours (on/off site source)	Construction workers	Inhalation of vapours/gas	Unlikely	Mild	Low ***Note 6.*** Sources of ground gas identified on-site (infilled ground). Depleted oxygen and carbon dioxide identified which is unlikely to present an exposure risk in outdoor air. Advice. Ensure safe ground working practices and wear PPE.	10
	End users	Inhalation of vapours/gas	Low likelihood	Mild	Low ***Note 7.*** Slightly elevated concentrations of carbon dioxide suggesting CS2 which is considered to be sourced from the thickened Made Ground overlying the site. Advice. Install ground gas protection to remove risk.	11

9.3 RISK COMMENTARY

9.3.1 Contamination Risk from Soil to Human Health – Construction Workers

The concentrations of soil determinands are unlikely to present a short-term exposure risk to adult construction workers, specifically from the dermal contact, ingestion and inhalation pathways. Nonetheless it is customary to advise that groundworkers should ensure suitable PPE is worn as a precaution during development which would include:

- Gloves to prevent dermal contact with any contaminated soils. It is advised that disposable latex gloves are worn beneath the outer 'work' gloves.

- To prevent ingestion of contaminated soils construction workers should avoid putting hands or objects in their mouth whilst on-site.

- To prevent ingestion of contaminated soils prior to eating or drinking, construction workers should ensure their hands are properly washed, rinsed and dried.

- To prevent inhalation of contaminated soils construction workers should wear dust masks on dry and windy days. On damp or wet still days the risk of dust inhalation is low.

- A Remediation Action Plan should be prepared if deemed necessary, to outline measures to take in the event unexpected contamination is encountered and verification testing within gardens and other soft landscaped areas after further construction works have been completed.

9.3.2 Contamination Risk from Soil to Human Health – End Users

Concentrations of soil determinands (lead and PAH) present a long-term exposure risk to site end users; specifically from inhalation, dermal contact and ingestion pathways.

It shall be necessary to construct a clean cover system to new private and communal gardens. Table 9.3.2 outlines a typical remedial cover system, which is necessary to soft landscaped areas only.

Table 9.3.2: Cover Systems

Garden Type	Depth (bgl)	Description
Private Garden (where produce can be grown)	Ground Level - 600mm*	BS3882:2015 'clean' Topsoil or Sub-soils
	600mm**	Terram Hi-Vis or similar product
Frontages or Communal Amenity Space (areas where produce cannot be grown)	Ground Level - 300mm*	BS3882:2015 'clean' Topsoil or Sub-soils
	300mm**	Terram Hi-Vis or similar product

*300mm/600mm considered to be minimum thickness for amenity space or private gardens which may require thickening depending of planting plan.

**Terram or Hi-Vis to be used in north of site as cover system.

9.3.3 Contamination Risk from Soil to Human Health – Domestic Water Supply

Special design for domestic water supply is unlikely. However, to be certain, it is advised that the report should be provided to the local water authority to ensure the correct materials are chosen for water supply pipes. Following the formal withdrawal of WRAS Guidance Note No. 9-04-03 (October 2002), it is recommended that

the following reference should be consulted:

Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21 by the UK Water Industry Research Ltd (UKWIR); ISBN: 1 84057 5697

Generally, all services should be placed within dedicated runs, and then backfilled with clean imported material.

9.3.4 Contamination Risk from Soils to Controlled Waters

It is not considered soils present a risk to controlled waters based on the soil analytical results recorded.

9.3.5 Contamination Risk from Groundwater

It is not considered soils present a risk to controlled waters.

9.3.6 Risk from Ground Gas

On the basis the site is largely underlain by a thickened unit of Made Ground, which is considered to be the source of the recorded concentrations of carbon dioxide above 5% it would be prudent to install ground gas protection (to future proof design and occupancy of the homes) to CS2 in accordance with BS8485.

10.0 GEOTECHNICAL ASSESSMENT

This section provides a geotechnical assessment in connection with the proposed development as described above and considers the GEO Limit State: failure or excessive deformation of the ground, in accordance with EN 1997 Eurocode 7: Geotechnical Design (and the UK National Annex to Eurocode 7) where applicable.

It is assumed for the purposes of this assessment that the finished ground floor level of the proposed apartment building is the same as the ground level at each of the exploratory hole locations.

The assessment of the stability of any slopes or retaining structures across or adjacent the site, the requirement for additional retaining structures and the requirements for cut and fill that may be required to facilitate construction is outside the scope of this report.

Where applicable the following assessment includes bearing resistance assuming conventional construction only and no allowances have been made for interaction between existing adjacent foundations and proposed foundations or loads.

Eurocode 7 Section 2.1 Basis for Geotechnical Design indicates that for each geotechnical design situation it shall be verified that no limit state is exceeded. Geotechnical design requirements have been established by three Geotechnical Categories, 1, 2 and 3. For the purpose of this assessment the development is Geotechnical Category 2: which include conventional types of structure and foundation with no exceptional risk or difficult or loading conditions. Designs for structures in Geotechnical Category 2 should normally include quantitative geotechnical data and analysis to ensure that the fundamental requirements are satisfied. Routine procedures for field and laboratory testing and for design and execution may be used for Geotechnical Category 2 designs.

10.1 GROUND MODEL

The following table 10.1 provides the ground model for the site as determined from ground conditions encountered during the site investigation works.

Table 10.1: Ground Model				
Stratum	**Description**	**Top of Stratum (m bgl)**	**Bottom of Stratum (m bgl)**	**Average Thickness (m)**
Made Ground (MG)	Silty sandy gravelly clay with asphalt and locally concrete at surface	G.L.	0.7-1.9	1.09
Langley Silt Member (LASI)	Soft, firm and stiff silty sandy locally gravelly CLAY	0.7 – 1.4	1.5 – 2.3	0.97
Lynch Hill Gravel Member (LHGR)	Medium dense and dense slightly silty sandy GRAVEL. Overlying horizon of stiff sandy very gravelly CLAY locally in BH1 to 3.2m	1.5 – 2.3	5.6 – 5.7	3.75
London Clay Formation (LC)	Stiff becoming very stiff and fissured and silty CLAY	5.6 – 5.7	30.5	-
Groundwater				
Groundwater encountered locally in WS2 at 1.83m bgl during return monitoring in June 2025, expected to be perched in the GRAVEL soils.				

10.2 FOUNDATION DESIGN CONCEPT

The ground model and the following considerations will need to be taken in account in determining the foundation solution for the proposed apartment development building:

- MADE GROUND extending to depths of up to 1.9m bgl (Aviron) and 1.85m+ bgl (CGL) and shallow low strength soils.
- The depth to competent strata and required bearing resistance for the proposed four to five storey apartment building.
- Temporary works in MADE GROUND and coarse soils and elevated groundwater.

The fine soils present at relatively shallow depth beneath the site are classified as CLAYs of mostly low and intermediate plasticity showing low-volume change potential (VCP) above GRAVEL of negligible VCP.

Due to the extent and depth of MADE GROUND encountered to 1.9m bgl, the anticipated bearing resistance needed to support the proposed apartment building, and the requirements of temporary works, a piled foundation solution is expected to be required.

10.3 EXCAVATION CONDITIONS

Excavation of the materials encountered during the ground investigation should be achieved using conventional hydraulic excavation techniques. Breaking equipment is expected to be required locally to remove below ground obstructions associated with existing and former construction.

10.3.1 Temporary Works

From the ground investigation undertaken, excavations in the natural fine soils may remain stable in the short term. However, due to the extent and depth of MADE GROUND, low strength soils encountered locally, coarse soils noted, and requirement for excavations to facilitate the construction in potentially elevated groundwater, care should be taken to ensure that instability of excavations does not affect existing structures and services (e.g. foundations, roads, boundary walls or buildings) both on and off-site. Temporary support is therefore expected to be required in order to achieve this. Further advice should be sought from the appointed structural engineer and specialist contractor regarding temporary works. General guidance can be found within CIRIA Report 97: Trenching Practice, dated 2001.

Care should be taken to ensure that falls from excavation faces do not adversely affect the integrity of foundation concrete.

All excavations on site should be in accordance with HSE guidelines and stability should be practically maintained at all times.

10.3.2 Dewatering

Groundwater was encountered locally during the return monitoring at a depth of 1.83m bgl (WS2) in June 2025. The groundwater is expected to represent the perched water within the Lynch Hill Gravel Member.

It should be noted that the investigation and subsequent monitoring took place during an unusually dry Spring, and that the groundwater encountered may not be representative of the typical free water surface at this time of year.

Groundwater is expected to rise, particularly in wetter winter months, and ongoing groundwater monitoring is recommended to determine the seasonal groundwater level below the site.

On the basis of the data obtained; dewatering is expected to be required in shallow excavations beneath the site (as of June 2025).

10.4 EXISTING SERVICES/SUBSTRUCTURES

Due to the historical development of the site and site environs, existing services or sub-structures should be anticipated.

Where foundations or obstructions are encountered during excavations for the proposed foundations, all new foundations should be extended downwards to fully penetrate all redundant former construction.

10.5 BEARING STRATA

As discussed, due to the extent and depth of MADE GROUND encountered to 1.9m bgl, shallow low strength soils, the anticipated bearing resistance needed to support the proposed apartment building, and the requirements of temporary works, consideration should be given to a piled foundation solution.

10.5.1 Atterberg Limits and Material Properties

Atterberg limits tests conducted on the fine soils of the Langley Silt Member overlying the site at depths of between 1.0m and 2.0m bgl indicate that the strata comprise inorganic CLAY of low and intermediate plasticity (CL/CI), with a modified plasticity index of 12-18%, showing low volume change potential (VCP).

The results of particle size distribution (PSD) analysis indicate that the coarse soils of the sub-cropping Lynch Hill Gravel Member comprise slightly clayey sandy fine to coarse GRAVEL of negligible VCP.

Samples of the underlying fine soils of the London Clay Formation comprise inorganic CLAY of high plasticity (CH) and are classified as being of medium and high VCP.

For the purposes of this assessment and in accordance with NHBC Standards Chapter 4.2, Building Near Trees, the overlying fine soils across the site are classified as being of low VCP, above coarse soils of negligible VCP above fine soils of medium and high VCP.

The results of unconsolidated undrained triaxial testing indicate that the shear strength of the shallow overlying CLAY is noted to be 27kPa (BH1) and 96kPa (BH2) indicating low and high strength soils. The underlying CLAY of the London Clay Formation are shown to of high strength with shear strength of between 80kPa and 98kPa.

10.5.2 Desiccation

An assessment in accordance with BRE Digest 412 Desiccation in Clay Soils, 1996, including a number of material properties and shear strength profiles indicates that of the samples tested, the overlying fine soils in the Langley Silt Member may be desiccated locally in BH1, BH2, WS3 and WS4.

Desiccated fine soils (clay) result from moisture being withdrawn from the soil, typically by root action. Heave forces occur following the re-hydration of these soils, by swelling on account of increased moisture content.

Moisture content within fine soils can increase due to seasonal weather variations (rain) and also the removal of trees, whereby moisture is no longer being drawn from the soil by root action. The effect of heave is increased when trees are removed.

The upward heave force can lift foundations causing structural damage (cracking of masonry, movement of door/window frames). Conversely during periods of dry weather, the moisture content reduces causing fine soils to shrink and the upward heave force to reduce; in such an event the foundation (re)settles. To remove the risk of continued and abnormal movement beneath the base of new foundations due to swelling and shrinking of fine soils the foundations should be placed beneath the desiccated zone.

Foundations should therefore be extended below the desiccated CLAY soils, most likely on plied foundations, and mitigation measures to prevent heave in the fine soils encountered across the site should be incorporated into the below ground construction.

The soil sampling and testing undertaken provides for a preliminary assessment only based on limited sampling and testing locations. To enable a comprehensive desiccation assessment, consideration should be given to additional soil sampling, in-situ testing and profiling and laboratory analysis including soil suction tests.

10.5.3 Design Parameters

Characteristic values for design parameters for the strata encountered beneath the site are included in Table 10.5.3 below.

Table 10.5.3: Design Parameters

Stratum	Volume Change Potential	Unit Weight $\gamma_{,k}$ (kN/m³)	Undrained Shear Strength C_{uk} (kPa) range	Peak Effective Angle of Friction $\phi'_{pk,k-}$ (degrees)	Critical State Angle of Friction $\phi'_{cv,k}$ (degrees)
MG	Low	17.6	27^{+} See note below	-	27^{*}
LASI - CLAY	Low	18.1	96^{+}	-	27^{*}
LHGR - GRAVEL	Negligible	19.0	-	34^{*}	32^{*}
LC - CLAY	Medium and High	19.2	80^{+} - 98^{+}	-	22^{*}

[+]Undrained shear strength provided relates to the results of the undrained triaxial shear strength tests limited to the locations of BH1 and BH2 only.

The range of unit weight and undrained shear strength (C_U) has been determined predominantly using laboratory testing data. Assumed[*] values determined using Tables 1, 2, 3 and 4 of BS8002:1994 September 2001, as well as empirical values. The undrained cohesion is assumed to be zero.

Geotechnical laboratory material property test results are presented within **Appendix IV.**

10.6 TREE INFLUENCE ON FOUNDATIONS

When considering the influence of trees on foundations, the material properties of the strata beneath the site and the distance and species of the trees to the foundations are the determining factors.

For the purposes of this assessment the CLAY soils overlying the site are classified as being of low volume change potential, and an adjustment to foundation depths is therefore required in accordance with NHBC Standards Chapter 4.2, Building Near Trees, 2021. An Arboricultural survey is recommended to confirm the required foundations depths.

Notwithstanding the above, it is anticipated that the proposed apartment building will be supported on piled foundations, and no adjustment to foundation depths would therefore be required.

Mitigation measures to prevent heave in the overlying CLAY soils encountered across the site should however be incorporated into the below ground construction within the influence of trees, and in the area of BH1, BH2, WS3 and WS4 in the overlying Langley Silt Member, where desiccation is expected to have occurred.

A record of the findings associated with roots, desiccated soils and tree stumps should be kept during the groundworks phase.

Mitigation measures to protect existing tree species during the construction process will also need to be considered.

10.7 FOUNDATION TYPE, DEPTH AND ALLOWABLE BEARING PRESSURE

10.7.1 Trench Fill/Strip Foundations

As discussed, due to the extent and depth of MADE GROUND encountered to 1.9m bgl, shallow low strength soils, the anticipated bearing resistance needed to support the proposed apartment building, and the requirements of temporary works, a conventional shallow foundation solution is not expected to be viable.

Consideration should therefore be given to supporting the proposed apartment building on piled foundations.

It should be noted that the above recommendations have been made using data in the cable and percussion boreholes and window sample boreholes completed.

10.7.2 Piled Foundations

It is anticipated that bored and continuous flight auger (CFA) piles would be appropriate for the site, however temporary casing is expected to be required given the ground and groundwater conditions encountered.

Given the proximity of neighbouring infrastructure, driven piles may not be appropriate due to potential and undesirable ground disturbance. Premature refusal may also occur in the shallower coarse soils encountered.

In terms of pile design parameters, no contribution to shaft friction should be assumed in the MADE GROUND. The effects of down-drag in the MADE GROUND should also be considered when determining the working loads of the piles as well as the effects of pile groups.

The advice of a piling specialist should be sought to determine the working loads of their proprietary piling technique when considering the ground and groundwater conditions encountered beneath the site, and the health and safety implications of working within the confines of the site and adjacent neighbouring properties.

10.7.3 Piling Mat Design

When considering piling mat design, the overlying soils tested from BH1 and BH2 at 1.0m bgl are shown to be of low and high strength with undrained shear strength (C_u) determined as 27kPa and 96kPa respectively. It should however be noted that the shear strength may have been artificially increased in BH2 due to desiccation, and the lower bound value may be more appropriate for design purposes.

In accordance with BRE 470, Working Platforms for Tracked Plant, 2004, special measures may be required to construct the piling mat (platform), and specialist advice should therefore be sought. Consideration may need to be given to incorporating a strengthening material such as a geosynthetic to provide adequate support.

10.7.4 Floor Slab and Heave

Due to the low strength soils encountered at shallow depth beneath the site, and the extent and depth of the MADE GROUND it is recommended that the ground floor slab beneath the proposed apartment building is suspended on ground beams.

Mitigation measures to prevent heave in the overlying fine soils encountered should also be incorporated into the below ground construction within the influence of trees, and in the area of BH1, BH2, WS3 and WS4 in the overlying Langley Silt Member, where desiccation is expected to have occurred.

Mitigation measures to prevent heave should extend to all aspects of in-ground construction, which may include services such as drainage and manholes.

10.8 CONCRETE CLASSIFICATION

In accordance with Building Research Establishment (BRE) Special Digest 1: 2005 - Concrete in Aggressive Ground, the following laboratory test data has been used to derive classifications for buried concrete (Table C1, natural ground locations) beneath the site:

- Soluble Sulphate (2:1 extract) – 0.0082 to 0.364g/l
- pH – 7.7 to 9.0
- Total Sulphate SO_4 – 0.0051 – 0.09%
- Total Sulphur – 0.0093 – 0.49%
- Total Potential Sulphate – 0.0279 – 1.47%
- Oxidisable Sulphide < 0.3% to 1.421%

"*BRE guidance suggests that 'if significant number of determination of oxidisable sulphides is above 0.3%, then use the results of total potential sulphate to determine the concrete class*".

Oxidisable sulphide has been calculated above 0.3% SO_4 in the natural soils of the London Clay Formation underlying the site at increased depth and exceeds the threshold where the concrete classification is based on oxidisable sulphide and total potential sulphate. However, provided the proposed apartment building is supported on piled foundations, the action of piling is unlikely to result in 'disturbed ground' and the results of soluble sulphate apply to natural soils. Piling arisings from the London Clay Formation should not be used as backfill against shallow foundations.

Based on the results obtained for soluble sulphate the Design Sulphate (DS) Class for shallow buried concrete beneath the site is DS-1. Assuming mobile groundwater (principal aquifer), the Aggressive Chemical Environment for Concrete (ACEC) Class is AC-1.

Should pile arisings from the London Clay Formation be used as backfill against foundations, the DS and ACEC class would be increased to DS-4 and AC-4 respectively.

It should be noted that additional considerations for the determination of concrete class and appropriate aggregate use are set out in BRE Special Digest 1. These are considerations specific to the soil type, the proposed development and the type of concrete foundations to be used at the site.

Laboratory results for the pH, sulphate and sulphur testing are included within **Appendix III**.

10.9 PAVEMENT DESIGN

The results of DCP/TRL testing indicate that the CBR value 'bottoms out' or reduces to between 1.6% and 4.8% once the probe penetrated the overlying soils. Locally increased results possibly reflect granular obstructions and inclusions in the MADE GROUND.

Provided soft spots locally are removed and replaced with suitable materials compacted to grade, consideration should be given to an estimated CBR value of 4% and 5%, which may be more appropriate for thin and thick construction respectively for 'sandy clay' (PI < 20%) in accordance with Design Guidance for Road Pavement Foundations IAN 73 06 HD25[rev1] 2009.

10.10 SOAKAWAY DESIGN

When access is available, consideration should be given to completing soil infiltration testing in accordance with BRE DG365 2016, to enable soakaway design.

Groundwater monitoring is also recommended to determine the seasonal water level beneath the site and to establish the feasibility of soakaways.

10.0 CONCLUSIONS AND RECOMMENDATIONS

This Supplementary Site Investigation included tier 2 GQRA and has provided an assessment of the site's history, geo-environmental setting and an evaluation of ground conditions.

11.1 ENVIRONMENTAL

Table 11.1 summarises the pertinent environmental risks providing advice on further works and assessment.

Table 11.1: Environment Risk Summary

Medium	Item	Risk Description	Comments/Recommendations
Soils	1	Exceedances of lead and PAH recorded during both investigations.	Remediation via the installation of a cover system is required to new gardens and soft landscaping areas. Prepare Remediation Action Plan (RAP).
	2	Made Ground may be physically unsuitable for sustained new plant growth.	Ensure suitable and chemically acceptable Topsoil (and sub-soil) to sustain planting. Prepare RAP.
	3	Ensure material encountered is suitable for desired water main.	Consult local water authority prior to water main installation.
Ground Gas	4	Ingress of hazardous ground gases (CO_2) into new homes and depleted oxygen.	On the basis the site is largely underlain by a thickened unit of Made Ground and has recorded concentrations of carbon dioxide above 5% it would be prudent to install ground gas protection (to future proof design and occupancy of the homes) to CS2 in accordance with BS8485.
Groundwater	n/a	Ground conditions are not considered to present a risk to controlled waters.	n/a.

Once the above risks have been evaluated/implemented the environmental risk assessment can be considered complete and the development suitable to proceed.

11.2 GROUND HAZARDS SUMMARY

This report and the Clients preferred foundation solution should be presented to the Local Authority or appropriate build warranty provider for approval prior to construction. Table 12.2 summarises the pertinent Ground Hazards.

Table 11.2: Ground Hazards Summary		
Construction Issue	**Ground Hazard**	**Recommendation**
Below Ground Obstructions	Made ground and possible obstructions should be anticipated at shallow depth beneath the site from the historical use.	Shallow obstructions likely to be removed with conventional hydraulic excavation plant and machinery.
Foundations	Low strength soils encountered as well as MADE GROUND to depths of up to 1.9m bgl. Shallow excavations in MADE GROUND and coarse soils unlikely to be stable in the short term. A conventional shallow foundation solution is therefore not expected to be viable for the proposed apartment building. Groundwater at depths as shallow as 1.83m bgl (June 2025). Groundwater expected to rise and fall seasonally.	Consideration should be given to supporting the proposed apartment building on piled foundations. Consult piling specialist to determine working loads. Dewatering expected to be required in shallow excavations depending on seasonal groundwater fluctuations. Shoring of excavations expected to be required. Overlying CLAY soils encountered are of low volume change potential (NHBC Chapter 4.2, Building Near Trees). Special measures may be required to construct the piling mat (platform), and specialist advice should therefore be sought.
Floor Slab and Heave	Insufficient bearing resistance in the overlying soils to support ground bearing floor slabs.	Floor slabs should be suspended on ground beams. Heave protection required in overlying shallow CLAY soils within the influence of trees and in the area of BH1, BH2, WS3 and WS4. Mitigation measures to prevent heave should extend to all aspects of in-ground construction, which may include services such as drainage and manholes.
Buried Concrete	Non aggressive ground conditions encountered when considering piled foundations.	Concrete classification DS-1, AC-1. DS-4 AC-4 should soil from the London Clay Formation be used as backfill against foundations.
Pavements	The results of DCP/TRL testing indicate results bottoming out between 1.6% and 4.8%.	Provided soft spots are removed and replaced with suitable materials compacted to grade, consider estimated CBR value of 4% and 5%, for thin and thick construction respectively for 'sandy clay' (PI < 20%) in accordance with IAN 73 06 HD25[rev1] 2009.
Soakaway Drainage	When access is available consider completing soil infiltration testing in accordance with BRE DG365 2016, to enable soakaway design.	Also consider ongoing groundwater monitoring to determine the seasonal water level beneath the site.

12.0 PROJECT INSTRUCTION AND LIMITATIONS

12.1 SCOPE OF WORKS

The following scope of work was undertaken to an agreed brief set out in Aviron's proposal and involves the following:

- Two cable and percussion boreholes to depths of 30.5m bgl, including SPTs at 1.0m and 2.0m intervals and undisturbed sampling for laboratory testing.
- Undertake one day of window sample boreholes to depths of up to 2.0m bgl, including SPTs at 1m intervals.
- Install three window sample boreholes with monitoring pipe to enable return gas readings.
- CBR DCP/TRL tests to determine road pavement parameters at a number of locations.
- Log the strata within each exploratory hole noting any water strikes.
- Collect disturbed soil samples from exploratory holes and submit for geochemical laboratory tests to determine the presence or absence of soil contaminants.
- All soil samples shall be collected in accordance with the instruction and ground conditions and submitted to UKAS/MCERTS accredited laboratories for testing.
- Prepare an interpretative report to interpret ground conditions with respect to potential environmental risks.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

12.2 PUBLISHED GUIDANCE

This report follows the technical approach presented on Land contamination risk management (LCRM), accessed on gov.uk website. The guidance replaced the Contaminated Land Report 11 (CLR11) "Model Procedures for the Management of Land Contamination" prepared by the Environment Agency in 2004. CLR11, which was withdrawn in 2020, provided guidance on the application of management processes when assessing potentially contaminated land.

This project and report have been designed to fulfil the information requirements set out in LCRM.

This report is additionally prepared in accordance with current guidance notes, standards and practices as set out by the Environment Agency and statutory organisations in order to establish potential and significant contaminant linkages as defined in Part IIA of the Environmental Protection Act 1990.

12.3 LIMITATIONS

Aviron's scope of work has been designed to meet the timeframe and as such it may follow that further work would be prudent upon evaluation of the ground conditions. The scope of work provided shall provide a view of site conditions and understanding of potential geo-environmental risks and possible mitigation procedures.

The information used in this report has been derived from the site investigation, which in turn were based on known current and historical land uses identified at the site and surrounding area, available to Aviron at the time of the investigation.

The intrusive points relate to the data collected and the risk assessment and recommendations will rely on these points only. It therefore follows that some areas of the site will not be examined. It is always possible that some areas not investigated may contain conditions which would be impossible to determine due to lack of evidence or time and budget restrictions.

This report provides recommendations for foundation design based upon the ground conditions encountered and where possible makes predictions for possible variations in ground conditions. However, it is always possible that not all variations in ground conditions can be accounted for and shall also be dependent upon design loadings and foundation construction techniques used. It should be acknowledged that ground conditions may vary from intrusive point to intrusive point and without undertaking continuous investigation it is impossible to entirely understand variations in ground conditions. Our recommendations should therefore not supersede the project's Consulting Structural and Civil Engineers design.

This report comprises a Ground Investigation Report in accordance with BS EN 1997-2, unless otherwise stated. This report does not constitute a Geotechnical Design Report (BS EN 1997-2) and geotechnical recommendations in this report are for guidance only.

In accordance with the BS EN 1998-1:2004+A1:2013 'Eurocode 8: Design of Structures for Earthquake Resistance – Part 1', the UK is located in an area of very low seismicity, and seismic loading need not be considered.

Unless otherwise stated, a preliminary or detailed risk assessment of unexploded ordnance (UXO) is outside the scope of this report.

Also, unless otherwise stated, an assessment of invasive species such as Japanese Knotweed and Himalayan

Balsam is outside the scope of this report.

Should changes in legislation, statutory requirements or industry practices occur following issue of this report, this report should be viewed in light of these changes.

Should a notable time period elapse between the date issue of this report and the date of application of this report, or changes to site dynamics, the site inspection notes may no longer be applicable should any change of use occur to the site in the interim.

13.0 REFERENCES AND OTHER SOURCES OF INFORMATION

Previous Reports

Phase I Preliminary Risk Assessment. Report ref. CGK00151. Dated November 2021. Prepared by Card Geotechnics Limited.

Phase II Generic Risk Assessment. Report ref. CGK00151. Dated December 2021. Prepared by Card Geotechnics Limited.

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BS EN 1997-2.2007 Eurocode 7 Geotechnical Design Part 2 Ground Investigation and Testing

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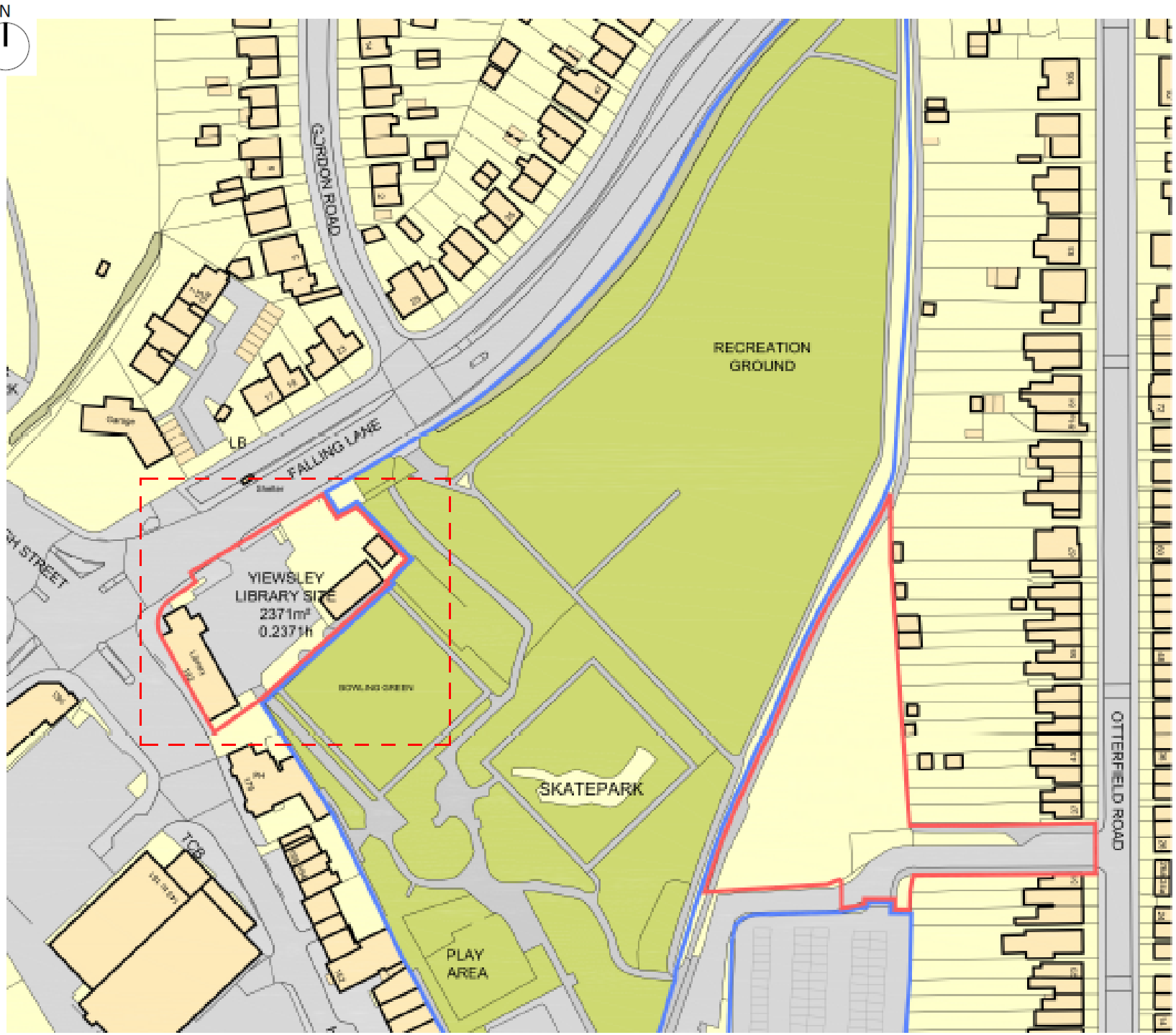
Figures



Legend

Approximate Site Boundary

Notes

M9534-HUN-01-00-DR-A-03-0001
Supplied by Client

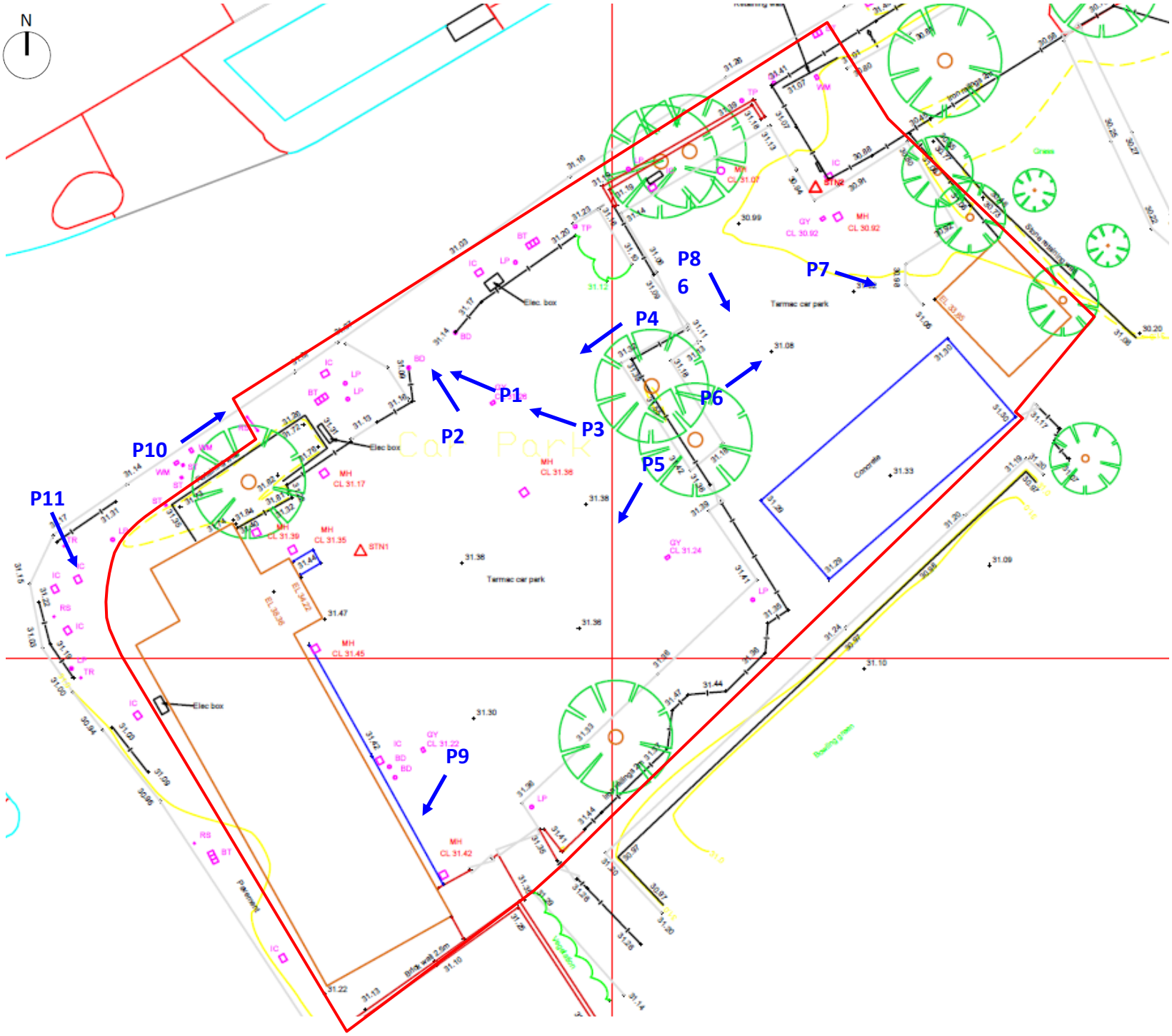
Figure 1

Drawing Title

Site Location Plan

Project Number	25-154.01
Project Title	Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE
Drawn by	DN
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk



Legend

- Approximate Site Boundary
- Photo Direction

Notes

Hywel John Surveys Ltd—Dwg No. 2319
Supplied by Client

Figure 2

Drawing Title

Existing Site Layout Plan

Project Number	25-154.01
Project Title	Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE
Drawn by	DN
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Legend

Notes

Figure 3

Drawing Title

Site Photographs

Project Number	25-154.01

Project Title

Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE

Drawn by	DN
Checked by	JB
Scale	NTS

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Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Legend

Notes

Figure 4

Drawing Title

Site Photographs

Project Number	25-154.01

Project Title

Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE

Drawn by	DN
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk

Legend

Approximate Site Boundary

Notes

Supplied by Client

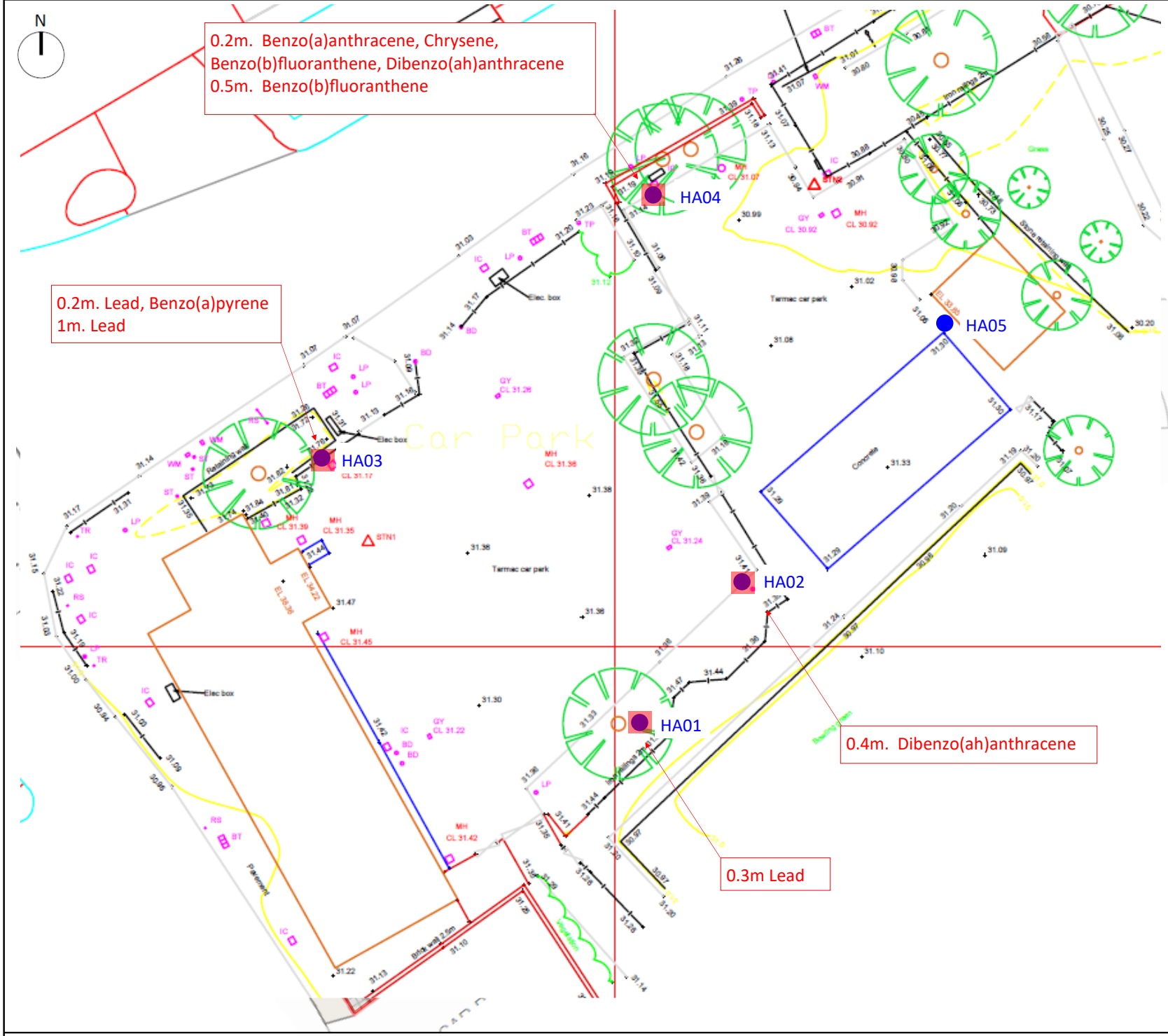
Figure 5

Drawing Title

Proposed Development Plan

Project Number	25-154.01
Project Title	Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE
Drawn by	DN
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk



Legend

- Previous CGL boreholes (2021)
- Identified contamination

Notes

Plan showing positions of the previous Gard Geotechnics Limited (CGL) investigation (2012)

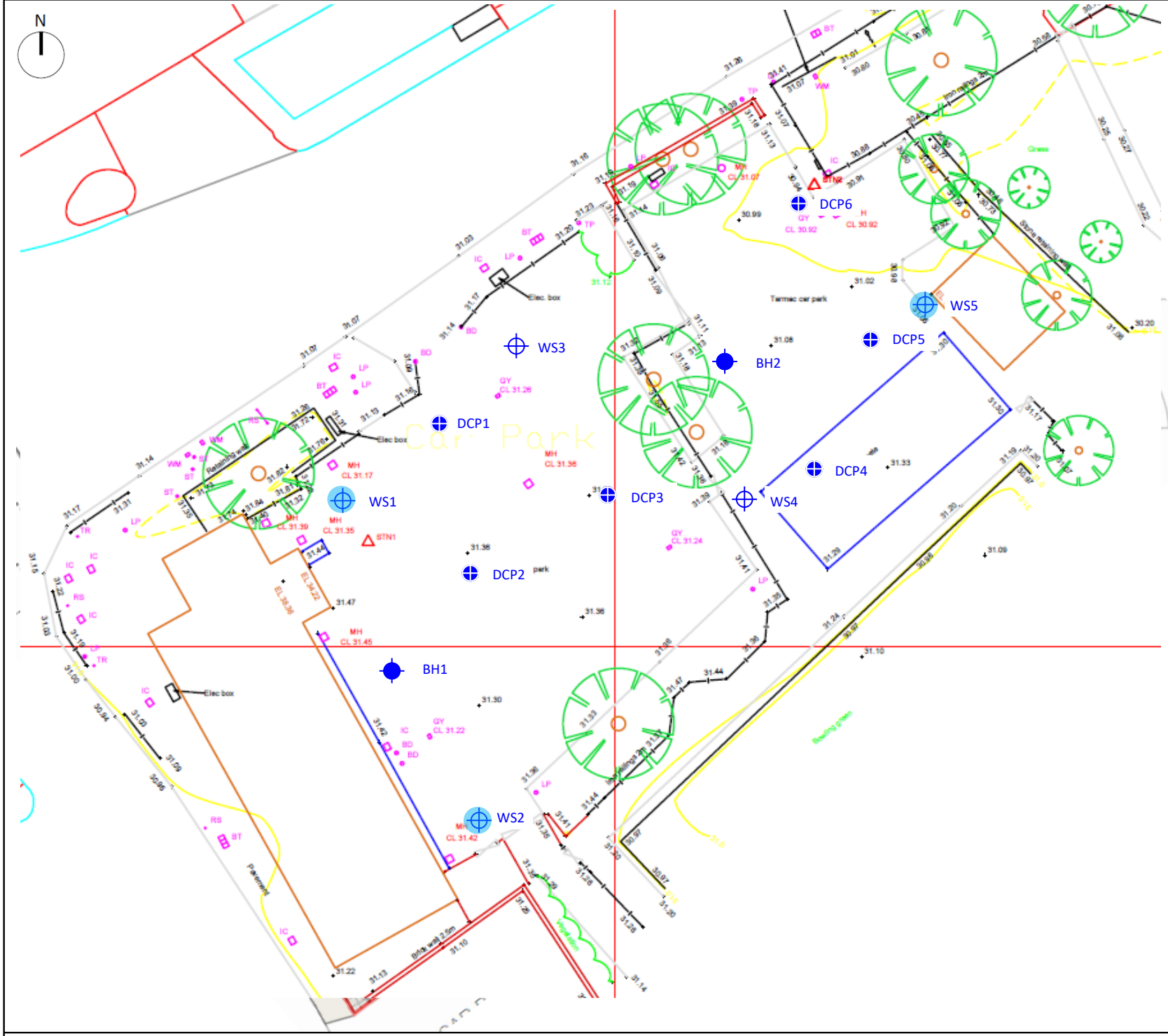
Figure 6

Drawing Title

CGL Identified Contamination Plan

Project Number	25-154.01
Project Title	Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE
Drawn by	OB
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk



Legend

- Cable Percussion Borehole
- Window Sample Location
- Monitoring Well
- DCP / TRL

Notes

Figure 7

Drawing Title	Exploratory Hole Location Plan - Existing Layout
Project Number	25-154.01
Project Title	Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE
Drawn by	OB
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk

Legend

- Cable Percussion Borehole
- Window Sample Location
- Monitoring Well
- DCP / TRL

Notes

Figure 8

Drawing Title

Exploratory Hole Location Plan - Proposed Development

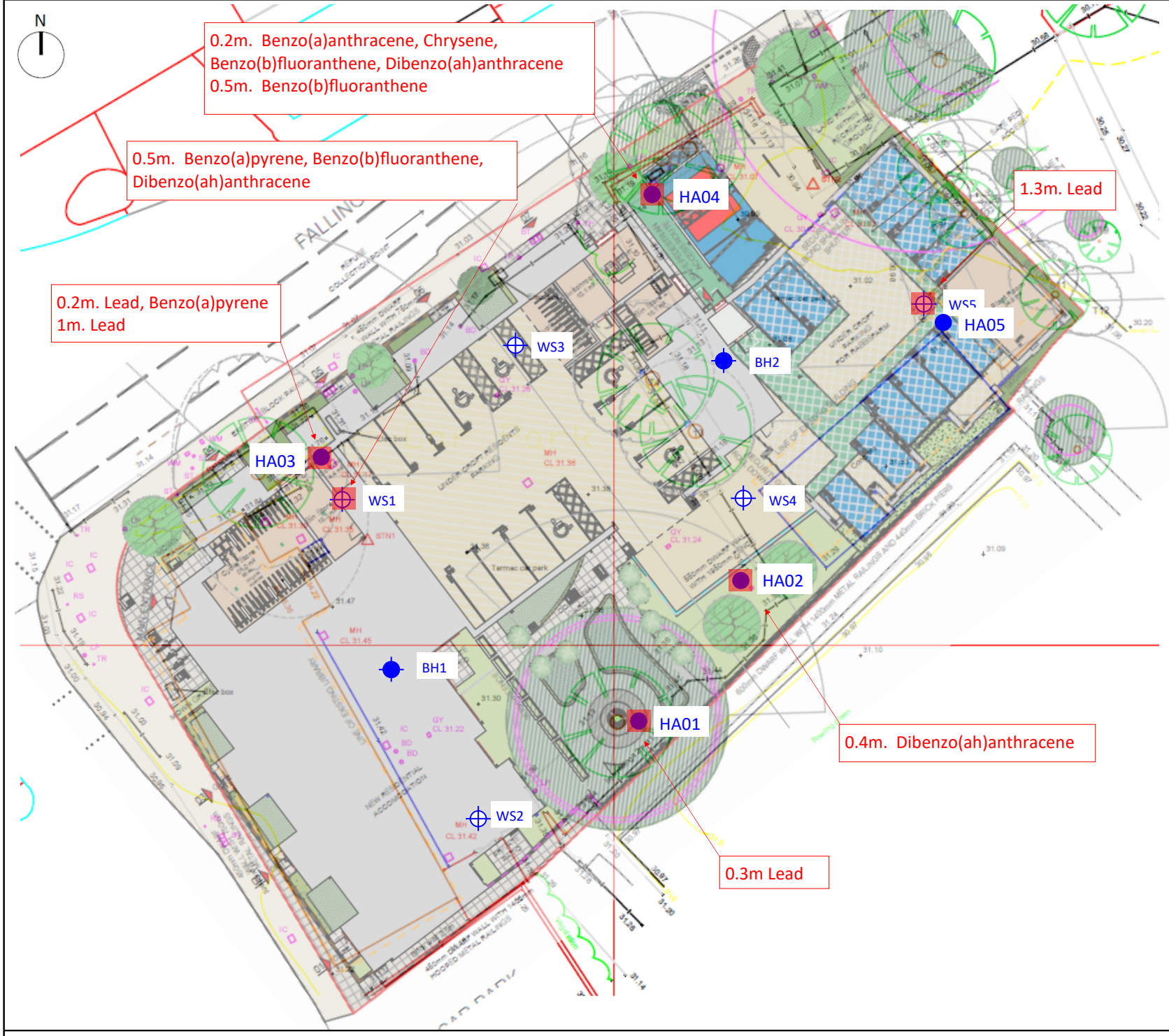
Project Number	25-154.01

Project Title

Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE

Drawn by	OB
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk



Legend

- Cable Percussion Borehole
- Window Sample Location
- Identified contamination

Notes

Figure 9

Drawing Title	CGL and Aviron Identified Contamination Plan
Project Number	25-154.01
Project Title	Yiewsley Library and Car Park, Falling Lane / High Street, Hillingdon, UB7 7BE
Drawn by	OB
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk

Appendices

Appendix

I Exploratory Hole Logs and Photographs

Percussion Drilling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 19/05/2025 - 20/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Star Drilling - PL	Drilling Equipment: Dando 150

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH1	CP		ac	1:50	Sheet 1 of 4

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.40			Tarmac over coarse and cobbly brick fragments. MADE GROUND
		0.60	ES					Soft, low strength, brown silty sandy gravelly CLAY. MADE GROUND
		1.00 - 1.45	U	Ublow=60				
		1.50	D		1.40			Firm brown silty sandy CLAY
		2.00	SPT	N=17 (1,2/2,3,5,7)				
		2.45	SPTLS		2.30			Stiff brown sandy very gravelly CLAY. Gravel is fine to coarse sub-angular top rounded of flint.
		3.00 - 3.45	B					
	Water Added =2000 l	3.00	SPT	N=29 (3,4/6,8,7,8)	3.20			Medium dense to dense brown slightly silty sandy fine to coarse sub-angular to rounded GRAVEL of flint
		4.00	SPT	N=31 (4,4/7,7,8,9)				
		4.45	SPTLS					
		5.00	SPT	N=26 (3,4/6,6,7,7)				
		5.45	SPTLS					
		5.80	D		5.70			Stiff brown silty CLAY
		6.00	SPT	N=27 (3,4/6,7,7,7)	5.90			Stiff to very stiff, high strength, grey silty CLAY
		6.45	SPTLS					
		7.00	SPT	N=29 (4,4/7,8,7,7)				
		7.45	SPTLS					
		8.00	SPT	N=30 (4,5/7,7,8,8)				
		8.45	SPTLS					
		9.00	SPT	N=32 (4,5/8,8,8,8)				
		9.45	SPTLS					
		10.00 - 10.45	U	Ublow=100				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
30.50	200	10.00 12.00	200 150	0.00	1.00	01:00					

Remarks

Percussion Drilling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 19/05/2025 - 20/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Star Drilling - PL	Drilling Equipment: Dando 150

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH1	CP		ac	1:50	Sheet 2 of 4

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		10.50	D		10.60			Stiff becoming very stiff, high strength, grey silty CLAY
		11.00	D					Stiff to very stiff, high strength, becoming very stiff fissured grey silty CLAY
		12.00	SPT	N=29 (3,4/6,7,8,8)				
		12.45	SPTLS					
		13.00	D					
		14.00	SPT	N=30 (4,4/6,7,8,9)				
		14.45	SPTLS					
		15.10	D					
		16.00	SPT	N=30 (4,5/7,7,8,8)				
		16.45	SPTLS					
		17.20	D					
		18.00 - 18.45	U	Ublow=100				
		18.50	D					
		19.20	D					
		20.00	SPT	N=29 (5,5/8,7,7,7)				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
30.50	200	10.00 12.00	200 150	0.00	1.00	01:00					

Remarks

Percussion Drilling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 19/05/2025 - 20/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Star Drilling - PL	Drilling Equipment: Dando 150

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH1	CP		ac	1:50	Sheet 3 of 4

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		20.45	SPTLS					Stiff to very stiff, high strength, becoming very stiff fissured grey silty CLAY
		21.10	D					
		22.00	SPT	N=30 (4,5/7,8,6,9)				
		22.45	SPTLS					
		23.10	D					
		24.00	SPT	N=30 (5,5/8,7,7,8)				
		24.45	SPTLS					
		25.20	D					
		26.00 - 26.45	U	Ublow=120				
		26.50	D					
		27.10	D					
		28.00	SPT	N=38 (4,5/8,9,10,11)				
		28.45	SPTLS					
		29.20	D					
		29.50	D					

21 22 23 24 25 26 27 28 29 30

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
30.50	200	10.00 12.00	200 150	0.00	1.00	01:00					

Remarks

Percussion Drilling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 19/05/2025 - 20/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Star Drilling - PL	Drilling Equipment: Dando 150

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH1	CP		ac	1:50	Sheet 4 of 4

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=46 (5,5/9,11,12,14)				Stiff to very stiff, high strength, becoming very stiff fissured grey silty CLAY
		30.45	SPTLS		30.50			End of Borehole at 30.500m

31 32 33 34 35 36 37 38 39 40

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
30.50	200	10.00 12.00	200 150	0.00	1.00	01:00					

Remarks

AGS

Percussion Drilling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 20/05/2025 - 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Star Drilling - PL	Drilling Equipment: Dando 150

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH2	CP		ac	1:50	Sheet 1 of 4

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
								Tarmac over concrete
					0.40			Brick cobbles and coarse rounded gravel and cobbles of flint. MADE GROUND
		0.80	D		0.90			
		1.00 - 1.45	U	Ublow=75	1.00			Stiff brown silty sandy CLAY with roots
								Stiff, high strength, brown silty sandy CLAY
	Water Added =2000 l	1.50	D		1.50			Medium dense and dense brown slightly silty sandy fine to coarse sub-angular to rounded GRAVEL of flint
		2.00 - 2.45	B					
		2.00	SPT	N=25 (3,3/5,7,6,7)				
		3.00	ES					
		3.00 - 3.45	B					
		3.00	SPT	N=38 (4,4/7,9,10,12)				
		4.00	SPT	N=41 (4,5/8,9,11,13)				
		4.45	SPTLS					
		5.00	SPT	N=28 (4,4/7,6,8,7)				
		5.45	SPTLS					
		5.70	D		5.60			Stiff brown silty CLAY
		6.00	SPT	N=28 (3,4/6,7,7,8)				
		6.45	SPTLS					
		7.00	SPT	N=29 (2,3/6,7,8,8)				
		7.45	SPTLS					
		8.00 - 8.45	U	Ublow=100				
		8.50	D					
		9.00	SPT	N=21 (3,3/5,4,5,7)				
		9.45	SPTLS		9.50			Stiff, high strength, grey silty CLAY
		10.00	SPT	N=24 (4,5/5,5,7,7)				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
30.50	200	10.00 12.00	200 150	0.00 9.50	1.00 9.70	01:00 01:00					

Remarks

Percussion Drilling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 20/05/2025 - 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Star Drilling - PL	Drilling Equipment: Dando 150

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH2	CP		ac	1:50	Sheet 2 of 4

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Stiff, high strength, grey silty CLAY
		10.45	SPTLS					
		11.00	D					
		12.00	SPT	N=28 (4,4/6,7,8,7)				
		12.45	SPTLS					
		13.00	D					
		14.00 - 14.45	U	Ublow=105				
		14.50	D					
		15.20	D					
		16.00	SPT	N=29 (4,4/6,7,7,9)				
		16.45	SPTLS					
		17.20	D					
		18.00	SPT	N=32 (4,5/7,8,9,8)	18.00			Very stiff, high strength, grey fissured silty CLAY
		18.45	SPTLS					
		19.20	D					
		20.00 - 20.45	U	Ublow=110				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
30.50	200	10.00 12.00	200 150	0.00 9.50	1.00 9.70	01:00 01:00					

Remarks

Percussion Drilling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 20/05/2025 - 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Star Drilling - PL	Drilling Equipment: Dando 150

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH2	CP		ac	1:50	Sheet 3 of 4

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Very stiff, high strength, grey fissured silty CLAY	
		20.50	D						
		21.00	D						21
		22.00	SPT	N=31 (5,5/8,7,8,8)					22
		22.45	SPTLS						
		23.00	D						23
		24.00	SPT	N=32 (4,5/7,8,8,9)					24
		24.45	SPTLS						
		25.00	D						25
		26.00	SPT	N=34 (4,5/8,8,9,9)					26
		26.45	SPTLS						
		27.00	D						27
		28.00	SPT	N=35 (5,5/8,7,9,11)					28
		28.45	SPTLS						
		29.00	D						29
									30

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
30.50	200	10.00	200	0.00	1.00	01:00					
		12.00	150	9.50	9.70	01:00					

Remarks

AGS

Percussion Drilling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 20/05/2025 - 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Star Drilling - PL	Drilling Equipment: Dando 150

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH2	CP		ac	1:50	Sheet 4 of 4

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	SPT	N=33 (4,5/7,8,8,10)				Very stiff, high strength, grey fissured silty CLAY
		30.45	SPTL S		30.50			End of Borehole at 30.500m

31 32 33 34 35 36 37 38 39 40

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
30.50	200	10.00 12.00	200 150	0.00 9.50	1.00 9.70	01:00 01:00					

Remarks

AGS

Windowless Sampling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Geospek - DO	Drilling Equipment: Archway Dart

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS1	WS		ac	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05			Tarmac
		0.50	ES					Soft brown silty sandy gravelly clay. Gravel is fine to medium angular to rounded of flint and coarse limestone (MOT Type 1). Occasional sub-angular fine to medium brick and cobbles of concrete. MADE GROUND.
		1.00	D					
		1.00	SPT	N=7 (1,1/1,2,2,2)	1.10			Soft light brown silty sandy gravelly CLAY. Gravel is fine to coarse sub-angular to rounded of flint.
		1.50	D					
		1.50	PP	4.50				
		1.75	PP	2.60				
		2.00	D		1.90			
		2.00	SPT	50 (25 for 125mm/50 for 180mm)	2.00			Very dense light brown slightly clayey sandy fine to medium angular to rounded GRAVEL of flint.
								End of Borehole at 2.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater not encountered. 50mm diameter standpipe installed to 1.9m

Windowless Sampling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Geospek - DO	Drilling Equipment: Archway Dart

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS2	WS		ac	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.05			Tarmac
					0.70			Soft brown silty sandy gravelly clay. Gravel is fine to medium angular to rounded of flint and coarse limestone (MOT Type 1). Occasional sub-angular fine to medium brick and cobbles of concrete. MADE GROUND.
		1.00	D					Soft to firm light brown very silty very sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to rounded of flint.
		1.00	SPT	N=8 (1,1/1,2,2,3)				
		1.25	PP	11.00				
		1.50	D					
		1.50	PP	11.00				
		1.75	PP	10.00				
		2.00	D		2.00			Very dense light brown slightly clayey sandy fine to coarse angular to rounded GRAVEL of flint.
		2.00	PP	7.30	2.00			End of Borehole at 2.000m
		2.00	SPT	48 (10,14/48 for 170mm)				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater not encountered. 50mm diameter standpipe installed to 1.9m

Windowless Sampling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Geospek - DO	Drilling Equipment: Archway Dart

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS3	WS		ac	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05			Tarmac
		0.30	ES					Stiff brown silty sandy gravelly clay. Gravel is fine to medium angular to rounded of flint and coarse limestone (MOT Type 1). Occasional sub-angular fine to medium brick and cobbles of concrete. Rootlets. MADE GROUND.
		1.00	D		0.90			Firm to stiff light brown very silty very sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to rounded of flint. Rootlets to 1.6m
		1.00	SPT	N=16 (3,2/3,5,4,4)				
		1.50	D					
		2.00	D		1.90			Very dense light brown slightly clayey sandy fine to coarse angular to rounded GRAVEL of flint.
		2.00	SPT	50 (25 for 115mm/50 for 155mm)	2.00			End of Borehole at 2.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater not encountered.

Windowless Sampling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Geospek - DO	Drilling Equipment: Archway Dart

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS4	WS		ac	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05			Tarmac
		0.80	ES		0.70			Stiff brown silty sandy gravelly clay. Gravel is fine to medium angular to rounded of flint and coarse limestone (MOT Type 1). Occasional sub-angular fine to coarse brick and cobbles of concrete. MADE GROUND.
		1.00	D					Stiff light brown very silty very sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to rounded of flint. Rootlets to 1.4m.
		1.00	SPT	N=23 (5,5/4,5,6,8)				
		1.20	ES					
		1.50	D					
		1.60	SPT	50 (25 for 115mm/50 for 170mm)				
					1.90			
		2.00	D		2.00			Very dense light brown slightly clayey sandy fine to medium angular to rounded GRAVEL of flint.
								End of Borehole at 2.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater not encountered.

Windowless Sampling Log

Project Name: Yiewsley Library and Car Park	Client: Bugler Developments Limited	Date: 21/05/2025
Location: Falling Lane / High Street, Hillingdon, UB7 7BE	Contractor:	
Project No. : 25-154.01	Crew Name: Geospek - DO	Drilling Equipment: Archwaty Dart

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS5	WS		ac	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05			Tarmac Firm brown silty sandy gravelly clay. Gravel is fine to medium angular to rounded of flint and coarse of limestone (MOT Type 1). Occasional sub-angular fine to medium brick and cobbles of concrete. MADE GROUND.
		1.00	SPT	N=13 (3,2/2,3,3,5)				
		1.30	ES					
		1.50	D					
		1.60	SPT	50 (25 for 95mm/50 for 135mm)				
					1.90			Very dense light brown slightly clayey sandy fine to coarse angular to rounded GRAVEL of flint.
					2.00			End of Borehole at 2.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater not encountered. 50mm diameter standpipe installed to 2.0m

Exploratory Hole Photos

Project Number 25-154.01 **Project Title** Yiewsley Library, Falling Lane/Highstreer, Hillingdon, UB7 7BE **Taken by** AC **Date** 21/05/2025

WS1 arisings

WS2 arisings

WS3 arisings

WS4 arisings

WS5 arisings

Appendix

II Field Monitoring Results

MONITORING DATA SHEET

SITE Yiewsley Library and Car Park, Falling Lane, Hillingdon, UB7 7BE
PROJECT 25-154.01

VISIT NUMBER 1
DATE 09/06/2025

EQUIPMENT GFM435 + MiniRAE
TAKEN BY AC

Record of Stable Concentrations										Interpretation		
Location	Time	Flow (l/h)	CH4 (% v/v)	CO2 (% v/v)	O2 (% v/v)	Baro. Prs. (mB)	PID (ppm)	Water (m bgl)	Base Well (m bgl)	CH4 GSV (l/h)	CO2 GSV (l/h)	CS
Site	09:21	n/a	0.0	0.0	20.4	1016	0.0	n/a	n/a	n/a	n/a	n/a
WS1	09:32	0.0	0.0	6.5	14.2	1016	0.8	Dry	1.95	0	0	CS-1
WS2	09:27	0.0	0.0	1.8	17.1	1016	0.0	1.83	1.99	0	0	CS-1
WS5	09:40	0.0	0.0	0.9	18.9	1016	0.0	Dry	1.32	0	0	CS-1

Weather Observations					
State of Ground	Cloud Cover	Wind	Rain	Air Temperature °C	
Dry	Clear	Calm	None	Before	16
Moist	Sunny	Light	Slight		
Wet	Slight	Moderate	Moderate	After	16
Snow	Cloudy	Strong	Heavy		
Frozen	Overcast				
	Fog/Mist				

Pressure Observations			
Source	Pressure Records		Trend
Metoffice	Location	**Hillingdon**	Falling
GFM435	Time	**6:00am**	Steady
	Pressure	**1022**	Rising

Notes	
Worst case conditions? (<1000mB and Falling)	No

Aviron Associates Limited
Badgemore House - Badgemore Park - Gravel Hill - Henley on Thames - RG9 4NR
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MONITORING DATA SHEET

SITE Yiewsley Library and Car Park, Falling Lane, Hillingdon, UB7 7BE
PROJECT 25-154.01

VISIT NUMBER 2
DATE 17/06/2025

EQUIPMENT GFM435 + MiniRAE
TAKEN BY OC

Record of Stable Concentrations										Interpretation		
Location	Time	Flow (l/h)	CH4 (% v/v)	CO2 (% v/v)	O2 (% v/v)	Baro. Prs. (mB)	PID (ppm)	Water (m bgl)	Base Well (m bgl)	CH4 GSV (l/h)	CO2 GSV (l/h)	CS
Site	14:53	n/a	0.0	0.0	20.4	1024	0.0	n/a	n/a	n/a	n/a	n/a
WS1	14:56	0.0	0.0	5.6	15.0	1024	0.2	Dry	1.95	0	0	CS-1
WS2	15:05	0.0	0.0	2.1	17.0	1024	0.0	Dry	1.99	0	0	CS-1
WS5	15:10	0.0	0.0	0.5	19.3	1024	0.0	Dry	1.32	0	0	CS-1

Weather Observations					
State of Ground	Cloud Cover	Wind	Rain	Air Temperature °C	
Dry	Clear	Calm	None	Before	16
Moist	Sunny	Light	Slight		
Wet	Slight	Moderate	Moderate	After	16
Snow	Cloudy	Strong	Heavy		
Frozen	Overcast				
	Fog/Mist				

Pressure Observations			
Source	Pressure Records		Trend
Metoffice	Location	**Henley**	Falling
GFM435	Time	**9:00am**	Steady
	Pressure	**1026mB**	Rising

Notes	
Worst case conditions? (<1000mB and Falling)	No

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Appendix

III Soil Contamination Results and Assessment Criteria

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Analytical Report Number : 25-026754

Project / Site name:	Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE	**Samples received on:**	22/05/2025
Your job number:	25 154 01	**Samples instructed on/ Analysis started on:**	22/05/2025
Your order number:	25 154 01	**Analysis completed by:**	29/05/2025
Report Issue Number:	1	**Report issued on:**	29/05/2025
Samples Analysed:	4 soil samples		

Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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

Analytical Report Number: 25-026754
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555813	555814	555815	555816
Sample Reference				BH2	BH2	BH2	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				3	8.5	16.45	30.45
Date Sampled				21/05/2025	21/05/2025	21/05/2025	21/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**				
Stone Content	%	0.1	NONE	67.6	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	3.5	17	17	15
Total mass of sample received	kg	0.1	NONE	0.6	0.5	0.5	0.6

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.6	8.3	8.2	8.6
Total Sulphate as SO_4	mg/kg	50	MCERTS	98	490	620	670
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	31	530	700	730
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0156	0.266	0.35	0.364
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	15.6	266	350	364
Total Sulphur	mg/kg	50	MCERTS	120	4900	3700	4000

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-026754
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
555813	BH2	None Supplied	3	Brown gravelly sand with stones
555814	BH2	None Supplied	8.5	Brown clay
555815	BH2	None Supplied	16.45	Brown clay
555816	BH2	None Supplied	30.45	Brown clay

Analytical Report Number : 25-026754
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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Analytical Report Number : 25-026761

Project / Site name:	Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE	**Samples received on:**	22/05/2025
Your job number:	25 154 01	**Samples instructed on/ Analysis started on:**	22/05/2025
Your order number:	25 154 01	**Analysis completed by:**	03/06/2025
Report Issue Number:	1	**Report issued on:**	04/06/2025
Samples Analysed:	12 soil samples		

Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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

Analytical Report Number: 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555845	555846	555847	555848	555849
Sample Reference				WS1	WS1	WS2	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.5	1.2	0.2	0.3	0.2
Date Sampled				21/05/2025	21/05/2025	21/05/2025	21/05/2025	21/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	39.1	< 0.1	46.8
Moisture Content	%	0.01	NONE	17	16	20	9.9	7.1
Total mass of sample received	kg	0.1	NONE	0.2	0.2	0.1	0.2	0.2
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PDO	PDO	-	PDO	PDO
Analysis completed	N/A	N/A	N/A	03/06/2025	03/06/2025	-	03/06/2025	03/06/2025
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	8.2	7.7	-	8.1	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	< 1.0
Total Sulphate as SO_4	mg/kg	50	MCERTS	900	460	-	350	420
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	260	160	-	33	69
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	130	79.7	-	16.4	34.6
Total Sulphur	mg/kg	50	MCERTS	760	190	-	170	180
Organic Matter (automated)	%	0.1	MCERTS	3.1	0.2	-	0.9	0.4
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.2	< 0.05	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.29	< 0.05	-	0.11	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.4	< 0.05	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.41	< 0.05	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	3.5	< 0.05	-	0.44	< 0.05
Anthracene	mg/kg	0.05	MCERTS	1.1	< 0.05	-	0.14	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	8.1	< 0.05	-	1.8	< 0.05
Pyrene	mg/kg	0.05	MCERTS	7.1	< 0.05	-	1.8	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.8	< 0.05	-	1.2	< 0.05
Chrysene	mg/kg	0.05	MCERTS	4.1	< 0.05	-	1.3	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	5.7	< 0.05	-	1.9	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	2.7	< 0.05	-	0.93	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	5.3	< 0.05	-	1.7	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.9	< 0.05	-	0.96	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.68	< 0.05	-	0.24	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.4	< 0.05	-	1.1	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	49.7	< 0.80	-	13.6	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	29	14	-	11	13
Boron (water soluble)	mg/kg	0.2	MCERTS	1	1.7	-	1.1	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3 **i	< 0.2	-	0.3	0.4

Analytical Report Number: 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555845	555846	555847	555848	555849
Sample Reference				WS1	WS1	WS2	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.5	1.2	0.2	0.3	0.2
Date Sampled				21/05/2025	21/05/2025	21/05/2025	21/05/2025	21/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24	37	-	25	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	90	23	-	25	30
Lead (aqua regia extractable)	mg/kg	1	MCERTS	180	18	-	50	79
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0.3	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	33	37	-	20	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.6	< 1.0	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	73	-	68	60
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	2.2	< 2.0	-	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	56	8.7	-	< 8.0	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	58	< 10	-	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	< 0.020	< 0.020	-	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	1.1	< 1.0	-	1.4	< 1.0
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	4.9	< 2.0	-	2.2	< 2.0
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	33	< 10	-	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	150	< 10	-	22	< 10
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	190	< 10	-	26	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	0.001	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	0.002	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	0.003	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	0.002	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	0.002	-	-
Total PCBs	mg/kg	0.007	MCERTS	-	-	0.009	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555850	555851	555852	555853	555854
Sample Reference				WS4	WS5	BH1	BH1	BH1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.8	1.3	0.6	2.45	5.45
Date Sampled				21/05/2025	21/05/2025	21/05/2025	21/05/2025	21/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	88.4
Moisture Content	%	0.01	NONE	7.9	10	17	15	1.5
Total mass of sample received	kg	0.1	NONE	0.2	0.2	0.1	0.4	0.8
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	PDO	PDO	-	-	-
Analysis completed	N/A	N/A	N/A	03/06/2025	03/06/2025	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	8.1	7.8	-	8.4	9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Total Sulphate as SO_4	mg/kg	50	MCERTS	400	890	-	590	51
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	100	240	-	61	16
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	0.0303	0.00817
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	30.3	8.17
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	51.9	119	-	-	-
Total Sulphur	mg/kg	50	MCERTS	130	320	-	220	93
Organic Matter (automated)	%	0.1	MCERTS	0.4	1.3	-	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.08	-	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.24	-	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.24	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.11	-	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.11	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.16	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.05	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.12	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.07	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.08	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	1.27	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	25	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	1.5	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.8	-	-	-

Analytical Report Number: 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555850	555851	555852	555853	555854
Sample Reference				WS4	WS5	BH1	BH1	BH1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.8	1.3	0.6	2.45	5.45
Date Sampled				21/05/2025	21/05/2025	21/05/2025	21/05/2025	21/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	24	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	69	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	13	320	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	32	24	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	56	55	-	-	-
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	-	-	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	-	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	< 0.020	< 0.020	-	-	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10	-	-	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10	-	-	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	< 10	-	-	-
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	-	-	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	-
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
Total PCBs	mg/kg	0.007	MCERTS	-	-	< 0.007	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555855	555856
Sample Reference				BH1	BH1
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				10.5	24.45
Date Sampled				21/05/2025	21/05/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	14
Total mass of sample received	kg	0.1	NONE	1.4	0.4
Asbestos					
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-
Asbestos Analyst ID	N/A	N/A	N/A	-	-
Analysis completed	N/A	N/A	N/A	-	-
General Inorganics					
pH (L099)	pH Units	N/A	MCERTS	8.4	8.5
Total Cyanide	mg/kg	1	MCERTS	-	-
Total Sulphate as SO_4	mg/kg	50	MCERTS	510	560
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	490	550
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.244	0.276
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	244	276
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-
Total Sulphur	mg/kg	50	MCERTS	3300	3200
Organic Matter (automated)	%	0.1	MCERTS	-	-
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-

Analytical Report Number: 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555855	555856
Sample Reference				BH1	BH1
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				10.5	24.45
Date Sampled				21/05/2025	21/05/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Petroleum Hydrocarbons					
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	-	-
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	-	-
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	-	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	-	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	-	-
VOCs					
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	-	-
Benzene	µg/kg	5	MCERTS	-	-
Toluene	µg/kg	5	MCERTS	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	-
p & m-Xylene	µg/kg	8	MCERTS	-	-
o-Xylene	µg/kg	5	MCERTS	-	-
PCBs by GC-MS					
PCB Congener 28	mg/kg	0.001	MCERTS	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-
Total PCBs	mg/kg	0.007	MCERTS	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
555845	WS1	None Supplied	0.5	Brown clay and sand with gravel
555846	WS1	None Supplied	1.2	Brown clay with gravel
555847	WS2	None Supplied	0.2	Brown clay and loam with vegetation and stones
555848	WS3	None Supplied	0.3	Brown clay and loam with gravel and vegetation
555849	WS4	None Supplied	0.2	Brown clay and loam with vegetation and stones
555850	WS4	None Supplied	0.8	Brown clay with gravel
555851	WS5	None Supplied	1.3	Brown clay and sand with gravel
555852	BH1	None Supplied	0.6	Brown clay with gravel
555853	BH1	None Supplied	2.45	Brown clay with gravel
555854	BH1	None Supplied	5.45	Brown sand with gravel and stones
555855	BH1	None Supplied	10.5	Brown clay
555856	BH1	None Supplied	24.45	Brown clay

Analytical Report Number : 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

Analytical Report Number : 25-026761
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

**i- Data reported unaccredited - Sample affected by spectral interference from high As. Data reported with additional background correction applied

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Analytical Report Number : 25-026765

Project / Site name:	Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE	**Samples received on:**	22/05/2025
Your job number:	25 154 01	**Samples instructed on/ Analysis started on:**	22/05/2025
Your order number:	25 154 01	**Analysis completed by:**	30/05/2025
Report Issue Number:	1	**Report issued on:**	30/05/2025
Samples Analysed:	1 soil sample - 1 leachate sample		

Signed:

Charlotte Hall
Customer Service Advisor
For & on behalf of i2 Analytical Ltd.

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

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

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

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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

Analytical Report Number: 25-026765
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555857
Sample Reference				COMP1
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				0.30-0.50
Date Sampled				21/05/2025
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
Stone Content	%	0.1	NONE	35.4
Moisture Content	%	0.01	NONE	14
Total mass of sample received	kg	0.1	NONE	0.1
General Inorganics				
pH (L005B)	pH Units	N/A	MCERTS	7.8
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1.2
Loss on Ignition @ 450°C	%	0.2	MCERTS	3.6
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	1.9
Speciated PAHs				
Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.11
Acenaphthene	mg/kg	0.05	MCERTS	0.06
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.8
Anthracene	mg/kg	0.05	MCERTS	0.19
Fluoranthene	mg/kg	0.05	MCERTS	2.4
Pyrene	mg/kg	0.05	MCERTS	2.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.3
Chrysene	mg/kg	0.05	MCERTS	1.4
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.9
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.9
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.92
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.16
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1
Coronene	mg/kg	0.05	NONE	0.39
Total PAH				
Total WAC-17 PAHs	mg/kg	0.85	NONE	15.3
Petroleum Hydrocarbons				
Mineral Oil (EC10 - EC40) EH_CU_1D_AL	mg/kg	10	NONE	< 10
VOCs				
Benzene	µg/kg	5	MCERTS	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0
Total BTEX	µg/kg	10	MCERTS	< 10
PCBs by GC-MS				
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001

Analytical Report Number: 25-026765
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE
Your Order No: 25 154 01

Lab Sample Number				555857
Sample Reference				COMP1
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				0.30-0.50
Date Sampled				21/05/2025
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Croxley Green Business Park
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Waste Acceptance Criteria Analytical Results

Report No:	**25-026765**						
					Client:	**Aviron Associates Ltd**	
Location	**Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE**						
Lab Reference (Sample Number)	555857				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	21/05/2025				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	COMP1						
Depth (m)	0.30-0.50						
Solid Waste Analysis							
TOC (%)**	1.2				3%	5%	6%
Loss on Ignition (%) **	3.6				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	15.3				100	--	--
pH (units)**	7.8				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	1.9				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00756			0.0756	0.5	2	25
Barium *	0.0122			0.122	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0022			0.022	0.5	10	70
Copper *	0.005			0.05	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00321			0.0321	0.5	10	30
Nickel *	0.0015			0.015	0.4	10	40
Lead *	0.01			0.1	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0099			0.099	4	50	200
Chloride *	2			20	800	15000	25000
Fluoride*	0.41			4.1	10	150	500
Sulphate *	20			200	1000	20000	50000
TDS*	65			650	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	6.36			63.6	500	800	1000
Leach Test Information							
Stone Content (%)	35.4						
Sample Mass (kg)	0.1						
Dry Matter (%)	86						
Moisture (%)	14						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

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

Analytical Report Number : 25-026765
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
555857	COMP1	None Supplied	0.30-0.50	Brown loam and clay with vegetation and stones

Analytical Report Number : 25-026765
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
One stage WAC 10:1 leachate preparation	One stage batch test at a liquid to solid ratio of 10 L/kg	BS EN 12457-2-2002	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025

Analytical Report Number : 25-026765
Project / Site name: Yiewsley Library Car Park, Falling Lane, Hillingdon, UB7 7BE

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Residential with Homegrown Produce
Soil Screening Values
Private Gardens

Determinant	1% SOM (mg/kg)	2.5% SOM (mg/kg)	6% SOM (mg/kg)	Criteria
METALS, SEMI-METALS, INROGANICS + PAH				
Arsenic	37	37	37	C4SL/LQM S4UL
Boron	290	290	290	LQM S4UL
Cadmium	11	11	11	LQM S4UL
Chromium III	910	910	910	LQM S4UL
Chromium IV	6	6	6	LQM S4UL
Copper	2,400	2,400	2,400	LQM S4UL
Mercury	1.2	1.2	1.2	LQM S4UL
Nickel	180	180	180	LQM S4UL
Lead	200	200	200	LQM S4UL
Selenium	250	250	250	LQM S4UL
Zinc	3,700	3,700	3,700	LQM S4UL
Free Cyanide	34	34	34	ATRISK
Acenaphthene	210	510	1100	LQM S4UL
Acenaphthylene	170	420	920	LQM S4UL
Anthracene	2,400	5,400	11,000	LQM S4UL
Benzo(a)anthracene	7.2	11	13	LQM S4UL
Benzo(a)pyrene	2.2	2.7	3	LQM S4UL
Benzo(b)fluoranthene	2.6	3.3	3.7	LQM S4UL
Benzo(ghi)perylene	320	340	350	LQM S4UL
Benzo(k)fluoranthene	77	93	100	LQM S4UL
Chrysene	15	22	27	LQM S4UL
Dibenz(ah)anthracene	0.24	0.28	0.3	LQM S4UL
Fluoranthene	280	560	890	LQM S4UL
Fluorene	170	400	860	LQM S4UL
Indeno(123-cd)pyrene	27	36	41	LQM S4UL
Naphthalene	2.3	5.6	13	LQM S4UL
Phenanthrene	95	220	440	LQM S4UL
Pyrene	620	1,200	2,000	LQM S4UL
Phenols	280	550	1,100	LQM S4UL
TOTAL PETROLEUM HYDOCARBONS				
Benzene	0.087	0.17	0.37	LQM S4UL
Toluene	130	290	660	LQM S4UL
Ethlybenzene	47	110	260	LQM S4UL
o-xylene	60	140	330	LQM S4UL
m-xylene	59	140	320	LQM S4UL
p-xylene	56	130	310	LQM S4UL
Aliphatic EC 5-6	42	78	160	LQM S4UL
Aliphatic EC >6-8	100	230	530	LQM S4UL
Aliphatic EC >8-10	27	65	150	LQM S4UL
Aliphatic EC >10-12	130	330	760	LQM S4UL
Aliphatic EC >12-16	1,100	2,400	4,300	LQM S4UL
Aliphatic EC >16-35	65,000	92,000	110,000	LQM S4UL
Aliphatic EC >35-44	65,000	92,000	110,000	LQM S4UL
Aromatic EC 5-7 (benzene)	70	140	300	LQM S4UL
Aromatic EC >7-8 (toluene)	130	290	660	LQM S4UL
Aromatic EC >8-10	34	83	190	LQM S4UL
Aromatic EC >10-12	74	180	380	LQM S4UL
Aromatic EC >12-16	140	330	660	LQM S4UL
Aromatic EC >16-21	260	540	930	LQM S4UL
Aromatic EC >21-35	1,100	1,500	1,700	LQM S4UL
Aromatic EC >35-44	1,100	1,500	1,700	LQM S4UL
Aromatic EC >44-70	1,600	1,800	1,900	LQM S4UL
ASBESTOS				
None Detectable			Aviron Adopted Value	

Appendix

IV Soil Geotechnical Results

Laboratory Report

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES A PHENNA GROUP COMPANY

Contract Number: 78927

Client Ref: **25-154.01**
Client PO: **25-154.01**

Date Received: **30-05-2025**
Date Completed: **17-06-2025**
Report Date: **17-06-2025**

Client: **Aviron Associates LTD**

This report has been checked and approved by:

Contract Title: **Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**
For the attention of: **Orlando**

Shaun Jones
Laboratory manager

Description	Qty
Determination of water content BS EN ISO 17892-1:2014 - @ Non Accredited Test	14
4 Point Liquid & Plastic Limit.. BS EN ISO 17892-12 - * UKAS	14
Particle Size Distribution BS EN ISO 17892-4 : 5.1 - * UKAS	3
Quick Undrained Triaxial Compression test - single specimen at one confining pressure (100mm or 38mm diameter) BS 1377:1990 - Part 7 : 8 - * UKAS	8

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Brendan Evans (Senior Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (HR & HSE Manager)

GEO Site & Testing Services Ltd
Unit 3-4 Heol Aur, Dafen Ind Est, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784 040 Fax: 01554 784 040 info@gstl.co.uk https://gstl.co.uk

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX** **BS EN ISO 17892-12:2018+A2:2022 4 Point Liquid Limit** **BS EN ISO 17892-1:2014+A1:2022 Determination of Water Content**	
Contract Number	78927	
Project Name	Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE	
Date Tested	14/06/2025	
	DESCRIPTIONS	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
BH1		U	1.00	-	1.45	Brown fine to medium gravelly slightly sandy silty CLAY
BH1		D	5.80	-		Brown fine to medium gravelly silty CLAY
BH1		U	10.00	-	10.45	Brown fine to medium gravelly silty CLAY
BH1		U	18.00	-	18.45	Brown silty CLAY
BH1		U	26.00	-	26.45	Brown fine to medium gravelly silty CLAY
BH2		U	1.00	-	1.45	Brown fine to medium gravelly silty sandy CLAY
BH2		U	8.00	-	8.45	Brown fine to medium gravelly silty CLAY
BH2		U	14.00	-	14.45	Brown silty CLAY
BH2		U	20.00	-	20.45	Brown fine to medium gravelly silty CLAY
BH2		D	29.00	-		Brown silty CLAY
WS2		D	1.00	-		Brown fine to medium gravelly sandy silty CLAY
WS2		D	1.50	-		Brown fine to medium gravelly sandy silty CLAY
WS2		D	2.00	-		Brown fine to medium gravelly sandy silty CLAY
WS4		D	1.00	-		Brown fine to medium gravelly silty sandy CLAY
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		

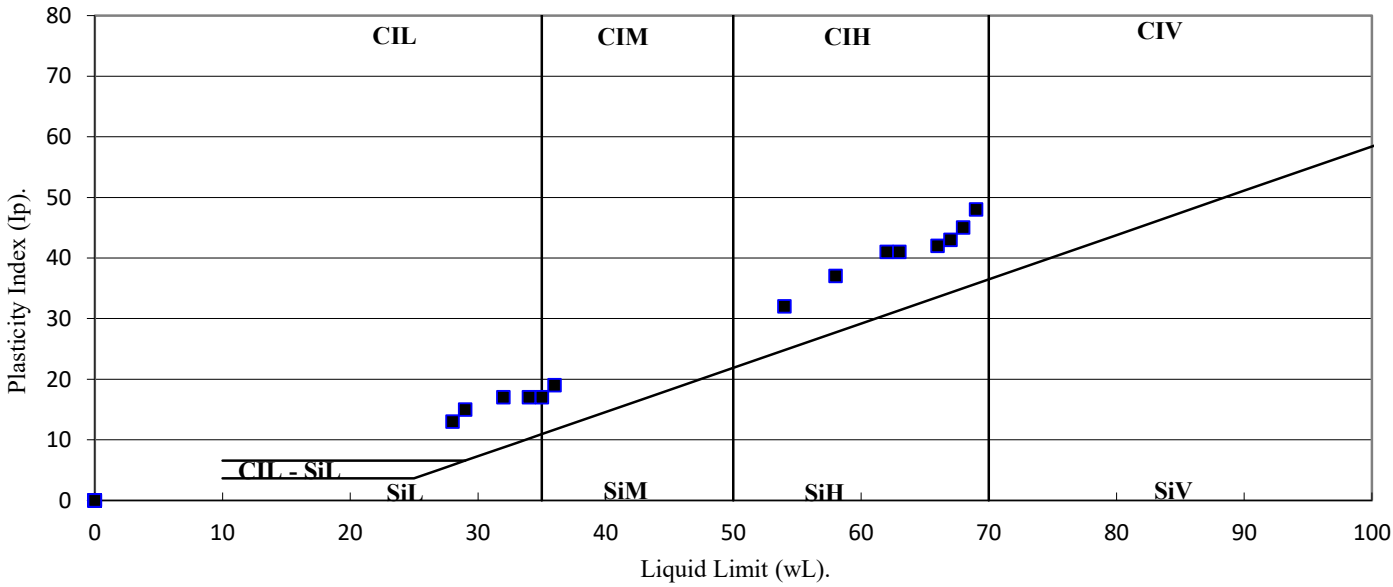
Operator
Owain. D

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX BS EN ISO 17892-12:2018+A2:2022 4 Point Liquid Limit BS EN ISO 17892-1:2014+A1:2022 Determination of Water Content	
Contract Number	78927	
Project Name	Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE	
Date Tested	14/06/2025	
Test Comments	80g/30° Fall cone used with increasing water content	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Water Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
BH1		U	1.00	-	1.45	23.1	35	18	17	91	CL/I Low/Inter. Plasticity
BH1		D	5.80	-		26.2	54	22	32	93	CH High Plasticity
BH1		U	10.00	-	10.45	24.7	58	21	37	93	CH High Plasticity
BH1		U	18.00	-	18.45	26.7	62	21	41	100	CH High Plasticity
BH1		U	26.00	-	26.45	24.2	69	21	48	96	CH High Plasticity
BH2		U	1.00	-	1.45	11.0	28	15	13	92	CL Low Plasticity
BH2		U	8.00	-	8.45	25.5	66	24	42	94	CH High Plasticity
BH2		U	14.00	-	14.45	25.3	68	23	45	100	CH High Plasticity
BH2		U	20.00	-	20.45	27.0	67	24	43	94	CH High Plasticity
BH2		D	29.00	-		25.3	63	22	41	100	CH High Plasticity
WS2		D	1.00	-		21.8	36	17	19	95	CI Intermediate Plasticity
WS2		D	1.50	-		17.8	32	15	17	92	CL Low Plasticity
WS2		D	2.00	-		19.5	34	17	17	90	CL Low Plasticity
WS4		D	1.00	-		11.2	29	14	15	95	CL Low Plasticity
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							

SYMBOLS : NP = Non Plastic **NB: All liquid limits are 4 point and wet sieved**

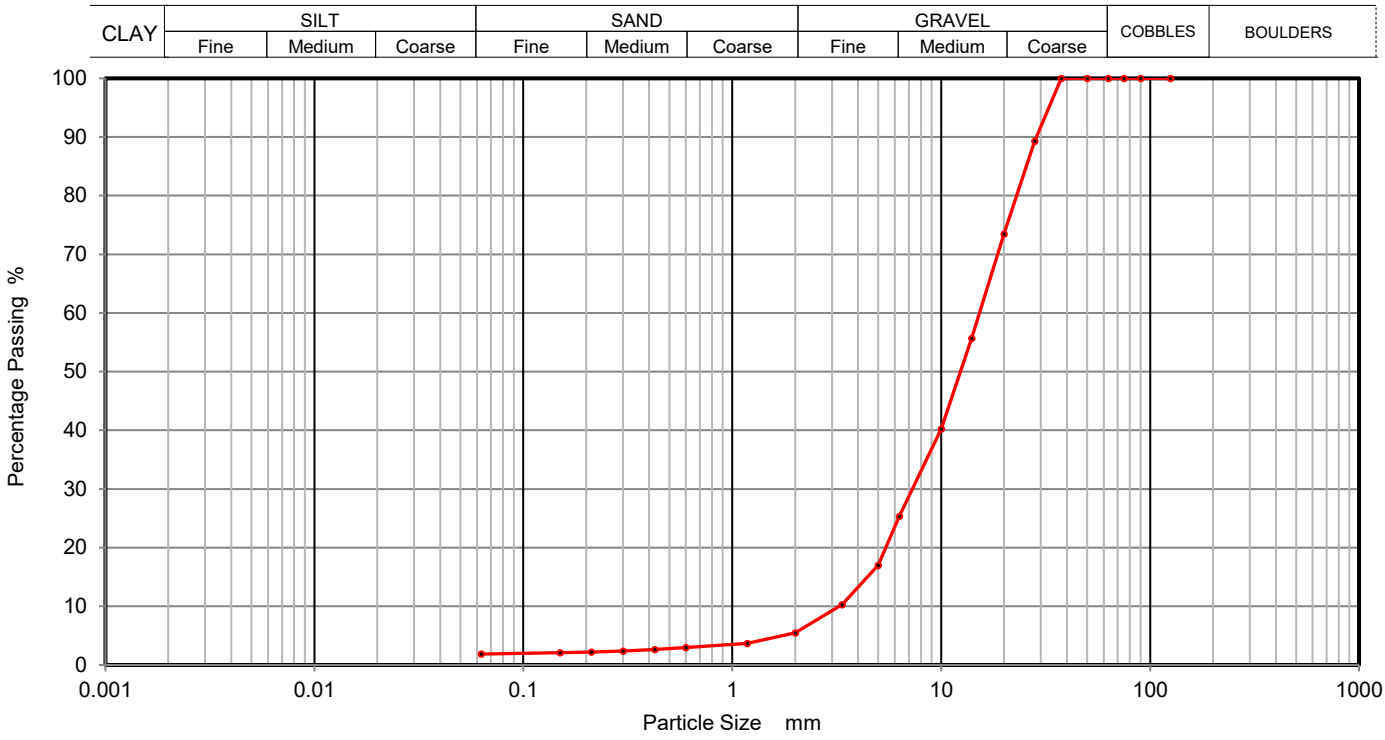
PLASTICITY CHART
BS EN ISO 14688-2:2018 Clause 4.4



***For sample descriptions please see sample descriptions sheet**

Operator
Owain. D

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS EN ISO 17892-4:2016 Wet Sieve, Clause 5.2**	Contract Number	**78927**
		Borehole/Pit No.	**BH1**
Project Name	**Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Sample No.	
Sample Description	Brown slightly silty/ clayey slightly sandy fine to coarse GRAVEL	Depth Top	**3.00**
		Depth Base	**3.45**
Date Tested	12/06/2025	Sample Type	**B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	89		
20	73		
14	56		
10	40		
6.3	25		
5	17		
3.35	10		
2	5		
1.18	4		
0.63	3		
0.425	3		
0.30	2		
0.20	2		
0.15	2		
0.063	2		

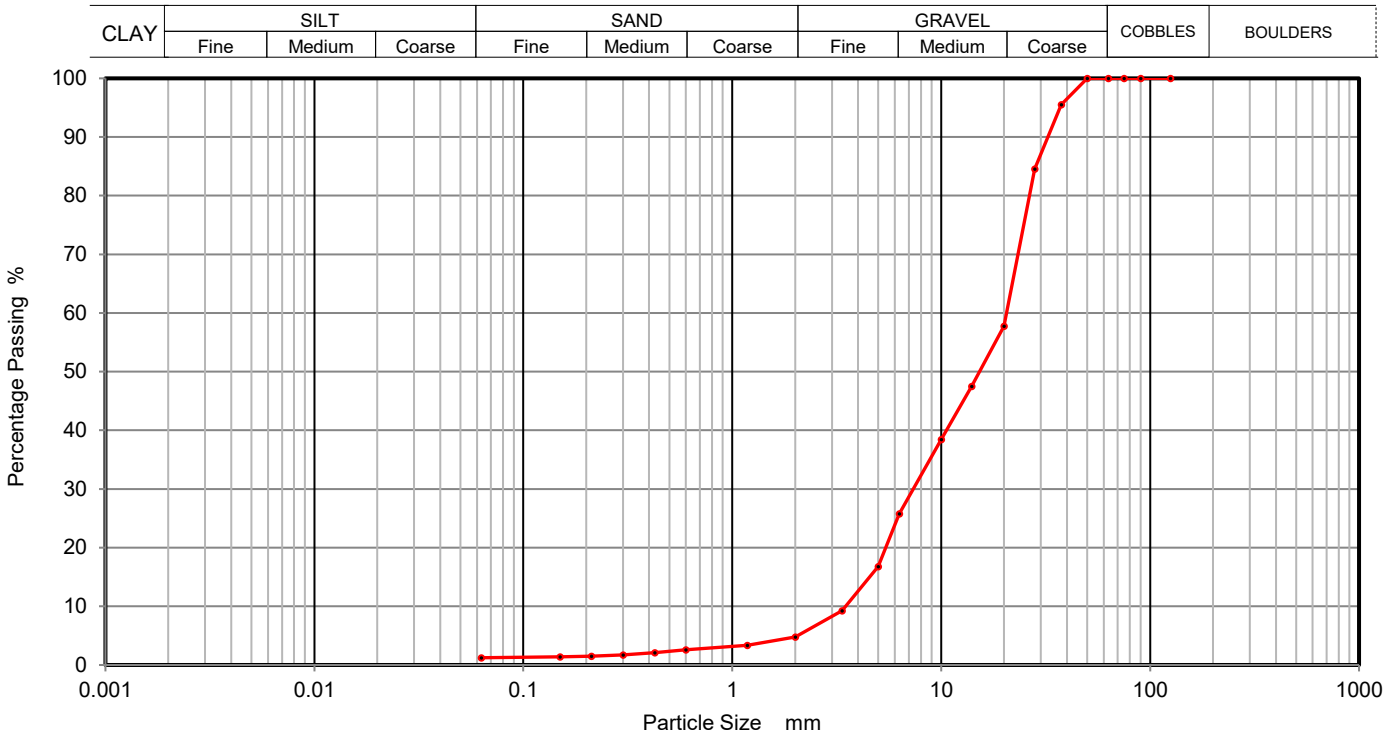
Sample Proportions	% dry mass
Cobbles	0
Gravel	95
Sand	3
Silt and Clay	2

Remarks

Preparation and testing in accordance with BS17892 unless noted below

Operator
Jordan. W

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS EN ISO 17892-4:2016 Wet Sieve, Clause 5.2**	Contract Number	**78927**
		Borehole/Pit No.	**BH2**
Project Name	**Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Sample No.	
Sample Description	Brown slightly silty/ clayey slightly sandy fine to coarse GRAVEL	Depth Top	**2.00**
		Depth Base	**2.45**
Date Tested	12/06/2025	Sample Type	**B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	96		
28	85		
20	58		
14	48		
10	38		
6.3	26		
5	17		
3.35	9		
2	5		
1.18	3		
0.63	3		
0.425	2		
0.30	2		
0.20	2		
0.15	1		
0.063	1		

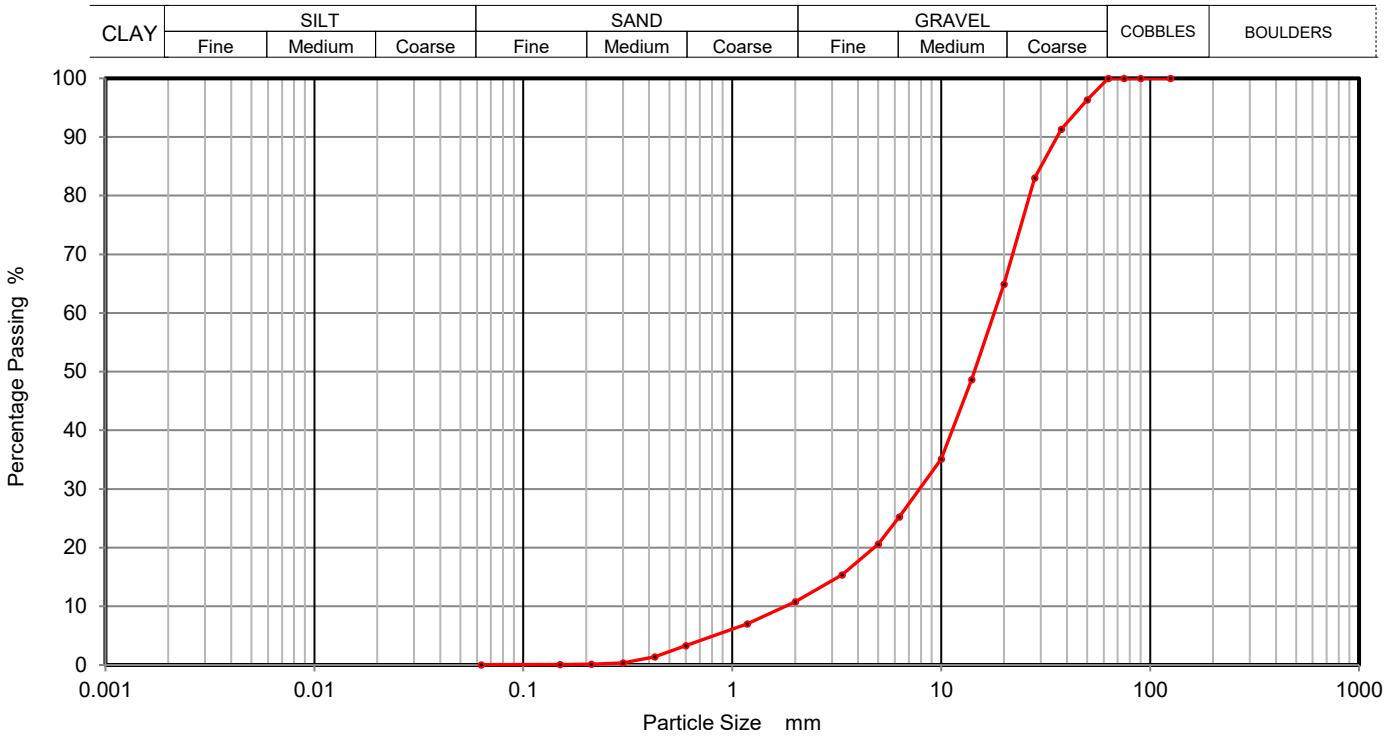
Sample Proportions	% dry mass
Cobbles	0
Gravel	95
Sand	4
Silt and Clay	1

Remarks

Preparation and testing in accordance with BS17892 unless noted below

Operator
Jordan. W

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS EN ISO 17892-4:2016 Wet Sieve, Clause 5.2**	Contract Number	**78927**
		Borehole/Pit No.	**BH2**
Project Name	**Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Sample No.	
Sample Description	Brown fine to coarse sandy fine to coarse GRAVEL	Depth Top	**3.00**
		Depth Base	**3.45**
Date Tested	12/06/2025	Sample Type	**B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	96		
37.5	91		
28	83		
20	65		
14	49		
10	35		
6.3	25		
5	21		
3.35	15		
2	11		
1.18	7		
0.63	3		
0.425	1		
0.30	0		
0.20	0		
0.15	0		
0.063	0		

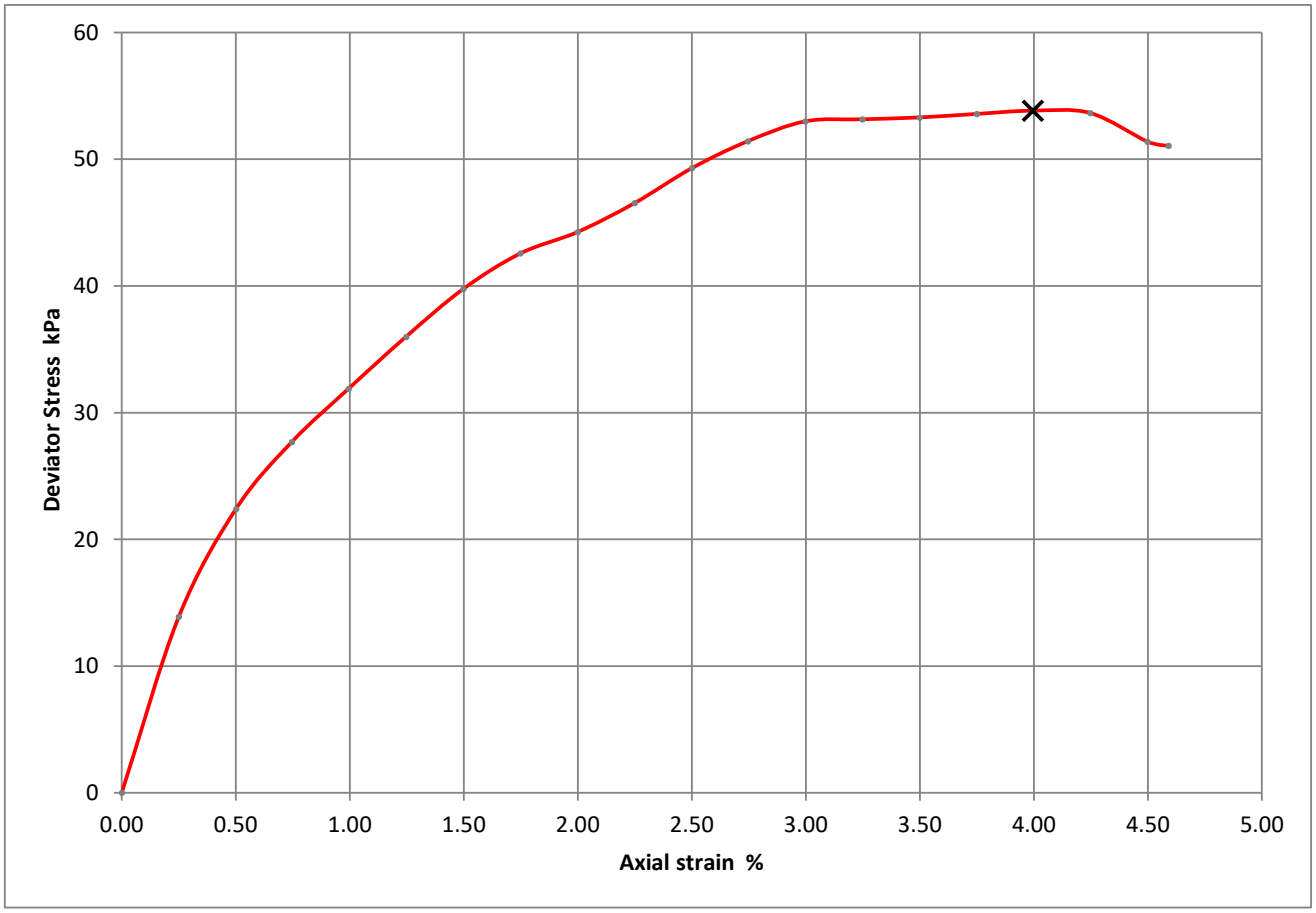
Sample Proportions	% dry mass
Cobbles	0
Gravel	89
Sand	11
Silt and Clay	0

Remarks

Preparation and testing in accordance with BS17892 unless noted below

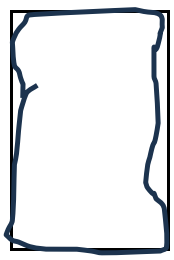
Operator
Jordan. W

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Single Stage Unconsolidated-Undrained Triaxial Test BS 1377 : 1990 Part 7 : 8**	Contract Number	78927
		Borehole/Pit No.	BH1
Project Name	Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE	Sample No.	
Soil Description	Brown silty sandy CLAY	Depth Top (m)	1.00
		Depth Base (m)	1.45
Date Tested	07/06/2025	Sample Type	U
		Operator	David. E



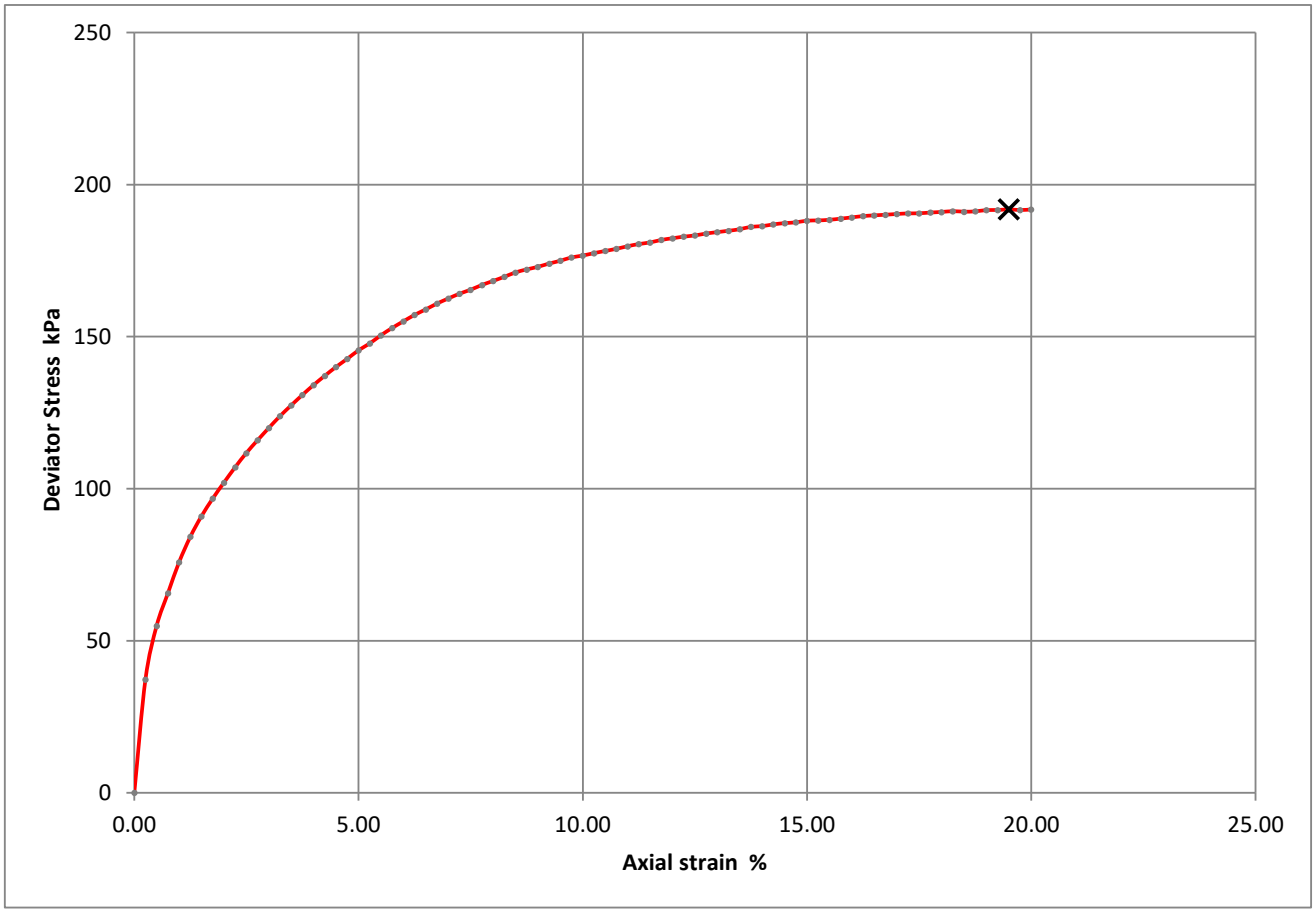
Moisture Content (%)	21
Bulk Density (Mg/m^3)	1.79
Dry Density (Mg/m^3)	1.48
Specimen Length (mm)	200.2
Specimen Diameter (mm)	104.3
Cell Pressure (kPa)	18
Deviator Stress (kPa)	54
Undrained Shear Strength (kPa)	27
Failure Strain (%)	4
Mode Of Failure	Plastic
Membrane Used/Thickness	Rubber/0.4mm
Rate of Strain (%/min)	1.37

Notes.



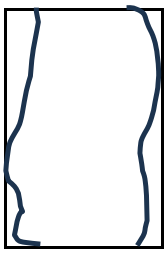
Failure Sketch.

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Single Stage Unconsolidated-Undrained Triaxial Test BS 1377 : 1990 Part 7 : 8**	Contract Number	78927
		Borehole/Pit No.	BH1
Project Name	Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE	Sample No.	
Soil Description	Brown silty CLAY	Depth Top (m)	10.00
		Depth Base (m)	10.45
Date Tested	06/06/2025	Sample Type	U
		Operator	David. E



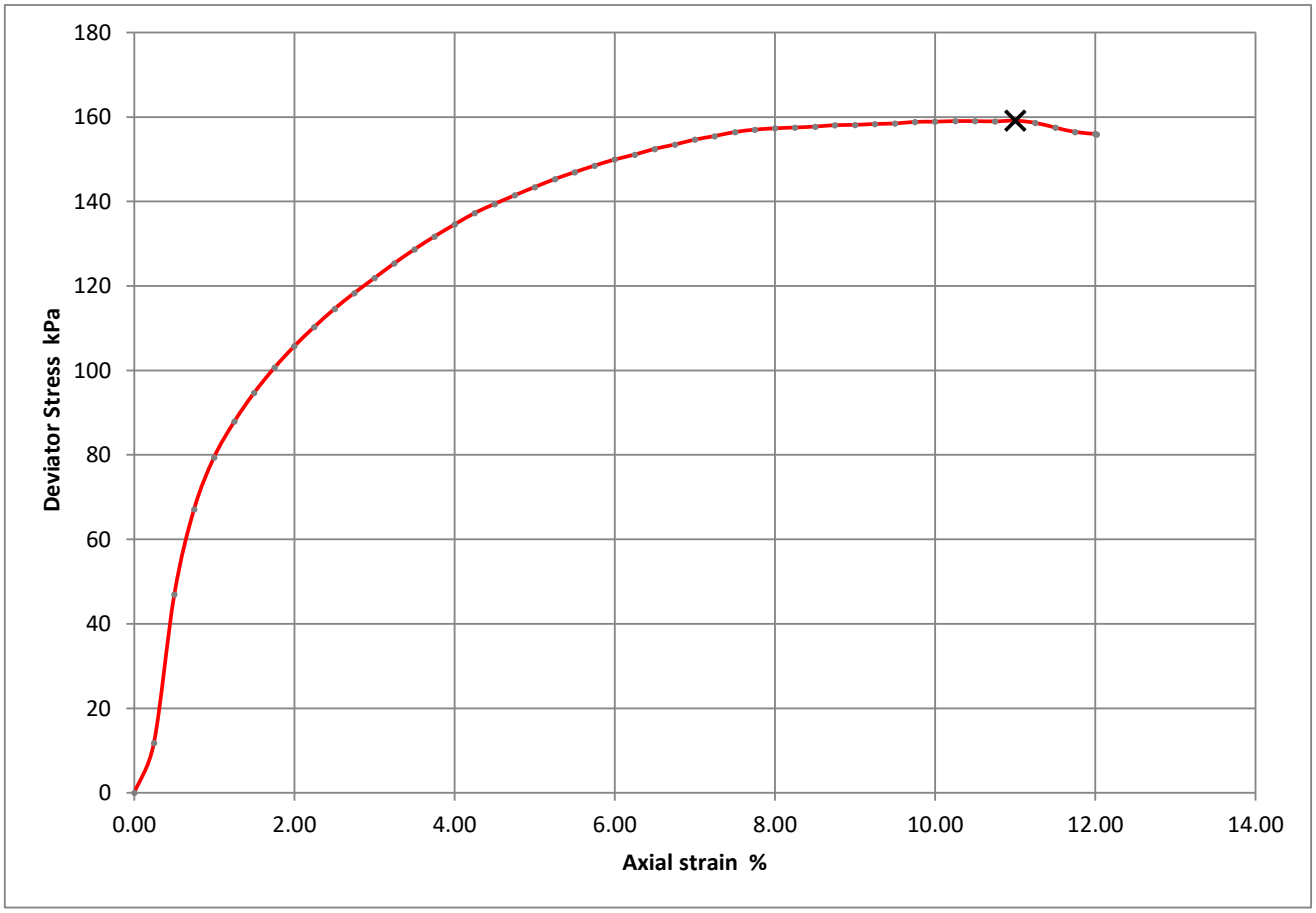
Moisture Content (%)	26
Bulk Density (Mg/m^3)	1.99
Dry Density (Mg/m^3)	1.59
Specimen Length (mm)	208.4
Specimen Diameter (mm)	104.3
Cell Pressure (kPa)	180
Deviator Stress (kPa)	192
Undrained Shear Strength (kPa)	96
Failure Strain (%)	19
Mode Of Failure	Plastic
Membrane Used/Thickness	Rubber/0.4mm
Rate of Strain (%/min)	1.32

Notes.



Failure Sketch.

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Single Stage Unconsolidated-Undrained Triaxial Test BS 1377 : 1990 Part 7 : 8**	Contract Number	78927
		Borehole/Pit No.	BH1
Project Name	Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE	Sample No.	
Soil Description	Brown silty CLAY	Depth Top (m)	18.00
		Depth Base (m)	18.45
Date Tested	07/06/2025	Sample Type	U
		Operator	David. E

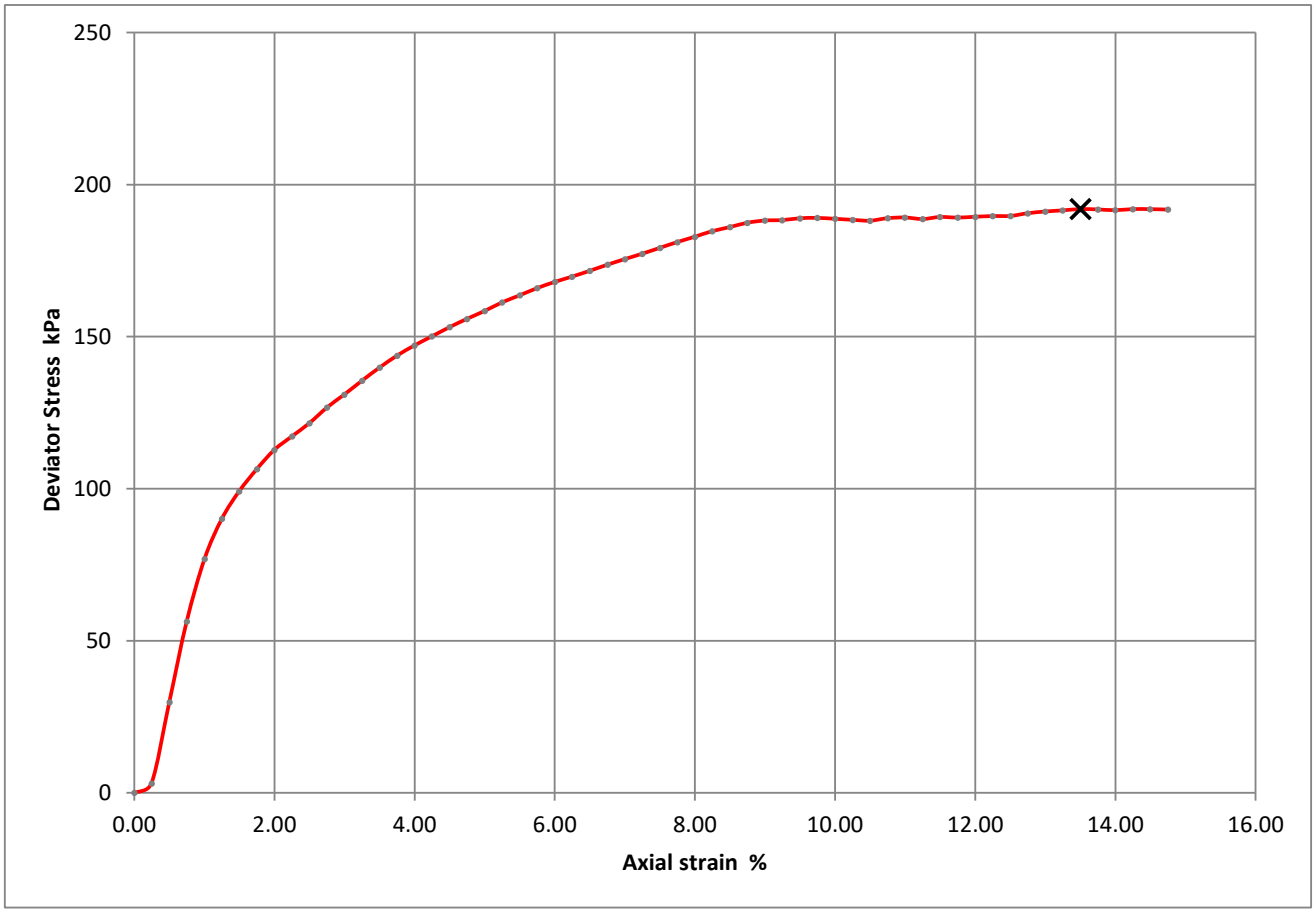


Moisture Content (%)	26
Bulk Density (Mg/m^3)	1.98
Dry Density (Mg/m^3)	1.57
Specimen Length (mm)	208.4
Specimen Diameter (mm)	104.2
Cell Pressure (kPa)	324
Deviator Stress (kPa)	159
Undrained Shear Strength (kPa)	80
Failure Strain (%)	11
Mode Of Failure	Compound
Membrane Used/Thickness	Rubber/0.4mm
Rate of Strain (%/min)	1.32

Notes.

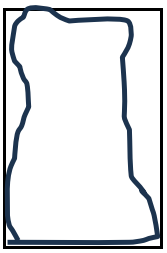
Failure Sketch.

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Single Stage Unconsolidated-Undrained Triaxial Test BS 1377 : 1990 Part 7 : 8**	Contract Number	78927
		Borehole/Pit No.	BH2
Project Name	Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE	Sample No.	
Soil Description	Brown silty sandy CLAY	Depth Top (m)	1.00
		Depth Base (m)	1.45
Date Tested	07/06/2025	Sample Type	U
		Operator	David. E



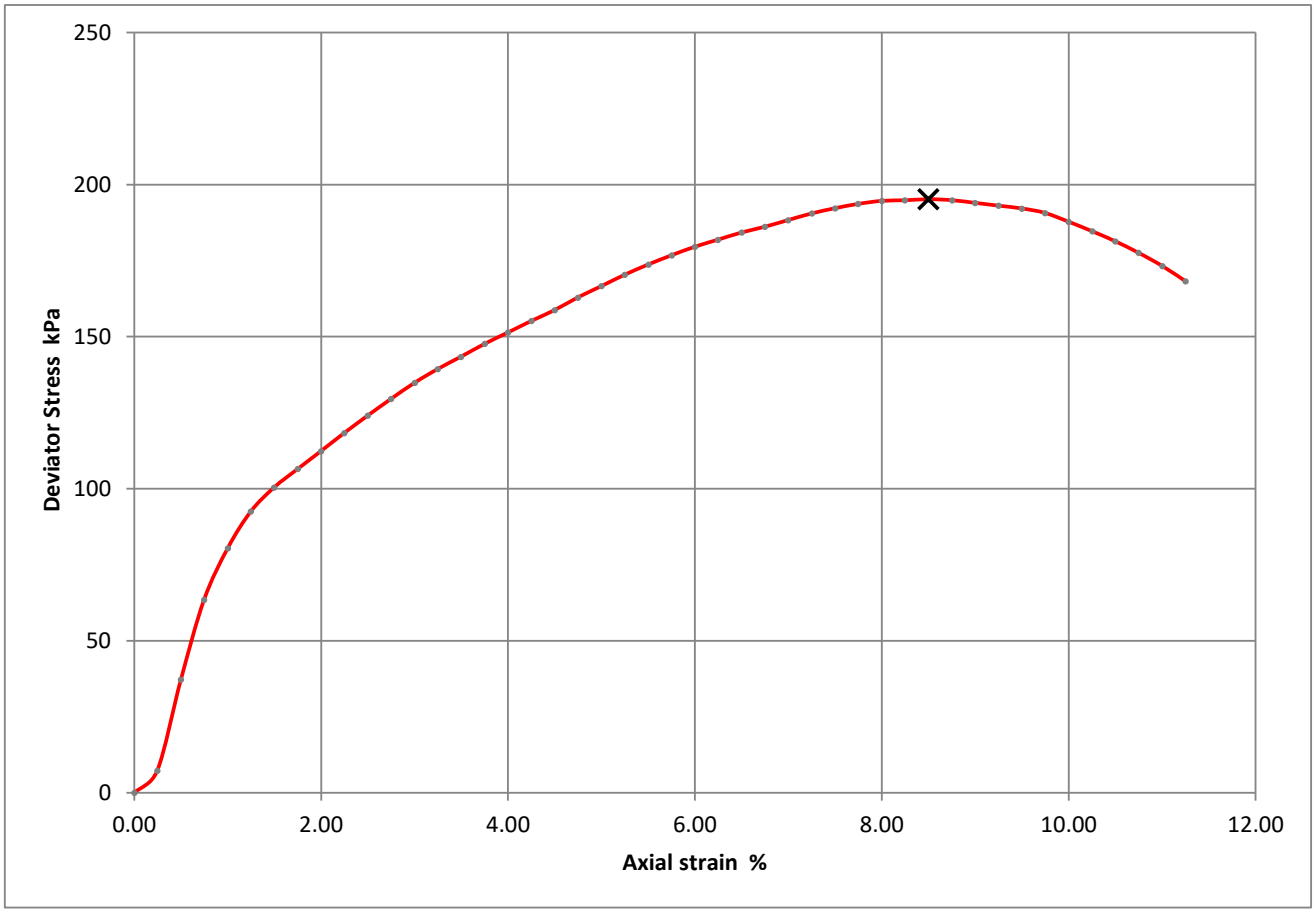
Moisture Content (%)	20
Bulk Density (Mg/m^3)	1.85
Dry Density (Mg/m^3)	1.54
Specimen Length (mm)	182.3
Specimen Diameter (mm)	104.1
Cell Pressure (kPa)	18
Deviator Stress (kPa)	192
Undrained Shear Strength (kPa)	96
Failure Strain (%)	14
Mode Of Failure	Plastic
Membrane Used/Thickness	Rubber/0.4mm
Rate of Strain (%/min)	1.51

Notes.



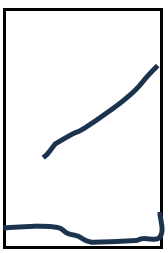
Failure Sketch.

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Single Stage Unconsolidated-Undrained Triaxial Test BS 1377 : 1990 Part 7 : 8**	Contract Number	78927
		Borehole/Pit No.	BH2
Project Name	Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE	Sample No.	
Soil Description	Brown silty CLAY (rootlets)	Depth Top (m)	14.00
		Depth Base (m)	14.45
Date Tested	07/06/2025	Sample Type	U
		Operator	David. E



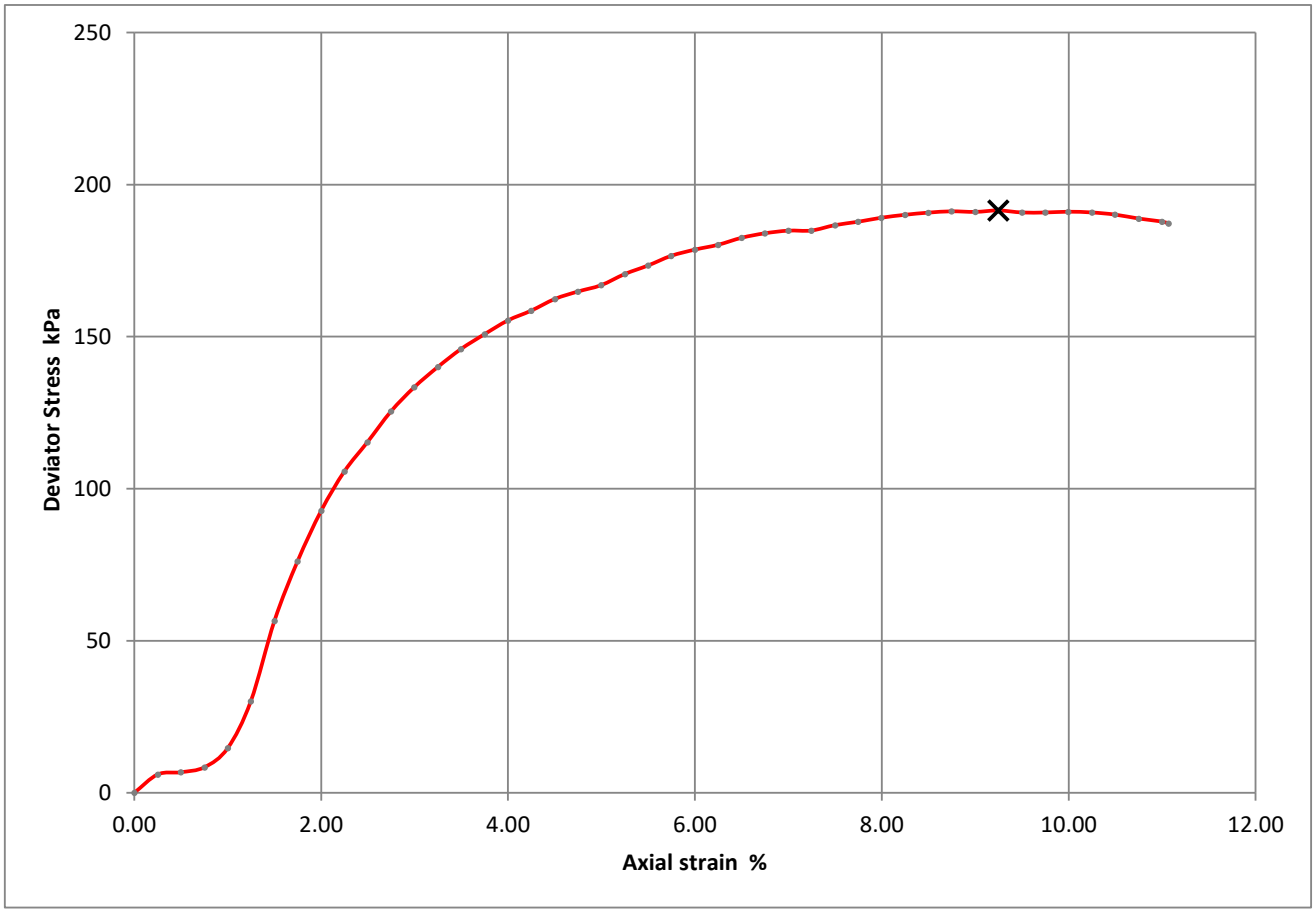
Moisture Content (%)	26
Bulk Density (Mg/m^3)	1.95
Dry Density (Mg/m^3)	1.55
Specimen Length (mm)	208.3
Specimen Diameter (mm)	104.3
Cell Pressure (kPa)	252
Deviator Stress (kPa)	195
Undrained Shear Strength (kPa)	98
Failure Strain (%)	9
Mode Of Failure	Compound
Membrane Used/Thickness	Rubber/0.4mm
Rate of Strain (%/min)	1.32

Notes.



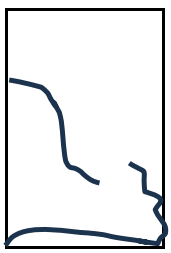
Failure Sketch.

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Single Stage Unconsolidated-Undrained Triaxial Test BS 1377 : 1990 Part 7 : 8**	Contract Number	78927
		Borehole/Pit No.	BH2
Project Name	Newsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE	Sample No.	
Soil Description	Brown silty CLAY	Depth Top (m)	20.00
		Depth Base (m)	20.45
Date Tested	07/06/2025	Sample Type	U
		Operator	David. E



Moisture Content (%)	26
Bulk Density (Mg/m^3)	1.91
Dry Density (Mg/m^3)	1.51
Specimen Length (mm)	208.3
Specimen Diameter (mm)	104.1
Cell Pressure (kPa)	360
Deviator Stress (kPa)	191
Undrained Shear Strength (kPa)	96
Failure Strain (%)	9
Mode Of Failure	Compound
Membrane Used/Thickness	Rubber/0.4mm
Rate of Strain (%/min)	1.32

Notes.



Failure Sketch.

Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP1**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

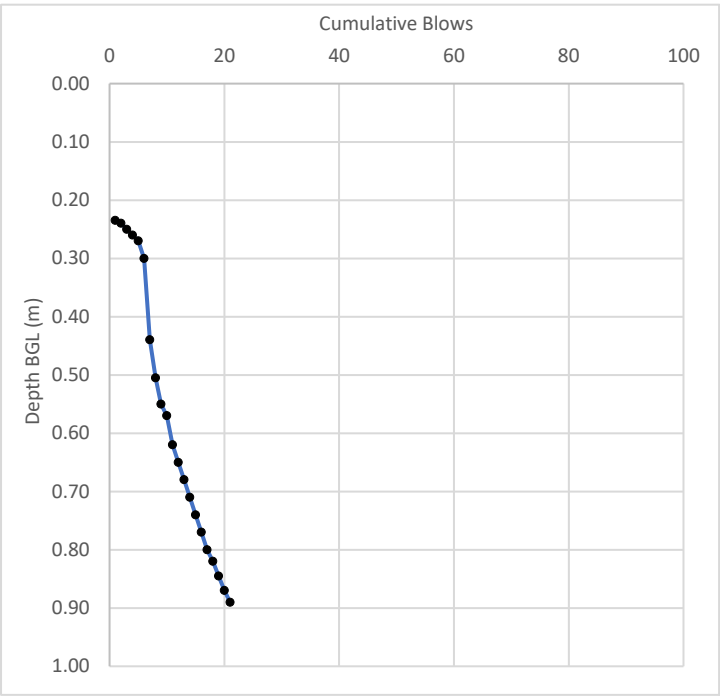
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		250	0.220	-0.220		
1	1	265	0.235	-0.235	15.0	17.3
1	2	270	0.240	-0.240	5.0	55.1
1	3	280	0.250	-0.250	10.0	26.5
1	4	290	0.260	-0.260	10.0	26.5
1	5	300	0.270	-0.270	10.0	26.5
1	6	330	0.300	-0.300	30.0	8.3
1	7	470	0.440	-0.440	140.0	1.6
1	8	535	0.505	-0.505	65.0	3.7
1	9	580	0.550	-0.550	45.0	5.4
1	10	600	0.570	-0.570	20.0	12.7
1	11	650	0.620	-0.620	50.0	4.8
1	12	680	0.650	-0.650	30.0	8.3
1	13	710	0.680	-0.680	30.0	8.3
1	14	740	0.710	-0.710	30.0	8.3
1	15	770	0.740	-0.740	30.0	8.3
1	16	800	0.770	-0.770	30.0	8.3
1	17	830	0.800	-0.800	30.0	8.3
1	18	850	0.820	-0.820	20.0	12.7
1	19	875	0.845	-0.845	25.0	10.1
1	20	900	0.870	-0.870	25.0	10.1
1	21	920	0.890	-0.890	20.0	12.7

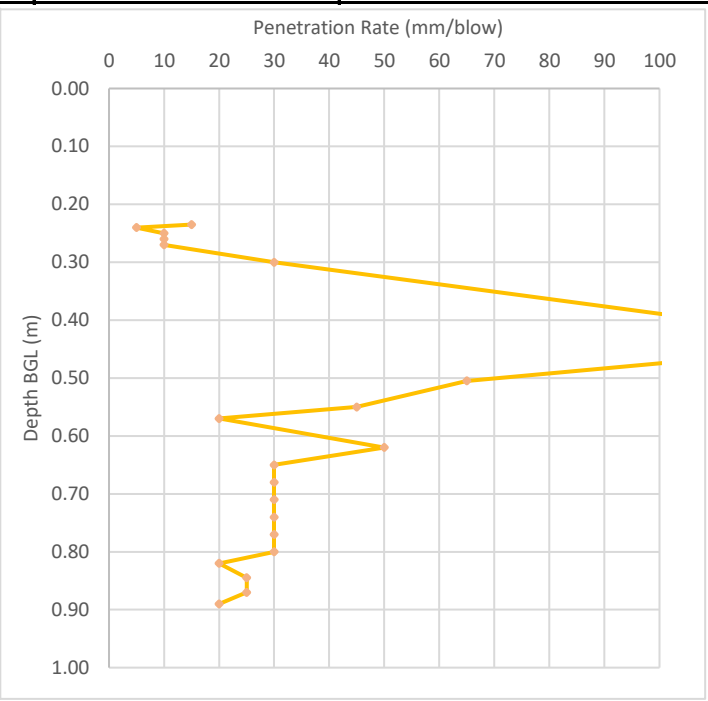
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

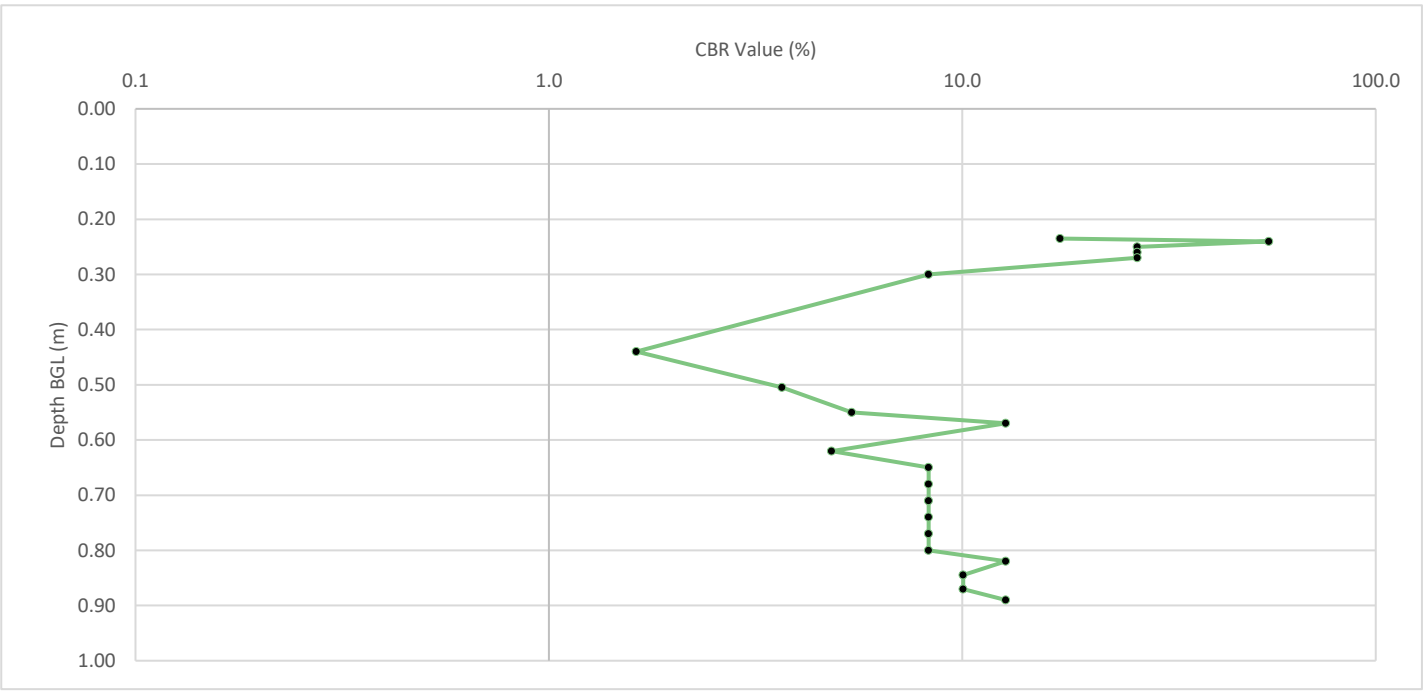
Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP1**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP2**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

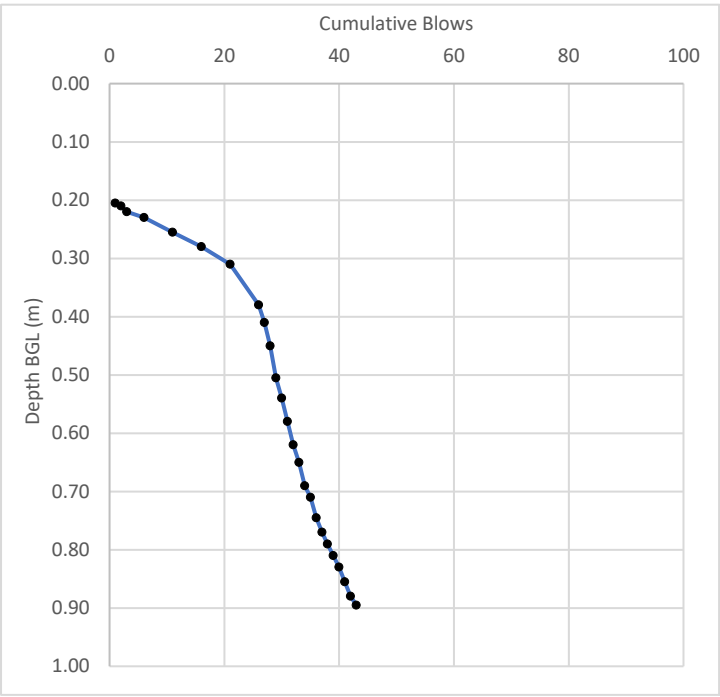
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		225	0.195	-0.195		
1	1	235	0.205	-0.205	10.0	26.5
1	2	240	0.210	-0.210	5.0	55.1
1	3	250	0.220	-0.220	10.0	26.5
3	6	260	0.230	-0.230	3.3	84.6
5	11	285	0.255	-0.255	5.0	55.1
5	16	310	0.280	-0.280	5.0	55.1
5	21	340	0.310	-0.310	6.0	45.4
5	26	410	0.380	-0.380	14.0	18.6
1	27	440	0.410	-0.410	30.0	8.3
1	28	480	0.450	-0.450	40.0	6.1
1	29	535	0.505	-0.505	55.0	4.4
1	30	570	0.540	-0.540	35.0	7.0
1	31	610	0.580	-0.580	40.0	6.1
1	32	650	0.620	-0.620	40.0	6.1
1	33	680	0.650	-0.650	30.0	8.3
1	34	720	0.690	-0.690	40.0	6.1
1	35	740	0.710	-0.710	20.0	12.7
1	36	775	0.745	-0.745	35.0	7.0
1	37	800	0.770	-0.770	25.0	10.1
1	38	820	0.790	-0.790	20.0	12.7
1	39	840	0.810	-0.810	20.0	12.7
1	40	860	0.830	-0.830	20.0	12.7
1	41	885	0.855	-0.855	25.0	10.1
1	42	910	0.880	-0.880	25.0	10.1
1	43	925	0.895	-0.895	15.0	17.3

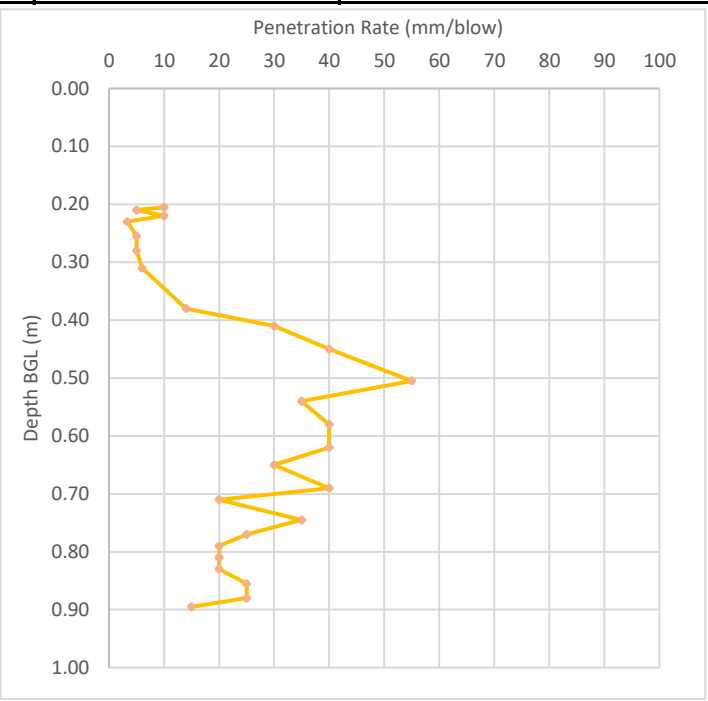
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

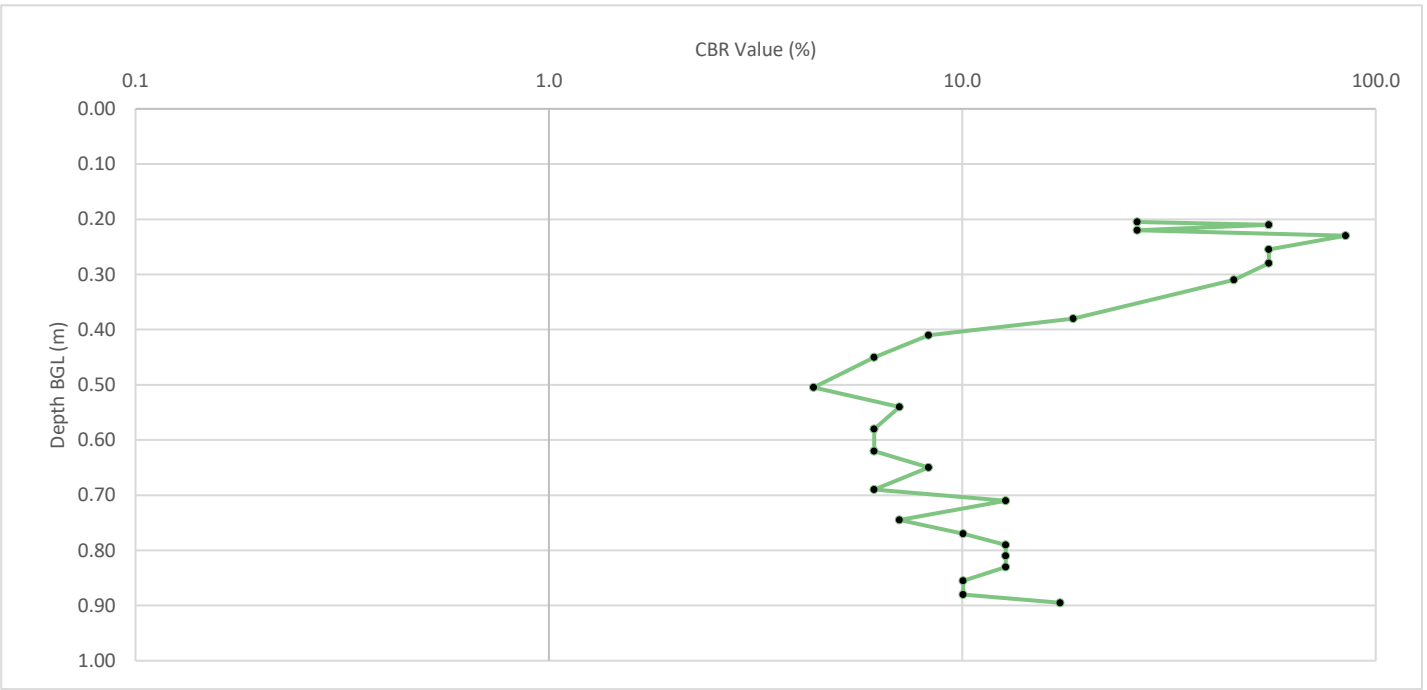
Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP2**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







Dynamic Cone Penetrometer

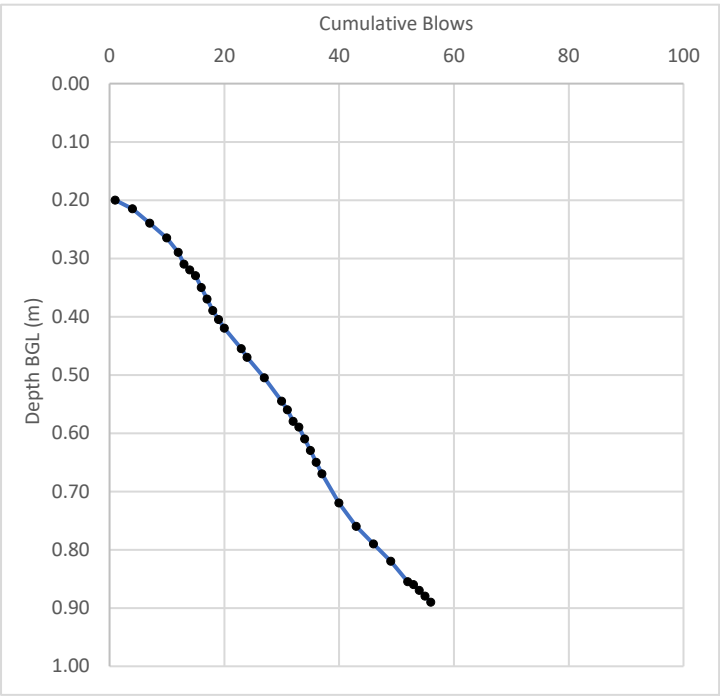
Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP3**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

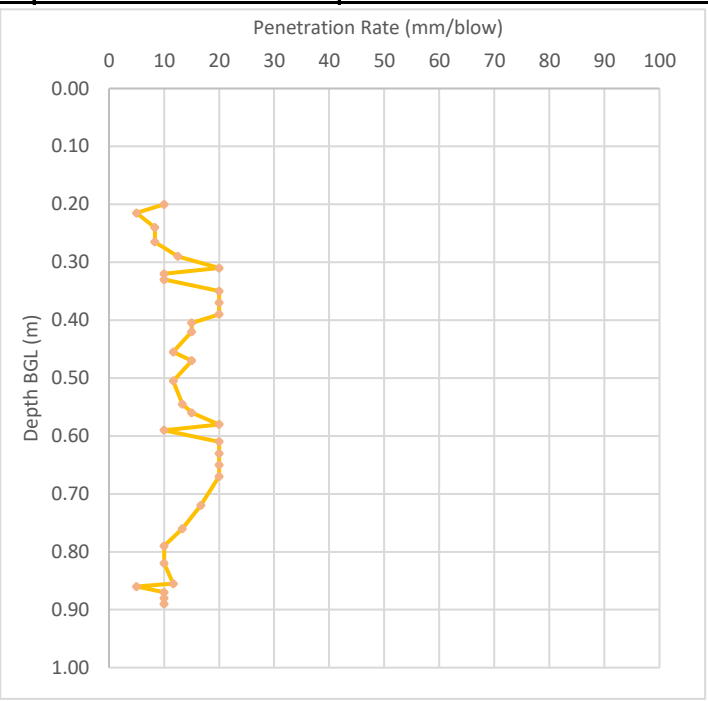
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		220	0.190	-0.190		
1	1	230	0.200	-0.200	10.0	26.5
3	4	245	0.215	-0.215	5.0	55.1
3	7	270	0.240	-0.240	8.3	32.1
3	10	295	0.265	-0.265	8.3	32.1
2	12	320	0.290	-0.290	12.5	20.9
1	13	340	0.310	-0.310	20.0	12.7
1	14	350	0.320	-0.320	10.0	26.5
1	15	360	0.330	-0.330	10.0	26.5
1	16	380	0.350	-0.350	20.0	12.7
1	17	400	0.370	-0.370	20.0	12.7
1	18	420	0.390	-0.390	20.0	12.7
1	19	435	0.405	-0.405	15.0	17.3
1	20	450	0.420	-0.420	15.0	17.3
3	23	485	0.455	-0.455	11.7	22.5
1	24	500	0.470	-0.470	15.0	17.3
3	27	535	0.505	-0.505	11.7	22.5
3	30	575	0.545	-0.545	13.3	19.5
1	31	590	0.560	-0.560	15.0	17.3
1	32	610	0.580	-0.580	20.0	12.7
1	33	620	0.590	-0.590	10.0	26.5
1	34	640	0.610	-0.610	20.0	12.7
1	35	660	0.630	-0.630	20.0	12.7
1	36	680	0.650	-0.650	20.0	12.7
1	37	700	0.670	-0.670	20.0	12.7
3	40	750	0.720	-0.720	16.7	15.4
3	43	790	0.760	-0.760	13.3	19.5
3	46	820	0.790	-0.790	10.0	26.5
3	49	850	0.820	-0.820	10.0	26.5
3	52	885	0.855	-0.855	11.7	22.5
1	53	890	0.860	-0.860	5.0	55.1
1	54	900	0.870	-0.870	10.0	26.5
1	55	910	0.880	-0.880	10.0	26.5
1	56	920	0.890	-0.890	10.0	26.5

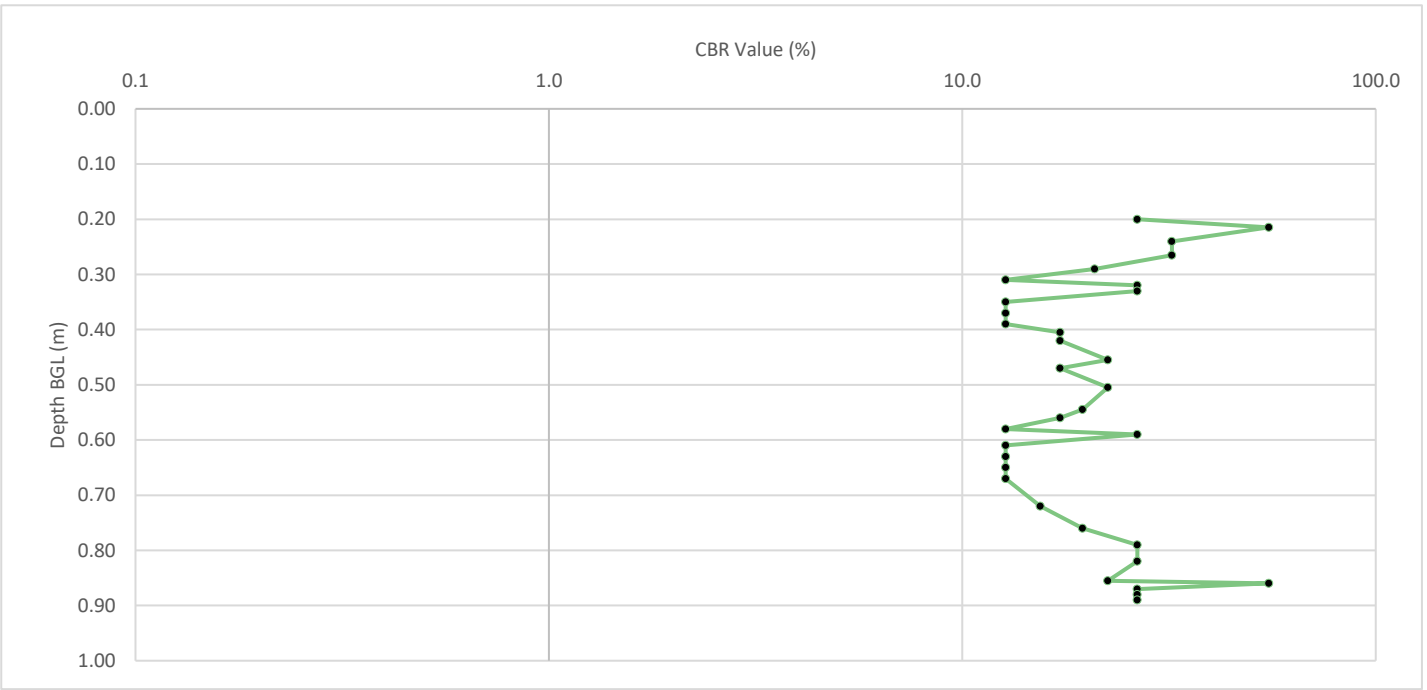
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow) | Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP3**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







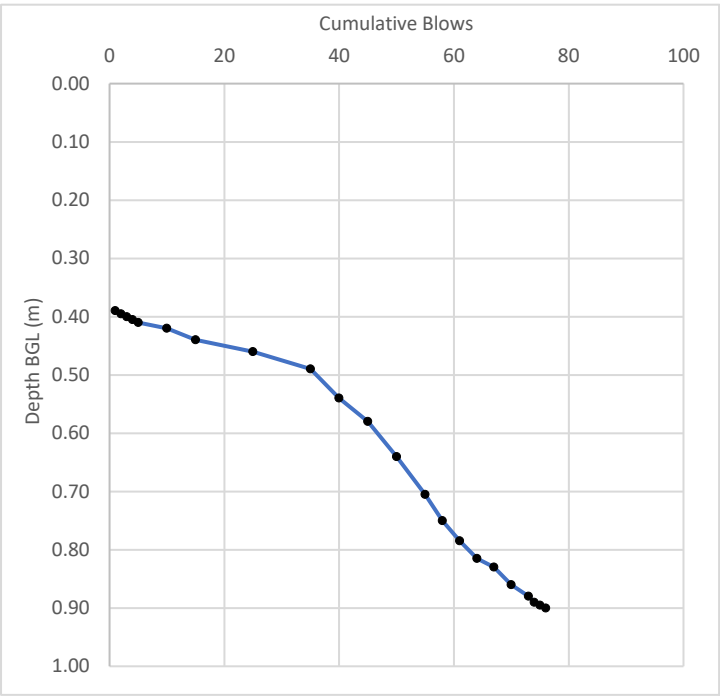
Dynamic Cone Penetrometer

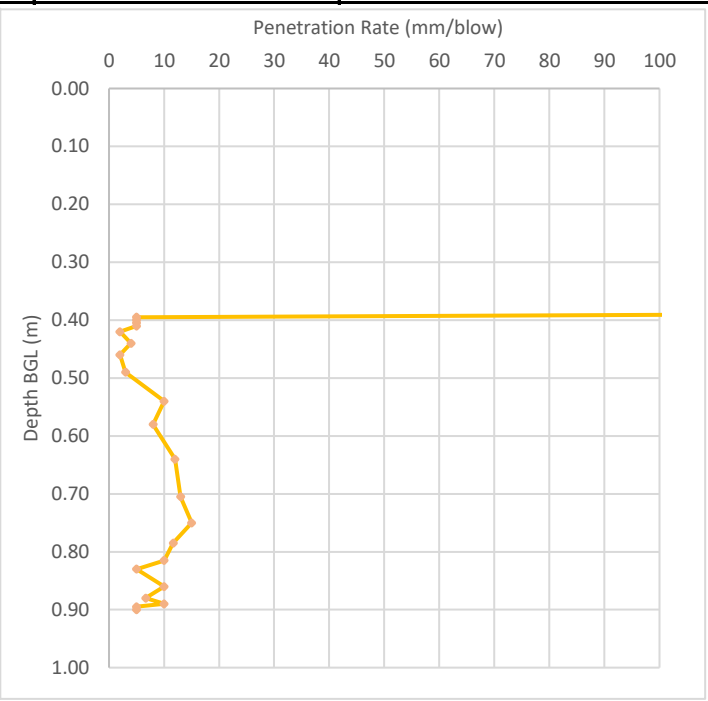
Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP4**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

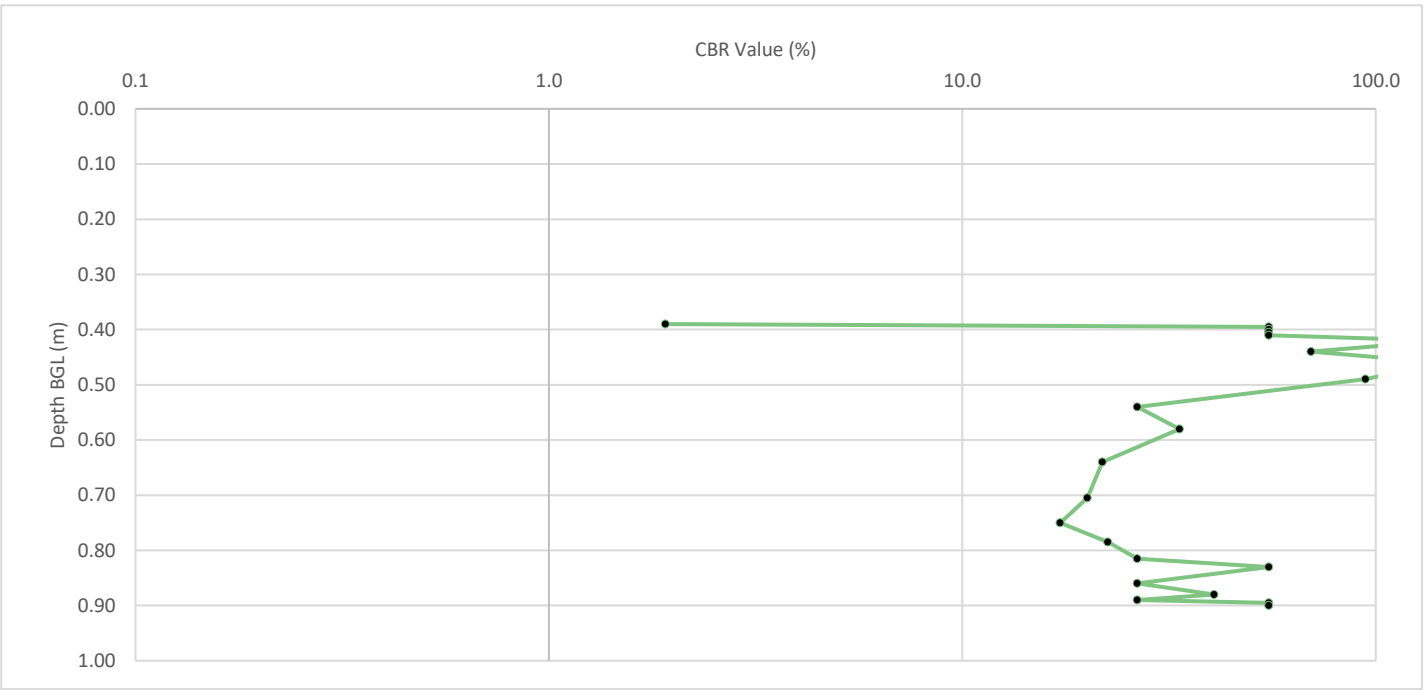
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		300	0.270	-0.270		
1	1	420	0.390	-0.390	120.0	1.9
1	2	425	0.395	-0.395	5.0	55.1
1	3	430	0.400	-0.400	5.0	55.1
1	4	435	0.405	-0.405	5.0	55.1
1	5	440	0.410	-0.410	5.0	55.1
5	10	450	0.420	-0.420	2.0	145.1
5	15	470	0.440	-0.440	4.0	69.8
10	25	490	0.460	-0.460	2.0	145.1
10	35	520	0.490	-0.490	3.0	94.6
5	40	570	0.540	-0.540	10.0	26.5
5	45	610	0.580	-0.580	8.0	33.5
5	50	670	0.640	-0.640	12.0	21.8
5	55	735	0.705	-0.705	13.0	20.1
3	58	780	0.750	-0.750	15.0	17.3
3	61	815	0.785	-0.785	11.7	22.5
3	64	845	0.815	-0.815	10.0	26.5
3	67	860	0.830	-0.830	5.0	55.1
3	70	890	0.860	-0.860	10.0	26.5
3	73	910	0.880	-0.880	6.7	40.7
1	74	920	0.890	-0.890	10.0	26.5
1	75	925	0.895	-0.895	5.0	55.1
1	76	930	0.900	-0.900	5.0	55.1
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)					Cone Angle 60°	

Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP4**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP5**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

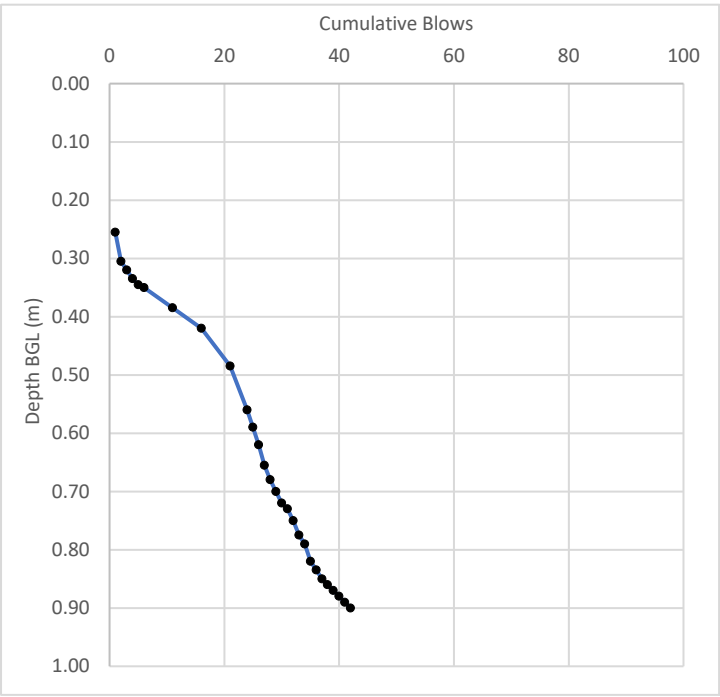
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		240	0.210	-0.210		
1	1	285	0.255	-0.255	45.0	5.4
1	2	335	0.305	-0.305	50.0	4.8
1	3	350	0.320	-0.320	15.0	17.3
1	4	365	0.335	-0.335	15.0	17.3
1	5	375	0.345	-0.345	10.0	26.5
1	6	380	0.350	-0.350	5.0	55.1
5	11	415	0.385	-0.385	7.0	38.6
5	16	450	0.420	-0.420	7.0	38.6
5	21	515	0.485	-0.485	13.0	20.1
3	24	590	0.560	-0.560	25.0	10.1
1	25	620	0.590	-0.590	30.0	8.3
1	26	650	0.620	-0.620	30.0	8.3
1	27	685	0.655	-0.655	35.0	7.0
1	28	710	0.680	-0.680	25.0	10.1
1	29	730	0.700	-0.700	20.0	12.7
1	30	750	0.720	-0.720	20.0	12.7
1	31	760	0.730	-0.730	10.0	26.5
1	32	780	0.750	-0.750	20.0	12.7
1	33	805	0.775	-0.775	25.0	10.1
1	34	820	0.790	-0.790	15.0	17.3
1	35	850	0.820	-0.820	30.0	8.3
1	36	865	0.835	-0.835	15.0	17.3
1	37	880	0.850	-0.850	15.0	17.3
1	38	890	0.860	-0.860	10.0	26.5
1	39	900	0.870	-0.870	10.0	26.5
1	40	910	0.880	-0.880	10.0	26.5
1	41	920	0.890	-0.890	10.0	26.5
1	42	930	0.900	-0.900	10.0	26.5

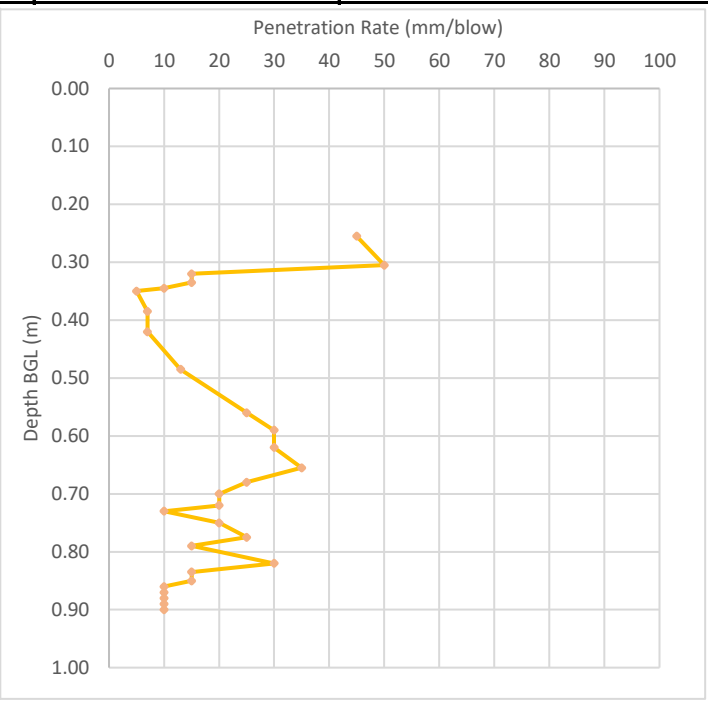
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

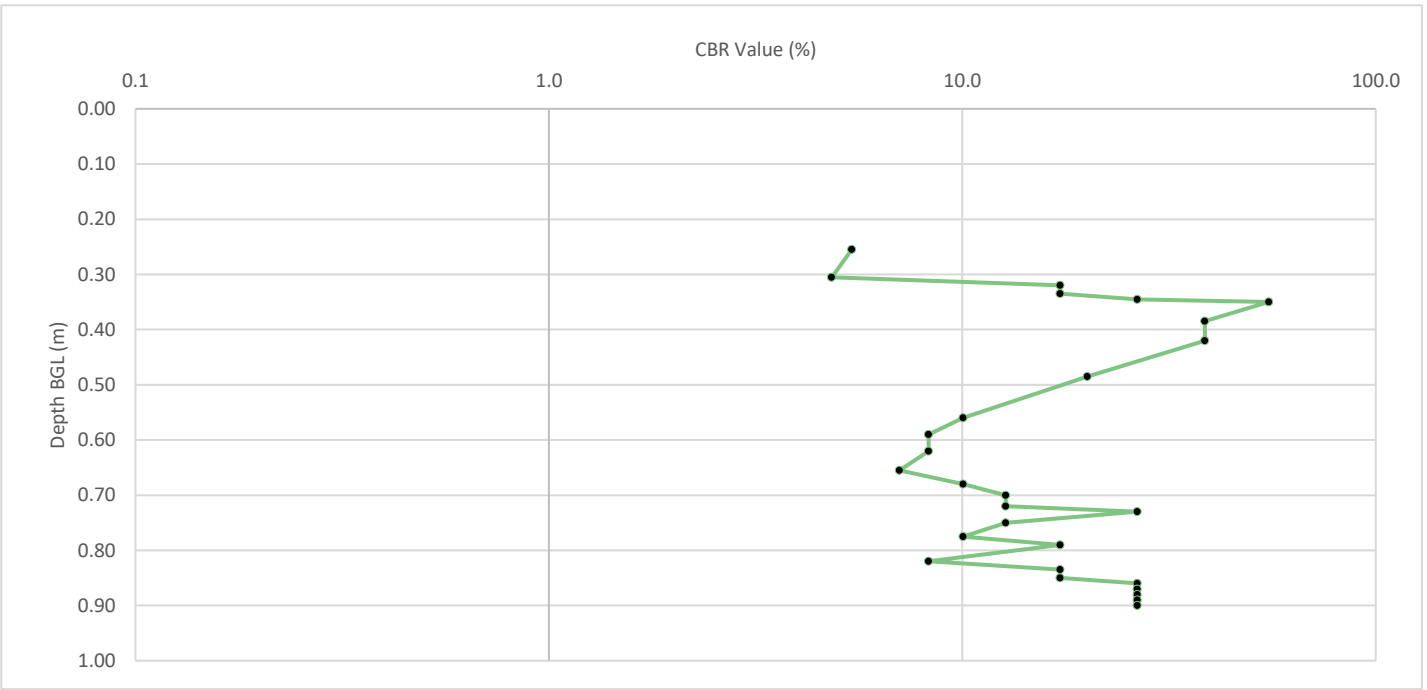
Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP5**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP6**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

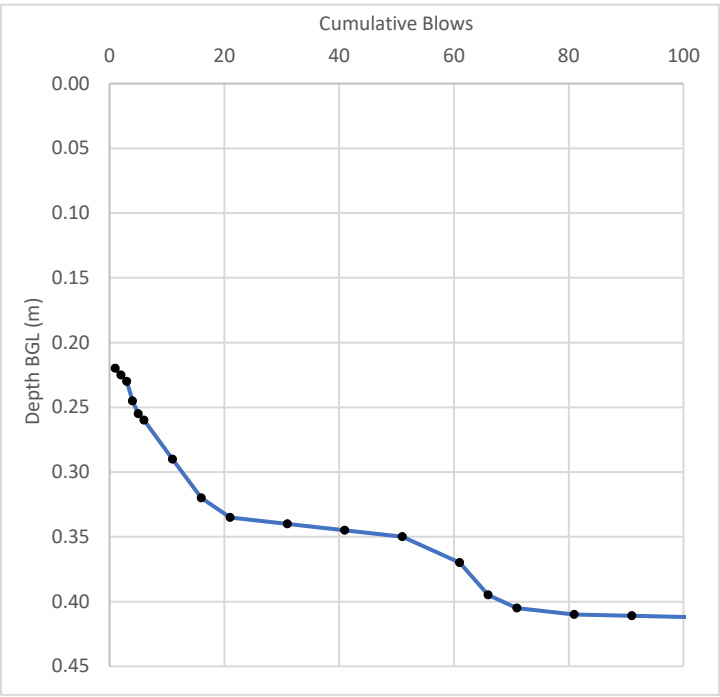
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		240	0.210	-0.210		
1	1	250	0.220	-0.220	10.0	26.5
1	2	255	0.225	-0.225	5.0	55.1
1	3	260	0.230	-0.230	5.0	55.1
1	4	275	0.245	-0.245	15.0	17.3
1	5	285	0.255	-0.255	10.0	26.5
1	6	290	0.260	-0.260	5.0	55.1
5	11	320	0.290	-0.290	6.0	45.4
5	16	350	0.320	-0.320	6.0	45.4
5	21	365	0.335	-0.335	3.0	94.6
10	31	370	0.340	-0.340	0.5	628.3
10	41	375	0.345	-0.345	0.5	628.3
10	51	380	0.350	-0.350	0.5	628.3
10	61	400	0.370	-0.370	2.0	145.1
5	66	425	0.395	-0.395	5.0	55.1
5	71	435	0.405	-0.405	2.0	145.1
10	81	440	0.410	-0.410	0.5	628.3
10	91	441	0.411	-0.411	0.1	3443.5
10	101	442	0.412	-0.412	0.1	3443.5
10	111	443	0.413	-0.413	0.1	3443.5
10	121	448	0.418	-0.418	0.5	628.3
10	131	450	0.420	-0.420	0.2	1655.1
10	141	451	0.421	-0.421	0.1	3443.5
10	151	452	0.422	-0.422	0.1	3443.5
10	161	453	0.423	-0.423	0.1	3443.5
10	171	454	0.424	-0.424	0.1	3443.5

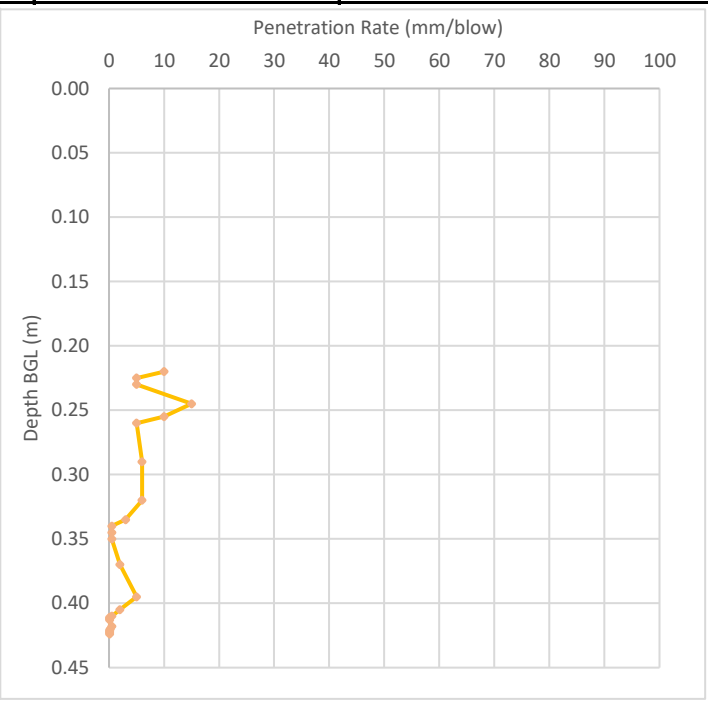
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Yiewsley Library and Car Park, Falling Lane/High Street, Hillingdon, UB7 7BE**	Project No: **25-154.01**	DCP Location: **DCP6**
Client:	**Bugler Developments Limited**	Operator: **OC**	Date: **21/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):





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