INTERPRETATIVE SITE INVESTIGATION REPORT

At

Davison C.E. High School for Girls

On behalf of

Davison C.E. High School for Girls

PROJECT REFERENCE: 22.1185

April 2023

constructiveevaluation
site investigation • building pathology

Interpretative Site Investigation Report

by

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	Version 1	Version 2	Version 3
History			
Issued to			
Date			

Foreword

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Figure 1 – Site Location Plan

Figure 2 – School Site Border

Figure 3 – Site Investigation Plan

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Appendix B – Stratigraphic Logs

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Appendix F – Report Terms and Conditions

1.0 Introduction

In December 2022 Constructive Evaluation (CE) Limited was commissioned by Davison C.E. High School for Girls to carry out a Site Investigation at Davison High School, Selborne Road, Worthing, West Sussex BN11 2JX, hereafter referred to as the "site".

The purpose of this investigation and report is to investigate the proposed area designated for the construction of a new 3G artificial football pitch with porous surface/subbase.

Attention is drawn to the fact that whilst every effort has been made to ensure the accuracy of the data supplied and any analysis derived from it, there is a potential for variations in ground and groundwater conditions between and beyond the specific locations investigated. No liability can be accepted for any such variations. Furthermore, any recommendations are specific to the client's requirements as detailed herein and no liability will be accepted should these be used by third parties without prior consultation with Constructive Evaluation Ltd.

A desk study as outlined in BS5930 "Code of practice for site investigations" was not requested and therefore has not been carried out.

1.1 Summary of Site Investigation

An outline of the intrusive works instructed are summarised below:

- 1 day of windowless sampling boreholes up to 3 boreholes to a depth of 3.0mbgl / refusal,
- Installation of 1-2no. 19mm diameter standpipes for future winter groundwater monitoring (WGWM),
- Machine excavated trial pit soakage testing (two pits) to general BRE365 standards,
- Collect samples for geotechnical and environmental laboratory testing.

2.0 Site Background

2.1 Published Geology

Reference to the publications of the British Geological Survey (BGS), indicate the site is underlain by bedrock of the Lambeth Group. Superficial deposits for the area are recorded as Alluvium and River Terrace Deposits.

Superficial Deposits - Alluvium

Alluvium is classified as unconsolidated detrital material mainly consisting of clay, silt, sand and gravel. Alluvial deposits are related to a river, stream or other body of running water and occur as sorted or semi-sorted sediment within the bed of a stream, deltaic or floodplain environment.

River Terrace Deposits consist of sand and gravel, with lenses of silt, clay or peat. These deposits arise from a time of hydrological shift that caused renewed downcutting, usually being rapid river erosion into a previous floodplain, forming an abandoned surface known as a river terrace. Both superficial deposits were deposited within the Quaternary Period.

Bedrock – Lambeth Group

The Lambeth Group is made up of vertically and laterally variable sequences of silty/sandy clay, with some sands and gravels. Occasional sandstone and conglomerate, minor limestones and lignite. Deposition would have occurred in fluvial, lagoonal, estuarine or proximal marine environments within the Late Palaeocene to Early Eocene.

2.2 Physical Site Setting

The subject site is approximately rectangular in shape and located within the ground of Davison High School, Worthing. It has an approximate grid reference of TQ 15997 03429 and an area of 4.8ha.

Based on Ordnance Survey 1:25000 maps of the area, the subject site is at an elevation of below approximately 5m AOD, with no open watercourses on or in close proximity to the site. A large water pipe used for storm overflow drainage is known to be trending east-west underneath the school field with connected manhole covers located in the site car park and fence boundary alongside B2223 road. The site location is shown in Figure 1.

The site is located within a largely urban area. A summary of the site surroundings is as follows;

- North boundary – The main school complex is located along the northern boundary and borders residential housing along Chesswood Road and terraced/semi-detached housing on the B2223 road.
- East boundary – The B2223 road runs along the boundary with some residential and commercial buildings.
- South boundary – Residential semi-detached/terraced housing along Chester Avenue. The Dynamic School of Performing Arts also borders the site. Dawes Avenue is at the southwest side of the site and detached/semi-detached housing borders the site.
- West boundary – Selbourne Road leads into the school/leisure centre car park. Ladydell Road runs north/south and has residential semi-detached housing.

At the time of investigation, the subject site comprised of two black-top surfaced car parks for the leisure centre, day nursey and school site, the site was accessed through a security gate on Selborne Road on the western extent of the site. There was a narrow access track along the south of the school building and the north of the playing field , which met the B2223 road via a locked gate. The actual subject site is located within the playing fields. Manhole covers for underground flood drainage pipes are located at the boundary northeast within an area of vegetation and mature trees. A few mature trees and moderate vegetation were located along the southern side of the field.

Site Photographs are presented in **Appendix A** whilst the site plans are included within the figures.

3.0 Field Work

The following preliminary intrusive investigation works were carried out over two days on the 19th and 22nd December 2022 over day shifts supervised by an Engineering Geologist from CE:

- Three window sampler boreholes (WS1-WS3) to a maximum depth of 3.00mbgl,
- Heavy Dynamic probe testing (DPH) at 100mm intervals to 2.90mbgl at WS1, WS2 and WS3,
- Installation of two 19mm standpipes within WS1 and WS3 to carry out winter groundwater monitoring (WGWM), over three months from January to March 2023,
- Six mechanically excavated trial pits (TP1a – TP1c & TP2a – TP2c) to varying depths of 0.50m to 0.90mbgl,
- Two soil infiltration tests within mechanically excavated trial pits (TP1c and TP2c) to 0.60mbgl,
- Soil sampling for geotechnical and environmental testing.

TP1a was terminated at 0.64mbgl after encountering a suspected historic buried brick wall trending east-west. TP1b was excavated approximately 4m north of TP1a and was also terminated due to encountering a suspected historic buried brick wall trending east-west at 0.50mbgl and perched water entering the trial pit. The suspected walls were perpendicular to the length of the trial pits and appeared at 0.30mbgl with an approximate width of 0.30m. TP1c was located approximately 2m north-east of TP1b. It was excavated to 0.60mbgl and was agreed as the soakage test depth due to the presence of alluvium CLAY at the base of the trial pit. The duration of the test was for 156mins.

TP2a was terminated at 0.90mbgl after encountering a historic ceramic drainage pipe at approximately 0.60mbgl, which caused an influx of groundwater that settled at 0.55mbgl. The pipe was repaired, and the trial pit was backfilled with arisings. TP2b was terminated at 0.90mbgl due to groundwater entering and making the trial pit unsuitable for a soakage test. TP2c was used for the soakage test at a shallow depth of 0.60mbgl and recorded for 31mins.

The exploratory positions are provided on the Site Investigation Plan in **Figure 2.**

The ground investigation was undertaken in accordance with the scope of works agreed with our client and in relation to statutory guidance including BS5930: 1999 Code of Practice for Site Investigations (Amendment 3: 2015) and BS10175: 2011+A1: 2013 Investigation of Potentially Contaminated Sites: Code of Practice.

3.1 Prevailing Weather Conditions

Met Office shows that December 2022 had very cold and frosty spells with temperatures reaching a minimum of 2°C. It is noted that rainfall was limited during the cold spell, however, from the 18th of December rainfall increased and brought the total rainfall just below the long-term monthly average. Early January saw an unsettled wet period with the first two weeks seeing the average rainfall for the month, which transitioned into much drier and colder weather. England had an average of 90.5 mm of rainfall during January 2023. The south of England was predominately dry throughout February, with an average rainfall of 15.3 mm. Also, the UK mean temperature had risen to 5.8°C. March has continued with predominately dry, cold conditions and some occasional showers.

3.2 Soil Sample Collection

All intrusive locations were logged, visual and/or olfactory evidence of contamination noted, and representative soil samples removed in accordance with current protocol for geotechnical and geo-environmental parameters.

Selected samples were placed in sealed glass jars or plastic tubs (dependent on the exact laboratory requirements and analysis to be undertaken) before transit. Samples were handled using a fresh pair of nitrile gloves.

3.3 Winter Groundwater Monitoring

The monitoring period extended from early January 2023 to middle March 2023, monitoring approximately every fortnight.

4.0 Ground Conditions

4.1 Observed Stratigraphical Units

The following stratigraphical units were encountered during the intrusive works:

Table 1: Observed Stratigraphical Units.

Material	Top Depth (mbgl)	Bottom Depth (mbgl)	Description
Topsoil	0.0	0.20	Grass over soft brown sandy gravelly CLAY. Gravels were noted to be of flint.
Made Ground	0.20	0.65 – 0.80	Brown sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is fine to coarse grained. Gravels were noted to be of flint and red brick fragments.
Alluvium deposits	0.65 – 0.80	1.90 – 2.40	Firm grey mottled brown slightly gravelly CLAY. Gravels were noted to be of flint.
Alluvium deposits	1.90 – 2.40	3.00	Very soft to soft dark grey silty CLAY.

The surface cover across the site comprised grass over brown sandy gravelly Clay to a maximum depth of 0.2mbgl. Made Ground soils were recorded in all the exploratory positions underlying the topsoil to a maximum depth of 0.8mbgl in WS2. Red brick fragments were recorded in the Made Ground. Beneath the Made Ground, alluvium deposits were recorded in all three boreholes from 0.7m to 2.4mbgl in WS1, 0.8m to 1.9mbgl in WS2 and 0.7 to 2.2mbgl in WS3. The material was recorded as grey mottled brown slightly gravelly Clay with flint gravel. Beneath, alluvium deposits comprising of soft to very soft dark grey silty Clay continued down to the final depth of 3.0mbgl at the base of the boreholes.

WS1 and WS3 were each installed with a standpipe for groundwater monitoring, using 19mm internal diameter HDPE plain and slotted pipe to 3.0mbgl. The response zone of the standpipe was designed to target the underlying groundwater. Installation details are provided within the corresponding stratigraphic logs.

On completion, both trial pit locations (TP1a to TP1c) and (TP2a to TP2c) were backfilled with arising materials and compacted with a hand rammer. The boreholes (WS1 and WS3) were backfilled with gravel to 1.0mbgl, bentonite pellets to 0.3mbgl, arisings compacted with a hand rammer to 0.1mbgl and finished with concrete around a flush cover. WS2 was backfilled with bentonite pellets to 1.0mbgl and finished with arisings compacted with a hand rammer.

The Stratigraphic Logs are provided in **Appendix B.**

4.2 Groundwater

The groundwater strike was observed approximately at a depth of 1.0mbgl within all three boreholes (WS1, WS2 and WS3), rising to a depth of 0.80mbgl after 20 minutes of window sampling. TP2b had a groundwater strike of 0.90mbgl that remained at this depth after 10 minutes of observation. TP1b, TP1c and TP2a identified perched water at 0.60 to 0.65mbgl that remained at this depth after 10 minutes of observation.

The WGWM incorporated the monitoring of the groundwater level and the base of the borehole within WS1 and WS3 from the 4th of January to the 15th of March between 10:00 and 13:00.

The table below summarises the results:

Table 2: Observed Stratigraphical Units.

Date	Groundwater Level (mbgl)		Base of Borehole (mbgl)	
	WS1	WS3	WS1	WS3
04/01/2023 (10:30)	1.35	0.90	3.10	3.00
17/01/2023 (13:00)	1.20	0.40	3.00	2.80
31/01/2023 (10:30)	1.50	0.90	3.00	2.80
15/02/2023 (10:00)	1.50	1.12	3.05	2.90
01/03/2023 (10:00)	1.53	1.18	3.10	2.90
15/03/2023 (10:30)	1.43	0.98	3.00	2.90

4.3 Field Evidence of Contamination

No visual or olfactory evidence of contamination was observed during the site investigation. Anthropogenic materials were observed throughout the shallow investigation.

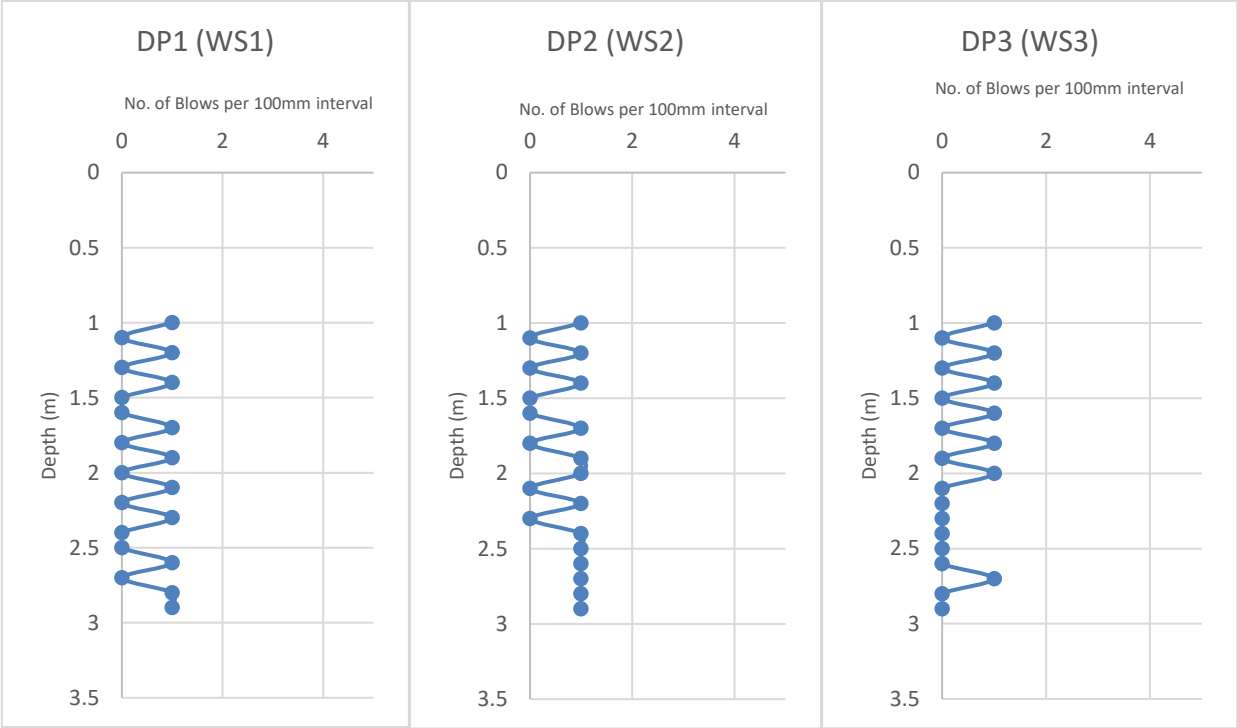
5.0 Insitu Testing

5.1 Heavy Dynamic Probing

Three dynamic probe heavy (DPH) tests, DP1 to DP3, were conducted adjacent to the window sampler boreholes WS1, WS2 and WS3 respectively to a maximum depth of 2.9mbgl.

This form of testing is completed using a 50kg drop hammer weight, over a 500mm drop, measuring the blow counts over 100mm increments of a 1m length rod with a cone on the end. As the test progresses additional rods are added to the string to achieve greater depths.

Table 3: Heavy Dynamic Probing Results



The probe testing shows generally poor ground conditions to extend to in excess of 3.0m bgl within DP3 and only marginally better results within DP1 and 2.

5.2 Pocket Penetrometer Testing

Pocket Penetrometer testing provides an unconfined compressive strength and were undertaken in cohesive materials throughout the drilling of the boreholes, summarised in Table 3. The measurements of strength from the test may not be directly representative of the material as a whole and should be regarded as point measurements. A correction factor of x98 has been used to convert from Kg/cm² to kPa.

Table 4: Pocket Penetrometer Results

Borehole ID	Depth (mbgl)	Lithology	Unconfined Compressive Strength (kPa)
WS1	1.00	Slightly gravelly CLAY	100
	1.40	Slightly gravelly CLAY	25
	1.90	Slightly gravelly CLAY	0
WS2	1.00	Slightly gravelly CLAY	100

Borehole ID	Depth (mbgl)	Lithology	Unconfined Compressive Strength (kPa)
	1.50	Slightly gravelly CLAY	50
	2.00	Silty CLAY	0
WS3	1.15	Slightly gravelly CLAY	0
	1.50	Slightly gravelly CLAY	25
	2.00	Slightly gravelly CLAY	0

Hand penetrometer testing could not be carried out beneath 2.0mbgl due to the very soft nature of the clay.

5.3 Infiltration Testing

Infiltration testing was undertaken in accordance with BRE Digest 365[3] within mechanically excavated trial pits TP1c and TP2c, with each excavated to a depth of 0.60mbgl. The ground conditions resulted in a low infiltration rate, classifying the surrounding soils as **poor** (Casagrande and Fadum, 1940). The test duration in TP1c was for 156 mins whilst TP2c ran for only 31 mins. Testing was carried out over a limited time period of two days. Due to the presence of shallow made ground at the proposed depth of installation, the time available for testing was further reduced as a result of needing to relocate trial pits multiple times . Table 5 below summarises the results:

Table 5: Soil Infiltration Summary

Trial Pit ID	Cycle/Test no.	Pit Depth (mbgl)	Time at 75% (mins)	Time at 25% (mins)	Permeability Coefficient (m/s)	Drainage Conditions
TP1c	1	0.60	126	~430	$3.57x10^{-06}$	Poor
TP2c	1	0.60	~75	~265	$6.84x10^{-06}$	Poor

Infiltration test results are provided in **Appendix C**.

6.0 Geotechnical Laboratory Testing

6.1 Natural Moisture Content and Atterberg Limits

Six samples of material were submitted for determination of their natural moisture content (NMC) and plasticity index (PI). These were selected from Made Ground material from TP2a and TP2c and possible reworked and undisturbed alluvium deposit from WS1, WS2 and WS3 at depths ranging from 1.30mbgl to 2.20mbgl. Geotechnical laboratory test results are provided in **Appendix D.**

Table 6 summarises the NMC results, and Table 7 summarises the PI results.

Table 6: Natural Moisture Content Summary

	Made Ground	Alluvium Deposit
Natural Moisture Content (%)	16.0 – 26.0	37.0 – 58.0

Table 7: Plasticity Index Summary

Stratigraphy	Sample Location	Depth (mbgl)	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Volume Change Potential
Alluvium deposit	WS1	1.3-1.6	37	57	20	37	Medium
	WS1	1.7-1.9	47	51	19	32	Medium
	WS2	1.8-2.1	54	56	21	35	Medium
	WS3	1.9-2.2	58	59	21	38	Medium
Made ground	TP2a	0-0.6	26	43	22	20	Low
	TP2c	0-0.6	16	40	20	20	Low

6.2 Sulphate And pH Analysis

Two samples of the made ground and a further two samples of the underlying natural soils were submitted for the determination of pH and water-soluble sulphate concentration.

Water soluble sulphate concentrations within the made ground soils recorded values of 22mg/l and 24mg/l, with pH values of 8.2 and 8.3.

Water soluble sulphate concentrations within the natural soils recorded values of 22mg/l and 23mg/l, with pH values of 8.4 and 8.7.

Environmental laboratory test results are provided in **Appendix E.**

7.0 Geo-Environmental Testing

7.1 Soil Analysis

Two soil samples obtained from depths ranging between ground level and 0.80mbgl were submitted to ELAB, a UKAS and MCERTS accredited laboratory testing facility, for a screen of contamination testing from the made ground.

Testing included an asbestos screen, heavy metals and hydrocarbons including speciated total petrol hydrocarbons (TPH LQM aromatic/aliphatic split), BTEX, MTBE and speciated polycyclic aromatic hydrocarbons (PAH), as well as a background suite of pH, SOM, total cyanide, and total phenols.

One sample was also subjected to a full suite of waste acceptance criteria (WAC) analyses. Testing was carried out on a sample from TP1c at a depth between 0.00m to 0.60mbgl.

7.2 Screening Criteria

The results of this laboratory testing have been compared to published guidance criteria, widely referred to by consultants and Regulatory Authorities within the industry, and include the following:

- The UK Soil Guideline (SGVs) for selected metals, BTEX and phenols, produced by the EA and the Department of Environment, Food and Rural Affairs (DEFRA), 2009;
- Suitable 4 Use Levels (S4ULs) Generic Assessment Criteria (GAC) for 82no. contaminants developed by the Chartered Institute of Environmental Health (CIEH) in partnership with Land Quality Management Ltd (2015). It is anticipated that this screening criteria will be applied by the Local Authorities, but it should be noted that the CIEH S4ULs have not been issued through the EA or DEFRA;
- A further set of GAC for 35no. mainly organic contaminants not already covered by SGV or S4ULs produced by the CIEH and published by Contaminated Land: Applications In Real Environments (CL:AIRE) in conjunction with the Association of Geotechnical and Environmental Specialists (AGS) and the Environmental Industries Commission (EIC), 2010;
- Provisional Category 4 Screening Levels (pC4SL) for lead, which have been produced by CL:AIRE (2014).

Comparisons were made against guidance criteria for the '**Public Open Space – park'** land use setting, based on the end use of the site with the proposed 3G artificial football pitch, adjacent to the school grassed playing field. A conservative Soil Organic Matter (SOM) value of 1% has been used for organic contaminants (i.e. TPH and PAH) as a worst-case scenario.

7.3 Soil Results

A summary of soil results is presented in the following paragraphs and tables, including further discussion.

Table 8: Soil analysis results

Determinand	GAC POS_{park}	Source	Min	Max	Exceeded
Asbestos	*DL*	*CE*	*Absent*	*Absent*	-
Asbestos Quantification	*0.1%*	*CE*	-	-	-
Total Cyanide	*50*	*DIV*	*BDL*	*BDL*	-
Total Phenols	*760*	*LQM*	*BDL*	*BDL*	-
Arsenic	*170*	*LQM*	*17.5*	*27.3*	-
Cadmium	*532*	*LQM*	*BDL*	*BDL*	-
Chromium	*33000*	*LQM*	*23.0*	*26.8*	-
Copper	*44000*	*LQM*	*70.5*	*85.3*	-
Lead	*1400*	*C4SL*	*469*	*598*	
Mercury	*240*	*LQM*	*0.4*	*0.4*	-
Nickel	*3400*	*LQM*	*18.8*	*20.4*	-
Selenium	*1800*	*LQM*	*BDL*	*BDL*	-
Zinc	*170000*	*LQM*	*104*	*182*	-
Naphthalene	*1200*	*LQM*	*0.03*	*0.03*	-
Acenaphthylene	*29000*	*LQM*	*BDL*	*0.03*	-
Acenaphthene	*29000*	*LQM*	*BDL*	*BDL*	-
Fluorene	*20000*	*LQM*	*BDL*	*BDL*	-
Phenanthrene	*6200*	*LQM*	*0.18*	*0.33*	-
Anthracene	*150000*	*LQM*	*0.07*	*0.07*	-
Fluoranthene	*6300*	*LQM*	*0.56*	*0.59*	-
Pyrene	*15000*	*LQM*	*0.49*	*0.50*	-
Benzo(a)anthracene	*49*	*LQM*	*0.33*	*0.38*	-
Chrysene	*93*	*LQM*	*0.36*	*0.42*	-
Benzo(b)fluoranthene	*13*	*LQM*	*0.34*	*0.51*	-
Benzo(k)fluoranthene	*370*	*LQM*	*0.15*	*0.23*	-
Benzo(a)pyrene	*11*	*LQM*	*0.39*	*0.44*	-
Indeno(1,2,3-cd)pyrene	*150*	*LQM*	*0.35*	*0.36*	-
Dibenz(a,h)anthracene	*1.1*	*LQM*	*0.08*	*0.09*	-
Benzo(ghi)perylene	*1400*	*LQM*	*0.31*	*0.32*	-
Benzene	*90*	*LQM*	*BDL*	*BDL*	-
Toluene	*87000*	*LQM*	*BDL*	*BDL*	-
Ethylbenzene	*17000*	*LQM*	*BDL*	*BDL*	-
Total Xylenes	*17000*	*LQM*	*BDL*	*BDL*	-
MTBE	*DL*	*CE*	*BDL*	*BDL*	-
Aliphatic >C5-C6	*95000*	*LQM*	*BDL*	*BDL*	-
Aliphatic >C6-C8	*150000*	*LQM*	*BDL*	*BDL*	-

Determinand	GAC POS_{park}	Source	Min	Max	Exceeded
Aliphatic >C8-C10	*14000*	*LQM*	*BDL*	*BDL*	-
Aliphatic >C10-C12	*21000*	*LQM*	*BDL*	*BDL*	-
Aliphatic >C12-C16	*25000*	*LQM*	*BDL*	*BDL*	-
Aliphatic >C16-C35	*450000*	*LQM*	*BDL*	*BDL*	-
Aliphatic >C35-C44	*450000*	*LQM*	*BDL*	*BDL*	-
Aromatic >C5-C7	*76000*	*LQM*	*BDL*	*BDL*	-
Aromatic >C7-C8	*87000*	*LQM*	*BDL*	*BDL*	-
Aromatic >C8-C10	*7200*	*LQM*	*BDL*	*BDL*	-
Aromatic >C10-C12	*9200*	*LQM*	*BDL*	*BDL*	-
Aromatic >C12-C16	*10000*	*LQM*	*BDL*	*BDL*	-
Aromatic >C16-C21	*7600*	*LQM*	*BDL*	*BDL*	-
Aromatic >C21-C35	*7800*	*LQM*	*BDL*	*1.0*	-
Aromatic >C35-C44	*7800*	*LQM*	*BDL*	*BDL*	-

Full laboratory certificates are provided in **Appendix E.**

In summary, there are no exceedances when compared to the adopted GAC POS_{park}.

WAC testing results suggest that soils are likely to be accepted at an Inert waste facility, however confirmation will have to be sought due to the high percentage of Total Organic Carbon (TOC).

8.0 Soil Engineering Properties

8.1 Made Ground

Below a surface cover of grass, the site is found to be underlain by Topsoil over Made Ground soils to a maximum depth recorded of 0.8mbgl in WS2. The Made Ground was observed within all locations with anthropogenic material of primarily red bricks.

Made Ground is highly variable in its nature both from the point of view of composition and bearing capacity and can be subject to significant settlement when loaded. In addition, Made Ground may contain contaminated materials which may be putrescible or a hazard to human health or a potential source of ground gases.

8.2 Alluvium

Beneath the Made Ground, Alluvium, formed of CLAY soils was observed to the maximum depth of all three boreholes at 3.0mbgl. The lithology was recorded as a firm to soft grey mottled brown CLAY, with rare flint gravels.

A summary of the insitu and laboratory test results is provided in Table 9.

Table 9: - Alluvium Parameters

Parameter	Range
Pocket penetrometer test	0 - 100
Moisture Content (%)	37.0 – 58.0
Liquid Limit (%)	51.0 – 59.0
Plastic Limit (%)	19.0 – 21.0
Plasticity Index (%)	32.0 – 38.0
Volume Change Potential	Medium
pH	8.4 – 8.7
Water Soluble Sulphate Concentration (mg/l)	22 – 23

A summary of in-situ and laboratory testing indicate the Alluvium CLAY soils can be interpretated as a low strength soil.

9.0 Geotechnical Discussion

9.1 Shallow Foundations

Any foundations formed within Made Ground soils would be expected to be subject to total and differential settlement beyond tolerable limits. These soils are frequently present in a variable and inconsistent nature such that would render them unsuitable as a founding strata.

It is envisioned that the proposed light towers will be founded on mass concrete pad foundations formed within the underlying natural soils. Whilst firm clays have been identified to a depth of 1.2 to 1.3m the natural soils are then noted to decrease in strength below this depth. Given the limited investigation works completed to date and the low strength of the natural soils it is recommended that a very conservative approach is taken to the design and construction of the foundation pads. At this stage an allowable bearing pressure of 20kPa can be assumed for 1.5m x 1.5m pads bearing at a nominal depth of 1.0mbgl. There is a higher risk of settlement as the size and mass of the pad increases.

It is recommended that further investigation works are completed at the location of each of the light towers to confirm the ground makeup and to establish whether an improved ABP could be achievable. Should a significantly increased bearing pressure be required then a deep foundation option maybe required such as piling.

9.2 Excavations

At this stage we are unaware of the extent or depth of any excavation proposed; however, the following recommendations assume that excavations to depths of approximately 1.5m may be required in order to form onsite infrastructure.

Suitable temporary works measures need to be in place to allow the work to be carried out in a safe and controlled manner. These temporary works may include temporary shoring or battering of temporary slopes to a safe angle; the exact methodology should be selected based on the proposed construction and be assessed in advance by a competent temporary works engineer.

9.3 Groundwater

Groundwater was observed during the investigation. It should be noted that any groundwater would not necessarily be readily observed due to the short timescale and relatively impermeable clays. It is likely groundwater levels will exhibit seasonal variations and levels may change after periods of heavy rainfall or prolonged drought.

Where groundwater or surface water is encountered within any excavations during the construction phase it should be dealt with appropriately and removed using good engineering practices. At this stage it is considered that pumping from sumps should be sufficient to deal with low volumes of groundwater.

The winter groundwater monitoring has shown variation across the proposed site with groundwater levels averaging at 1.42mbgl in WS1 and 0.91mbgl in WS3. Proposed shallow excavation to depths of approximately 1.5m may be impacted by the groundwater, potentially causing problems in relation to collapse and inundation. Furthermore, perched water settled along the alluvium soil can potentially increase the volume of water within the proposed excavation and further this problem.

9.4 Infiltration

The trial pits TP1c and TP2c were used for the infiltration testing and ranged in depth from 0.60 to 0.90mbgl. A full three cycles for each test were not completed and therefore predicted values for the infiltration rate were determined from the data obtained on site. The poor drainage has resulted in a low infiltration rate. The Alluvium

consisting of largely CLAY material and the high groundwater levels recorded suggest that traditional soakaways may not be possible. It may however be possible to construct some form of sub pitch drainage with attenuation tanks to improve the playing surface. It is recommended that a specialist drainage engineer is engaged to provide further advise in this regard.

9.5 Concrete in Aggressive Ground

The results of laboratory testing have indicated a requirement of the same recommended design classes and subclasses between the made ground material and alluvium soils, which will be suitable for buried concrete on this site, in accordance with BRE SD1 guidance.

Four samples from the made ground material and alluvium soils were tested, therefore following BRE guidance the highest measured sulphate concentration (mg/l SO_4), and lowest pH has been used. This is in response to a maximum water-soluble sulphate concentration of 24mg/l and a minimum pH value of 8.2 resulting in an overall design sulphate class of DS-1 with a subclass of AC-1d.

10.0 Geo-Environmental Discussion

10.1 Discussion of Findings

The aim of the Site Investigation was to target the proposed area of the 3G artificial football pitch which will have porous surface/subbase.

For POS_{park} land use there were no exceedances of determinands from the soils tested. However, further to the above, there is some potential for other unidentified areas of contamination.

It is likely that the superficial materials will be excavated and removed as part of the future construction of the artificial football pitch and enabling works. These soils will likely be disposed of off-site at a licensed waste facility. However, if reused it should be noted that the soils cannot be used for plant uptake, due to high levels of lead.

11.0 Geo-Environmental Recommendations

The following recommendations are based on the plans proposed at the time of writing this report and may be subject to change.

11.1 Remedial Strategy

Subsequent report sections detail the required remedial works. The Local Authority should be contacted to confirm whether a standalone Remedial Options Appraisal and Strategy Report is required.

11.2 Record Keeping

Any actions must be adequately documented in order that an accurate Validation Report may be issued to the statutory authorities upon request.

The following table summarises actions currently identified as necessary, how and by whom the implementation of these should be recorded. Further details are provided in subsequent report sections.

Table 10: - Actions required for Validation Report

Action Required	Detail Required for Validation	Party to Record Action
Removal of appropriate thickness of Made Ground soil from proposed area of artificial pitch	Photographic record showing excavations, including depth detail.	Site manager / developer's nominated person.
Importation of clean certified material to area of artificial football pitch	Test certificates to prove suitability. Photographic record including depth detail.	Site manager / developer's nominated person. Testing completed by Environmental Consultant.
Disposal of excess earth spoils from groundworks.	Waste classification testing, waste transfer notes / dockets.	Site manager / developer's nominated person.

Concise records of these actions must be kept for submission to the Local Authority within a Validation Report upon request.

11.3 Watching Brief

A watching brief should be maintained on site, particularly during ground works. This must be undertaken as part of good working practices and in case there are any areas of unidentified contamination.

During any ground works, an appraisal of the exposed soils should be made by the on-site manager or developer's nominated person. If any material is noted to show visual and/or olfactory sign of contamination this material should be stockpiled separately and tested prior to its appropriate removal off site or re-use where necessary. A suitably qualified environmental specialist should be contacted to advise what further work is required.

The on-site manager / developer's nominated person should be able to display the relevant level of qualification and / or experience in managing construction works on contaminated land.

11.4 Imported Material

Any material intended to be used as subsoil or engineered fill should be analysed in order to confirm it is suitable for use. Test certificates from source should be kept providing evidence of the materials placed.

11.5 Waste Disposal

An explanation of Waste Disposal Guidance is presented below:

According to Technical Guidance WM3 – Waste Classification: Guidance on the classification and assessment of waste (2015), as part of Duty of Care, waste must be classified:

Before it is collected, disposed of or recovered;
To identify the controls that apply to the movement of the waste;
To complete waste documents and records;
To identify suitably authorised waste management options;
To prevent harm to people and the environment.

Before waste can be accepted at a landfill site, the landfill operator must be satisfied that the waste meets permit conditions, the waste acceptance procedures (WAP) and waste acceptance criteria (WAC).

11.6 Waste Acceptance Procedures

The WAP consist of three steps to identify and periodically check the main characteristics of the waste.

Level 1: basic characterisation – before waste is sent to landfill, its composition and properties must be verified to determine it is suitable for acceptance and at which class of site.

Level 2: compliance testing – if production of waste is regular, waste must be periodically checked to ensure that properties have not changed.

Level 3: on-site verification – each delivery must be checked to ensure that it is the expected waste and that it has not been contaminated in storage or transport.

11.6.1 Waste Acceptance Criteria

The European Waste Catalogue (List of Waste Regulations) should be used in the determination of whether a waste is hazardous.

Waste producers must characterise waste for the Duty of Care Description whether or not it is intended to send it to landfill. This includes making an assessment of its hazardousness (is it classified hazardous waste or not) unless it is an absolute non-hazardous entry waste. This is achieved by reference to the List of Waste Regulations.

Note, WAC testing cannot be used to make an assessment of whether a waste is hazardous.

11.6.2 Summary

Before a waste producer can take waste to a landfill site for disposal, they must check the landfill has the appropriate permit, and must have completed the following:

- Duty of Care transfer note/ Hazardous Waste consignment note;
- Pre-treatment declaration form;
- Waste code (using List of Wastes);
- Composition of the waste (by testing, if necessary); and
- WAC testing (if required).

Requirements are considered in more detail within Waste Acceptance at Landfills (2010).

It is prudent to ascertain the testing requirements of the waste facility prior to the movement of any spoil. All relevant dockets will need to be kept to provide evidence of the removal of waste. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

12.0 Statutory Consultees

We would recommend that this report be forwarded to the relevant Statutory Consultees including the Local Council's Environmental Health and Planning Department to seek their comments and subsequent approval prior to works commencing on site.

The Statutory Authorities may require a Validation and/or closure report providing documentation/audit trail for the importation/removal/reuse of material on site and any other remedial works completed on site.

FIGURES

Figure 1 – Site Location Overview

Figure 2 – Approximate Site Border

Figure 3 – Site Investigation Plan

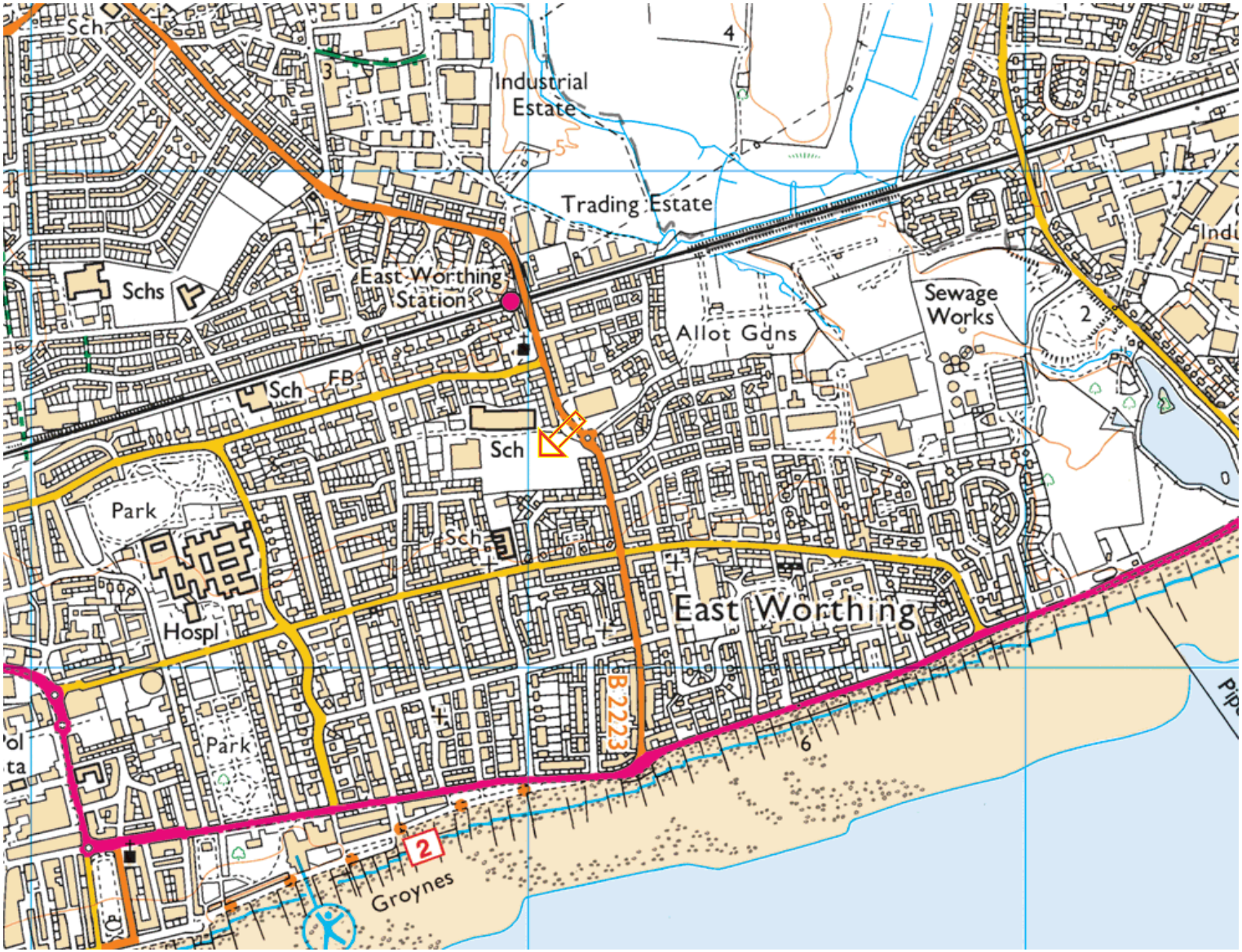


Figure 1:

Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Constructive Evaluation Ltd.

KEY

Site Location

Drawing Title:

Site Location Plan

Project Reference:

22.1185

Site Name:

Davison High School

Revision: 0
Drawn by: Soils
Scale: Not to Scale

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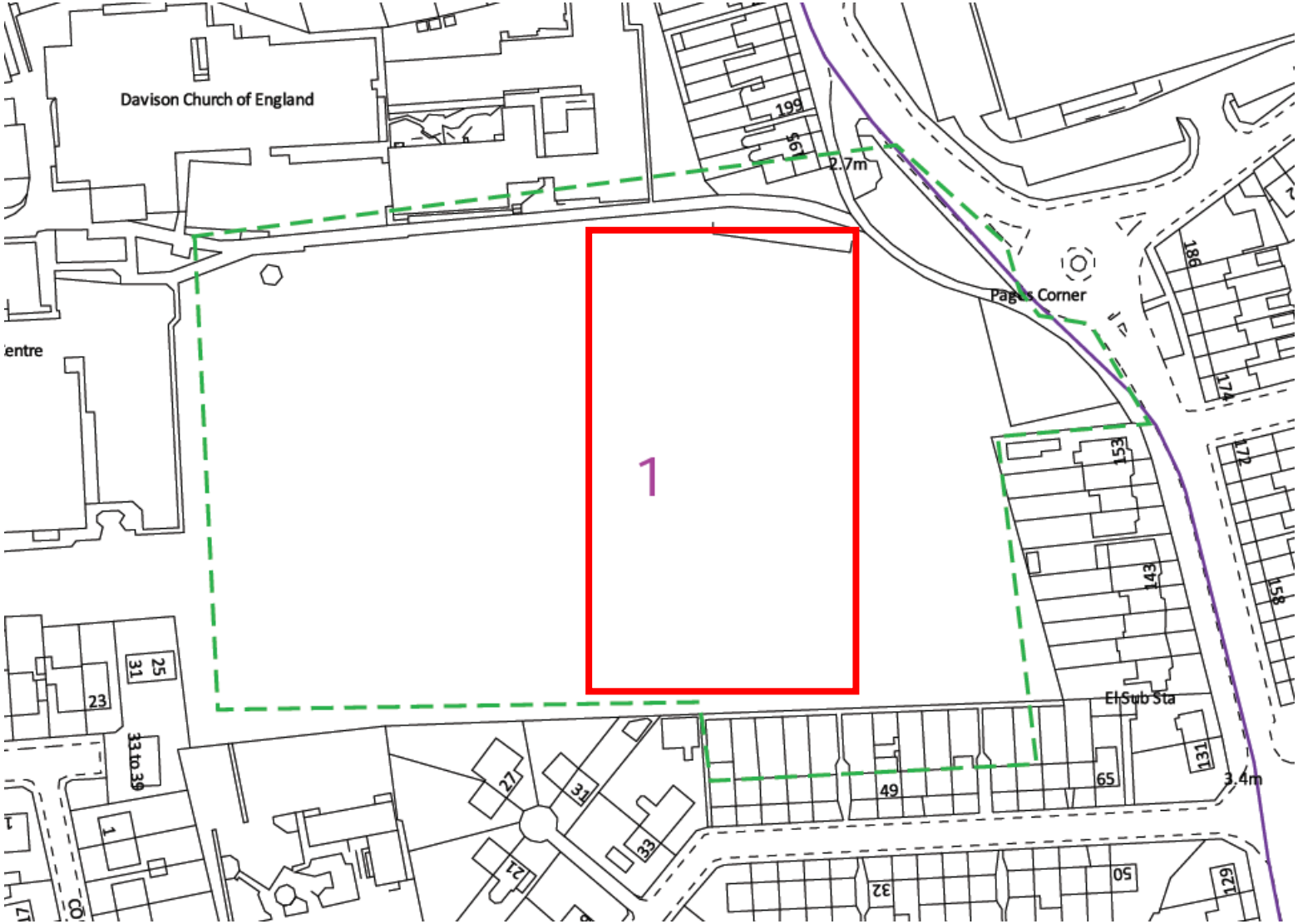

Figure 2:

Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Constructive Evaluation Ltd.

KEY

Approximate site border

Drawing Title:

School Site Border

Project Reference:

22.1185

Site Name:

Davison High School

Revision: 0
Drawn by: Soils
Scale: Not to Scale

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Figure 3:

Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Constructive Evaluation Ltd.

KEY

WS

TP

Drawing Title:

Site Investigation Plan

Project Reference:

22.1185

Site Name:

Davison High School

Revision: 0
Drawn by: Soils
Scale: Not to Scale

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APPENDICES

Appendix A – Site Photographs

Appendix B – Stratigraphic Logs

Appendix C – Soil Infiltration Test Results

Appendix D – Geotechnical Laboratory Testing

Appendix E – Environmental Laboratory Testing

Appendix F – Report Terms and Conditions

APPENDIX A

Site Photographs

Site Photographs

Project Ref: 22.1185

Site Name: Davison High School, Worthing

1.



2.



1) TP1B 0-0.50mbgl
2) TP2A 0-0.90mbgl
3) TP1C Soakage Test
4) TP2C Soakage Test

3.



4.



Site Photographs

Project Ref: 22.1185

Site Name: Davison High School, Worthing

5.



6.



7.



8.



5) Site overview from northwest

6) Halfway line facing west

7) Southeast corner

8) Southwest corner

Site Photographs

9.



10.



11.



12.



9) WS1 location

10) WS1 window sampler

11) WS1 0-1mbgl

12) WS1 spoil

APPENDIX B

Stratigraphic Logs

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Borehole Log

Borehole No.
WS1
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords:	516051E - 103473N	Hole Type WS
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Level:	2.04	Scale 1:15
Client:	Davison C.E. High School for Girls		Dates:	22/12/2022	Logged By L.S

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.80	D					Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to sub-angular red brick concrete and flint. Fragment of scrap metal 20cm diameter. (MADE GROUND)	
					0.70	1.34		Soft light grey mottled brown slightly gravelly CLAY. Gravel is fine to coarse sub angular to rounded flint.	
		1.00	PP	100.00					1
		1.30 - 1.60	D						
		1.40	PP	25.00					
		1.70 - 1.90	D						
		1.90	PP	0.00					2
					2.40	-0.36		Very soft dark grey silty CLAY.	
					3.00	-0.96		End of Borehole at 3.000m	3

Remarks

1) Location CAT and Genny scanned prior to breaking ground and at 0.3m intervals to 0.9mbgl.
2) Groundwater strike at 1.0mbgl (rising to 0.80mbgl after 20minutes)
3) On completion, borehole installed with a 19mm groundwater monitoring standpipe to 3.0mbgl

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Borehole Log

Borehole No.
WS2
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords:	516028E - 103430N	Hole Type WS
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Level:	1.95	Scale 1:15
Client:	Davison C.E. High School for Girls		Dates:	22/12/2022	Logged By L.S

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular red brick concrete and flint. (MADE GROUND)	
					0.80	1.15			
		0.90 - 1.10	D					Soft pale grey mottled brown slightly gravelly CLAY. Gravel is fine to coarse sub-angular to rounded flint.	
		1.00	PP	100.00					1
		1.10	PP	100.00					
		1.50	PP	50.00					
		1.70 - 2.10	D						
					1.90	0.05		Very soft grey silty CLAY.	
		2.00	PP	0.00					2
					3.00	-1.05		End of Borehole at 3.000m	3

Remarks

1) Location CAT and Genny scanned prior to breaking ground and at 0.3m intervals to 0.9mbgl.
2) Groundwater strike at 1.0mbgl (rising to 0.80mbgl after 20minutes)
3) On completion, borehole was backfilled with bentonite and arisings.

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Borehole Log

Borehole No.
WS3
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords:	516011E - 103377N	Hole Type WS
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Level:	2.00	Scale 1:15
Client:	Davison C.E. High School for Girls		Dates:	22/12/2022	Logged By L.S

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular red brick concrete and flint. (MADE GROUND)
					0.65	1.35		Soft pale grey mottled brown slightly gravelly CLAY. Gravel is fine to coarse sub angular to rounded flint.
		1.15	PP	0.00				
		1.40 - 1.70	D					
		1.50	PP	25.00				
		1.90 - 2.20	D					
		2.00	PP	0.00				
					2.20	-0.20		Very soft grey silty CLAY.
					3.00	-1.00		End of Borehole at 3.000m

Remarks

1) Location CAT and Genny scanned prior to breaking ground and at 0.3m intervals to 0.9mbgl.
2) Groundwater strike at 1.0mbgl (rising to 0.80mbgl after 20minutes)
3) On completion, borehole installed with a 19mm groundwater monitoring standpipe to 3.0mbgl

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Trial Pit Log

Trialpit No
TP1a
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords: 515999.00 - 103447.00 Level: 1.77	Date 19/12/2022
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Dimensions (m): 1.58 × 0.4, Depth 0.64	Scale 1:10
Client:	Davison C.E. High School for Girls			Logged L.S

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.64	1.13		Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular red brick concrete and flint. (MADE GROUND)
							End of pit at 0.64 m

1
2

Remarks: CAT scanned prior to excavation. Trial pit terminated due to suspected historic brick wall at 0.50mbgl. On completion trial pit open and dry to depth.

Stability: Trial pit remained stable throughout excavation.

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Trial Pit Log

Trialpit No
TP1b
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords: 515999.00 - 103447.00 Level: 1.95	Date 19/12/2022
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Dimensions (m): 1.4 × 0.4, Depth 0.50	Scale 1:10
Client:	Davison C.E. High School for Girls			Logged L.S

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.50	1.45		Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular red brick concrete and flint. (MADE GROUND)
							End of pit at 0.50 m

1

2

Remarks: CAT scanned prior to excavation. Trial pit terminated due to suspected historic brick wall at 0.50mbgl. Perched water was observed at 0.60mbgl. On completion trail pit open and wet to depth.

Stability: Trial pit remained stable throughout excavation.

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Trial Pit Log

Trialpit No
TP1c
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords: 515999.00 - 103447.00 Level: 1.95	Date 19/12/2022
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Dimensions (m): 1.1 × 0.5, Depth 0.60	Scale 1:10
Client:	Davison C.E. High School for Girls			Logged L.S

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.60	D		0.60	1.35		Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular red brick concrete and flint. (MADE GROUND)
							End of pit at 0.60 m

1
2

Remarks: CAT scanned prior to excavation Shallow depth - high watertable at 0.65mbgl. On completion trial pit open and dry to depth.

Stability: Trial pit remained stable throughout excavation.

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Trial Pit Log

Trialpit No
TP2a
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords: 516053.00 - 103396.00 Level: 2.01	Date 19/12/2022
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Dimensions (m): 1.2 × 0.5 Depth 0.90	Scale 1:10
Client:	Davison C.E. High School for Girls			Logged L.S

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.60	D					Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular red brick concrete ceramic and flint. (MADE GROUND)
	0.60 - 0.90	D		0.60	1.41		Firm greyish brown CLAY.
				0.90	1.11		End of pit at 0.90 m

Remarks: CAT scanned prior to excavation. Termination due to a brick ceramic pipe broken at 0.60mbgl. On completion trial pit open and wet to depth.

Stability: Trial pit remained stable throughout excavation.

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Trial Pit Log

Trialpit No
TP2b
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords: 516053.00 - 103396.00 Level: 2.01	Date 19/12/2022
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Dimensions (m): 1.3 × 0.4 Depth 0.90	Scale 1:10
Client:	Davison C.E. High School for Girls			Logged L.S

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.70	D					Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular red brick concrete and flint. (MADE GROUND)
	0.70 - 0.90	D		0.70	1.31		Firm light grey CLAY. Fine grained.
				0.90	1.11		End of pit at 0.90 m

Remarks: CAT scanned prior to excavation. Trial pit was terminated due to groundwater at 0.90mbgl. On completion trial pit open and wet to depth.

Stability: Trial pit remained stable throughout excavation.

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Trial Pit Log

Trialpit No
TP2c
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords: 516053.00 - 103396.00 Level: 2.01	Date 19/12/2022
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Dimensions (m): 1.1 × 0.5 Depth 0.60	Scale 1:10
Client:	Davison C.E. High School for Girls			Logged S.B

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.60	D		0.60	1.41		Grass over firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular red brick concrete and flint. (MADE GROUND) End of pit at 0.60 m

Remarks: CAT scanned prior to excavation. On completion trial pit open and dry to depth.

Stability: Trial pit remained stable throughout excavation.

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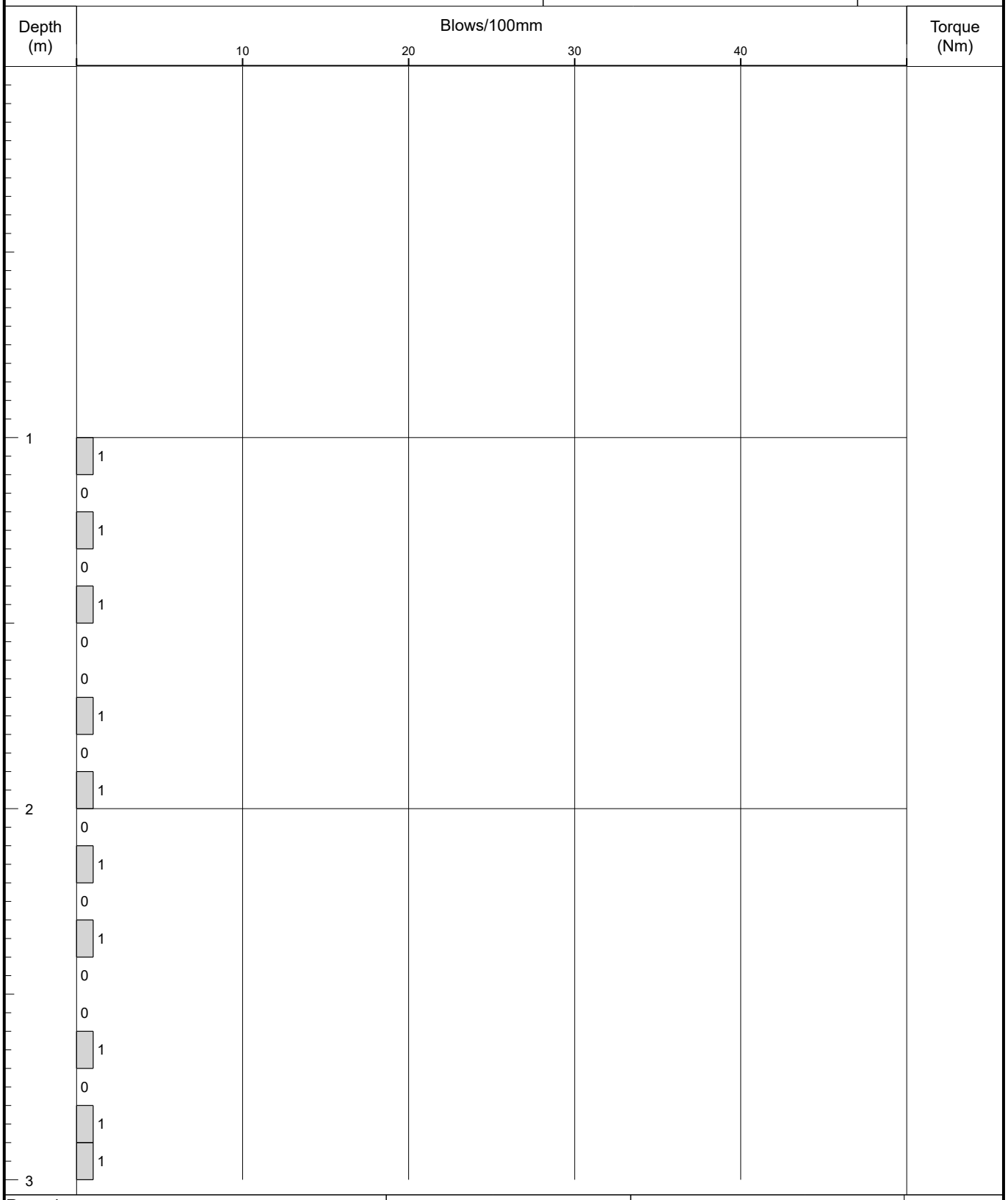
Probe Log

Borehole No.
DP1
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords:	516051.00 - 103473.00	Hole Type DP
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Level:	2.04	Scale 1:15
Client:	Davison C.E. High School for Girls		Dates:	22/12/2022 -	Logged By



Remarks				
	Fall Height	500	Cone Base Diameter	55
	Hammer Wt	50	Final Depth	2.90
	Probe Type	DPH	Log Scale	1:15

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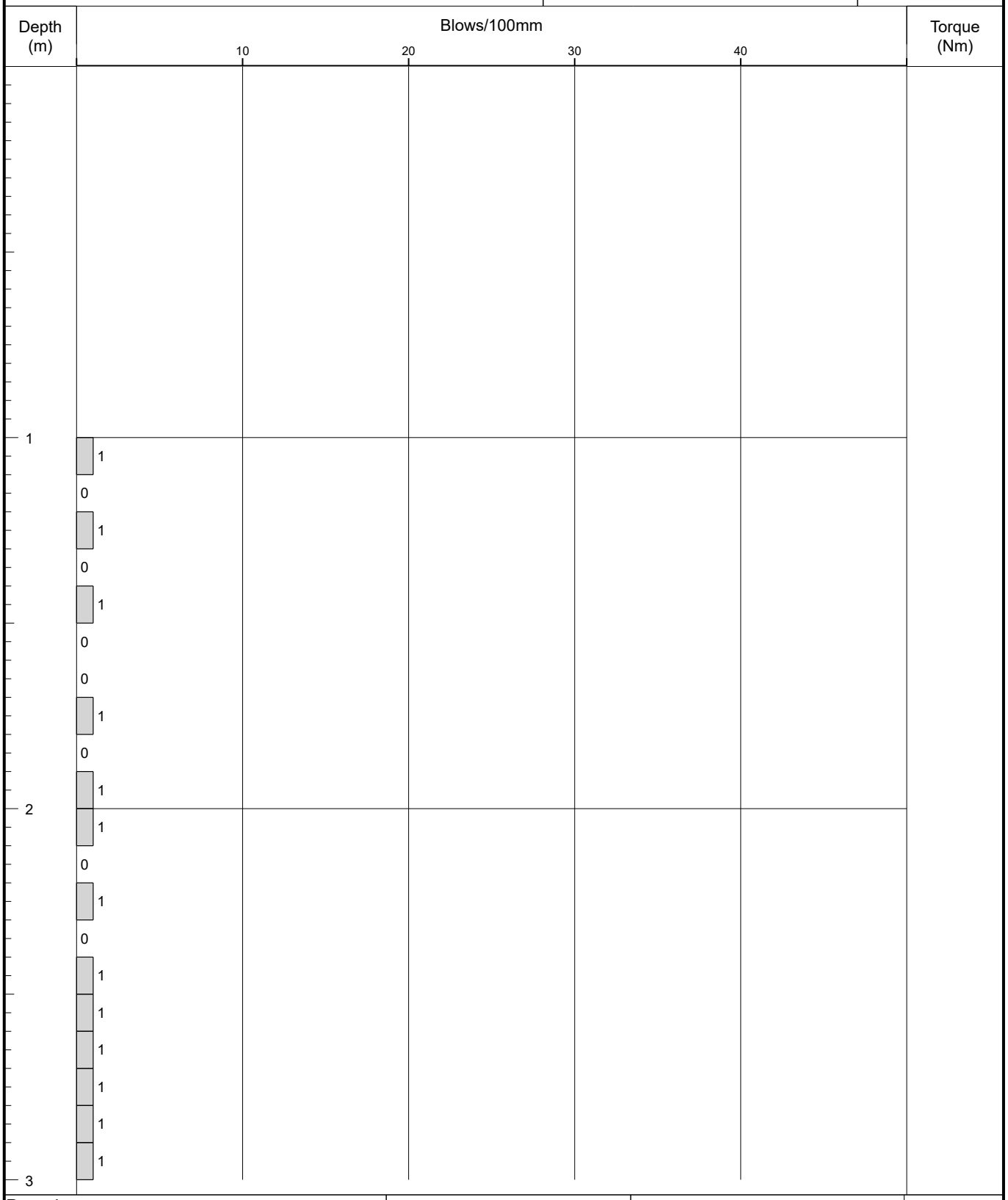
Probe Log

Borehole No.
DP2
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords:	516028.00 - 103430.00	Hole Type DP
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Level:	1.95	Scale 1:15
Client:	Davison C.E. High School for Girls		Dates:	22/12/2022 -	Logged By



Remarks				
	Fall Height	500	Cone Base Diameter	55
	Hammer Wt	50	Final Depth	2.90
	Probe Type	DPH	Log Scale	1:15

AGS

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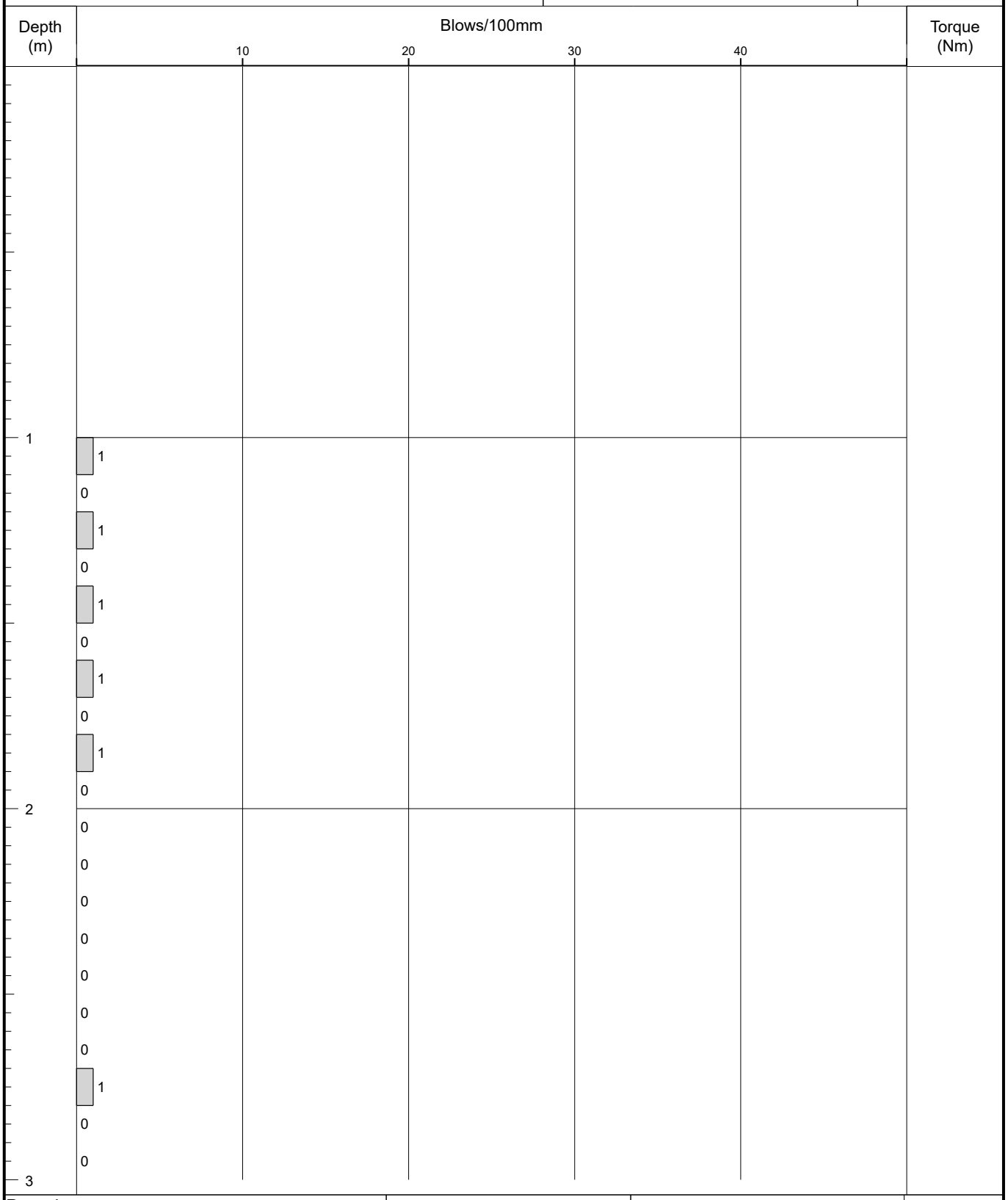
Probe Log

Borehole No.
DP3
Sheet 1 of 1

Project Name:	Davison C.E. High School for Girls	Project No. 22.1185	Co-ords:	516011.00 - 103377.00	Hole Type DP
Location:	Davison High School, Selbourne Road, Worthing, West Sussex BN11 2JX		Level:	2.00	Scale 1:15
Client:	Davison C.E. High School for Girls		Dates:	22/12/2022 -	Logged By



Remarks				
	Fall Height	500	Cone Base Diameter	55
	Hammer Wt	50	Final Depth	2.90
	Probe Type	DPH	Log Scale	1:15

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APPENDIX C

Soil Infiltration Test Results

Soakaway Test Results & Soil Infiltration Rate

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Site: Davison CE High School for Girls, Worthing.

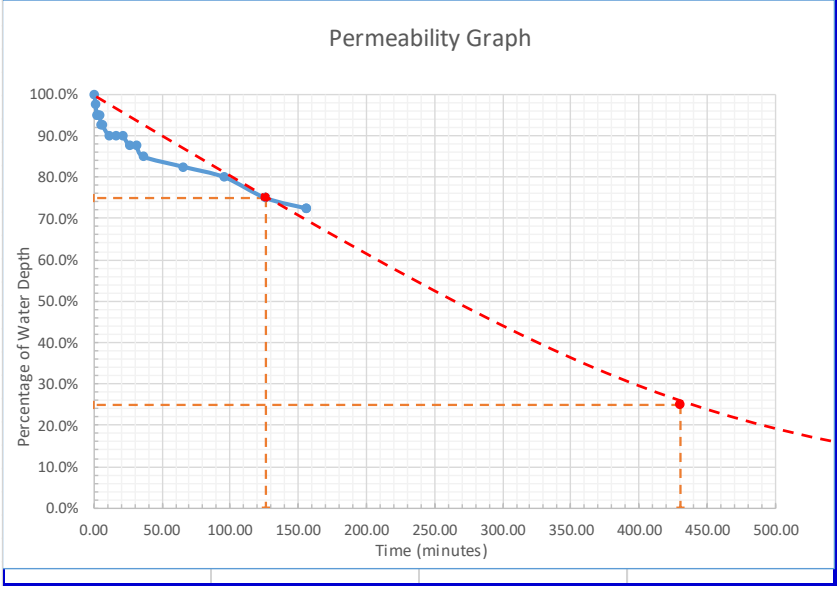
Ref: 22.1185 | **Trial Hole: TP1c** | **Test 1**

Time in minutes	Depth in metres to water surface	Head of Water from Base of Pit	Percentage of water depth at start
0.00	0.200	0.400	100.0%
1.00	0.210	0.390	97.5%
2.00	0.220	0.380	95.0%
3.00	0.220	0.380	95.0%
4.00	0.220	0.380	95.0%
5.00	0.230	0.370	92.5%
6.00	0.230	0.370	92.5%
11.00	0.240	0.360	90.0%
16.00	0.240	0.360	90.0%
21.00	0.240	0.360	90.0%
26.00	0.250	0.350	87.5%
31.00	0.250	0.350	87.5%
36.00	0.260	0.340	85.0%
66.00	0.270	0.330	82.5%
96.00	0.280	0.320	80.0%
126.00	0.300	0.300	75.0%
156.00	0.310	0.290	72.5%
156.00			72.5%

WARNING DOES NOT FALL TO 25% OF START DEPTH-Refer to graph sheet for calculation

Pit Size		Time in mins	
Length	1.18	126	75%
Width	0.58	430	25%
Depth	0.60		

Infiltration Rate	from 75%-25%	**5.40506E-06**	
		m/s	



Soakaway Test Results & Soil Infiltration Rate

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Site: Davison CE High School for Girls, Worthing.

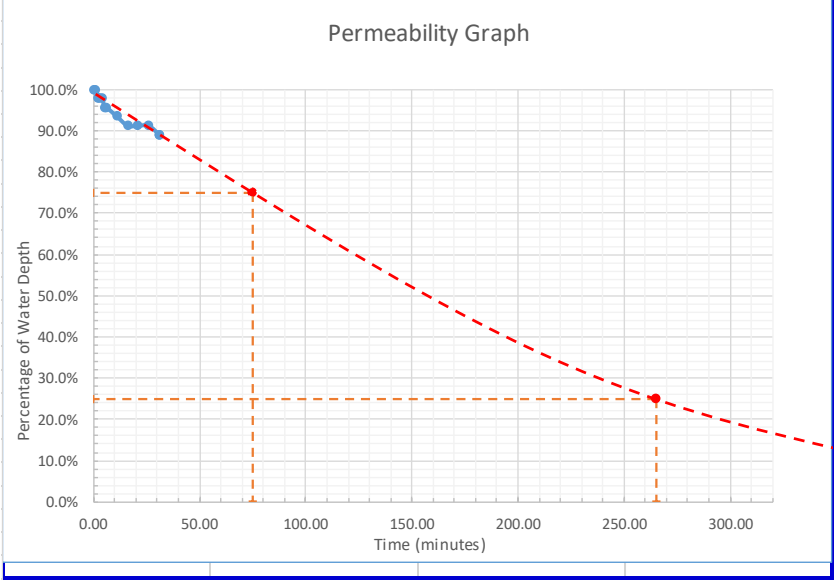
Ref: 22.1185 | **Trial Hole: TP2c** | **Test 1**

Time in minutes	Depth in metres to water surface	Head of Water from Base of Pit	Percentage of water depth at start
0.00	0.140	0.460	100.0%
1.00	0.140	0.460	100.0%
2.00	0.150	0.450	97.8%
3.00	0.150	0.450	97.8%
4.00	0.150	0.450	97.8%
5.00	0.160	0.440	95.7%
6.00	0.160	0.440	95.7%
11.00	0.170	0.430	93.5%
16.00	0.180	0.420	91.3%
21.00	0.180	0.420	91.3%
26.00	0.180	0.420	91.3%
31.00	0.190	0.410	89.1%
31.00			89.1%

WARNING DOES NOT FALL TO 25% OF START DEPTH-Refer to graph sheet for calculation

Pit Size		Time in mins	
Length	1.10	75	75%
Width	0.30	265	25%
Depth	0.60		

Infiltration Rate	from 75%-25%	**6.83562E-06**	
		m/s	



APPENDIX D

Geotechnical Laboratory Results

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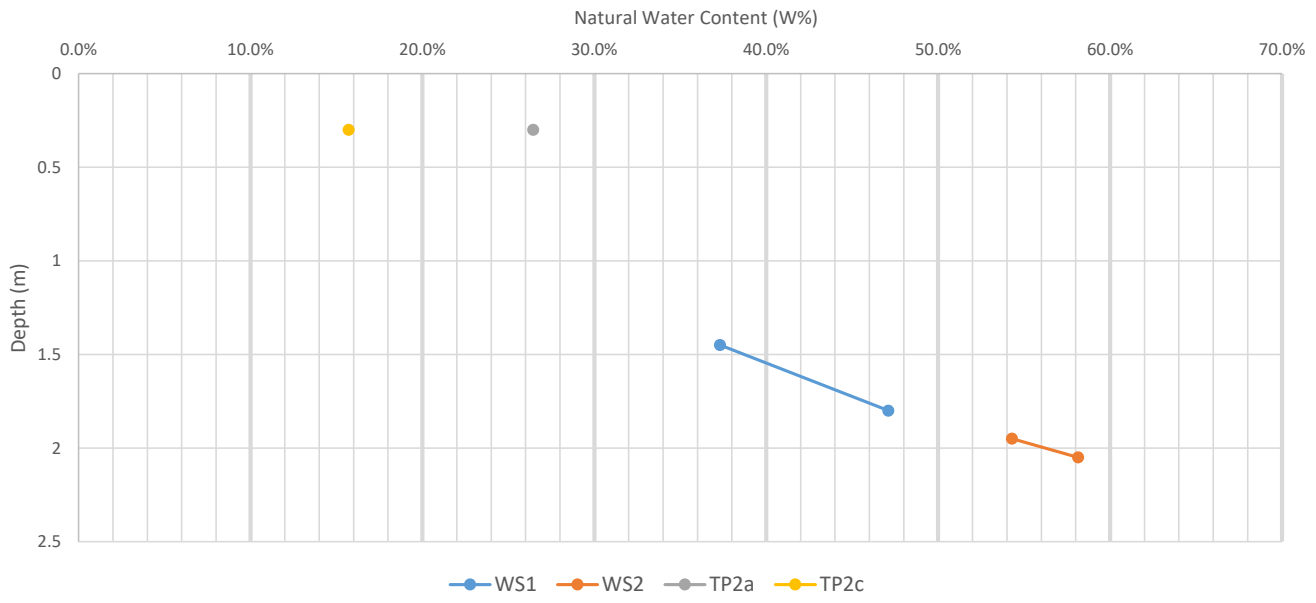
NATURAL WATER CONTENT

SUMMARY OF RESULTS FROM LL & PI

Project No	**22.1185**
Project Name	**Davison CE High School for Girls**
Client	**Davison CE High School**

Hole ID	Depth (m)	Natural Water Content (W%)	Remarks
WS1	1.30-1.60m	37.3%	
WS1	1.70-1.90m	47.1%	
WS2	1.80-2.10m	54.3%	
WS3	1.90-2.20m	58.1%	
TP2a	0-0.60m	26.4%	
TP2c	0-0.60m	15.7%	



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Test Procedure(s): BS17892: Part 1: Clause 5.2 : 2014: Determination of water content by the oven drying method

Checked and Approved: SFL (Senior Lab Technician)

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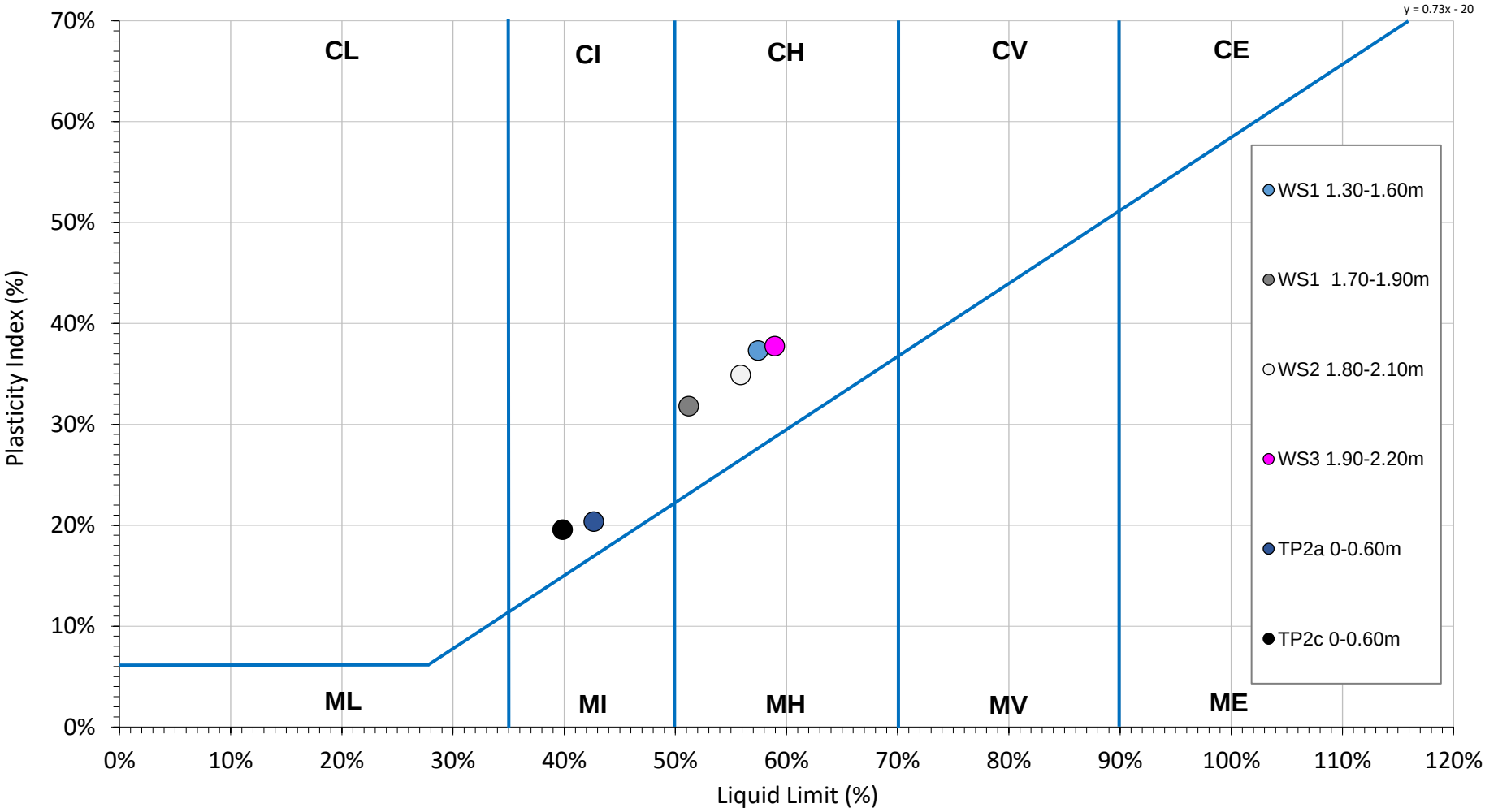
PLASTICITY CHART FOR SOIL CLASSIFICATION:

22.1185 Davison CE High School for Girls



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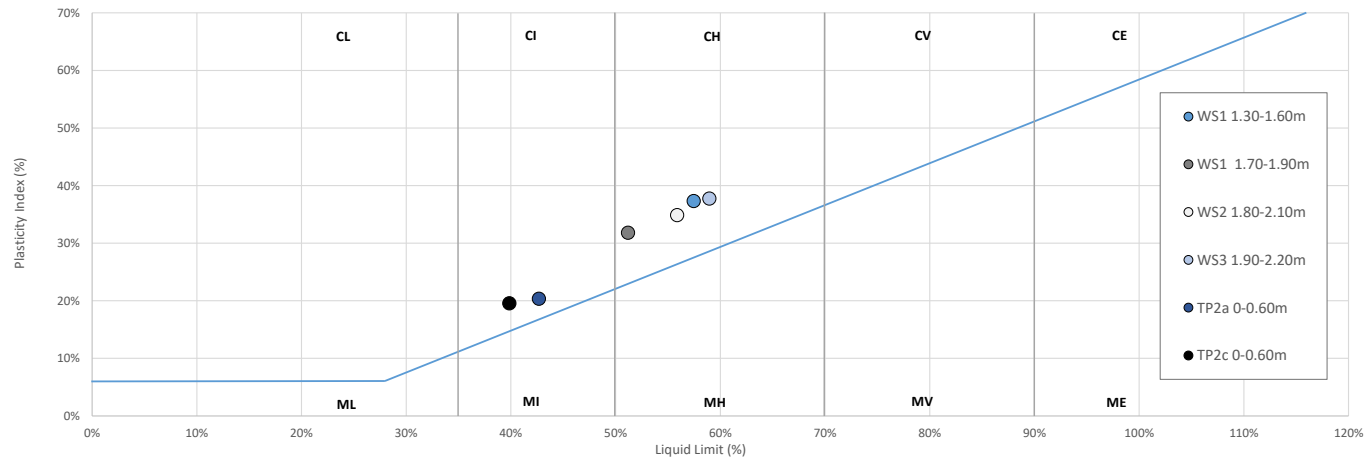
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

SUMMARY OF RESULTS

Project No	22.1185
Project Name	Davison CE High School for Girls
Client	Davison CE High School

Hole ID	Depth (m)	Moisture Content (W%)	Liquid Limit (WL%)	Plastic Limit (WP%)	Plasticity Index (IP%)	Portion retained on 425µm Sieve (%)	Modified PI (I'p%)	Soil Classification	Consistency Index (Ipc)	Sample description	Volume change potential			Remarks
											Low	Medium	High	
WS1	1.30-1.60m	37%	57%	20%	37%	0%	37%	CH	0.54	Brown mottled light grey CLAY.	No	Yes	No	
WS1	1.70-1.90m	47%	51%	19%	32%	3%	31%	CH	0.13	Grey slightly gravelly slightly sandy CLAY. Gravel is fine flint and shell fragments.	No	Yes	No	
WS2	1.80-2.10m	54%	56%	21%	35%	2%	34%	CH	0.05	Grey CLAY.	No	Yes	No	
WS3	1.90-2.20m	58%	59%	21%	38%	1%	37%	CH	0.02	Grey CLAY.	No	Yes	No	
TP2a	0-0.60m	26%	43%	22%	20%	26%	15%	MI	0.80	MADE GROUND: Dark brown slightly gravelly silt. Gravel is fine to medium flint, glass and metal fragments.	Yes	No	No	
TP2c	0-0.60m	16%	40%	20%	20%	54%	9%	MI	1.23	MADE GROUND: Dark brown gravelly slightly sandy silt. Gravel is fine to coarse flint, brick and glass fragments.	Yes	No	No	



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E: info@celtduk.com

Test Procedure(s):	BS17892: Part 1: Clause 5.2 : 2014: Determination of water content by the oven drying method	
	BS17892: Part 12: Clause 5.3 : 2018: Determination of the liquid limit by the fall cone method	
	BS17892: Part 12: Clauses 5.5 & 6.5 : 2018: Determination of the plastic limit and plasticity index	
Checked and Approved:	**SFL (Senior Lab Technician)**	**09/02/2022**

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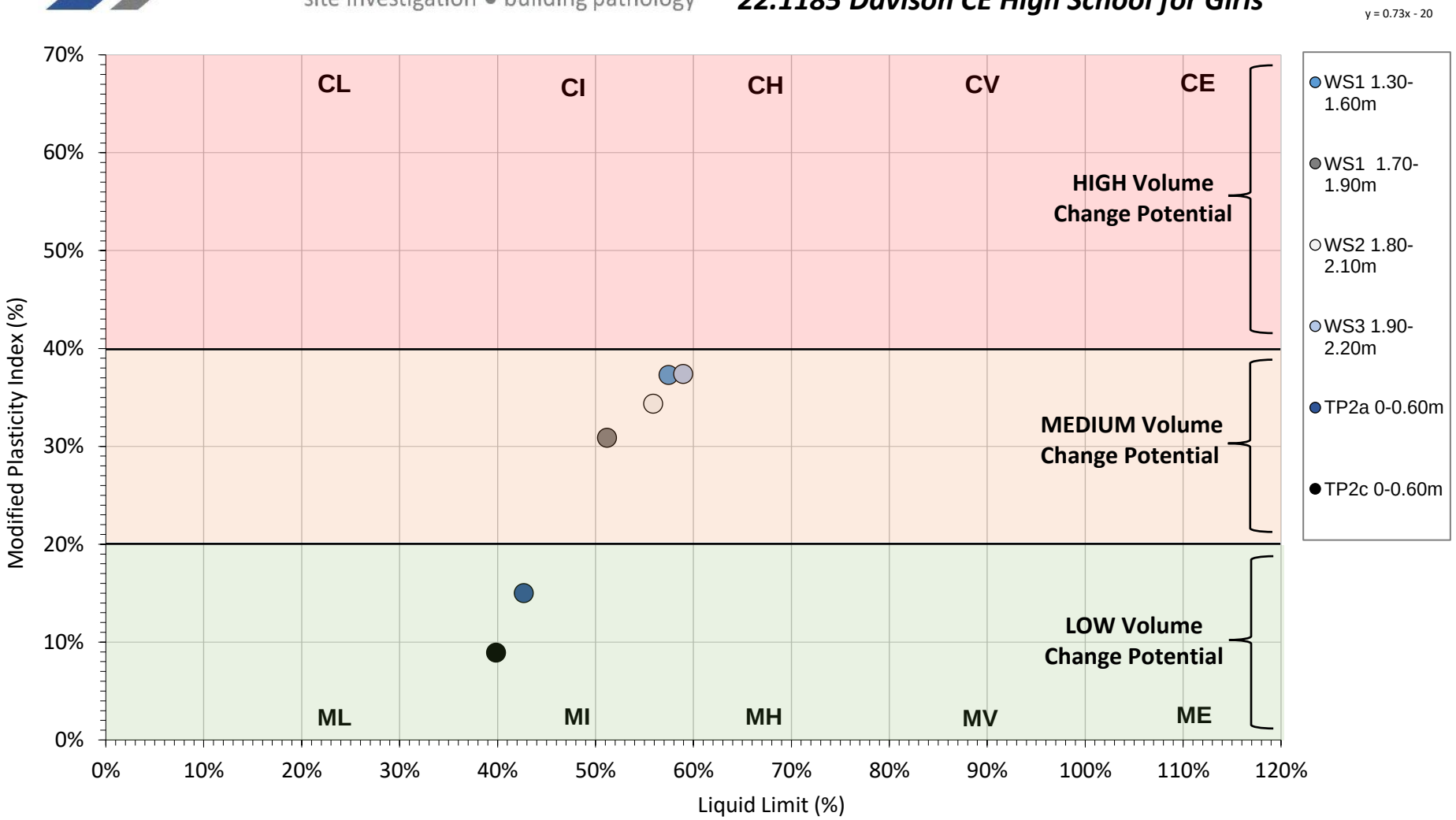
NHBC Volume Change Potential:

22.1185 Davison CE High School for Girls



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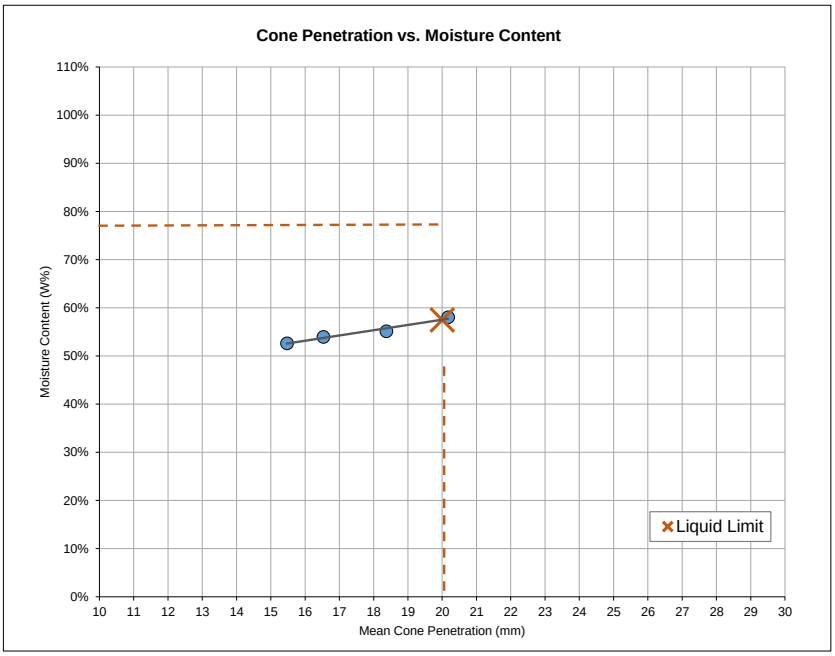
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

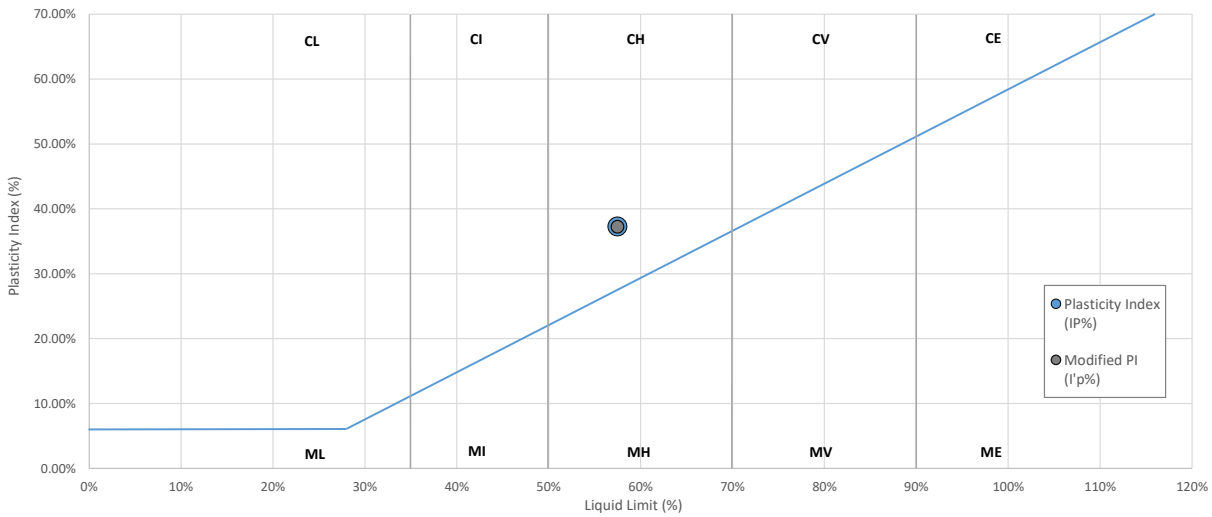
Testing performed in accordance with BS 17892-12: 2018: Clauses 5.3, 5.5, 6.5

Project No	**22.1185**
Project Name	**Davison CE High School for Girls**
Client	**Davison CE High School**

Sample Position & Depth:	**WS1**	**1.30-1.60m**	**Test Date:**	**09/02/2022**
Sample Description:	Brown mottled light grey CLAY.		**Original Dried Mass (g):**	166.55

Natural Moisture Content (W%)	37%
Liquid Limit (WL%)	**57%**
Plastic Limit (WP%)	**20%**
Plasticity Index (IP%)	**37%**
Classification	**CH**
Portion Retained on 425µm Sieve (%)	**0%**
Modified Plasticity Index (factoring in the above) (I'p%)	**37%**
Consistency Index (Ipc)	**0.54**
Fall Cone Used:	**30°–80 g cone**
Remarks	





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Test Procedure(s):	BS17892: Part 1: Clause 5.2 : 2014: Determination of water content by the oven drying method	
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	BS17892: Part 12: Clauses 5.5 & 6.5 : 2018: Determination of the plastic limit and plasticity index	
Checked and Approved:	**SFL (Senior Lab Technician)**	**09/02/2022**

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LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

Testing performed in accordance with BS 17892-12: 2018: Clauses 5.3, 5.5, 6.5

Project No	**22.1185**
Project Name	**Davison CE High School for Girls**
Client	**Davison CE High School**

Sample Position & Depth:	**WS1**	**1.70-1.90m**

Test Date:	**09/02/2022**

Sample Description:	Grey slightly gravelly slightly sandy CLAY. Gravel is fine flint and shell fragments.

Original Dried Mass (g):	151.35

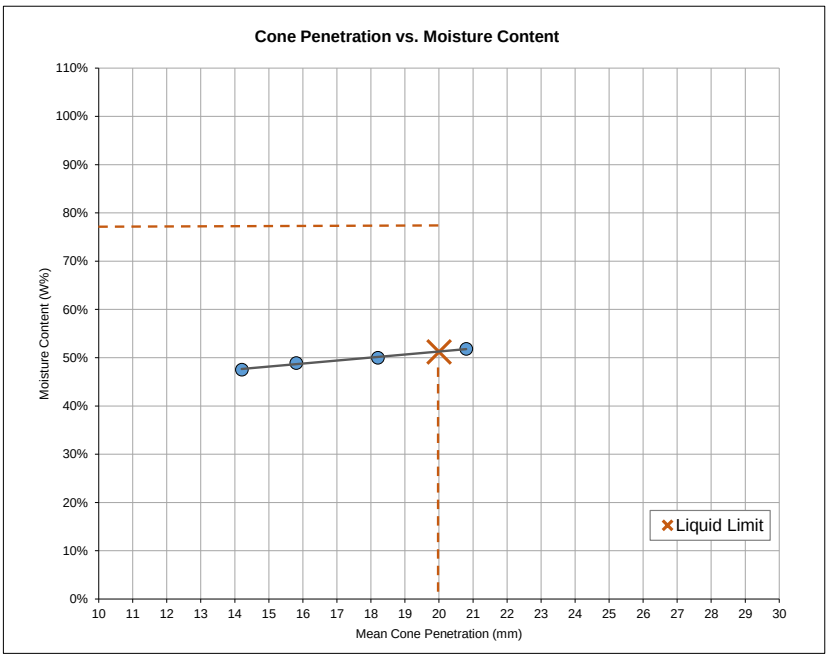
Natural Moisture Content (W%)	47%
Liquid Limit (WL%)	**51%**
Plastic Limit (WP%)	**19%**
Plasticity Index (IP%)	**32%**

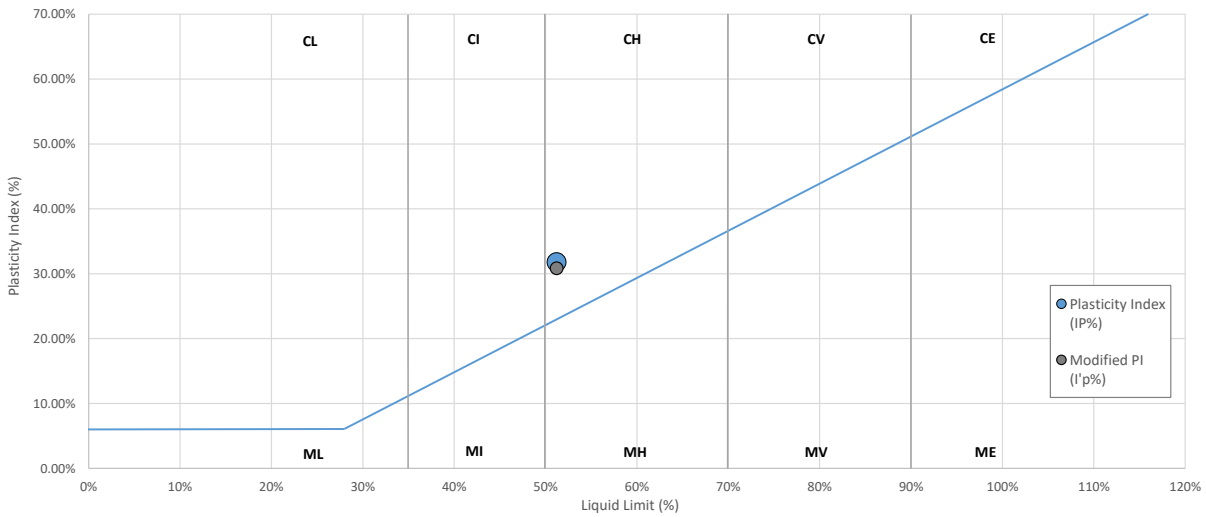
Classification	**CH**

Portion Retained on 425µm Sieve (%)	**3%**
Modified Plasticity Index (factoring in the above) (I'p%)	**31%**
Consistency Index (Ipc)	**0.13**

Fall Cone Used:	**30°–80 g cone**

Remarks	





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	BS17892: Part 12: Clauses 5.5 & 6.5 : 2018: Determination of the plastic limit and plasticity index	
Checked and Approved:	**SFL (Senior Lab Technician)**	**09/02/2022**

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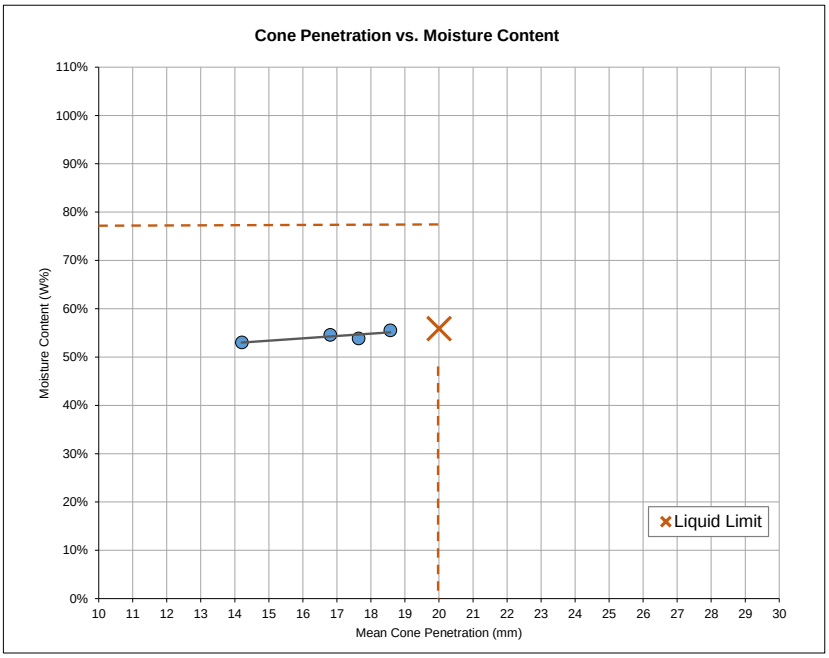
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

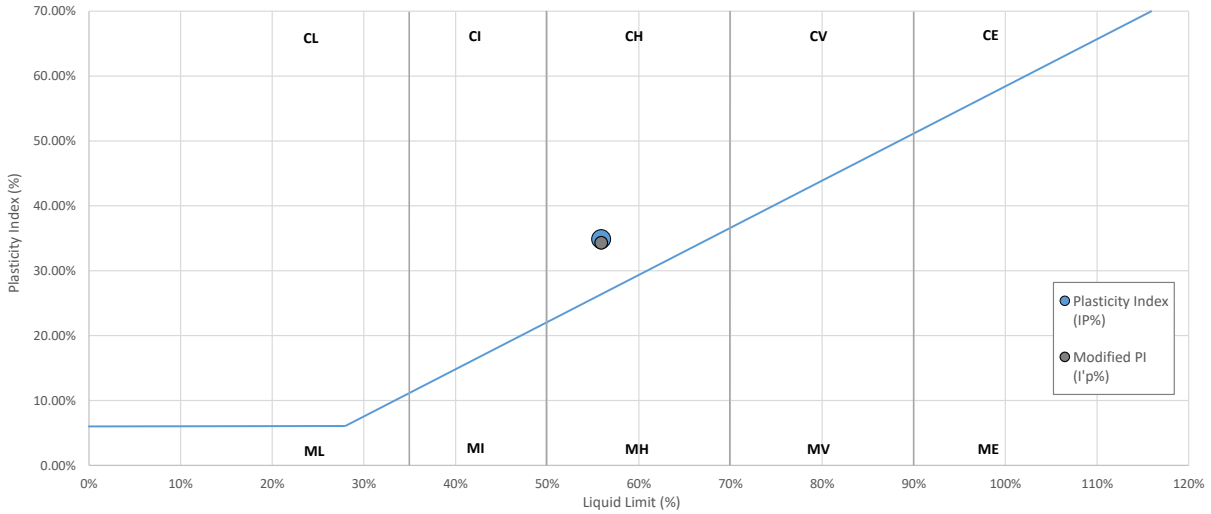
Testing performed in accordance with BS 17892-12: 2018: Clauses 5.3, 5.5, 6.5

Project No	**22.1185**
Project Name	**Davison CE High School for Girls**
Client	**Davison CE High School**

Sample Position & Depth:	**WS2**	**1.80-2.10m**	**Test Date:**	**09/02/2022**
Sample Description:	Grey CLAY.		**Original Dried Mass (g):**	119.25

Natural Moisture Content (W%)	54%
Liquid Limit (WL%)	**56%**
Plastic Limit (WP%)	**21%**
Plasticity Index (IP%)	**35%**
Classification	**CH**
Portion Retained on 425µm Sieve (%)	**2%**
Modified Plasticity Index (factoring in the above) (I'p%)	**34%**
Consistency Index (Ipc)	**0.05**
Fall Cone Used:	**30°–80 g cone**
Remarks	





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Checked and Approved:	**SFL (Senior Lab Technician)**	**09/02/2022**

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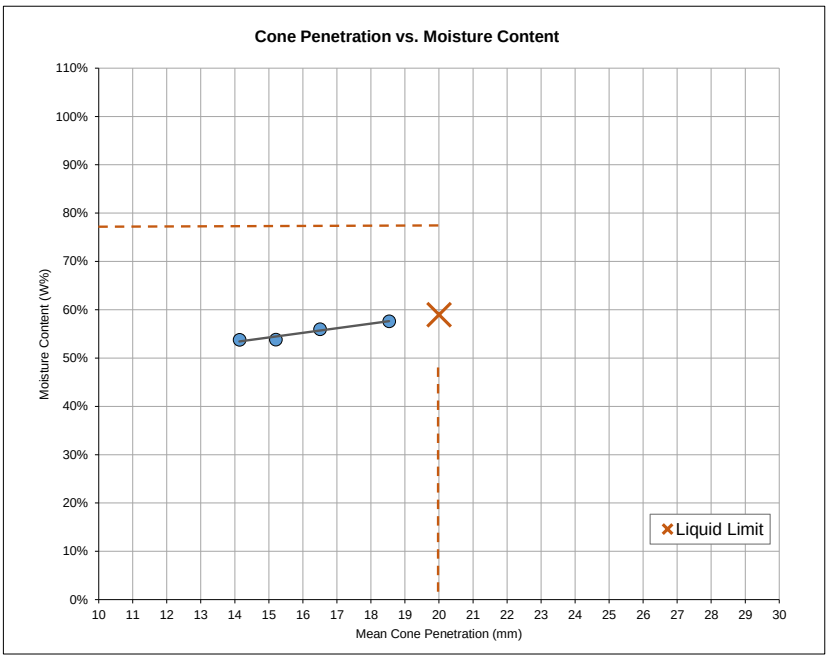
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

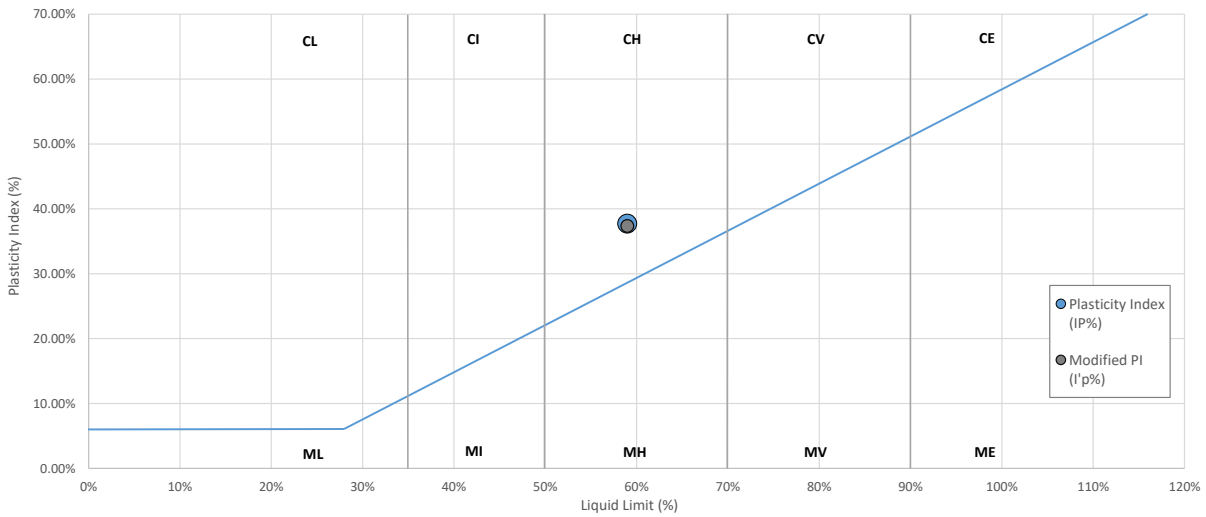
Testing performed in accordance with BS 17892-12: 2018: Clauses 5.3, 5.5, 6.5

Project No	**22.1185**
Project Name	**Davison CE High School for Girls**
Client	**Davison CE High School**

Sample Position & Depth:	**WS3**	**1.90-2.20m**	**Test Date:**	**09/02/2022**
Sample Description:	Grey CLAY.		**Original Dried Mass (g):**	193.50

Natural Moisture Content (W%)	58%
Liquid Limit (WL%)	**59%**
Plastic Limit (WP%)	**21%**
Plasticity Index (IP%)	**38%**
Classification	**CH**
Portion Retained on 425µm Sieve (%)	**1%**
Modified Plasticity Index (factoring in the above) (I'p%)	**37%**
Consistency Index (Ipc)	**0.02**
Fall Cone Used:	**30°–80 g cone**
Remarks	





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Test Procedure(s):	BS17892: Part 1: Clause 5.2 : 2014: Determination of water content by the oven drying method		
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Checked and Approved:	**SFL (Senior Lab Technician)**		**09/02/2022**

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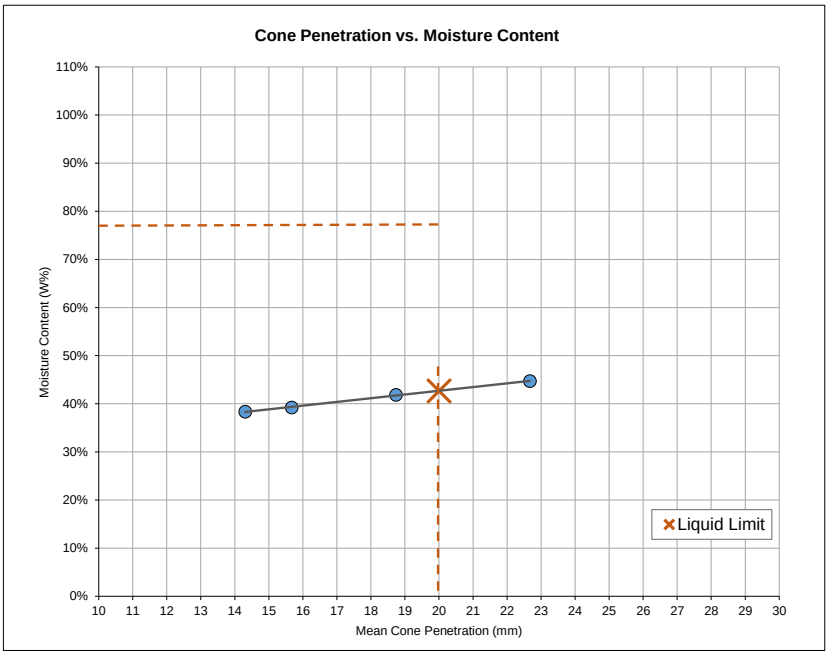
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

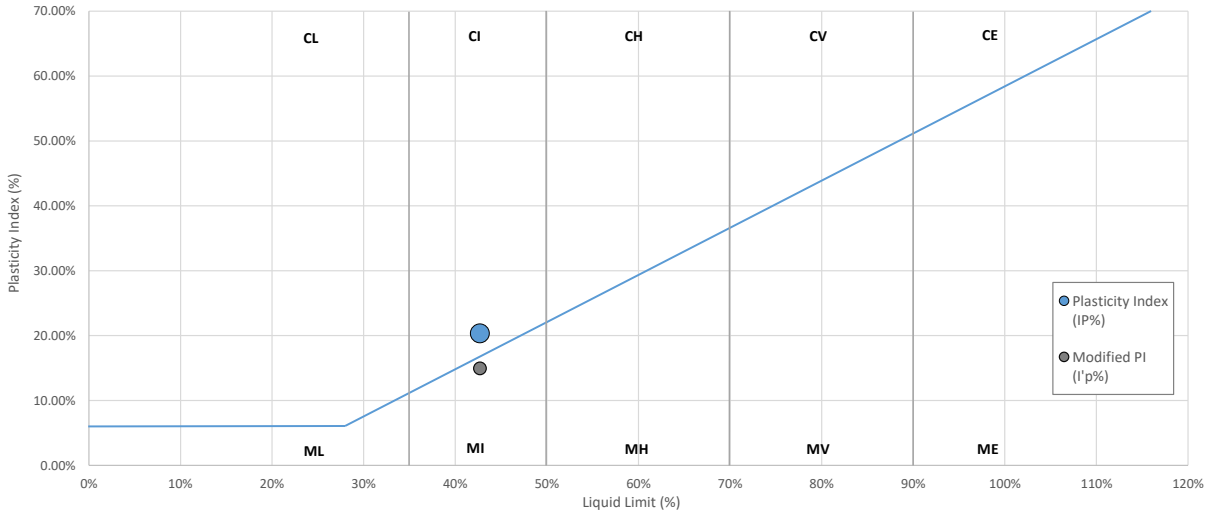
Testing performed in accordance with BS 17892-12: 2018: Clauses 5.3, 5.5, 6.5

Project No	**22.1185**
Project Name	**Davison CE High School for Girls**
Client	**Davison CE High School**

Sample Position & Depth:	**TP2a**	**0-0.60m**	**Test Date:**	**09/02/2022**
Sample Description:	wn slightly gravelly silt. Gravel is fine to medium flint, g		**Original Dried Mass (g):**	242.55

Natural Moisture Content (W%)	26%
Liquid Limit (WL%)	**43%**
Plastic Limit (WP%)	**22%**
Plasticity Index (IP%)	**20%**
Classification	**MI**
Portion Retained on 425µm Sieve (%)	**26%**
Modified Plasticity Index (factoring in the above) (I'p%)	**15%**
Consistency Index (Ipc)	**0.80**
Fall Cone Used:	**30°–80 g cone**
Remarks	





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Test Procedure(s):	BS17892: Part 1: Clause 5.2 : 2014: Determination of water content by the oven drying method	
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	BS17892: Part 12: Clauses 5.5 & 6.5 : 2018: Determination of the plastic limit and plasticity index	
Checked and Approved:	**SFL (Senior Lab Technician)**	**09/02/2022**

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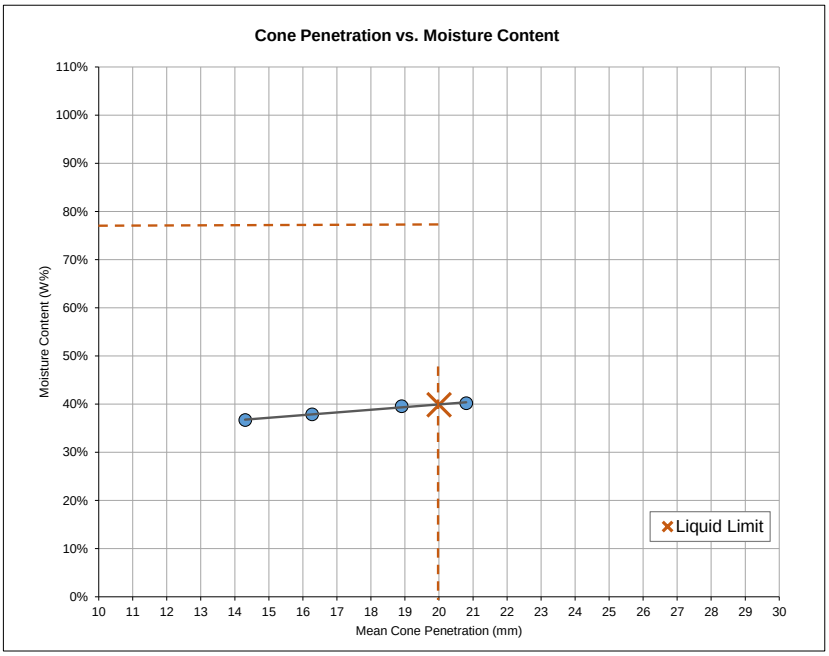
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

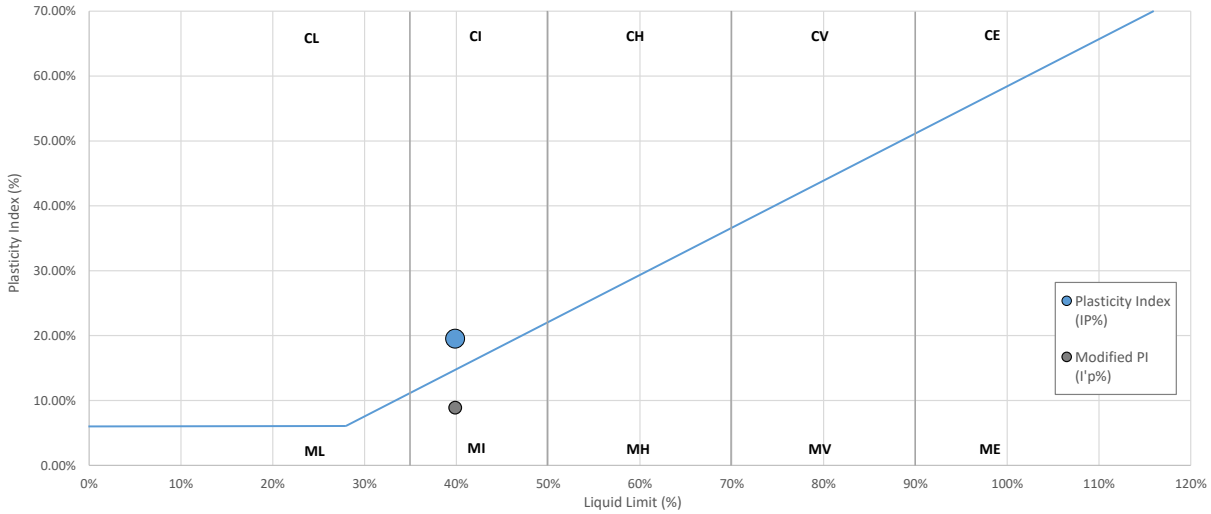
Testing performed in accordance with BS 17892-12: 2018: Clauses 5.3, 5.5, 6.5

Project No	22.1185
Project Name	Davison CE High School for Girls
Client	Davison CE High School

Sample Position & Depth:	TP2c	0-0.60m	Test Date:	09/02/2022
Sample Description:	h gravelly slightly sandy silt. Gravel is fine to coarse flir		Original Dried Mass (g):	440.80

Natural Moisture Content (W%)	16%
Liquid Limit (WL%)	40%
Plastic Limit (WP%)	20%
Plasticity Index (IP%)	20%
Classification	MI
Portion Retained on 425µm Sieve (%)	54%
Modified Plasticity Index (factoring in the above) (I'p%)	9%
Consistency Index (Ipc)	1.23
Fall Cone Used:	30°–80 g cone
Remarks	





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Checked and Approved:	SFL (Senior Lab Technician)	09/02/2022

APPENDIX E

Environmental Laboratory Results

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info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	23-45724
Issue:	1
Date of Issue:	31/01/2023
Contact:	Simon Lyle
Customer Details:	Constructive Evaluation Unit 15 & 16 Ford Lane Business Park Arundel West SussexBN18 0UZ
Quotation No:	Q22-03418
Order No:	22.1185
Customer Reference:	22.1185
Date Received:	05/01/2023
Date Approved:	31/01/2023
Details:	Davison CE High School
Approved by:	[redacted]

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683

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Sample Summary

Report No.: 23-45724, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
307136	TP1c 0.00 - 0.60	19/12/2022	05/01/2023	Silty loam	fg
307137	TP2a 0.60 - 0.90	19/12/2022	05/01/2023	Silty clayey loam	
307138	WS1 0.00 - 0.80	19/12/2022	05/01/2023	Silty loam	fg
307139	WS3 1.40 - 1.70	19/12/2022	05/01/2023	Clayey loam	

Results Summary

Report No.: 23-45724, issue number 1

			ELAB Reference	307136	307137	307138	307139
			Customer Reference				
			Sample ID				
			Sample Type	DISTURBED	DISTURBED	DISTURBED	DISTURBED
			Sample Location	TP1c	TP2a	WS1	WS3
			Sample Depth (m)	0.00 - 0.60	0.60 - 0.90	0.00 - 0.80	1.40 - 1.70
			Sampling Date	19/12/2022	19/12/2022	19/12/2022	19/12/2022
Determinand	**Codes**	**Units**	**LOD**				
Soil sample preparation parameters							
Moisture Content	N	%	0.1	18.9	20.1	16.7	20.5
Material removed	N	%	0.1	8.9	10.0	6.8	< 0.1
Description of Inert material removed	N		0	Stones/Clinker	Stones	Stones/Brick/Clinker	None
Metals							
Arsenic	M	mg/kg	0.5	17.5	n/t	27.3	n/t
Cadmium	M	mg/kg	0.2	< 0.2	n/t	< 0.2	n/t
Chromium	M	mg/kg	1	23.0	n/t	26.8	n/t
Copper	M	mg/kg	4	85.3	n/t	70.5	n/t
Lead	M	mg/kg	1	598	n/t	469	n/t
Mercury	M	mg/kg	0.1	0.4	n/t	0.4	n/t
Nickel	M	mg/kg	1	18.8	n/t	20.4	n/t
Selenium	M	mg/kg	1	< 1.0	n/t	< 1.0	n/t
Zinc	M	mg/kg	4.5	104	n/t	182	n/t
Anions							
Water Soluble Sulphate	M	mg/l	20	24	23	22	22
Inorganics							
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	n/t	< 0.8	n/t
Total Cyanide	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
Miscellaneous							
Acid Neutralisation Capacity	N	mol/kg	0.1	< 0.1	n/t	n/t	n/t
Loss on Ignition	M	%	0.01	8.02	n/t	n/t	n/t
pH	M	pH units	0.1	8.2	8.4	8.3	8.7
Soil Organic Matter	U	%	0.1	2.5	n/t	2.3	n/t
Total Organic Carbon	N	%	0.01	4.8	n/t	n/t	n/t

Results Summary

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			ELAB Reference	307136	307137	307138	307139
			Customer Reference				
			Sample ID				
			Sample Type	DISTURBED	DISTURBED	DISTURBED	DISTURBED
			Sample Location	TP1c	TP2a	WS1	WS3
			Sample Depth (m)	0.00 - 0.60	0.60 - 0.90	0.00 - 0.80	1.40 - 1.70
			Sampling Date	19/12/2022	19/12/2022	19/12/2022	19/12/2022
Determinand	**Codes**	**Units**	**LOD**				
Phenols							
Phenol	M	mg/kg	1	f < 1	n/t	f < 1	n/t
M,P-Cresol	N	mg/kg	1	f < 1	n/t	f < 1	n/t
O-Cresol	N	mg/kg	1	f < 1	n/t	f < 1	n/t
3,4-Dimethylphenol	N	mg/kg	1	f < 1	n/t	f < 1	n/t
2,3-Dimethylphenol	M	mg/kg	1	f < 1	n/t	f < 1	n/t
2,3,5-trimethylphenol	M	mg/kg	1	f < 1	n/t	f < 1	n/t
Total Monohydric Phenols	N	mg/kg	5	f < 5	n/t	f < 5	n/t
Polyaromatic hydrocarbons							
Naphthalene	MS	mg/kg	0.02	0.03	n/t	0.03	n/t
Acenaphthylene	MS	mg/kg	0.02	< 0.02	n/t	0.03	n/t
Acenaphthene	MS	mg/kg	0.02	< 0.02	n/t	< 0.02	n/t
Fluorene	US	mg/kg	0.02	< 0.02	n/t	< 0.02	n/t
Phenanthrene	MS	mg/kg	0.02	0.33	n/t	0.18	n/t
Anthracene	US	mg/kg	0.02	0.07	n/t	0.07	n/t
Fluoranthene	MS	mg/kg	0.02	0.56	n/t	0.59	n/t
Pyrene	MS	mg/kg	0.02	0.49	n/t	0.50	n/t
Benzo(a)anthracene	US	mg/kg	0.02	0.33	n/t	0.38	n/t
Chrysene	MS	mg/kg	0.02	0.36	n/t	0.42	n/t
Benzo(b)fluoranthene	MS	mg/kg	0.02	0.34	n/t	0.51	n/t
Benzo(k)fluoranthene	MS	mg/kg	0.03	0.15	n/t	0.23	n/t
Benzo(a)pyrene	US	mg/kg	0.02	0.39	n/t	0.44	n/t
Indeno(1,2,3-cd)pyrene	MS	mg/kg	0.02	0.36	n/t	0.35	n/t
Dibenzo(a,h)anthracene	MS	mg/kg	0.02	0.09	n/t	0.08	n/t
Benzo[g,h,i]perylene	MS	mg/kg	0.02	0.32	n/t	0.31	n/t
Total PAH(16)	NS	mg/kg	0.34	3.81	n/t	4.13	n/t
Total (of 17) PAHs	N	mg/kg	2	fg 6	n/t	n/t	n/t

Results Summary

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ELAB Reference	307136	307137	307138	307139
Customer Reference				
Sample ID				
Sample Type	DISTURBED	DISTURBED	DISTURBED	DISTURBED
Sample Location	TP1c	TP2a	WS1	WS3
Sample Depth (m)	0.00 - 0.60	0.60 - 0.90	0.00 - 0.80	1.40 - 1.70
Sampling Date	19/12/2022	19/12/2022	19/12/2022	19/12/2022

Determinand	Codes	Units	LOD				
BTEX							
Benzene	M	ug/kg	10	fg < 10.0	n/t	fg < 10.0	n/t
Toluene	M	ug/kg	10	fg < 10.0	n/t	fg < 10.0	n/t
Ethylbenzene	M	ug/kg	10	fg < 10.0	n/t	fg < 10.0	n/t
Xylenes	M	ug/kg	10	fg < 10.0	n/t	fg < 10.0	n/t
MTBE	U	ug/kg	10	fg < 10.0	n/t	fg < 10.0	n/t
Total BTEX	N	mg/kg	0.01	fg < 0.01	n/t	n/t	n/t
TPH CWG							
>C5-C6 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	fg < 0.01	n/t	fg < 0.01	n/t
>C6-C8 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	fg < 0.01	n/t	fg < 0.01	n/t
>C8-C10 Aliphatic (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C10-C12 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C12-C16 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C16-C21 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C21-C35 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C35-C40 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
Total aliphatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C5-C7 Aromatic (HS_1D_MS)	N	mg/kg	0.01	fg < 0.01	n/t	fg < 0.01	n/t
>C7-C8 Aromatic (HS_1D_MS)	N	mg/kg	0.01	fg < 0.01	n/t	fg < 0.01	n/t
>C8-C10 Aromatic (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C10-C12 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C12-C16 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C16-C21 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
>C21-C35 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	n/t	f 1.0	n/t
>C35-C40 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
Total aromatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	f 1.0	n/t	f 1.4	n/t
Total petroleum hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_Total)	N	mg/kg	1	f 1.1	n/t	f 1.4	n/t
Total Petroleum Hydrocarbons							
Mineral Oil w Florisil (EH_CU_1D_Total)	N	mg/kg	5	fg < 5	n/t	n/t	n/t
PCB (ICES 7 congeners)							
Total PCBs (7 congeners)	NS	mg/kg	0.03	< 21.00	n/t	n/t	n/t

Tests marked N are not UKAS accredited.

Results Summary

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WAC Analysis								
Elab Ref:	307136					**Landfill Waste Acceptance Criteria Limits***		
Sample Date:	19/12/2022					**Inert Waste Landfill**	**Stable Non-reactive Hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:	TP1c							
Depth (m)	0.00 - 0.60							
Site:	Davison CE High School							
Determinand		**Code**	**Units**					
Total Organic Carbon		N	%		4.80	3	5	6
Loss on Ignition		M	%		8.0	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		N	mg/kg		< 21.00	1	--	--
TPH Total WAC (EH_CU_1D_Total)		N	mg/kg		< 5	500	--	--
Total (of 17) PAHs		N	mg/kg		6.0	100	--	--
pH		M			8.2	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate
Eluate Analysis			**10:1**		**10:1**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
			mg/l		**mg/kg**			
Arsenic		N	0.031		0.31	0.5	2	25
Barium		N	0.006		0.06	20	100	300
Cadmium		N	< 0.001		< 0.01	0.04	1	5
Chromium		N	< 0.005		< 0.05	0.5	10	70
Copper		N	0.006		0.06	2	50	100
Mercury		N	< 0.005		< 0.01	0.01	0.2	2
Molybdenum		N	< 0.005		< 0.05	0.5	10	30
Nickel		N	0.002		< 0.05	0.4	10	40
Lead		N	0.005		< 0.05	0.5	10	50
Antimony		N	0.006		0.06	0.06	0.7	5
Selenium		N	< 0.005		< 0.05	0.1	0.5	7
Zinc		N	0.011		0.11	4	50	200
Chloride		N	< 5		< 50	800	15000	25000
Fluoride		N	< 5		< 10	10	150	500
Sulphate		N	2		23.80	1000	20000	50000
Total Dissolved Solids		N	74		737.00	4000	60000	100000
Phenol Index		N	< 0.01		< 0.10	1	-	-
Dissolved Organic Carbon		N	10.100		101.00	500	800	1000
Leach Test Information								
pH		N	8.0					
Conductivity (uS/cm)		N	110					
Dry mass of test portion (g)			100.000					
Dry Matter (%)			79					
Moisture (%)			27					
Eluent Volume (ml)			952					

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

* Stated limits are for guidance only, and not for conformity assessment.

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Results Summary

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Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #)
in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
307136	0.00 - 0.60	TP1c	Brown Soil, Stones, Clinker, Brick	No asbestos detected	n/t	n/t	n/t	n/t
307138	0.00 - 0.80	WS1	Brown Soil, Stones, Clinker,	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

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Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	06/01/2023	110	Colorimetry
Phenols in solids	M	As submitted sample	05/01/2023	121	HPLC
PAH (GC-FID)	N	As submitted sample	09/01/2023	133	GC-FID
Water soluble anions	M	Air dried sample	06/01/2023	172	Ion Chromatography
Low range Aliphatic hydrocarbons soil	N	As submitted sample	09/01/2023	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	09/01/2023	181	GC-MS
Total cyanide	M	As submitted sample	06/01/2023	204	Colorimetry
TPH CWG soil by gc-gc	M	As submitted sample	10/01/2023	271	
Asbestos identification	U	Air dried sample	09/01/2023	280	Microscopy
Aqua regia extractable metals	M	Air dried sample	06/01/2023	300	ICPMS
Soil organic matter	U	Air dried sample	09/01/2023	BS1377:P3	Titrimetry
Leachate					
Arsenic	N		10/01/2023	301	ICPMS
Cadmium	N		10/01/2023	301	ICPMS
Chromium	N		10/01/2023	301	ICPMS
Lead	N		10/01/2023	301	ICPMS
Nickel	N		10/01/2023	301	ICPMS
Copper	N		10/01/2023	301	ICPMS
Zinc	N		10/01/2023	301	ICPMS
Mercury	N		10/01/2023	301	ICPMS
Selenium	N		10/01/2023	301	ICPMS
Antimony	N		10/01/2023	301	ICPMS
Barium	N		10/01/2023	301	ICPMS
Molybdenum	N		10/01/2023	301	ICPMS
pH Value	N		10/01/2023	113	Electrometric
Electrical Conductivity	N		10/01/2023	136	Probe
Dissolved Organic Carbon	N		10/01/2023	102	TOC analyser
Chloride	N		10/01/2023	131	Ion Chromatography
Fluoride	N		10/01/2023	131	Ion Chromatography
Sulphate	N		10/01/2023	131	Ion Chromatography
Total Dissolved Solids	N		10/01/2023	144	Gravimetric
Phenol index	N		10/01/2023	121	HPLC
WAC Solids analysis	N				
pH	M	Air dried sample	09/01/2023	113	Electrometric
Total Organic Carbon	N	Air dried sample	09/01/2023	210	IR
Loss on Ignition	M	Air dried sample	09/01/2023	129	Gravimetric
Acid Neutralisation Capacity	N	Air dried sample	09/01/2023	NEN 737	Electrometric
Total BTEX	M	As submitted sample	09/01/2023	181	GCMS
Mineral Oil (EH_CU_1D_Total)	N	As submitted sample	11/01/2023	117	GCFID
Total PCBs (7 congeners)	N	Air dried sample	09/01/2023	120	GCMS
Total (of 17) PAHs	N	As submitted sample	17/01/2023	133	GCFID

Tests marked N are not UKAS accredited

Report Information

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Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.
	Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
	ELAB are unable to provide an interpretation or opinion on the content of this report.
	The results relate only to the sample received.
	PCB congener results may include any coeluting PCBs
	Uncertainty of measurement for the determinands tested are available upon request
	Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

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

APPENDIX F

Report Terms and Conditions

Trading Terms

Unless specifically stated within the tender/quotation or unless identified within the introduction to this report it is confirmed that this report has been compiled wholly in accord with Constructive Evaluation Limited's terms of engagement. This report is provided for sole use by the Client and is confidential to them. No responsibility whatsoever for the contents of the report will be accepted to anyone other than the Client.

Copyright

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Context

This report is written in the context of an agreed scope of work between Constructive Evaluation Limited and the Client and should not be used in a different context. In light of additional information becoming available, improved practices and changes in legislation amendment or re-interpretation of the report in whole or part may be necessary after its original submission.

Professional Interpretation

The recommendations made and opinions expressed in the report are based on the conditions revealed by the site works together with an assessment of the data from the insitu and laboratory testing or in respect of the desktop reports. No responsibility can be accepted for conditions that have not been revealed by the research, site works and testing.

The Client is advised that the conditions observed on site by Constructive Evaluation Limited at the time of any site survey may be subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance and they may subsequently have become evident. It is not possible to assess areas which are inaccessible or where access is not granted and CE accept no liability for risks subsequently identified therein.

The conceptual model, Risk assessment and sampling regime has been formulated in accordance with current UK guidance at time of production based upon the relevant information gained from Phase 1 and Phase 2 investigations. While the model and assessment offer opinions and interpretations of these guidelines, the comments made are for guidance only and no liability can be accepted for their accuracy. It is possible that aspects of desktop study may need to be altered to conform to the requirements of the statutory regulatory bodies.

Intrusive Field Operations

The data collected through direct operations in the production of this report has been so obtained, unless directly otherwise stated, in accordance with current UK guidance, law or accepted industry practice, including but not limited to: BS.5930: 1990 Code of Practice for Site Investigations (Amendment 2: 2010), BS 10175:2011+A1:2013 Investigations into Potentially Contaminated Sites, and BS.8576:2013 Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds. Exact exploratory locations will depend upon access conditions, site use and plant capability, CE do not accept liability for issues arising from material identified between or outside of the area of exploratory locations.

Laboratory Testing

Unless stated otherwise within the text, all geotechnical and material laboratory tests have been performed in accordance with the relevant British Standard Documents. Laboratory testing for contaminated land assessment is completed under the UKAS / MCERTS accreditation schemes, unless identified as otherwise in the report.

Human Health Risk Assessment Criteria

The Environment Agency has recently undertaken revision of the Soil Guideline Values (SGVs) which are partially complete. Where standards are available using the "new" approach, these have been utilised for correlative purposes. Where standards have not yet been revised, guidance following the "old" approach has been utilised. Please note that upon release of the remaining guidelines, the standards contained within this report may be subject to change. In addition, the second edition of the LQM CIEH guidance has now been released and will be utilised in favour of previously published guideline values.

Third Parties

The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from previous Site investigations and chemical testing laboratories. Constructive Evaluation Limited has assumed that such information is correct. Constructive Evaluation Limited cannot and does not guarantee the authenticity or reliability of the information it has relied upon and can accept no responsibility for inaccuracies with the data supplied by other parties.

The accuracy of the historical map extracts supplied cannot be guaranteed and it should be noted that different conditions may have existed between mapping sheet editions. Therefore, there can be no certainty that all areas of contamination have been identified during the Phase 1 investigation.

Definitions

Reference to the word "contamination" in this report does not relate to the statutory definition of contaminated land under 1990 Environmental Protection Act unless otherwise stated. The definition used in this report is: "Land that contains substances that, when present in sufficient quantities or concentrations, are likely to cause harm, directly or indirectly, to man, to the environment, or on occasion to other targets" (NATO CCMS, 1985). CE Ltd 2014