PADDOCK GEO ENGINEERING

Burgess Hill Community Entertainment and Events Centre, Cyprus Road, Burgess Hill, RH15 8DX

GROUND INVESTIGATION

Burgess Hill Town Council

October 2019

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ISSUE	DATE	Written By	Comment
1	07/01/19	Matt Paddock MSc FGS	-
		Written By	**Comment**
2	18/10/2019	Stephen J Fisk BSc FGS	Updated to include additional fieldwork and laboratory testing
		Checked and Approved By	
		Matt Paddock MSc FGS	
For and on behalf of Paddock Geo Engineering Limited			

1.0 INTRODUCTION

Paddock Geo Engineering Limited (PGE) were instructed by the client, Burgess Hill Town Council, to undertake a Ground Investigation including a Site Contamination assessment for the subject site, referred to as Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX.

The Assessment undertaken relates to the proposed redevelopment of the site for a single structure including a single storey partial basement.

The report has been updated in October 2019 following additional site works, laboratory testing and ground gas monitoring.

1.1 Terms of Reference

- British Standards BS 10175:2011 Investigation of Potentially Contaminated Sites – Code of Practice.
- CLR11 Model Procedures for the Management of Land Contamination, 2010, DEFRA/Environment Agency.
- PPG23 (PPS23) Planning and pollution control (contaminated land aspects), 2002
- GPLC1 Guiding Principles for Land Contamination, 2010, Environment Agency
- Environmental Protection Act: 1990 – Contaminated Land Statutory Guidance, April 2012, DEFRA
- CIRIA C665 Assessing risks posed by hazardous ground gases to buildings. CIRIA 2007
- BS 5930:2015 Site Investigation Code of Practice
- BS EN 1997-2, Eurocode 7. Geotechnical design. Ground investigation and testing
- BS EN ISO 22475 Series (1-3), Geotechnical investigation and testing. Sampling methods and groundwater measurements.
- NHBC Standards Chapter 4.2 2006, Building Near Trees
- TRL Laboratory Report 1132:1984 – The Structure of Bituminous Road, Appendix C Table C1

1.2 Objective

The objective of the Ground Investigation for the site comprised the following elements:

- An Intrusive Investigation
- A Geotechnical Appraisal
- An Initial Site Contamination Assessment and Generic Human Health Risk Assessment, including a ground gas risk assessment

The scope of work was based on the SI specification produces by the Client's Engineer; Sinclair Johnston and Partners and was agreed with the Client prior to commencement. The investigation was carried out in order to provide data on the sub-soil characteristics of the site, the groundwater regime and soil infiltration properties, the foundations of the current community hall/club structure and also to recover samples for geotechnical laboratory testing and chemical analysis.

This data was employed to produce a geotechnical appraisal to derive foundation design criteria and a generic human health contamination risk assessment for the site including an initial ground gas risk assessment.

Following initial reporting and consultation with the client an additional series of window sample boreholes and associated lab testing and monitoring was carried out to provide further clarification and better resolution of the contamination status of the ground beneath the site for an updated human health contamination and ground gas risk assessments.

2.0 THE SITE

2.1 Site Description

The subject site is currently occupied by a split-level former Club building of conventional brick construction with small hardstanding open area to the south or front and north or rear. The site has a significant slope to the rear or north allowing the current site structure to have three storeys at the northern end and only two storeys and to the front or south of the site.

The site is located within the town centre of Burgess Hill and is at the approximate national grid reference of 531480, 119120. The site is oblong in shape with its long axis orientated approximately north-south and covers an area of approximately 0.06 hectares.

The study area is surrounded by a car park to the north, residential properties to the south and similar community buildings to the east and west.

Site Location Plans and an Aerial Photograph are presented in Appendix A.

2.2 Proposed Development

The proposed development scheme involves the clearance of the existing detached split-level building and construction of a new Community Entertainment and Events Centre to accommodate new flexible use spaces such as a theatre, rehearsal rooms and dance studios as well as the option of hosting banqueting in the modified theatre space.

These works are indicated to comprise the complete demolition of existing property, the installation of earth support structures around the perimeter of the proposed basement and excavation to required formation levels, construction of a new basement under the southern end of the site to match the existing lower ground level to the northern end of the site.

The proposed development is detailed on the Proposed Development Location Plan presented in Appendix A.

3.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT SUMMARY

An associated Preliminary Contamination Risk Assessment (PRA) have been carried out for the site by PGE reference P18-93pra dated December 2018, with which reference should be made. Salient data from the PRA are summarised and extracted from the PRA and presented in the following Sections.

3.1 Geology, Hydrogeology and Hydrology

Information on the underlying geology at the site indicated that there are no Superficial Deposits indicated on the site. The bedrock geology is indicated to be Weald Clay Formation comprising dark grey thinly-bedded mudstones and mudstones with subordinate siltstones, fine to medium grained sandstones, including calcareous sandstone, shelly limestones and clay ironstones. The Weald Clay Formation forms part of the Wealden Group from the Hauterivian age in the Cretaceous period.

A significant fault is noted within 50-100m to the north of the site. This is considered to be a potential cause of the topographic level reduction to the north of the site.

Made and Worked Ground is indicated approximately 900m east of the site and 850m northwest. The site is suspected to have a limited depth of Made Ground associated with its previous development. Historical map regression also indicated that the area adjacent to the north of the site was a clay pit and was levelled and partially infilled buy the late 1960s.

A search was made of the online BGS database for published borehole records within the area. One of the closer wells have been selected and summarised. Borehole reference TQ31NW14 was advanced to a depth of 6.40m and is located approximately 150m west of the site at an unknown surface level. The encountered geology comprised 0.20m of Topsoil over Fill and Rubble to 0.60m depth. The natural geology from 0.60m bgl comprised firm light brown mottled grey silty CLAY to 1.35m bgl. Beneath this was stiff to hard dark brown shaly CLAY with light grey mottling to a depth of 5.35m bgl. At the base of the borehole to a depth of 6.40m bgl was hard grey shaly CLAY with some partings of light grey silt. The encountered natural strata were suspected to be Weald Clay Formation. The groundwater was recorded at a steady level of 3.25m bgl.

The groundwater vulnerability map for the site and the surrounding area indicates that the site is underlain by unproductive strata. There are no groundwater source protection zones indicated within 1000m of the site, with no indicated groundwater abstractions also within 1000m of the site.

It is indicated within the EnviroCheck Report that the nearest surface water feature is located 332m southeast of the site and is suspected to be some ponds.

The site and the immediate vicinity are listed as not having a potential for groundwater flooding to occur. There are no zones of flooding within 250m of the site area.

3.2 Trees on and Near the Site

The site is located within a built-up area and no significant trees were noted within 20m of the site. The adjacent to the east building had some decorative shrubs.

3.3 Historic Land Use on the Site and Surrounding Area

The available historical maps span a period of 143 years, dating back to 1875. The site was open land until before 1937 when a structure similar to current was noted on the site.

The site was located adjacent to the south of a Clay Pit from before 1897 which was infilled and level before 1967 when it was developed into the current car park.

The site area has remained urban since the earliest map editions, with limited light industrial land use, such as Clay Pits from 50m of the site from 1897 to current (unfilled) and a Smithy 80m NE from 1897 to before 1937. The site area has increased in development density throughout the mapping, from very low density on the earliest maps to high density by the mid 1900s.

3.4 Landfill Sites

No active or historic landfills are indicated within 500m of the site area.

3.5 Potential Contaminant Sources Summary

The potential contaminants are based on the data within CL8, Department of the Environment (DoE) Industry Profiles, the current and historic site uses.

Current Potential On-Site Contaminant Sources	**Potential Contaminants**
Existing Club on the site since before 1937	None significant
Historic Potential On-Site Sources	**Potential Contaminants**
Potential Made Ground associated with the development and extension of the site	Heavy metals, hydrocarbons and Asbestos
Current Potential Off-Site Contaminant Sources	**Potential Contaminants**
Car park adjacent to the south of the site	Heavy metals, organics, hydrocarbons (PAHs and TPH), BTEX, PCBs, VOCs, SVOCs and Asbestos
Historic Potential Off-Site Contaminant Sources	**Potential Contaminants**
Infilled and redeveloped Clay Pit adjacent to north of the site before 1967	Ground gases
Some light industrial land use in the site area; Smithy 80m NE from 1897 to 1937 and Builders Yard 50m S	Heavy metals, organics, hydrocarbons (PAHs and TPH), BTEX, PCBs, VOCs, SVOCs, and Asbestos

3.6 Conceptual Contaminant-Pathway-Receptor Model

The information gathered from the associated Preliminary Contaminated Land Risk Assessment was compiled to produce a Contaminant-Pathway-Receptor (C-P-R) model, which has been extracted and presented below.

The risk posed to site construction workers has not been assessed as any risks are considered to be mitigated through good site practices.

Preliminary Contamination Source-Pathway-Receptor Table

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Current Car Park adj. to North.	Dermal / direct contact	Current site users	No	
	Direct ingestion		No	
	Direct inhalation		No	

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Made Ground associated with development and possible extension of the site. Low UXO Risk Historic Infilled and developed Clay Pit adj. to North of the site before 1967. Limited Light Industrial land use in the site area.	Inhalation of Radon	(Disused Club)	No	
	Inhalation of wind-blown dust		No	
	Vapour migration		No	
	Ground gas migration		No	
	Dermal / direct contact	Future site users (Community Entertainment Facility, with no planted spaces)	Yes	Low
	Direct ingestion		Yes	Low
	Direct inhalation		Yes	Low
	Inhalation of Radon gas		No	
	Inhalation of wind-blown dust		Yes	Low
	Vapour Migration onto the site		Yes	Low
	Ground gas migration		Yes	Low to Moderate
	Direct contact	Services	Yes	Low
	Migration of contaminants: non-aqueous phase		Yes	Low
	Migration of contaminants: aqueous phase		Yes	Low
	Migration of contaminants off-site: non-aqueous phase	Adjacent Properties	No	
	Migration of contaminants off site: aqueous phase		No	
	Vapour migration		No	
	Inhalation of wind-blown dust	Ecological Impacts	No	
	Migration of contaminants: non-aqueous phase		No	
	Migration of contaminants: aqueous phase		No	
	Migration of contaminants from site: non-aqueous phase	Controlled groundwater	No	
	Migration of contaminants from site: aqueous phase		No	
	Migration of Contaminants: non-aqueous phase	Surface Waters	No	
	Migration of contaminants: aqueous phase		No	

3.7 PRA Conclusions

The preliminary contamination risk assessment has identified complete Contaminant-Pathway-Receptor (CPR) linkages with a maximum Low to Moderate risk level from the potential contamination sources risk drivers identified on the site and surrounding area.

The most significant of these potential source drivers, which has the potential to impact the proposed future recreational and staff users at the site is the potential for ground gases to migrate to the site from the infilled and redeveloped former Clay Pit located adjacent to the north of the site. Further to this there is a risk considered to be posed from the parking of vehicles on the adjacent former Clay Pit to the north of the site from 1967 and from potentially unclean Made Ground beneath the current site from previous development.

Given the discussion above, to assess for a 'Significant Possibility of Significant Harm' from potential contamination sources to the proposed future recreational and staff site users, it is considered that an intrusive ground investigation will need to be undertaken across the site to confirm the risks to receptors and confirm the ground conditions, with respect to potential geotechnical and geo-environmental risks. Samples of the near surface soils should be collected and analysed to determine the presence of contamination on site. Further to this it is recommended that ground gas and volatile contaminant monitoring be carried out at the same time as the soil assessment. These works would be best carried out following the clearance of the site to ensure the entire area can be investigated freely.

An asbestos survey of the existing structures should be carried out to confirm whether any sources of asbestos are present on site. Any asbestos materials encountered should be removed by a licensed asbestos contractor in line with the Control of Asbestos Regulations (CAR 2012) prior to the construction phase of the proposed development.

A UXO Desk Study was carried out as part of the PRA works and indicated a low risk of UXO on the site, with no further assessment required.

The site is underlain by Weald Clay Formation bedrock. This is considered a good founding strata. However, clay horizons may be subject to a volume change potential due to changes in moisture content. Therefore, it is recommended that a ground investigation be carried out to derive foundation design criteria for the proposed development.

Further to this, should any unexpected contamination be identified during the development groundworks, especially beneath the floors of the structures, then a suitably qualified and experienced Geo-Environmental Engineer should be consulted and if necessary further assessment should be carried out.

4.0 INTRUSIVE INVESTIGATION FIELDWORKS

The purpose of the intrusive investigation was to establish the sub-soil characteristics in relation to the proposed development, to gather geotechnical data to derive foundation design criteria and to assess the contamination status of the near surface soils beneath the site to confirm the findings of the preliminary contamination risk assessment (PRA) Phase of the investigation.

The main fieldworks were carried out between 27th and 29th November 2018 and comprised the forming of 2no. boreholes using cable percussion drilling techniques. Further to this 6no. trial pit were formed by hand to assess the foundations of the current community hall/club structure. The weather was raining during the fieldworks.

These initial exploratory positions were formed within accessible locations as requested by the Client's Engineer; Sinclair Johnston and Partners. The locations are indicated on the Borehole and Trial Pit Plan presented in Appendix B. The boreholes were also located to avoid buried or above ground services.

The depths of the borehole, sample details, strata descriptions and comments on the groundwater conditions are detailed on the Log which is presented in Appendix B along with a Borehole Location Plan.

Schematic sections of the foundation trial pits are presented in Appendix B.

The boreholes were formed using cable percussion techniques and were employed to assess the geological succession beneath the site, near surface contamination, to gather geotechnical and groundwater data for shallow foundation and basement design criteria and recovery of samples for laboratory analysis. The boreholes were each formed to targeted depths of 15.0m below ground level (bgl). During the siteworks, the boreholes reached a maximum depth of 13.0m bgl on refusal within Mudstone strata.

The boreholes were installed upon completion to 10.0m depth with 50mm internal diameter HDPE well pipe in a 3-6mm gravel filter. The top 1.0m of the wells was formed of plain pipe with a wetted pelleted bentonite seal. The headworks comprise a square metal flush mounted cover.

Groundwater was encountered within the borehole BH1 located to the rear (north) of the site during drilling. Groundwater was not encountered within BH2 located at the south front of the site.

Standard Penetration Testing (SPT) was carried out at 1.0m centres to 5.00m depth and 1.50m centres below this within the boreholes. The SPT testing was alternated with frequent U100 undisturbed samples. Hand vane shear strength testing was not carried out on intact liner samples due to the predominantly granular nature of the soils encountered.

The hand excavated trial pits were formed in internal areas of the site as indicated on the associated SI specification. The trial pits to the north of the site area encountered loose brick rubble material which could not be dug effectively by hand, so these positions were moved externally to allow the foundation to be exposed.

ADDITIONAL FIELDWORKS

Additional fieldwork was carried out on 1st and 2nd October 2019 and comprised the formation of 12no. hand-held window sample boreholes internally and externally with associated subsequent laboratory testing. An additional two ground gas monitoring visits were also undertaken following the additional intrusive fieldwork.

No groundwater was encountered within the handheld window sampler boreholes.

Photographs of the siteworks are included within Appendix B.

4.1 Encountered Strata

The borehole arisings were logged by a Geotechnical Engineer generally in accordance with BS5930: 2015.

A log of the exploratory holes and Exploratory Point Location Plan showing the positions investigated are presented in Appendix B.

The strata encountered beneath the site is summarised in the table below.

Encountered Strata –Boreholes

Encountered Strata – Boreholes Strata	**Exploratory Hole and Basal Depth (m bgl)**	
	BH1	**BH2**
CONCRETE	0.20	0.20
MADE GROUND Brick and Concrete Rubble Soft dark grey and black slightly sandy slightly chalk gravelly CLAY	 0.60 1.00	 0.40 0.60
WEALD CLAY FORMATION Firm becoming stiff dark grey and green brown slightly sandy silty CLAY	2.45	3.00
WEALD CLAY FORMATION Stiff red brown silty shaley CLAY SPT – 17 - 90 HV – None VCP – Medium	5.80	11.70
WEALD CLAY FORMATION Stiff to hard grey silty shaley CLAY with thin mudstone/Siltstone bands (2-10mm) SPT – 25 - 94 HV – None VCP – Medium	13.00	13.00
Root Depth (m bgl)	None	None
Borehole Depth (m bgl)	**13.00**	**13.00**

The site was surfaced by concrete to a depth of 0.20m bgl.

The surfacing was underlain by Made Ground of brick and concrete rubble sub-base to a depth of 0.40m within both boreholes and soft dark grey/black CLAY to a depth of 1.00m in BH1 and 0.60m in BH2.

The natural soils were encountered at 1.00m in BH1 and 0.60m in BH2 and comprised firm becoming stiff dark grey and green brown silty CLAY to a depth of between 2.45m and 3.00m bgl. This was suspected to be a Weathered profile of the Weald Clay Formation.

To the base of the boreholes was stiff becoming hard silty shaley CLAY. This was red brown in colour at shallower depth to grey at depth. Towards the base of the strata thin mudstone/Siltstone bands (2-10mm) were noted to the full depth of the assessment of 13.00m bgl.

The geological profile encountered agrees with the reviewed available published records.

4.2 Groundwater Conditions

Groundwater was encountered within borehole BH1 at 0.80m and 8.50m during the drilling works. Groundwater was not identified within BH2 during the drilling.

No groundwater was encountered within the small percussion liner sampling boreholes during the additional fieldwork.

Standpipe piezometers were installed within each of the boreholes. These indicated that BH2 remained dry throughout the monitoring period. The lower borehole BH1 indicated a shallow groundwater level of between 1.20m and 0.80m bgl, which is suspected to be due to the shallow perched water strike whilst drilling.

An additional standpipe piezometer was installed within WS08 during the supplementary fieldwork in October 2019. At this time upon monitoring of the existing wells, the lower borehole BH1 indicated a shallow groundwater level of between 1.20m and 0.80m bgl, which is suspected to be due to the shallow perched water strike whilst drilling.

4.3 Ground Gas Conditions

Initial ground gas and volatile contaminant monitoring was carried out within the wells installed within the boreholes on four occasions due to the identified potential ground gas sources in the site area from the associated Preliminary Contamination Risk Assessment.

Further to this in October 2018 an additional two rounds of monitoring were carried out to bring the total visits to 6 no.

The monitoring was carried out approximately weekly commencing after the well installation to allow the wells to settle. The wells were monitored, using a Geotech GA5000 gas analyser, for the concentration of the asphyxiant gas carbon dioxide ($CO_{2)}$, flammable gas methane (CH_4) and oxygen (O_2).

The atmospheric pressure and borehole flow and differential pressure were also monitored. The wells were also monitored for VOCs using a MiniRae Light Photo Ionisation Detector (PID).

The initial ground gas monitoring results are presented in Appendix D.

4.4 Sampling Strategy

Disturbed and undisturbed samples were recovered for geotechnical testing from each of the exploratory points and from each stratum encountered. These were used to gather soil data to allow classification of the soils encountered in relation to the derivation of foundation design criteria.

Samples were recovered in suitable containers for chemical analysis from the top metre of soils from the general site area.

5.0 CONTAMINATION ASSESSMENT

5.1 Chemical Analysis

A total of 16no. soil samples (4no. from the initial phase and 12no. from the supplementary works) were sent to an external laboratory to obtain total soil concentrations for a range of priority contaminants. The suite of analysis was decided based on consultation of the Contamination Exposure Assessment (CLEA) supporting documents and an assessment of the former site and surrounding area land uses carried out for the PRA stage of the investigation.

The suite of testing included:

- Asbestos screen for near surface Made Ground samples with subsequent quantification if identified
- Metals and Inorganic compounds
- Polyaromatic Hydrocarbons (PAH) USPEA Priority 16 Compounds
- Total Petroleum Hydrocarbons (TPH) Screen (C10 – C40 band).

Initial in-house screening levels derived for three band TPH fractions (roughly equivalent to PRO, DRO and Mineral Oil) are employed to initiate fully speciated hydrocarbon analysis to the TPH Committee Working Group Methodology (TPHCWG).

Results of the chemical analysis are presented in Appendix C.

5.2 Human Health Assessment Criteria

The assessment has been carried out in accordance with the Contaminated Land Exposure Assessment (CLEA) methodology as detailed within CLR11 2004. The assessment criteria employed are based on the proposed final land use of the site. For this site, a worst-case proposed land use of 'Residential with Home Grown Produce' will be employed for the site which is an overall conservative approach for the proposed community centre.

In March 2014 DEFRA published new guidance detailing the Category 4 Screening Levels (C4SL) system for the classification of contaminated land. The C4SL system was published to assist with revised statutory guidance published in 2012 for Part 2a of the Environmental Protection Act.

It introduces a new four category system for the classification of land under Part 2a where a Significant Possibility of Significant Harm to human health has been concluded. The categories correspond to Category 1 – land where the level of risk is clearly unacceptable, to Category 4 – where the level of risk posed is acceptably low. In short, land that passes the category 4 test "should not be capable of being determined as contaminated land under Part 2a".

Currently no statutory chemical guidance levels for land and controlled waters contamination exist in the UK. Therefore, the reported soil total contaminants concentrations will be compared to In-House Generic Assessment Criteria (GAC) used as C4SLs.

These In-House GACs are presented in Appendix C and are generally based on the LQM/CIEH S4UL values.

The S4UL values employed are based on a Soil Organic Material (SOM) concentration of 2.5% for the initial screening.

A S4UL has not been published for lead. The GAC value employed has been derived using the DEFRA C4SL[1] toxicological data and exposure parameters and the CLEA Software V1.071:2015.

The C4SL value employed for the lead GAC, for a residential with plant uptake land use scenario, is based on a blood lead level of 3.5ug/dl for the lower level of toxicological concern employing the Integrated Exposure Uptake Biokinetic model (IEBUK) estimated blood lead concentrations in children and employs the exposure parameters within the DEFRA C4SL report.

A minimal risk approach was employed to derive the S4UL values, whereas the C4SL model uses a lower level for risk model, which is deemed generally less conservative than the minimal risk approach. However, the use of a lower level for risk model screening criteria is considered strongly precautionary and is generally considered appropriate for use within the planning regime.

However, with consideration of the C4SL and S4UL values there still remain some gaps in the available chemical and/or toxicological data for non-priority contaminants and therefore a limited number of previously used CLEA SGVs and ICRCL guideline values have been retained and include those for pH, sulphide, sulphur and water-soluble boron.

Should an exceedance be noted when site priority contaminant concentrations are compared to the employed GACs, a site specific assessment criteria can be derived using CLEA software or similar human health risk assessment software. This can also include consideration of bio-availability of the contaminants if required.

Further to the above, samples of near surface Topsoil and Made Ground are generally screened for asbestos presence. Generic assessment criteria do not exist currently for asbestos presence in soil within the UK. Therefore, where asbestos is identified in soil it is recommended that further risk assessment be carried out by suitably qualified and registered persons.

5.3 Groundwater Assessment Criteria

A detailed controlled groundwater risk assessment was outside the scope of this report.

6.0 GENERIC SITE CONTAMINATION RISK ASSESSMENT

Statistical analysis of the data set is carried out employing the statistical method detailed in CL:AIRE Document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration', if exceedances are noted on individual comparison of the contaminant concentrations to the employed assessment criteria, which allows a derivation of a true mean concentration (μ).

The statistical analysis also assesses if the data is normally distributed and considers high levels to determine if they are part of the underlying data set due to 'site wide contamination' or due to contamination 'outliers'. The statistical analysis derives a 95th percentile upper confidence limit of μ for each determinands for comparison to the suitable employed guidance level (GAC) or 'Critical Concentration (Cc)'.

The reported soil sample total contaminant concentrations data set was not separated into averaging areas for the site due to the similar sample recovery strata and small sample data set.

[1] DEFRA SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Final Project Report (Revision 2) 2014

Further to this the data was compared individually to the PGE In-House GACs presented in Appendix C. This was carried out to mitigate any bias resulting from the small data set if the statistical analysis were to be employed.

6.1 Total Soil Concentrations

The total priority contaminant concentrations from the 16 no. samples analysed and a summary of the results are presented in Appendix C and are detailed in the following section.

Heavy Metals

The comparison of the reported heavy metal concentrations within the samples analysed did not indicate any 95th percentile upper confidence limit of μ concentrations which were in excess of the Human Health GAC for Residential with Home Grown Produce land use scenario employed.

Individual comparison of the reported heavy metal concentrations within the samples analysed did not indicate any concentrations which exceeded the respective Human Health GAC for Residential with Home Grown Produce land use scenario employed.

Comparison of the copper and zinc concentrations against their respective phytotoxicity guidance levels indicated 95th percentile upper confidence limit of μ concentrations below the employed guidance concentration.

Hydrocarbons

The comparison of the reported hydrocarbon priority determinand concentrations within the samples analysed indicated 95th percentile upper confidence limit of μ concentrations for the PAH indicative compounds benzo[a]pyrene and dibenzo[a,h,]anthracene which were in excess of the Residential with Home Grown Produce land use scenario employed.

Statistical analysis of the data set indicated that the 95th percentile upper confidence limit of μ concentrations for the exceeding PAH compounds are due to statistical outliers or contamination 'Hotspots' contamination.

Individual comparison of the reported hydrocarbon priority determinand concentrations within the samples analysed indicated concentrations which exceeded the respective Human Health GAC for Residential with Home Grown Produce land use scenario employed.

Heavy Metal GAC Exceedances

Determinand	Assessment Criteria (mgkg^{-1})	Borehole and Depth (m bgl) (strata)	Maximum Reported Concentration (mgkg^{-1})	95th Percentile Upper Confidence Limit (mgkg^{-1}) (with exceedances removed)
Benzo[a]pyrene	2.70	TP4 @ 0.80 WS04 @ 1.0 WS08 @ 0.8 WS09 @ 1.0 WS10 @ 1.0	13 11 11 63 12	6.59
Dibenzo[a,h,]anthracene	0.28	TP4 0.80 WS04 @ 1.0 WS07 @ 1.1 WS08 @ 0.8	1.7 2 0.74 1.7	0.16

Determinand	Assessment Criteria ($mgkg^{-1}$)	Borehole and Depth (m bgl) (strata)	Maximum Reported Concentration ($mgkg^{-1}$)	95th Percentile Upper Confidence Limit ($mgkg^{-1}$) (with exceedances removed)
		WS09 @ 1.0 WS10 @ 1.0	9.7 1.6	

Headspace analysis was carried out on the soil samples using a PID to assess the Volatile Organic Compound (VOCs) concentrations. This did not indicate any VOCs within the samples tested.

Other Priority Contaminants

The comparison of the reported other priority concentrations within the samples analysed did not indicate any 95th percentile upper confidence limit of μ concentrations for any other priority contaminants which were in excess of the Human Health GAC for Residential with Home Grown Produce land use scenario employed.

Individual comparison of the reported other priority contaminant concentrations within the samples analysed did not indicate any concentrations which exceeded the respective Human Health GAC for Residential with Home Grown Produce land use scenario employed.

Samples of shallow Made Ground were analysed for the presence of asbestos. This reported chrysotile asbestos fibres within all samples analysed except the sample from TP4. Subsequent quantification indicated asbestos concentration as high as 0.060% within TP2a at 0.40m.

The additional 12no. samples testing in October were also screened for asbestos; however, no additional positive asbestos identifications were made.

6.2 Controlled Water Risk Assessment

A controlled water risk assessment was beyond the scope of this assessment.

6.3 Ground Gas Risk Assessment

A potential pollutant linkage has been concluded in the associated PRA from the potential for ground gas and volatile contaminant generation and migration from infilled former quarry workings located adjacent to the north of the site.

Therefore, a detailed conceptual ground gas model has been produced and initial ground gas monitoring was undertaken on six occasions since the installation of the monitoring wells.

A Conceptual Ground Gas Model (CGM) has been produced and is presented graphically and presented in Appendix D.

6.3.1 Sources

There are no current or historical landfill sites listed within 500m of the site boundary. However, historical mapping indicates the infilling and levelling of a former quarry adjacent to the north of the site for redevelopment as the current car park before the late 1960s.

Given the site setting a Low to Moderate Environmental Risk classification for the generation of carbon dioxide and methane gases on site has been concluded for the site in accordance with CIRIA C665 and BS8576:2013.

6.3.2 Pathways

The predominating pathway concluded in the CGM is for the generation and migration of ground gases from the infilled land to the north of the site through the more permeable near surface strata to impact the users of the proposed development.

The groundwater on the site was monitored to be at between 0.80m and 1.20m bgl within the furthest north borehole (BH1) only. This shallow groundwater is considered likely to significantly retard the generation and migration of any ground gases beneath the site as is the fine grained geology identified beneath the site from shallow depth.

6.3.3 Receptors

The main receptors of concern are the highly sensitive future site users of the proposed community centre development on the site through inhalation of asphyxiant gases (CO_2) and explosion from flammable gases (CH_4) within any new structures.

6.3.4 Ground Gas Monitoring

Gas wells were installed within both of the boreholes on the site during associated ground investigation works. The wells were positioned to give general site coverage and to concentrate on areas of potential ground gases generation. The depth of the wells was 10.00m bgl.

An additional well was installed within the addition internal hand held window sampler boreholes WS8 in October 2019.

The deeper boreholes were installed to 10.00m bgl with 50mm internal diameter HDPE well pipe at the base and 1.0m of plain well pipe at the surface. The shallower internal handheld borehole was installed within 2.20m. The borehole installations were backfilled with 3-6mm gravel and a pelleted bentonite seal was created for the top metre. The well was finished with a cap and gas valve on the pipe and a flush bolted cover. A Borehole Location Plan showing the monitoring well locations are presented in Appendix B.

The wells were initially monitored for their ground gas and VOC concentrations on 4no. occasions on an approximately weekly basis commencing after their installation. Further monitoring was carried out in October 2019 following the additional siteworks to complete 6 no. monitoring visits.

The monitoring was carried out by PGE using a Geotech GA5000 Gas Analyser and MiniRae Lite PID. The monitoring included periods of low and falling atmospheric pressure.

The results of the monitoring are summarised in the table below, with the highest gas level within each well highlighted. The monitoring data is presented in Appendix D.

Ground Gas Monitoring Summary

Borehole	Date	GW Level (mbgl)	Atmospheric Pressure (Mb)	Maximum Methane (% v/v)	Maximum Carbon Dioxide (% v/v)	Oxygen (% v/v)	Max sustained Flow (l/hr)*
BH1	08/12/19 – 22/10/19	0.80 – 1.20	1000 – 1038	0.1	0.5	14.6	12.3
BH2	08/12/19 – 22/10/19	Dry	1000 – 1038	0.1	3.1	16.0	14.3
WS8	02/10/19 – 22/10/19	Dry	1018 - 1038	0.1	0.3	19.5	0.0

Note

* Maximum gas flow on initial gas tap opening

No VOCs were detected during any of the monitoring visits.

The ground gas monitoring on the site did not indicate any significant flammable gas (methane) concentrations but did indicate carbon dioxide concentrations with a maximum concentration of 3.1% v/v within BH2 22/10/19 monitoring visit. No sustained gas flows were noted from the monitoring. An initial small burst of flow up to 14.3l/h were noted on initial opening of the gas tap, but very shortly returned to zero (<3 seconds) potentially when the well pressure equalised with the atmospheric pressure.

6.3.5 Ground Gas Risk Assessment

The results of all the monitoring were assessed in accordance with CIRIA C665 2007 – Assessing the risks posed by hazardous gases to building.

For the subject development of proposed conventional construction dwellings, a CIRIA C665 2007, 'Situation A (not those that belong to Situation B (Low rise residential with 150mm underfloor void))', was employed for the risk assessment of the identified gas concentrations.

A maximum methane concentration of 0.2% v/v and carbon dioxide concentration of 3.1% v/v were identified during the monitoring with maximum sustained gas flows of 0.1l/hr detected.

The typical methane concentrations on the site were less than 1% v/v. The levels of carbon dioxide were less than 5% v/v with a maximum value of 3.1% v/v in BH2 on 22/10/19.

These values give a maximum Gas Screening value of 0.0002l/hr for methane and 0.0031l/hr carbon dioxide.

The calculated gas screening values are, therefore, less than 0.07l/hr for methane and carbon dioxide, which allows a Characteristic Situation 1 (Very Low Risk) employing the Modified Wilson and Card classification detailed in CIRIA C665 2007.

Further to the ground gas risk assessment the levels of VOCs were monitored within the wells. This did not record any detectable concentrations on any of the monitoring visits.

6.3.6 Ground Gas Risk Assessment Conclusions

A Conceptual Gas Model has been produced for the site which indicates a Low to Moderate ground gas risk to the proposed end site users.

Initial ground gas and volatile contaminant monitoring comprised 3no. visits were carried out on the site in December 2018.

The gas monitoring results gave a worst-case gas screening value of 0.0031l/hr for CO_2. This allows a Characteristic Situation 1 employing the Modified Wilson and Card classification detailed in CIRIA C665 2007.

Ground water was monitored to be as high as 0.80m bgl in BH1 on the north of the site. At these levels the groundwater is considered to allow some retardation to ground gas flow.

For a Characteristic Situation 1 classifying site, for community centre proposed structures, no ground gas protection measures are deemed necessary.

6.4 Conceptual Site Model

An assessment of the risk posed by the identified contaminant concentrations has been carried out employing the Source-Pathway-Receptor (S-P-R) methodology detailed within the CLEA methodology.

Potential On-Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Elevated PAH compounds and asbestos in Made Ground beneath the floors of the current structure. **Insignificant ground gas and volatile contaminants identified.**	Dermal/Direct Contact	Current Site Users (Disused Club)	N	
	Direct Ingestion		N	
	Direct Inhalation		N	
	Inhalation of Radon Gas		N	
	Inhalation of Wind Blown Dust		N	
	Vapour Migration		N	
	Gas Migration		N	
	Dermal/Direct Contact	Future Site Users (Place of Worship (Applied - Residential without Plant Uptake)	N	
	Direct Ingestion		N	
	Direct Inhalation		N	
	Inhalation of Radon Gas		N	
	Inhalation of Wind Blown Dust		N	
	Vapour Migration		N	
	Ground Gas Migration		N	
	Direct Contact	Service	N	
	Migration of Contaminants – Non-Aqueous Phased		N	
	Migration of Contaminants – Aqueous Phased		N	
	Migration of Contaminants – Non-Aqueous Phased	Adjacent Properties	N	
	Migration of Contaminants – Aqueous Phased		N	

Potential On-Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
	Vapour Migration		N	
	Inhalation of Wind Blown Dust	Ecological Impacts	N	
	Migration of Contaminants – Non-Aqueous Phased		N	
	Migration of Contaminants – Aqueous Phased		N	
	Migration of Contaminants from site – Non-Aqueous Phased	Controlled groundwater	N	
	Migration of Contaminants from site – Aqueous Phased		N	
	Migration of Contaminants – Non-Aqueous Phased	Surface Waters	N	
	Migration of Contaminants – Aqueous Phased		N	

The risk to construction workers has not been assessed as generally any risks posed to site construction workers from identified contamination can be mitigated through good site practices and robust sitework risk assessment.

However, works carried out on sites where any asbestos fibres have been identified must be carried out by a suitable contractor and a site specific Health and Safety Plan for site construction workers must be produced in line with CAR 2012[2].

6.5 Soil Waste Assessment

Waste Acceptance Criteria (WAC) testing was carried out on 2no. composite samples of natural soils recovered from the north and south of the site from soils expected to require disposal in the proposed development. These natural soils indicated levels of the WAC determinands which were below the relevant levels for inert waste, with the exception of fluoride in the southern area sample which was slightly in excess of the required levels. However, this level may still allow an inert waste classification depending upon the disposal site.

Elevated total priority contaminant concentrations were identified for PAH compounds and asbestos from the shallow Made Ground from beneath the site building footprint. These levels identified may require a hazardous waste classification for disposal of this material. The material with a maximum asbestos level of 0.060% from TP2a may require a hazardous waste classification if disposal is required.

All waste classification should be confirmed with the receiving facility, who will require the total soil chemical analysis presented in Appendix C of this report.

6.6 Potable Water Supply Pipe

Guidance on the type of potable water supply pipe to be employed on residential development sites is given by UKWIR, who have published guidance for the type of potable water supply pipework to be employed for new structures on reused land.

[2] Control of Asbestos Regulations 2012

The results of the chemical analysis carried out on samples recovered from shallow depth and around the suspected depth of pipe burial (0.80m) on the site, although not strictly to the UKWIR required standard, indicated hydrocarbon priority determinand concentrations in excess of detection levels. Therefore, regular PE potable water supply pipe are not deemed suitable for buried potable water supply pipework on the site.

6.7 Site Contamination Assessment Discussion

Elevated PAH indicative compound and asbestos levels were identified within the shallow Made Ground from beneath the current building footprint when compared to the conservative Residential with productive planting land use scenario. Volatile contaminants were not identified.

The community centre proposals do not include any area of open space, therefore, the identified non-volatile contaminants do not have a pathway to the proposed end site users and the risk posed by the affected Made Ground to the proposed end users of the site is considered low.

Given the above and the lack of complete S-P-R pollutant linkages, the site is considered suitable for its proposed community centre development use.

Asbestos containing construction materials were not identified visually on the site during the siteworks. However, asbestos screening and subsequent quantification indicated chrysotile asbestos fibre contamination to a maximum level of 0.060% within TP2a in Made Ground soil beneath the current building footprint.

It is recommended that an asbestos survey of the existing structure be carried out to confirm whether further sources of asbestos are present on site. Any asbestos materials encountered should be removed by a licensed asbestos contractor in line with the Control of Asbestos Regulations (CAR 2012) prior to the construction phase of the proposed development.

A ground gas risk assessment was carried out and did not indicate any significant ground gas concentrations which allowed a low Characteristic Situation 1 for the site. A Characteristic Situation 1 does not require any ground gas protection measures.

The additional sampling works carried out in October 2019 have greatly increased the resolution of the contamination assessment for the site and as such are considered to have effectively removed any uncertainty that any unexpected or previously unidentified contamination would be discovered during the future site development works.

The only S-P-R linkages deemed active for the proposed development are the migration of any volatile contaminants and during the comprehensive investigation on the site no volatile contaminants have been noted within the soils beneath the site or migrating to the site. No other pathways are deemed active as the entire site footprint being covered in imperviable building footprint in the proposed development which severs all other direct contact pathways to the proposed site end users.

However, should, in the practically inconceivable event that any unexpected or previously unidentified volatile contamination be identified, then the measures detailed within an associated remedial method statement should be followed to deal with the impacted materials by a suitably qualified and experienced person.

7.0 FOUNDATION DESIGN CRITERIA

7.1 Geotechnical Laboratory Testing

A number of representative samples were sent to an external laboratory following visual assessment and logging of the borehole arisings. The testing programme was designed to classify the properties of the encountered soils and to determine the chemistry of the soil in relation to the design of buried concrete.

7.1.1 Atterberg Limits

The results of 6 no. Atterberg Limit determinations on the fine grained Weald Clay Formation soils are presented in Appendix E. The results have also been plotted on a Casegrande Plasticity Chart, also presented in Appendix E.

The soils tested have been assessed for their volume change potential (VCP) in accordance with NHBC Standards Chapter 4.2 and are detailed in the table below.

Atterberg Limit Results

Exploratory Point	Depth (m)	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing 0.425mm	Casegrande Classification	NHBC Modified Plasticity Index	NHBC Volume Change Potential
BH1	2.45	20	43	21	22	100	CI	22	Medium
BH1	5.00	20	40	22	18	100	CI	18	Medium
BH1	11.00	22	33	19	14	100	CL	14	Medium
BH2	0.60	26	49	19	30	94	CI	28	Medium
BH2	3.45	19	43	25	18	100	CI	18	Medium
BH2	8.00	15	61	25	36	100	CH	36	Medium

The Liquid Limits of the fine grained soils varied from 33% to 61% and therefore the sample may be classed as having 'Low to High' plasticity according to Casagrande Classification.

The soils had a modified plasticity index of between 14% and 28%, therefore, can be classified as **'Medium'** Volume Change Potential (VCP) employing the NHBC classification scheme due to the coarse grained fraction.

7.1.2 Natural Moisture Content

The natural moisture content (NMC) of the fine-grained soil subjected to Atterberg Limit testing and selected samples from within the exploratory holes. The results were used to assist in the geological profile and assessment of the encountered strata with published data.

The results are presented in Appendix E.

7.1.3 Laboratory Soil Strength Testing

Undisturbed samples from the boreholes were sent for soil strength testing within a triaxial cell. This indicated a strength for the Weald Clay Formation soils of between 47kPa at shallow depth to 92kPa.

7.1.4 pH and SO_x

The level of pH, sulphate and other determinands within the BRE SD1 Suite have been determined for selected samples from above and at the proposed likely shallow foundation invert level to assess the appropriate Design Sulphate Class for buried concrete in accordance with BRE Special Digest 1 Table 2. The results of the analysis are presented in Appendix C along with the chemical laboratory results.

The table below summarises the reported pH values, Total Sulphate and 2:1 Water Soluble Sulphate concentrations and any samples from the contamination assessment which were noted to have Total Sulphate levels in excess of the DS-1 Concrete Design Sulphate Class allowable concentration.

Design Sulphate Class for Site

Borehole	Depth	pH	Water Soluble Sulphate (2:1 Water Extract) (mg/l)	Total Sulphate (%)	Appropriate Design Sulphate Class
BH1	0.70	8.7	220	0.077	DS-1
BH1	3.00	9.1	48	0.019	DS-1
BH1	6.50	9.1	18	0.014	DS-1
BH1	12.50	9.7	2.1	0.069	DS-1
BH2	2.45	9.2	15	0.027	DS-1
BH2	5.45	9.2	36	0.021	DS-1
BH2	9.50	9.2	15	0.016	DS-1

The above assessment assumes that all of the Total Sulphate (%) is in a suitable form that following ground disturbance could oxidise.

The Design Sulphate Class was similar beneath the site and with a worst-case Design Sulphate Class of **DS-1**.

A worst case Aggressive Chemical Environment for Concrete (ACEC) site classification is **AC-1s**.

During the ground investigation, no sulphur containing minerals or mineralisation was noted, such as obvious selenite or pyrite crystals.

7.2 In-Situ Testing

Standard Penetration Testing (SPT) was carried out at 1.0m centres to 5.00m depth and 1.50m to full depth within the boreholes. The testing was alternated with the recovery of undisturbed U100 samples. The SPT summaries are presented with the Borehole Logs in Appendix B.

The standard penetration testing indicated the near surface Weald Clay Formation to have SPT 'N' values of 2 at shallow depth within BH1 and 94 at depth. The lower SPT N values were attributed to groundwater penetration into the shallow tested strata and the higher values are attributed to Mudstone/Siltstone bands in the deeper strata.

8.0 ENGINEERING EVALUATION

8.1 Introduction

The proposed development scheme involves the clearance of the existing detached split-level building and construction of a new Community Entertainment and Events Centre to accommodate new flexible use spaces such as a theatre, rehearsal rooms and dance studios as well as the option of hosting banqueting in the modified theatre space. These works are indicated to comprise the complete demolition of existing property, the installation of earth support structures around the perimeter of the proposed basement and excavation to required formation levels, construction of a new basement under the southern end of the site to match the existing lower ground level to the northern end of the site.

The site was surfaced by concrete to a depth of 0.20m bgl. The surfacing was underlain by Made Ground of brick and concrete rubble sub-base to a depth of 0.40m and soft dark grey/black CLAY to a depth of 1.00m in BH1 and 0.60m in BH2.

The natural soils were encountered at 1.00m in BH1 and 0.60m in BH2 and comprised firm becoming stiff dark grey and green brown silty CLAY to a depth of between 2.45m and 3.00m bgl. This was suspected to be a Weathered profile of the Weald Clay Formation. To the base of the boreholes was stiff becoming hard silty shaley CLAY. This was red brown in colour at shallower depth to grey at depth. At the base of the strata thin mudstone/Siltstone bands (2-10mm) were noted to the full depth of the assessment of 13.00m bgl.

Groundwater was encountered within borehole BH1 at 0.80m and 8.50m during the drilling works. Groundwater was not identified within BH2 during the drilling or during follow on monitoring.

The trial pits established the existing foundations to be generally bearing onto firm Weald Clay Formation soils.

8.2 Foundation Design Considerations

Conventional foundations, such as strip and isolated pads, placed into Made Ground, variable soils or soils containing significant organic matter are generally subjected to increased risk of settlement, especially differential settlement. Therefore, it is not recommended that foundation be placed into Made Ground encountered to a depth of 1.00m in the north of the site.

The strength of the soils beneath the site have been assessed through standard penetration testing (SPT) in the field and laboratory triaxial strength testing, the results of which are summarised and presented with the logs in Appendix B.

Atterberg Limit testing and assessment using the NHBC Standards Chapter 4.2 indicated the fine-grained Weald Clay Formation soils sampled to be of Medium Volume Change Potential (VCP).

8.3 New Structure Foundation Design Criteria

8.3.1 Building Near Trees Assessment

Trees were not identified in the site area.

Therefore, a minimum foundation depth of 1.25m bgl is recommended to allow for restricted new decorative planting given the medium VCP Weald Clay Formation soils beneath the site.

8.3.2 Excavations

Excavations should be readily achieved within the near surface soils using conventional plant.

The material encountered was considered to remain stable in the short term, with the exception of the loose near surface brick and tile rubble encountered beneath the northern area of the building, which was considered to be unstable.

Perched groundwater was encountered within BH1 only at a depth of 0.80m bgl.

At no time should any excavations be entered by personnel without correct shoring and only after an assessment of whether the task can be completed without entry to the excavation has been completed.

8.4 Foundation Options Discussion

The proposed development is indicated to comprise a large single structure of conventional construction with 2-3 storeys and a partial basement under the southern end of the structure to a depth of c. 4.00m below the level of Cypress Road, to match the level of the lower northern half of the structure and site.

For the main structure either a raft or strip foundations are considered suitable bearing onto the Weald Clay Formation in the order 3.5m below the level of Cypress Road, reducing to a minimum of 1.25m bgl to the northern rear of the site and downslope.

Given the above assessment it is also considered possible to employ conventional strip foundations for any outbuilding structures on the site with consideration of the required foundation of a minimum depth of 1.25m bgl to be considerate of any future planting.

The above foundation options and design approaches are subject to detailed Structural Engineer design and regulator agreement.

8.5 Bearing Capacity

For shallow conventional foundations on the site, bearing on the Weald Clay Formation soils at a depth depending upon the structural Engineer's minimum foundation depth assessment or below 1.25m bgl, the allowable bearing capacity would be in the order of **90kPa.**

For the southern basement area of the proposed structure bearing onto the Weald Clay Formation soils at a depth of around 4.00m bgl, the allowable bearing capacity would be in the order of **150kPa** for both strip and raft foundations.

These estimates include a factor of safety of 3 against general shear failure and should keep settlements within tolerable limits.

All excavations for the footings should be inspected by a suitably qualified person to assess the variability of the soils and groundwater conditions. If, following inspection, the soil conditions differ from those identified within this geotechnical appraisal the recommendations may require reassessment. Any roots, organic matter, and in particular any 'soft/loose', or otherwise unsuitable material encountered at the founding depth, should be removed prior to pouring of any concrete.

8.6 Retaining Structures Design Criteria

It is considered that retaining structures may be required for the proposed works. For the design of retaining structures, the groundwater details in Section 4.2 should be noted. In summary groundwater was not encountered in the proposed basement area to the south of the site, however, was encountered at around 0.80m bgl on the northern lower area of the site.

For preliminary effective stress design coefficients, the laboratory Plasticity Index values have been assessed using the methodology of Padfield and Mair, and a 'worst credible' value has been used following the guidance of CIRIA C580 Embedded retaining walls - guidance for economic design: 2003.

Retaining Structure Design Criteria

Strata	Bulk Density (Mgm^{-3})	Effective Cohesion (c') kNm^{-2}	Effective Friction Angle (φ') (degrees)
Made Ground	1.75	0	20°
Weald Clay Formation	2.00	0	24°

8.7 Excavation Heave

The partial basement excavation is indicated to be approximately 4.00m depth, and this soil removal is likely to result in the unloading of the formation soils by some $80kN/m^2$. This is likely to result in stress reduction and the potential for short term and long-term heave movements within the Weald Clay Formation.

The approximate 4.00m depth basement excavation is not considered to lead to significant basal heave. However, approximately half of the total heave movement is considered likely to occur during excavation of the basement with the remaining heave of the London Clay Formation occurring over the longer term as it recovers, and this should be considered during slab design.

Given that groundwater was not encountered during the drilling works and subsequent monitoring in the basement area of the site, the potential hydrostatic pressures from groundwater are unlikely to be significant. However, the slab design should take into account potential accidental flood conditions.

8.8 Ground Floor Slabs

Based on the strata encountered during the investigation, such as the presence of fine-grained soils at the surface, the use of ground bearing floors is not recommended for ground level movement sensitive structures as detailed in Section 5.1 of the NHBC Standards.

8.9 Sub-Surface Concrete

The Design Sulphate Class was generally the same across the site and with depth with a worst-case Design Sulphate Class of **DS-1**.

A worst case Aggressive Chemical Environment for Concrete (ACEC) site classification is **AC-1s**.

8.10 Foundations of Existing Structures

Foundation Trial Pits were excavated to expose the foundations of the current structure. The trial pits proposed in the northern lower area of the site were moved externally as loose rubble was encountered beneath the current floors of the structure which could not be excavated by hand.

The trial pit was excavated by hand held equipment and, once completed and logged, was backfilled with arisings and finished with concrete.

The location of the Foundation Trial Pit, schematic sections and photographs of the foundations exposed are presented in Appendix C.

8.11 Surface Water Soakaways and Soil Permeability

Infiltration testing was not carried out on the site. The fine-grained Weald Clay Formation soils are not considered to have a significant permeability and the use of conventional soakaways for surface water disposal would be considered ineffective on the site.

9.0 CERTIFICATION

This report is produced for the sole use of the Client, and no responsibility of any kind, whether for negligence or otherwise, can be accepted for any Third Party who may rely upon it.

The conclusions and recommendations given in this report are based on our understanding of the future plans for the site and based on a scope of works agreed by the Client and afforded by the agreed budget. No responsibility is accepted for conditions not encountered, which are between exploratory points or outside of the agreed scope of work.

If the future plans for the site are changed, such as the site is developed for a more or less sensitive use, then a different interpretation might be appropriate.

The report has been prepared generally following the guidelines and principles established in the British Standards, BS5930:1999+A2:2010, BS 10175:2011, entitled 'Investigation of Potentially Contaminated Sites – Code of Practice' and the DEFRA/EA Contaminated Land Reports CLR7 and CLR8.

It necessarily relies on the co-operation of other organisations and the free availability of information and total access. No responsibility can, therefore, be accepted for conditions arising from information that was not available to the investigating team as a result of information being withheld or access being denied.

This report may suggest an opinion on a suspected configuration of strata or conditions between exploratory points and below the maximum depth of investigation. However, this is for guidance only and no liability can be accepted for its accuracy. Comments on the groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. It should be noted, however, that groundwater levels might vary due to seasonal or other effects.

It should be noted that this report is based solely on the samples collected in the borehole locations investigated. During the works and following general site clearance, should the sub-soil conditions in other areas of the site appear to be inconsistent with those found in the areas sampled then this geotechnical appraisal and site contamination assessment may need to be reviewed.

This report is prepared and written in the context of the proposals stated in the introduction to this report and it should not be used in a differing context. Furthermore, new information, improved practices and changes in legislation may require an alteration to the report in whole or in part after its submission. Therefore, with any changes in circumstances, or after one year from the date of the report, the report should be referred back to Paddock Geo Engineering Limited for re-assessment (and, if necessary, for an estimate for the cost of such).

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APPENDIX A – MAPS AND PLANS

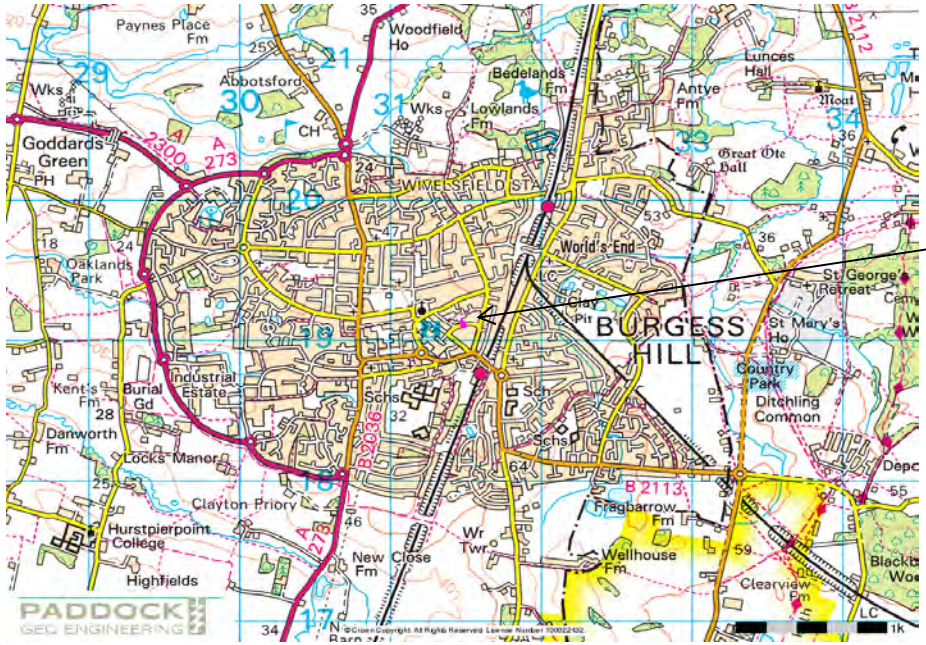
Site Location Plan

Site Plan

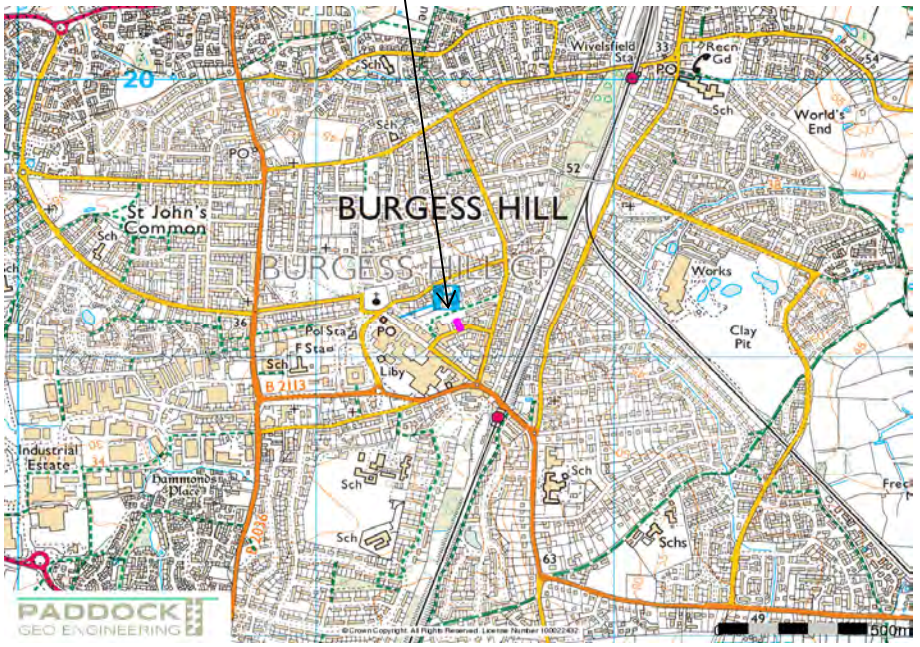
Aerial Photograph

Proposed Development Plan

SITE LOCATION PLAN

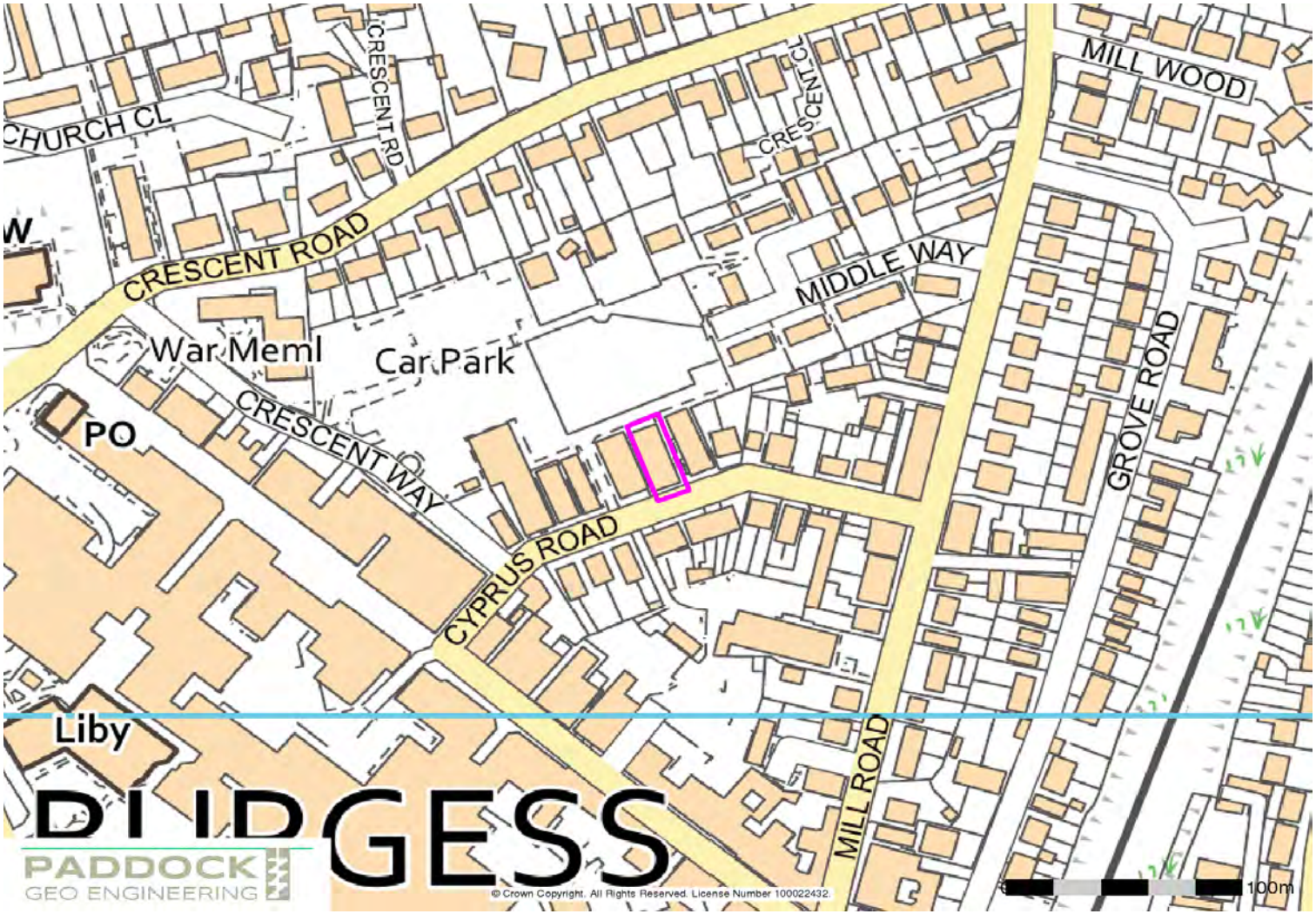


Site Location



CLIENT:	Burgess Hill Town Council
PROJECT No:	P18-193gi
PROJECT TITLE:	Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX

SITE PLAN



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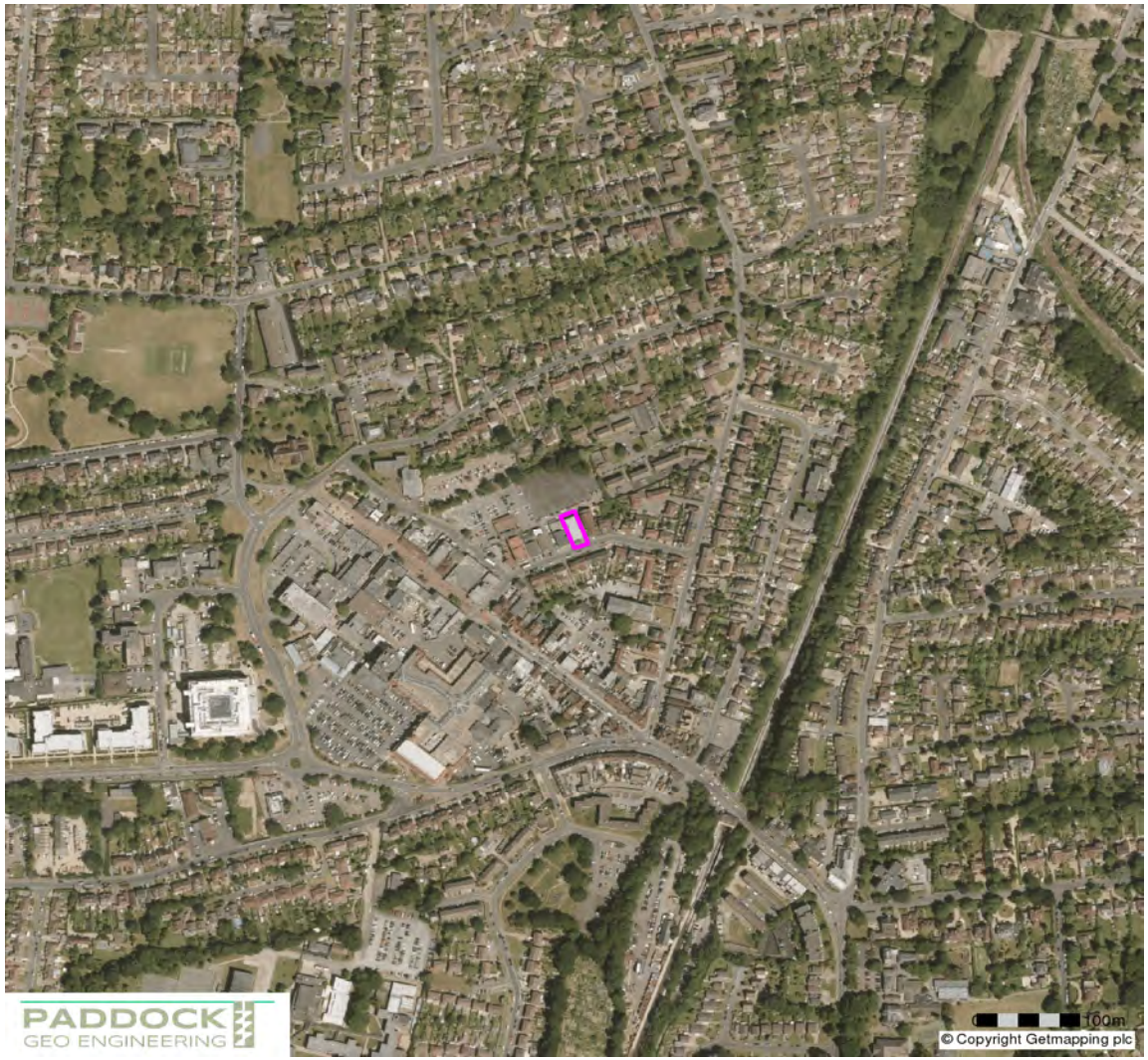
AERIAL PHOTOGRAPH



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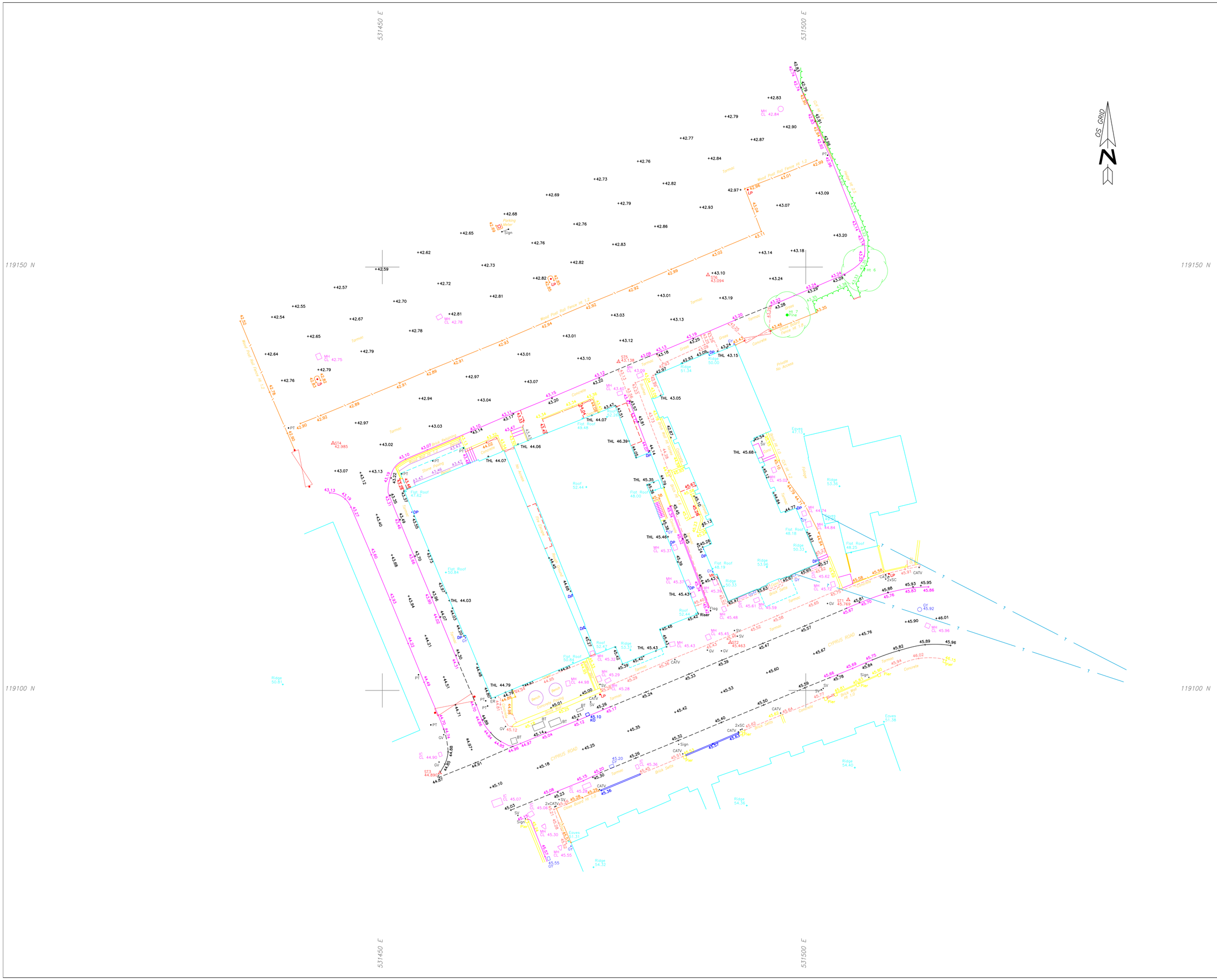
PROJECT No:	P18-193gi
PROJECT TITLE:	Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX



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LAND AND BUILDING SURVEYS, UNDERGROUND
SERVICES LOCATION, CCTV DRAINAGE SURVEYS.
Established 1975. Member of The Survey Association.
LASER SURVEYS LTD, OPEN SPACE UPPER INTERFIELDS, MALVERN WR14 1UT
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OLD DAIRY. STUBBERS FARM. MOUNTNESSING ROAD, BLACKMORE. CM4 0NX
TEL 01708 438408 FAX 01708 438405 email: london@lasersurveys.com

DATUM NOTES

CO-ORDINATES USED ARE BASED ON O/S NATIONAL GRID, OBTAINED USING THE ACTIVE GPS NETWORK AND ADJUSTED TO A LOCAL GRID WITH A SCALE FACTOR OF 1.0000.

LEVELS ARE RELATED TO :- ORDNANCE SURVEY ACTIVE GPS NETWORK.

SURVEY CONTROL STATIONS SHOWN △

ABBREVIATIONS (where applicable)

AV	Air Valve	MK	Marker
BK	Brick	MS	Milestone
BL	Bollard	MT	Meter
BS	Bus Stop	MY	Mercury
BT	British Telecom	OH	Overhead
C/B	Close Boarded	PAV	Paving
CL	Cover Level	PB	Post Box
CLK	Chainlink	PE	Pipe
CO	Column	PM	Parking Meter
Conc	Concrete	P/R	Post and Rail
CP	Catch Pit	PT	Post
CPS	Concrete Paving Slabs	P/W	Post and Wire
CTV	Cable Television	RE	Rodding Eye
CW	Combined Water	RET	Retaining
DC	Drainage Channel	RS	Road Sign
DP	Drain Pipe	RSJ	Rolled Steel Joist
EP	Electricity Pole	SC	Stop Cock
ER	Earthing Rod	SK	Soakaway
FB	Flower Bed	SPT	Septic Tank
FE	Fence	ST	Silt Trap
FH	Fire Hydrant	SV	Stop Valve
FL	Floor Level	SVC	Security Video Camera
FP	Flag Pole	SW	Storm Water
FW	Foul Water	TCB	Telephone Call Box
GP	Gate Post	THL	Threshold Level
GV	Gas Valve	TL	Traffic Light
GY,G	Gully	TK	Tank
HT	Height	TP	Telegraph Pole
IC	Inspection Cover	UG	Underground
IL	Invert Level	UTF	Unable to trace Further
IN	Interceptor	UTR	Unable To Raise
I/R	Iron Railings	VP	Vent Pipe
JB	Junction Box	WL	Water Level
KO	Kerb Outlet	WM	Water Meter
LB	Litter Bin	WO	Wash Out
LP	Lamp Post		
MH	Manhole Cover		

NOTES

- * Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only.
- * Tree species (where shown) should be treated with caution and expert identification is advised.
- * Although this is a digital survey the accuracy and amount of detail shown is only commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.
- * Visible features in the vicinity of the boundaries as shown above, may not represent the extent of legally conveyed ownership.
- * Whilst every effort has been made to achieve accuracy on this plan, CRUCIAL clearance dimensions, levels and invert levels should be checked prior to design and construction.
- * Kerb levels have been taken in the bottom of the channel.

SHEET LAYOUT
NOT TO SCALE

FORMER ROYAL BRITISH LEGION
CYPRUS ROAD
BURGESS HILL
RH15 8DX

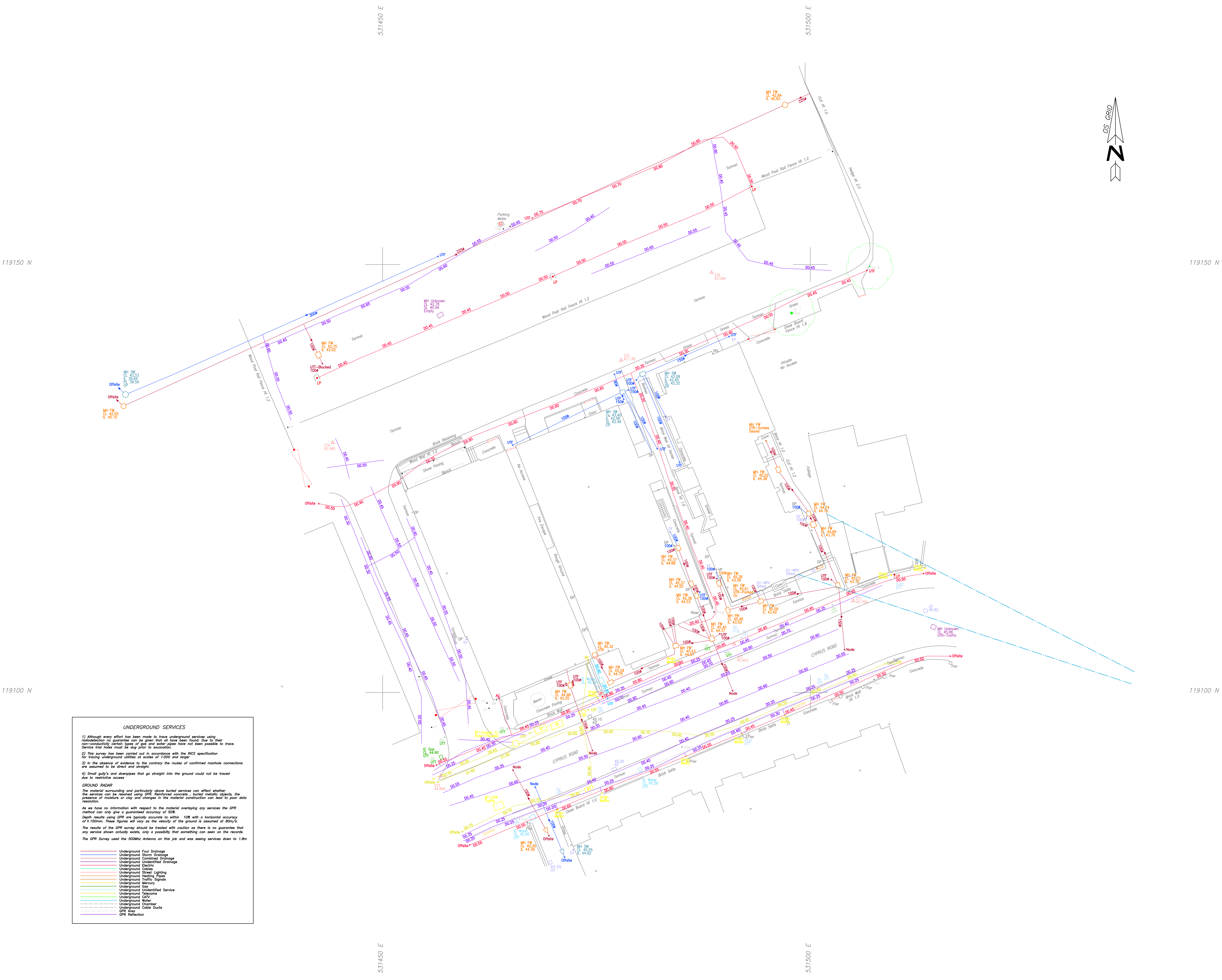
TOPOGRAPHICAL SURVEY

SURVEYED FOR
Sinclair Johnston & Partners Ltd
930 Great Suffolk Street
London
SE1 0BX

SURVEYOR Z HUNDLEY
DATE NOVEMBER 2018

NO	DATE	REVISION

DRAWING NO	G 9170/1 REV 0
DRAWING TITLE	TOPOGRAPHICAL
SCALE	1 : 200 (A1)
SEE ALSO DWG NOS	
SHEET	1 of 2
REF NO	G 9170



UNDERGROUND SERVICES

1) Although every effort has been made to trace underground services using radiodetection no guarantee can be given that all have been found. Due to their non-conductivity certain types of gas and water pipes have not been possible to trace. Service trial holes must be dug prior to excavation.

2) This survey has been carried out in accordance with the RICS specification for tracing underground utilities at scales of 1:500 and larger

3) In the absence of evidence to the contrary the routes of confirmed manhole connections are assumed to be direct and straight.

4) Small gully's and downpipes that go straight into the ground could not be traced due to restrictive access

GROUND RADAR

The material surrounding and particularly above buried services can effect whether the services can be resolved using GPR. Reinforced concrete , buried metallic objects, the presence of moisture or clay and changes in the material construction can lead to poor data resolution.

As we have no information with respect to the material overlaying any services the GPR method can only give a guaranteed accuracy of 50%.

Depth results using GPR are typically accurate to within 10% with a horizontal accuracy of ± 150mm. These figures will vary as the velocity of the ground is assumed at 80m/s.

The results of the GPR survey should be treated with caution as there is no guarantee that any service shown actually exists, only a possibilty that something can seen on the records.

The GPR Survey used the 500Mhz Antenna on this job and was seeing services down to 1.8m

Underground Foul Drainage
Underground Storm Drainage
Underground Combined Drainage
Underground Unidentified Drainage
Underground Electric
Underground Cables
Underground Street Lighting
Underground Heating Pipes
Underground Traffic Signals
Underground Mercury
Underground Gas
Underground Unidentified Service
Underground Telecoms
Underground CATV
Underground Water
Underground Chamber
Underground Cable Ducts
GPR Area
GPR Reflection

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OLD DAIRY. STUBBERS FARM. MOUNTNESSING ROAD, BLACKMORE. CM4 0NX
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DATUM NOTES

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LEVELS ARE RELATED TO :- ORDNANCE SURVEY ACTIVE GPS NETWORK.

SURVEY CONTROL STATIONS SHOWN

ABBREVIATIONS (where applicable)

AV	Air Valve	MK	Marker
BK	Brick	MS	Milestone
BL	Bollard	MT	Meter
BS	Bus Stop	MY	Mercury
BT	British Telecom	OH	Overhead
C/B	Close Boarded	PAV	Paving
CL	Cover Level	PB	Post Box
CLK	Chainlink	PE	Pipe
CO	Column	PM	Parking Meter
Conc	Concrete	P/R	Post and Rail
CP	Catch Pit	PT	Post
CPS	Concrete Paving Slabs	P/W	Post and Wire
CTV	Cable Television	RE	Rodding Eye
CW	Combined Water	RET	Retaining
DC	Drainage Channel	RS	Road Sign
DP	Drain Pipe	RSJ	Rolled Steel Joist
EP	Electricity Pole	SC	Stop Cock
ER	Earthing Rod	SK	Soakaway
FB	Flower Bed	SPT	Septic Tank
FE	Fence	ST	Silt Trap
FH	Fire Hydrant	SV	Stop Valve
FL	Floor Level	SVC	Security Video Camera
FP	Flag Pole	SW	Storm Water
FW	Foul Water	TCB	Telephone Call Box
GP	Gate Post	THL	Threshold Level
GV	Gas Valve	TL	Traffic Light
GY,G	Gully	TK	Tank
HT	Height	TP	Telegraph Pole
IC	Inspection Cover	UG	Underground
IL	Invert Level	UTF	Unable to trace Further
IN	Interceptor	UTR	Unable To Raise
I/R	Iron Railings	VP	Vent Pipe
JB	Junction Box	WL	Water Level
KO	Kerb Outlet	WM	Water Meter
LB	Litter Bin	WO	Wash Out
LP	Lamp Post		
MH	Manhole Cover		

FW	Foul Water
SW	Storm Water
CW	Combined Water
PL	Pit Level
SL	Silt Level
D	Depth
S/C	Surcharged
B/D	Backdrop Pipe
NPV	No Pipes Visible
AG	Above Ground

NOTES

* Tree species (where shown) should be treated with caution and expert identification is advised.
* Although this is a digital survey the accuracy and amount of detail shown is only commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.
* Visible features in the vicinity of the boundaries as shown above, may not represent the extent of legally conveyed ownership.
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* Kerb levels have been taken in the bottom of the channel.

SHEET LAYOUT
NOT TO SCALE

FORMER ROYAL BRITISH LEGION
CYPRUS ROAD
BURGESS HILL
RH15 8DX

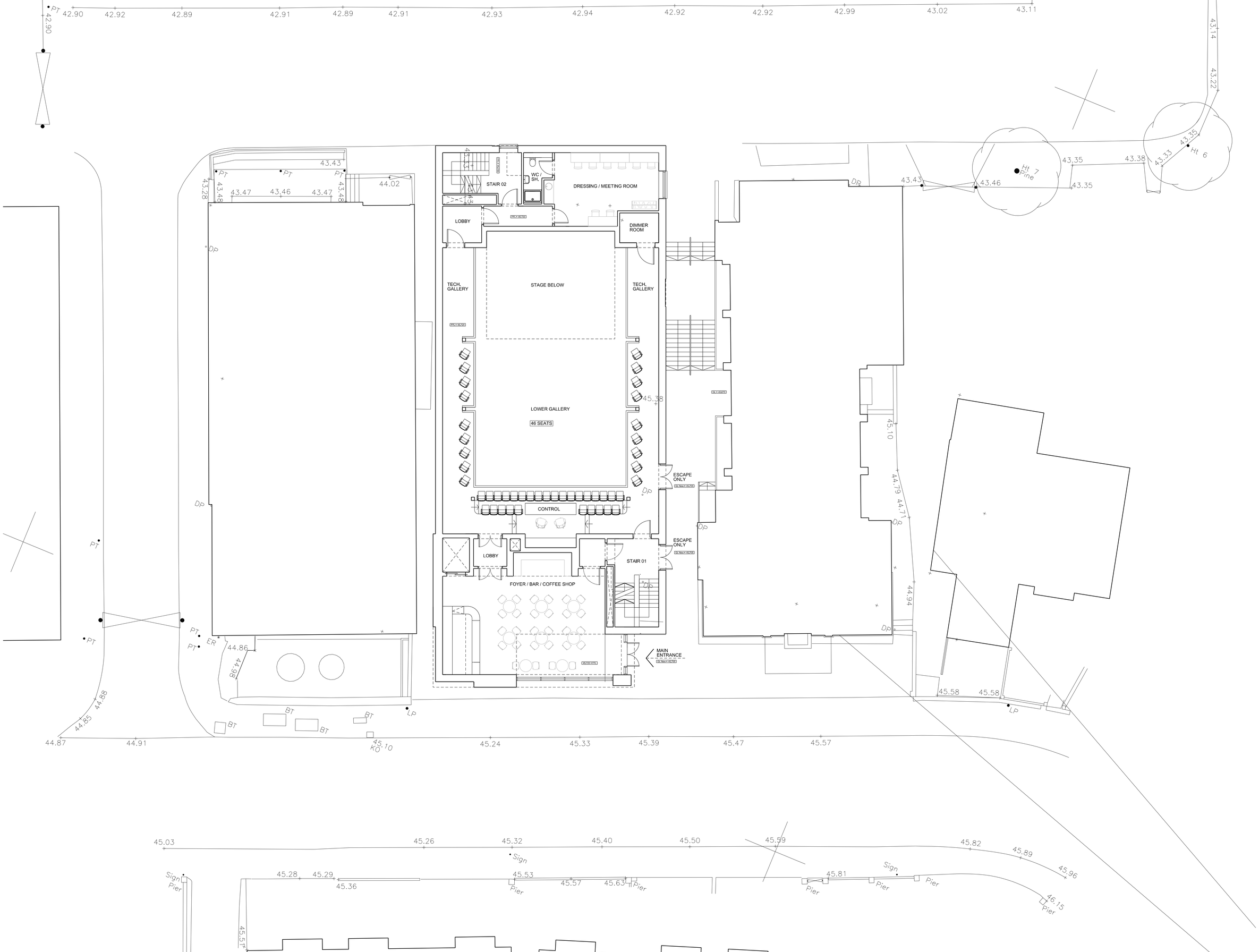
UNDERGROUND SERVICES SURVEY

SURVEYED FOR Sinclair Johnston & Partners Ltd
930 Great Suffolk Street
London
SE1 0BX

SURVEYOR R HARRIS
DATE NOVEMBER 2018

	DATE	REVISION

DRAWING NO	G 9170/2	REV	0
DRAWING TITLE	UNDERGROUND		
SCALE	1 : 200 (A1)		
SEE ALSO DWG NOS			
SHEET	2 of 2		
REF NO	G 9170		


STAIR 02
WC / SH.
DRESSING / MEETING ROOM
LOBBY
DIMMER ROOM
TECH. GALLERY
STAGE BELOW
TECH. GALLERY
LOWER GALLERY
46 SEATS
ESCAPE ONLY
CONTROL
ESCAPE ONLY
LOBBY
STAIR 01
FOYER / BAR / COFFEE SHOP
MAIN ENTRANCE
DP
PT
ER
BT
LP
Ht 7 Pine
Ht 6
Sign
Pier
42.90
42.92
42.89
42.91
42.89
42.91
42.93
42.94
42.92
42.92
42.99
43.02
43.11
43.14
43.22
43.35
43.38
43.33
43.43
43.46
43.35
43.47
43.46
43.47
43.48
43.28
44.02
45.38
45.10
44.79
44.71
44.94
44.86
44.98
44.85
44.88
44.87
44.91
45.10
45.24
45.33
45.39
45.47
45.57
45.58
45.58
45.03
45.26
45.32
45.40
45.50
45.59
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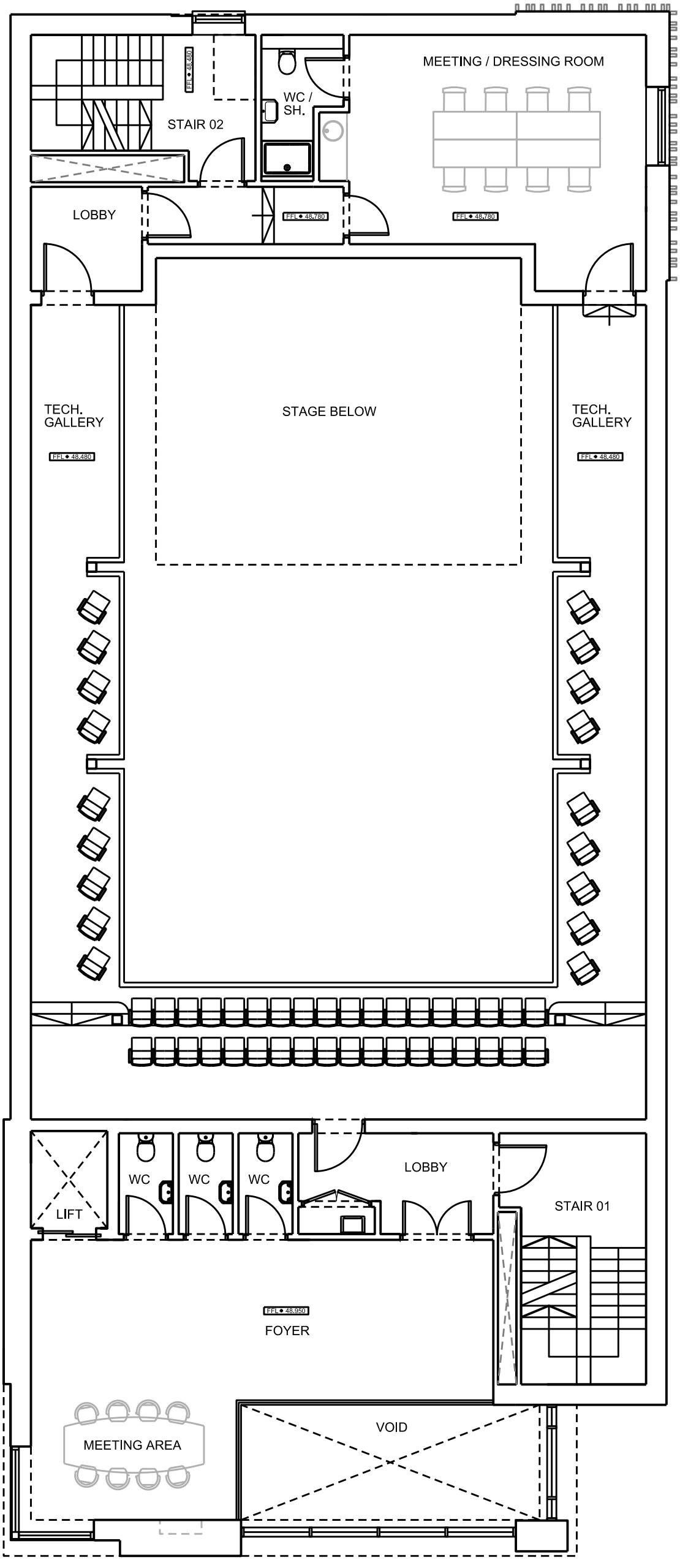
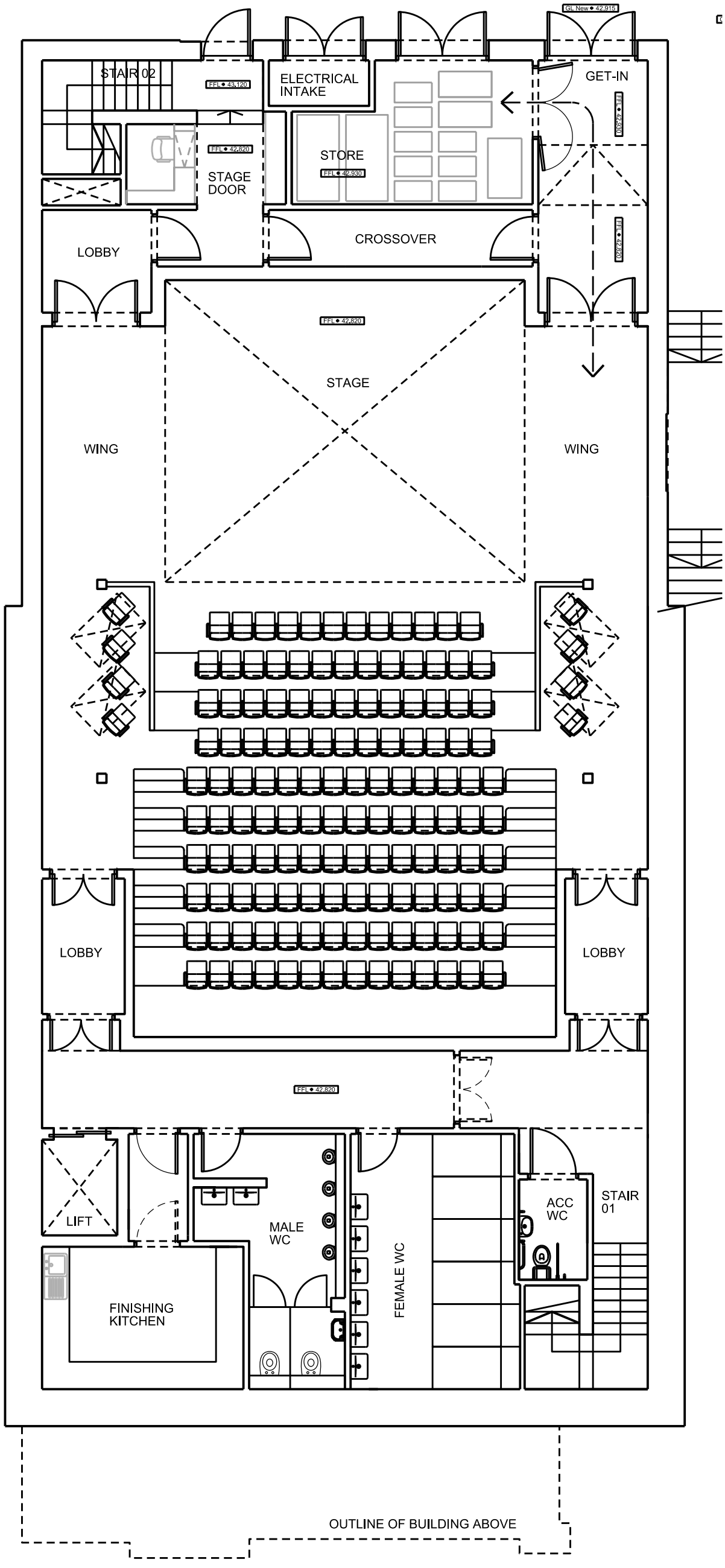
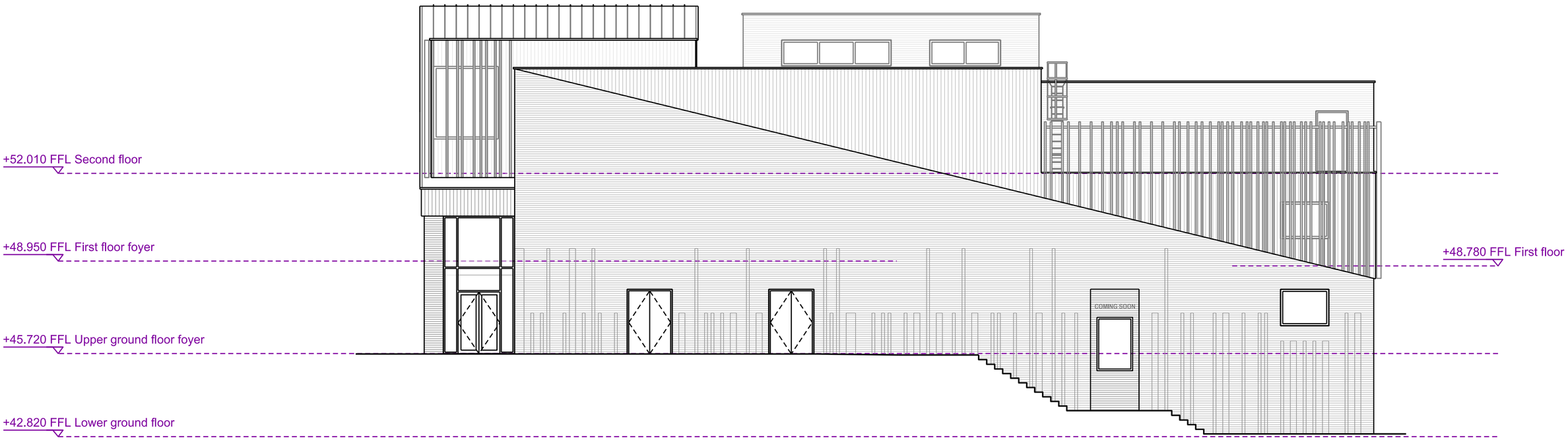
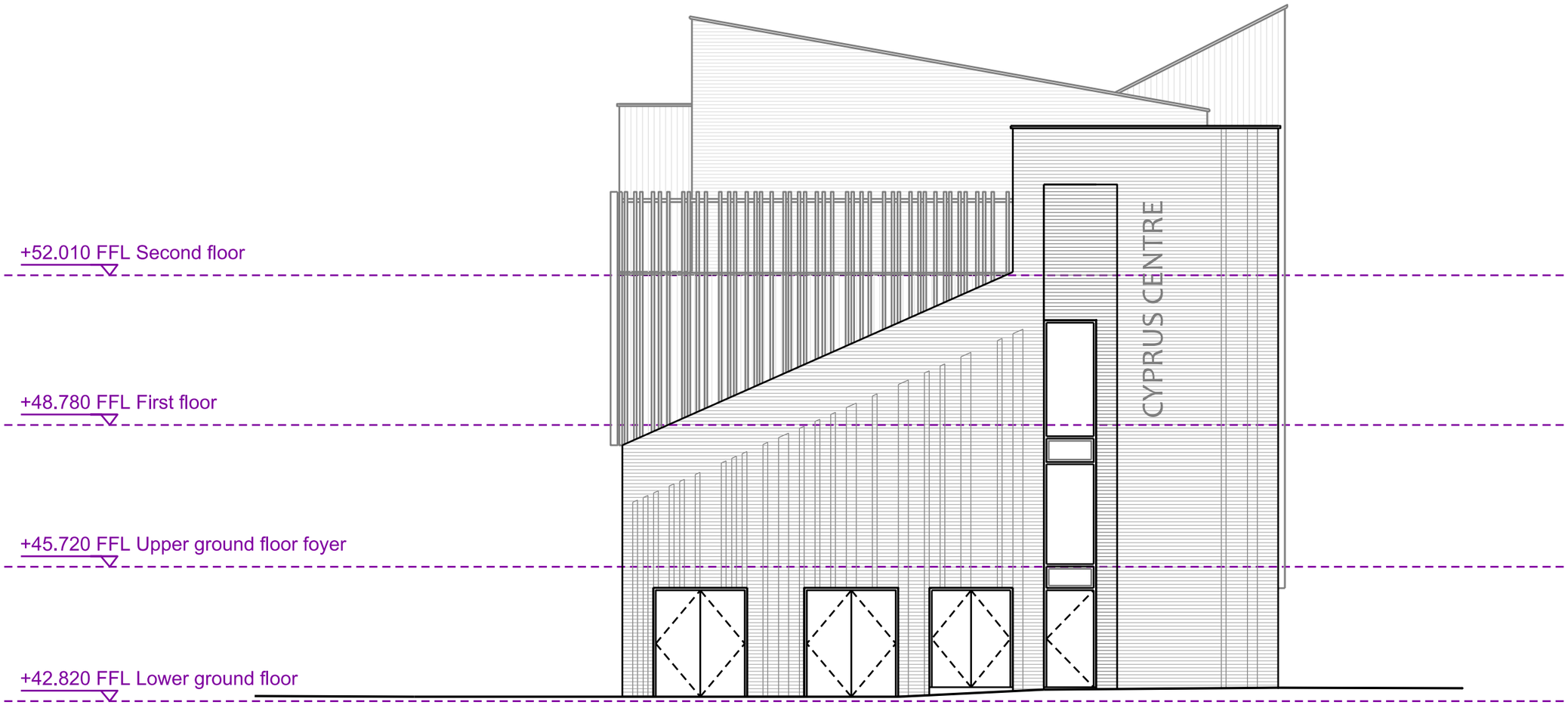
45.53
45.57
45.63
45.81
46.15
45.51


STAIR 02
FFL 48.480
WC / SH.
MEETING / DRESSING ROOM
LOBBY
FFL 48.780
FFL 48.780
TECH. GALLERY
FFL 48.480
STAGE BELOW
TECH. GALLERY
FFL 48.480
WC
WC
WC
LOBBY
LIFT
STAIR 01
FFL 48.950
FOYER
MEETING AREA
VOID


GL New ◆ 42.915
STAIR 02
FFL ◆ 43.120
ELECTRICAL INTAKE
GET-IN
FFL ◆ 42.830
FFL ◆ 42.820
STAGE DOOR
STORE
FFL ◆ 42.930
CROSSOVER
LOBBY
FFL ◆ 42.820
STAGE
WING
WING
LOBBY
LOBBY
FFL ◆ 42.820
LIFT
MALE WC
FEMALE WC
ACC WC
STAIR 01
FINISHING KITCHEN
OUTLINE OF BUILDING ABOVE


+52.010 FFL Second floor
+48.950 FFL First floor foyer
+48.780 FFL First floor
+45.720 FFL Upper ground floor foyer
+42.820 FFL Lower ground floor
COMING SOON

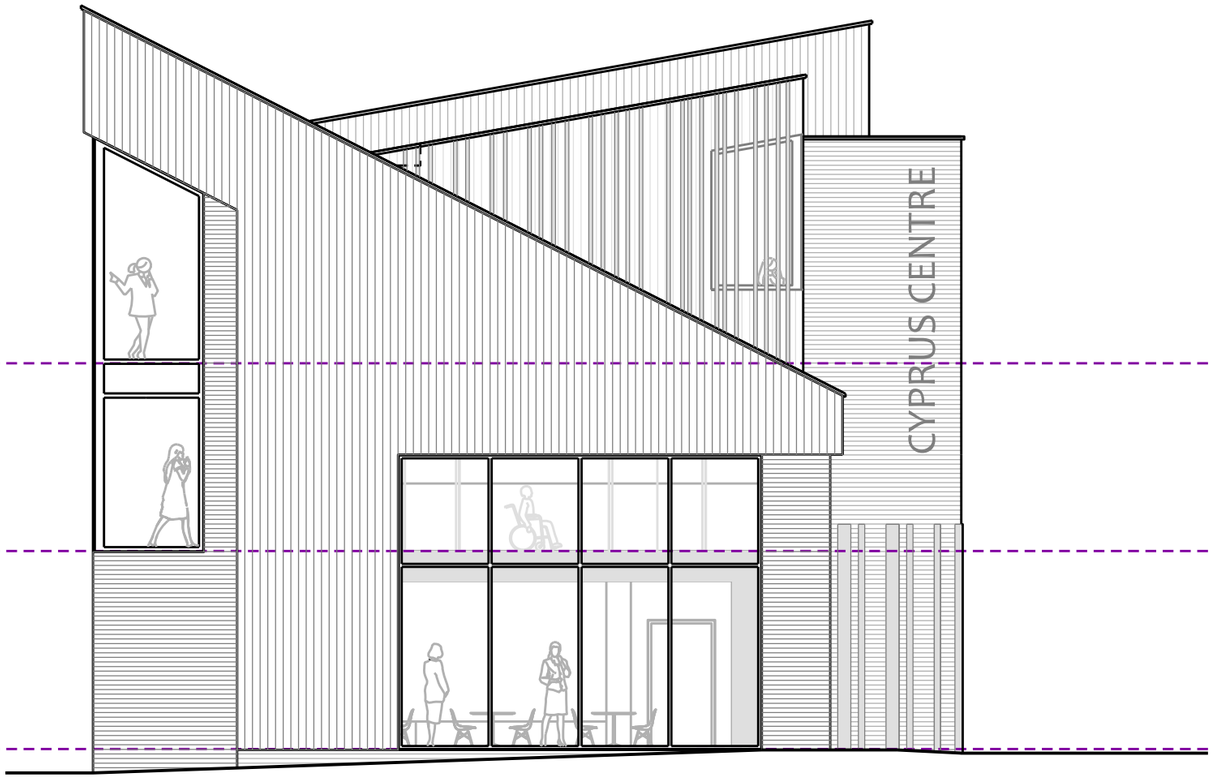

+52.010 FFL Second floor
+48.780 FFL First floor
+45.720 FFL Upper ground floor foyer
+42.820 FFL Lower ground floor
CYPRUS CENTRE

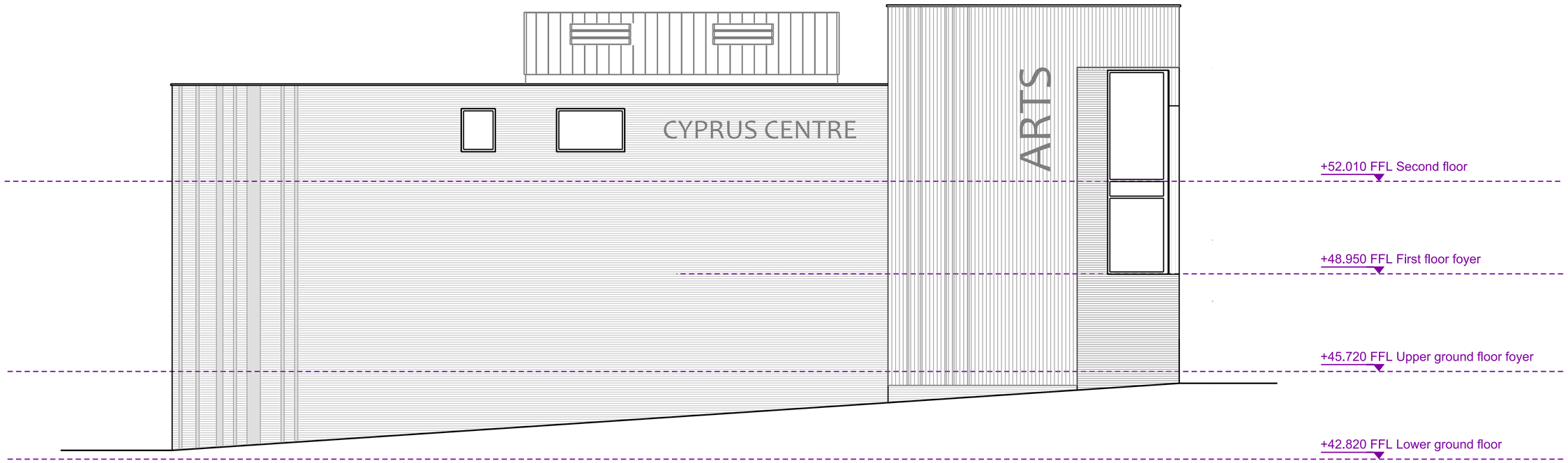
+52.010 FFL Second floor

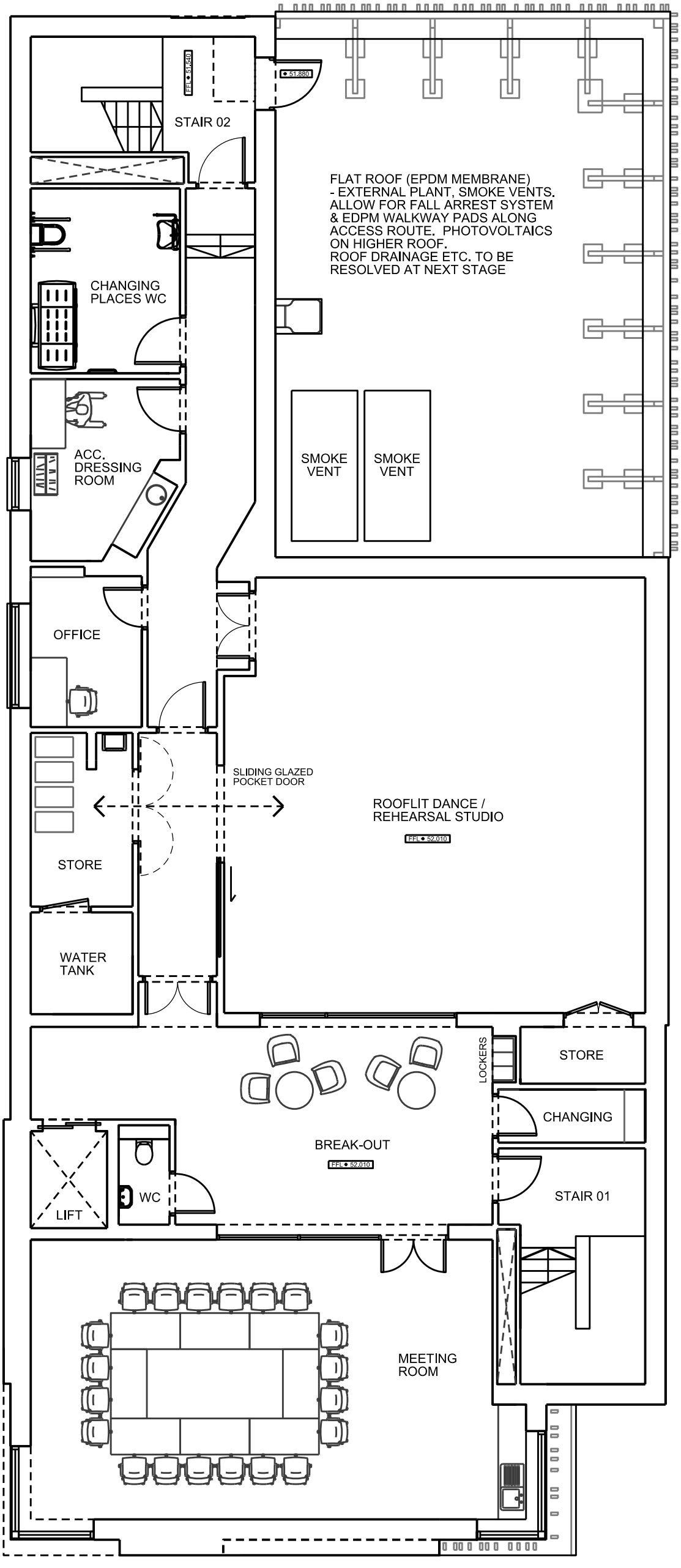
+48.950 FFL First floor foyer

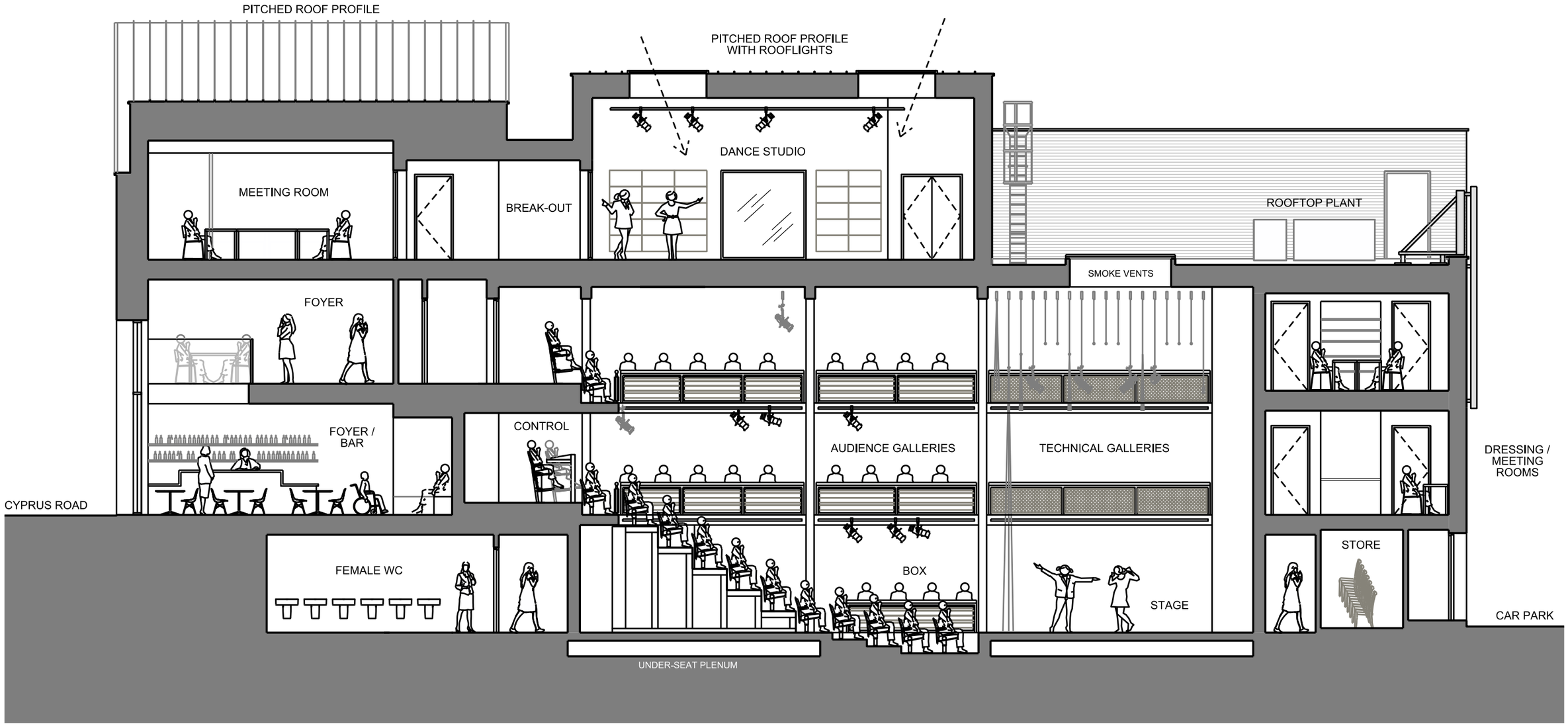
+45.720 FFL Upper ground floor foyer

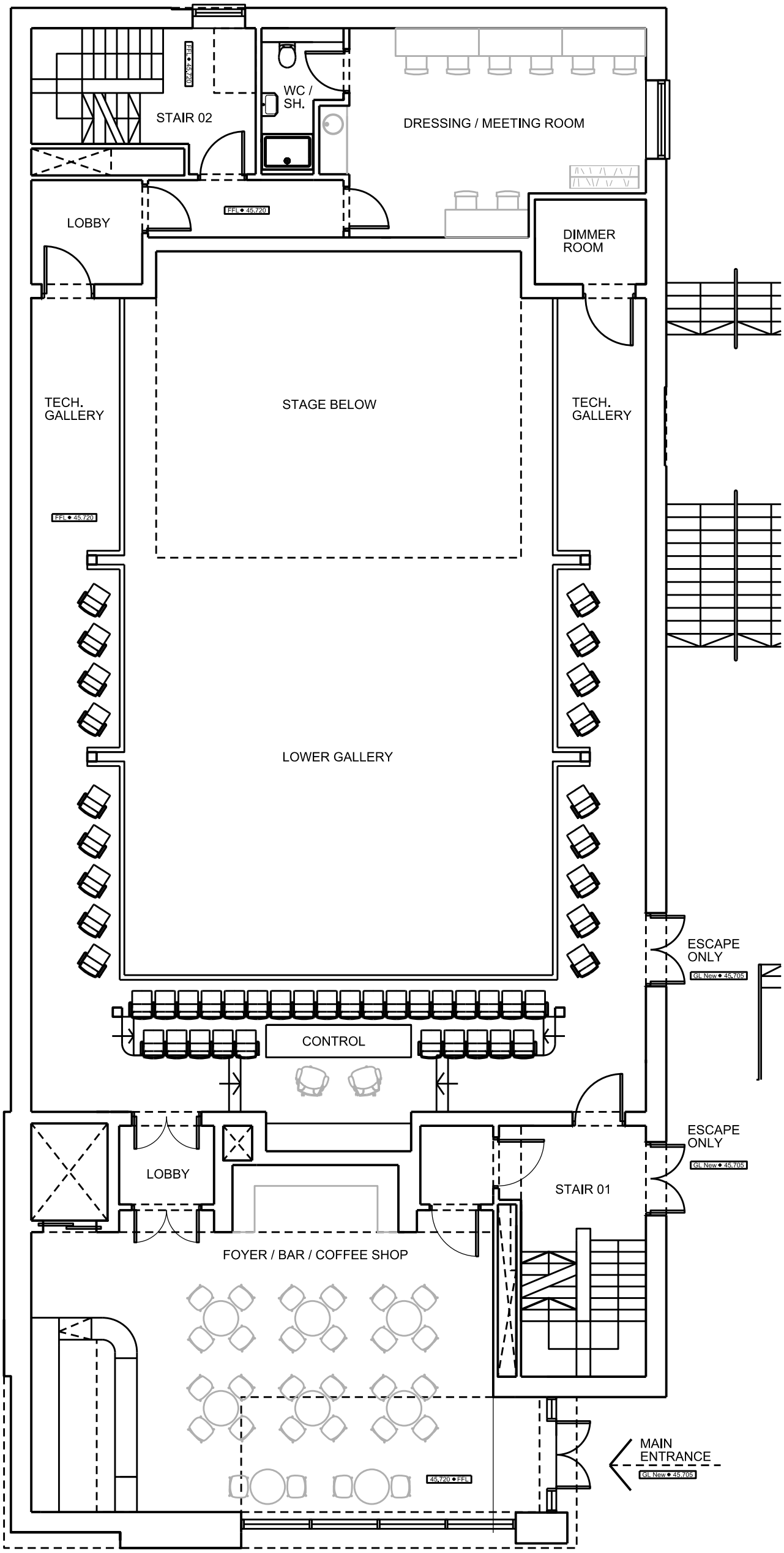
+42.820 FFL Lower ground floor




CYPRUS CENTRE
ARTS
+52.010 FFL Second floor
+48.950 FFL First floor foyer
+45.720 FFL Upper ground floor foyer
+42.820 FFL Lower ground floor


FFL • 51.540
51.880
STAIR 02
FLAT ROOF (EPDM MEMBRANE)
- EXTERNAL PLANT, SMOKE VENTS.
ALLOW FOR FALL ARREST SYSTEM
& EDPM WALKWAY PADS ALONG
ACCESS ROUTE. PHOTOVOLTAICS
ON HIGHER ROOF.
ROOF DRAINAGE ETC. TO BE
RESOLVED AT NEXT STAGE
CHANGING
PLACES WC
SMOKE
VENT
SMOKE
VENT
ACC.
DRESSING
ROOM
OFFICE
SLIDING GLAZED
POCKET DOOR
ROOFLIT DANCE /
REHEARSAL STUDIO
FFL • 52.010
STORE
WATER
TANK
LOCKERS
STORE
CHANGING
BREAK-OUT
FFL • 52.010
WC
LIFT
STAIR 01
MEETING
ROOM


PITCHED ROOF PROFILE
PITCHED ROOF PROFILE
WITH ROOFLIGHTS
MEETING ROOM
BREAK-OUT
DANCE STUDIO
ROOFTOP PLANT
SMOKE VENTS
FOYER
FOYER /
BAR
CONTROL
AUDIENCE GALLERIES
TECHNICAL GALLERIES
DRESSING /
MEETING
ROOMS
CYPRUS ROAD
FEMALE WC
BOX
STAGE
STORE
CAR PARK
UNDER-SEAT PLENUM


FFL ◆ 45.720
STAIR 02
WC / SH.
DRESSING / MEETING ROOM
FFL ◆ 45.720
LOBBY
DIMMER ROOM
TECH. GALLERY
STAGE BELOW
TECH. GALLERY
FFL ◆ 45.720
LOWER GALLERY
ESCAPE ONLY
GL New ◆ 45.705
CONTROL
ESCAPE ONLY
GL New ◆ 45.705
LOBBY
STAIR 01
FOYER / BAR / COFFEE SHOP
45.720 ◆ FFL
MAIN ENTRANCE
GL New ◆ 45.705

APPENDIX B – SITE DETAILS

Borehole Location Plan

Borehole Logs

Foundation Trial Pit Schematic Sections

Site Photographs

PADDOCK GEO ENGINEERING

Borehole Location Plan
Burgess Hill Community Entertainment and Events Centre, Rh15 8DX

Burgess Hill Town Council

October 2019

Borehole Location

North

Not to scale.
All positions are approximate.
Based on Topo plan forwarded by Client

PADDOCK GEO ENGINEERING

Site	Borehole Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	BH1

Machine : Dando 2000	Casing Diameter	Ground Level (mOD)	Client	Job Number
Method : Cable Percussion	150mm cased to 13.00m		Burgess Hill Town Council	P18-193
	Location	**Dates** 26/11/2018-27/11/2018	**Project Contractor** FSI	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.20) 0.20	CONCRETE (Reinforced)			
						(0.40) 0.60	Brick and Concrete Rubble in Sand Matrix (MADE GROUND)			
0.70	D1			Seepage(1) at 0.80m, rose to 0.70m in 20 mins, sealed at 1.40m.		(0.40) 1.00	Soft dark grey and black slightly sandy slightly chalk gravelly CLAY with occasional chalk cobbles (MADE GROUND)		▼1 ▽1	
1.00	D2									
1.00-1.45	SPT N=2		0.90	0,0/0,0,1,1		(1.45) 2.45	Firm becoming stiff dark grey and greeny brown slightly sandy silty CLAY (WEALD CLAY FORMATION)			
2.00	U1	2.00		100 blows						
2.45	D3						Stiff red brown silty shaley CLAY (WEALD CLAY FORMATION)			
3.00-3.45	SPT N=17	2.40		5/4,3,5,5						
3.00	D4									
4.00-4.45	SPT N=31	2.40		6/5,7,8,11		(3.35)				
4.00	D5									
5.00-5.45	SPT N=44	2.40		10/9,10,11,14						
5.00	D6									
						5.80	Stiff to hard grey silty shaley CLAY with thin Siltstone/Mudstone bands (2-10mm) (WEALD CLAY FORMATION)			
6.50-6.95	SPT N=55	2.40		16/12,11,15,17						
6.50	D7								▼2	
8.00-8.45	SPT N=53	2.40	6.50	39/28,25						
8.00	D8								▽2	
				Fast(2) at 8.50m, rose to 7.00m in 20 mins.						
						(7.20)				
9.50-9.95	SPT N=25	2.40	4.50	48/25						
9.50	D9									

Remarks
Installed with full depth 50mm HDPE monitoring well with flush cover to 10.00m.
Chiselling from 0.00m to 0.20m for 1 hour. Chiselling from 0.20m to 1.00m for 1 hour. Chiselling from 10.00m to 11.00m for 1 hour.

Scale (approx)	Logged By
1:50	MC

Figure No. P18-193.BH1

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

PADDOCK GEO ENGINEERING

Site Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX			**Borehole Number** BH1
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 150mm cased to 13.00m	**Ground Level (mOD)**	**Client** Burgess Hill Town Council	**Job Number** P18-193
	Location	**Dates** 26/11/2018-27/11/2018	**Project Contractor** FSI	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00-11.00	B1									
11.00-11.45 11.00	SPT N=50 D10	2.40	6.00	13/9,16,11,14						
12.50-12.95 12.50	SPT N=94 D11	2.40	7.20	21/19,22,25,28		13.00	Complete at 13.00m			

Remarks
Chiselling from 10.00m to 11.00m for 1 hour. Chiselling from 11.00m to 12.50m for 2 hours.

Scale (approx)	Logged By
1:50	MC

Figure No. P18-193.BH1

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PADDOCK GEO ENGINEERING

Site	Borehole Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	BH2

Machine : Dando 2000	Casing Diameter	Ground Level (mOD)	Client	Job Number
Method : Cable Percussion	150mm cased to 13.00m		Burgess Hill Town Council	P18-193
	Location	**Dates** 27/11/2018-28/11/2018	**Project Contractor** FSI	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.20) 0.20	MACADAM over CONCRETE			
						(0.20) 0.40	Brick and Concrete Rubble in Sand Matrix (MADE GROUND)			
0.60	D1					(0.20) 0.60	Soft dark grey and black slightly sandy slightly chalk gravelly CLAY with occasional chalk cobbles (MADE GROUND)			
1.00	U1			80 blows			Firm becoming stiff dark grey and greeny brown slightly sandy silty CLAY (WEALD CLAY FORMATION)			
1.45	D2					(2.40)				
2.00	U2	1.40		95 blows						
2.45	D3									
3.00	U3	1.40		105 blows		3.00	Stiff red brown silty shaley CLAY (WEALD CLAY FORMATION)			
3.45	D4									
4.00	U4	1.40		105 blows						
4.45	D5									
5.00	U5	1.40		110 blows						
5.45	D6									
6.50-6.95 6.50	SPT N=62 D7	1.40		13/10,13,19,20		(8.70)				
8.00-8.45 8.00	SPT N=78 D8	1.40		15/13,18,21,26						
9.50-9.95 9.50	SPT N=90 D9	1.40		13/15,21,24,30						

Remarks
No groundwater encountered
Installed with full depth 50mm HDPE monitoring well with flush cover to 10.00m.
Chiselling from 0.00m to 0.20m for 1 hour. Chiselling from 0.20m to 1.00m for 1 hour.

Scale (approx)	Logged By
1:50	MC

Figure No. P18-193.BH1

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

PADDOCK GEO ENGINEERING

Site Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX			**Borehole Number** BH2
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 150mm cased to 13.00m	**Ground Level (mOD)**	**Client** Burgess Hill Town Council	**Job Number** P18-193
	Location	**Dates** 27/11/2018-28/11/2018	**Project Contractor** FSI	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00-11.45 11.00	SPT N=25 D10	1.40		38/25						
						11.70	Stiff to hard grey silty shaley CLAY with thin Siltstone/Mudstone bands (2-10mm) (WEALD CLAY FORMATION)			
						(1.30)				
12.50-12.95 12.50	SPT N=72 D11	1.40		20/16,18,18,20						
						13.00	Complete at 13.00m			

Remarks

Scale (approx)	Logged By
1:50	MC

Figure No. P18-193.BH1

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS01

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 01/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.04	Brown CONCRETE screed. (MADE GROUND)		
					(0.08)			
					0.12	Grey CONCRETE with blue plastic membrane at base. (MADE GROUND)		
0.20	ES					Red sandy GRAVEL of crushed brick and terracotta tile with ash sand matrix. (MADE GROUND)		
					(0.73)			
0.60	ES							
					0.85	Firm blue brown and green grey slightly gravelly CLAY with occasional black rootlets. Gravel is rounded flint. (WEALD CLAY FORMATION)		
					(0.55)			
1.20	ES							
1.30	SV 52kPa							
					1.40	Complete at 1.40m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS02

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 01/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.04	Brown CONCRETE screed. (MADE GROUND)		
					(0.11)			
					0.15	Grey CONCRETE with blue plastic membrane at base. (MADE GROUND)		
						Red sandy GRAVEL of crushed brick and terracotta tile with ash sand matrix. (MADE GROUND)		
0.40	ES				(0.60)			
					0.75	Soft red slightly sandy CLAY. (MADE GROUND)		
0.80	ES				(0.20)			
					0.95	Firm blue brown and green grey slightly gravelly CLAY with occasional black rootlets. Gravel is rounded flint. (WEALD CLAY FORMATION)		
1.00	ES				(0.15)			
					1.10	Complete at 1.10m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS03

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 01/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.90)	Timber floor over void.		
					0.90 (0.05) 0.95	Grey sandy GRAVEL of flint. Blue plastic membrane at base. (MADE GROUND)		
1.10	ES				(0.45)	Light grey slightly sandy slightly gravelly CLAY. Gravel is brick, coal and flint. (MADE GROUND)		
1.50 1.50	SV 39kPa ES				1.40	Firm brown slightly sandy CLAY. (MADE GROUND)		
					(0.50)	... becoming red and green grey from 1.6m depth.		
2.00 2.00	SV 125kPa ES				1.90	Stiff red brown, grey and green grey slightly sandy CLAY. (WEALD CLAY FORMATION)		
2.70	SV 135kPa				(1.00)			
					2.90	Complete at 2.90m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS04

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 01/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						Timber floor over void.		
					(1.00)			
					1.00			
1.00	ES				(0.10)	Grey sandy GRAVEL of flint. Blue plastic membrane at base. (MADE GROUND)		
					1.10			
1.20	ES					Light grey slightly sandy slightly gravelly CLAY. Gravel is brick, coal and flint. (MADE GROUND)		
					(0.60)	... becoming light brown from 1.4m depth.		
1.50	ES							
1.70	SV 101kPa				1.70	Stiff red and grey occasionally green grey slightly sandy CLAY. (WEALD CLAY FORMATION)		
2.00	SV 156kPa							
2.00	ES							
					(1.30)			
					3.00	Complete at 3.00m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS05

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 01/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.70)	Timber floor over void.		
					0.70			
0.80	ES				(0.40)	Firm dark brown slightly sandy slightly gravelly CLAY. Gravel is brick, flint, tile and timber fragments. (MADE GROUND)		
					1.10			
1.20	ES				(0.85)	Firm light brown slightly sandy slightly gravelly CLAY. Gravel is red tile, brick, timber fragments and occasional coal and flint. (MADE GROUND)		
1.80	ES				1.95			
					(0.05)	Stiff blue grey CLAY. (WEALD CLAY FORMATION)		
					2.00	Complete at 2.00m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS06

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 01/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(1.20)	Timber floor over void.		
1.20	ES				1.20 (0.10)	Grey sandy GRAVEL of flint. Blue plastic membrane at base. (MADE GROUND)		
1.40	ES				1.30	Soft dark brown slightly sandy slightly gravelly CLAY. Gravel is brick, flint and coal. (MADE GROUND)		
1.60	SV 39kPa				(0.70)	... becoming firm and light brown from 1.8m depth.		
2.20	ES				2.00	Stiff red mottled green grey slightly sandy CLAY. (WEALD CLAY FORMATION)		
2.40	SV 111kPa				(0.70)			
					2.70	Complete at 2.70m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS07

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 02/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.08) 0.08	CONCRETE screed. (MADE GROUND)		
					(0.16) 0.24	Grey CONCRETE. (MADE GROUND)		
					(0.07) 0.31	Soft dark brown slightly sandy slightly gravelly CLAY. Gravel is brick, flint and coal. (MADE GROUND)		
						Stiff red mottled green grey slightly sandy CLAY. (WEALD CLAY FORMATION)		
0.80	ES							
1.10	ES							
1.30	ES							
					(2.39)			
1.90	SV 120kPa							
					2.70	Complete at 2.90m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS08

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 02/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.08) 0.08	CONCRETE screed. (MADE GROUND)		
					(0.12)	Grey CONCRETE. (MADE GROUND)		
0.20	ES				0.20	Soft dark brown slightly sandy slightly gravelly CLAY. Gravel is brick, flint and coal. (MADE GROUND)		
0.60	SV 36kPa				(0.90)			
0.80	ES							
						... becoming dark brown from 1.0m depth.		
1.10	SV 39kPa				1.10	Stiff blue grey and brown slightly sandy CLAY. (WEALD CLAY FORMATION)		
1.20	ES							
					(1.10)			
1.80	D							
					2.20	Complete at 2.20m		

Remarks
No groundwater encountered.
Monitoring standpipe installed upon completion.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS09

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 02/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.04			
					(0.06)	MACADAM. (MADE GROUND)		
0.10	ES				0.10			
					(0.06)	Grey sandy GRAVEL of igneous rock and limestone. (MADE GROUND)		
					0.16			
						Brown sandy GRAVEL of limestone. (MADE GROUND)		
0.30	ES				(0.34)	Black sandy GRAVEL of ash and coal fragments with occasional flint and chalk. (MADE GROUND)		
					0.50			
						Stiff grey slightly sandy slightly gravelly CLAY. Gravel is brick, flint and chalk. (MADE GROUND)		
					(0.30)			
0.80	ES				0.80			
						Firm blue grey and brown slightly sandy CLAY. (WEALD CLAY FORMATION)		
1.00	ES				(0.35)			
					1.15			
						Complete at 1.15m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS10

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 02/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.80)	Timber floor over void.		
0.80	ES				0.80 (0.10) 0.90	Grey sandy GRAVEL of flint. Blue plastic membrane at base. (MADE GROUND)		
1.00	ES				(0.70)	Firm brown slightly sandy slightly gravelly CLAY. Gravel is flint and chalk with rare brick and tile fragments. (MADE GROUND)		
1.50	ES				1.60	Stiff red, orange, brown and green grey slightly sandy CLAY. (WEALD CLAY FORMATION)		
2.00	ES				(0.90)			
					2.50	Complete at 2.50m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS11

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 02/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.22)	Grey CONCRETE with blue plastic membrane at base. (MADE GROUND)		
					0.22			
0.30	ES				(0.28)	Red sandy GRAVEL of crushed brick and terracotta tile with ash sand matrix. (MADE GROUND)		
					0.50			
					(0.20)	Firm blue grey CLAY with occasional brick and tile fragments. (MADE GROUND)		
0.70	ES				0.70			
					(0.30)	Stiff blue grey occasionally mottled orange brown slightly sandy CLAY. (WEALD CLAY FORMATION)		
0.90	ES				1.00			
						Complete at 1.00m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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PADDOCK GEO ENGINEERING

Site	Number
Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX	WS12

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Burgess Hill Town Council	P18-193
	Location	**Dates** 02/10/2019	**Project Contractor** PGE	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.23)	Grey CONCRETE with blue plastic membrane at base. (MADE GROUND)		
					0.23			
0.40	ES				(0.47)	Red sandy GRAVEL of crushed brick and terracotta tile and occasional clinker with ash sand matrix. (MADE GROUND)		
0.70	ES				0.70 (0.10) 0.80	Firm blue grey slightly sandy slightly gravelly CLAY with occasional black rootlets. Gravel is flint and brick. (MADE GROUND)		
					(0.40)	Firm to stiff blue grey occasionally mottled orange brown slightly sandy CLAY. (WEALD CLAY FORMATION)		
1.10	ES				1.20	Complete at 1.20m		

Remarks
No groundwater encountered.

Scale (approx)	Logged By
1:20	SJF

Figure No. P18-193.WS01

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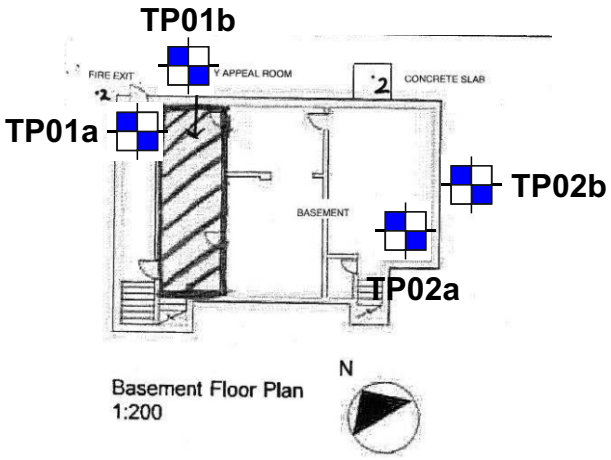
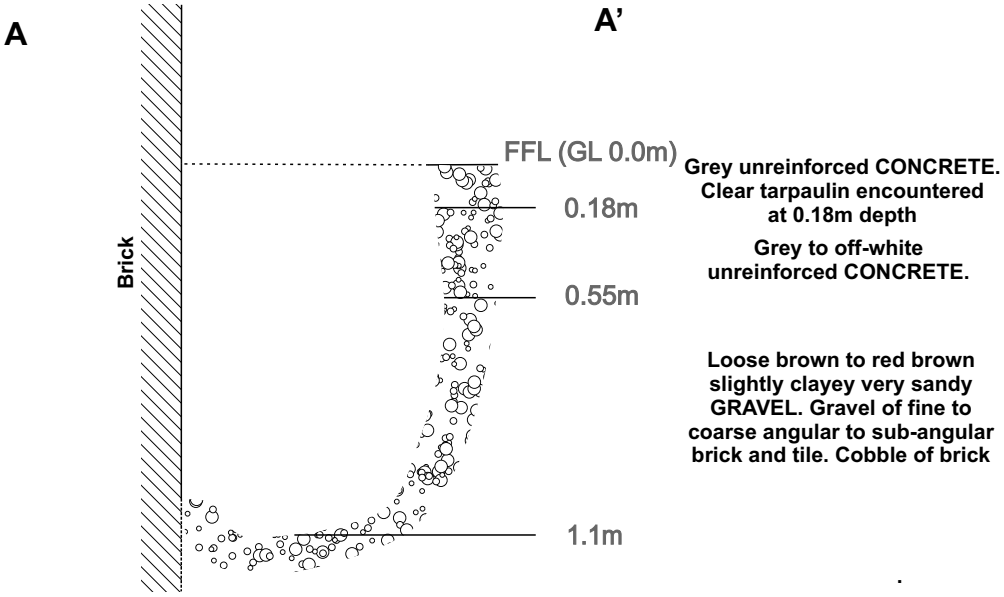
A

A’

TP1a Photograph



TP1a - Side Wall Section



PADDOCK GEO ENGINEERING

Trial Pit TP1a - Schematic Section

Burgess Hill Community Entertainment Centre
Cyprus Road
Rh15 8DX

Burgess Hill Town Council

January 2019

Samples:
ES - 0.70m

Hand Vane:
Unable to undertake test

Groundwater - None

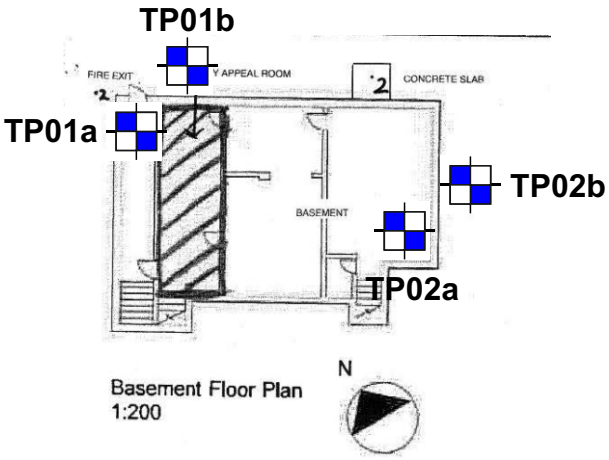
Notes:
Foundation not encountered due to gravel and cobbles of brick and tile continuously collapsing.
The concrete above was being undermined by the continuous collapse.

Not to scale.
All positions are approximate
Plan based on GI mark up plan provided by Sinclair Johnston and Partners

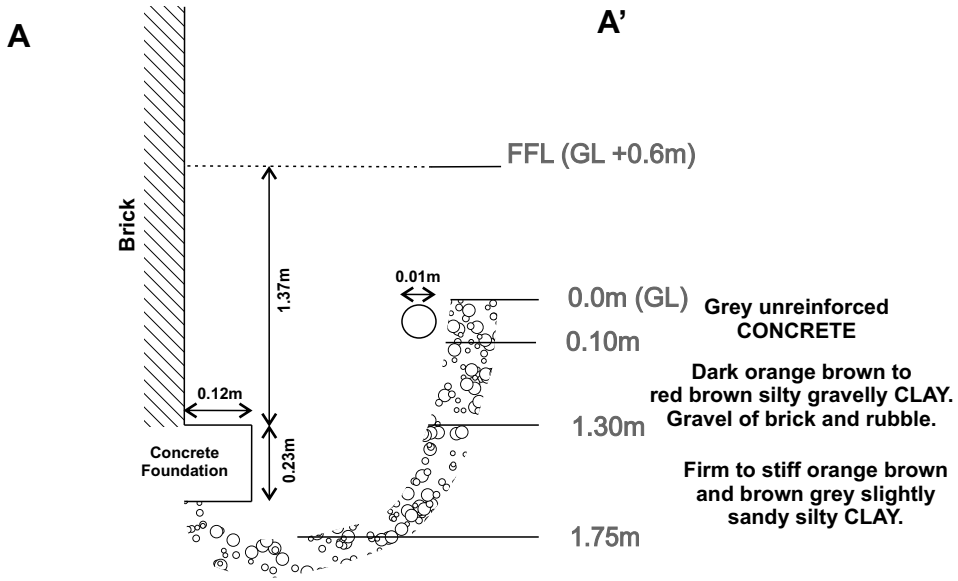
A

A'

TP1b Photograph



TP1b - Side Wall Section



PADDOCK GEO ENGINEERING

Trial Pit TP1b - Schematic Section

Burgess Hill Community Entertainment Centre
Cyprus Road
Rh15 8DX

Burgess Hill Town Council

January 2019

Samples:
ES - 1.0m
D - 1.60m

Hand Vane:
Unable to undertake test

Groundwater - None

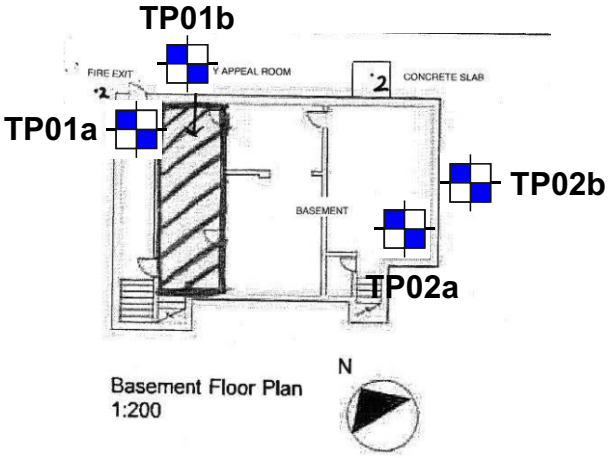
Notes:
Redundant clay service encountered directly beneath GL.

Not to scale.
All positions are approximate
Plan based on GI mark up plan provided by Sinclair Johnston and Partners

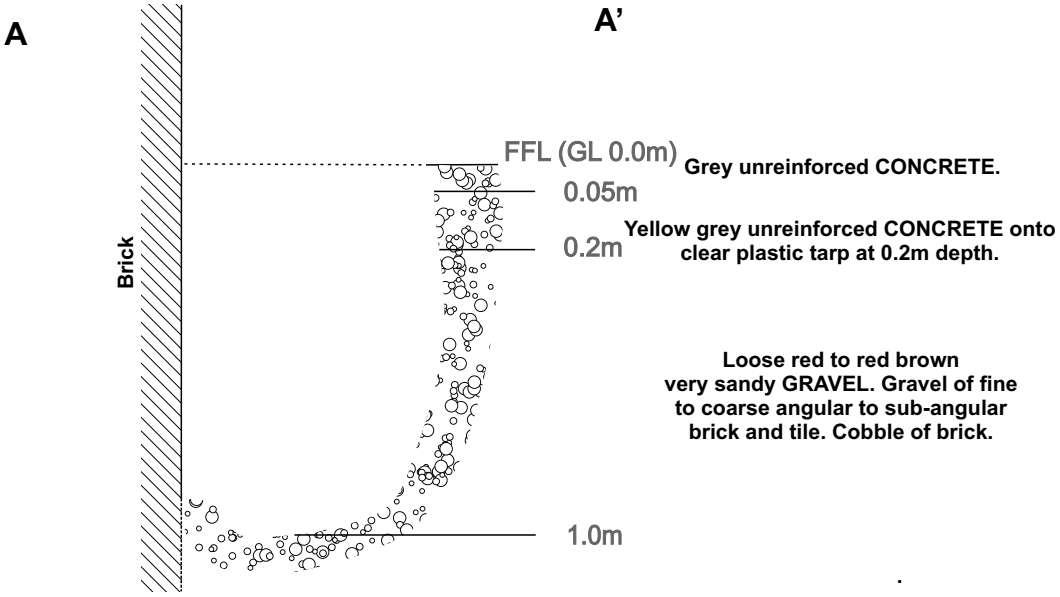
A

A’

TP2a Photograph



TP2a - Side Wall Section



PADDOCK GEO ENGINEERING

Trial Pit TP2a - Schematic Section

Burgess Hill Community Entertainment Centre
Cyprus Road
RH15 8DX

Burgess Hill Town Council

January 2019

Samples:
None taken

Hand Vane:
Unable to undertake test

Groundwater - None

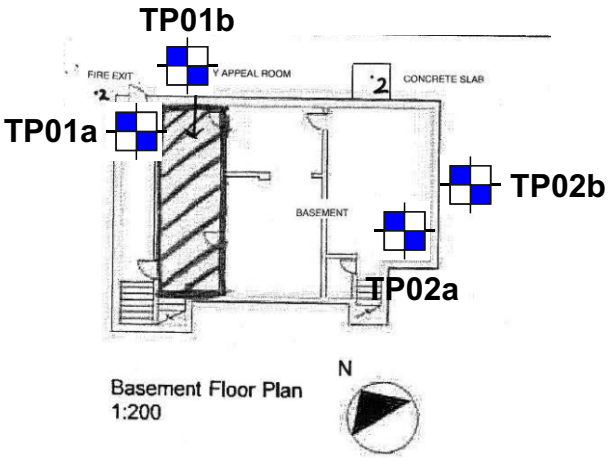
Notes:
Foundation not encountered due to gravel and cobbles of brick and tile continuously collapsing.
The concrete above was being undermined by the continuous collapse.

Not to scale.
All positions are approximate
Plan based on GI mark up plan provided by Sinclair Johnston and Partners

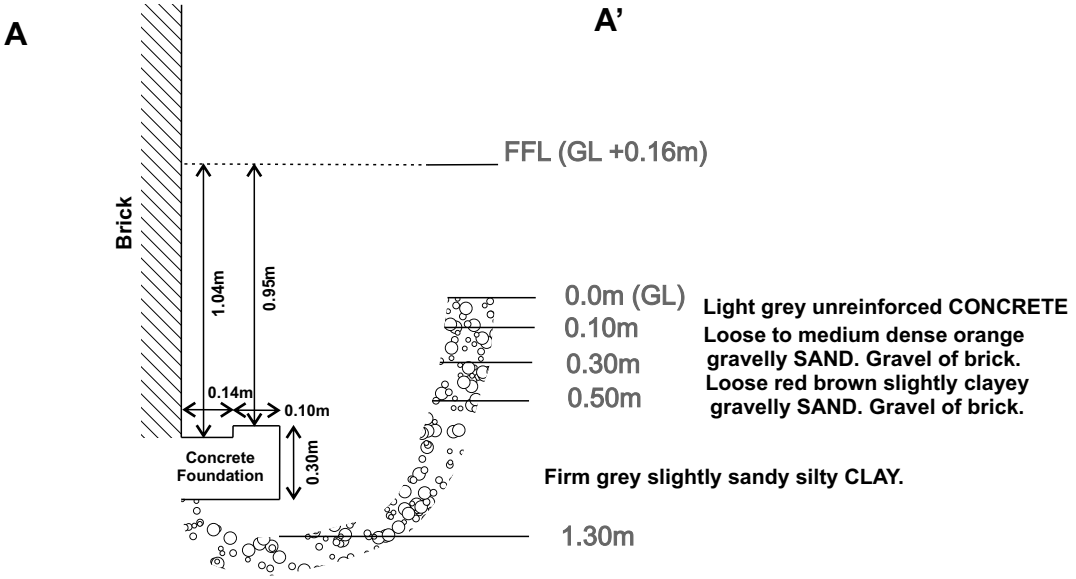
A

A’

TP2b Photograph



TP2b - Side Wall Section



PADDOCK GEO ENGINEERING

Trial Pit TP2b - Schematic Section

Burgess Hill Community Entertainment Centre
Cyprus Road
RH15 8DX

Burgess Hill Town Council

January 2019

Samples:
ES - 0.4m
ES - 0.9m
D - 0.6m
D - 1.2m

Hand Vane:
Unable to undertake test

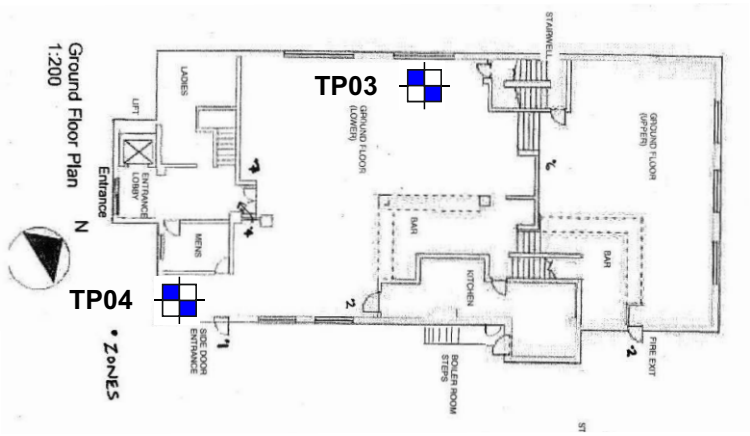
Groundwater - After 20 minutes slight seepage at base.

Not to scale.
All positions are approximate
Plan based on GI mark up plan provided by Sinclair Johnston and Partners

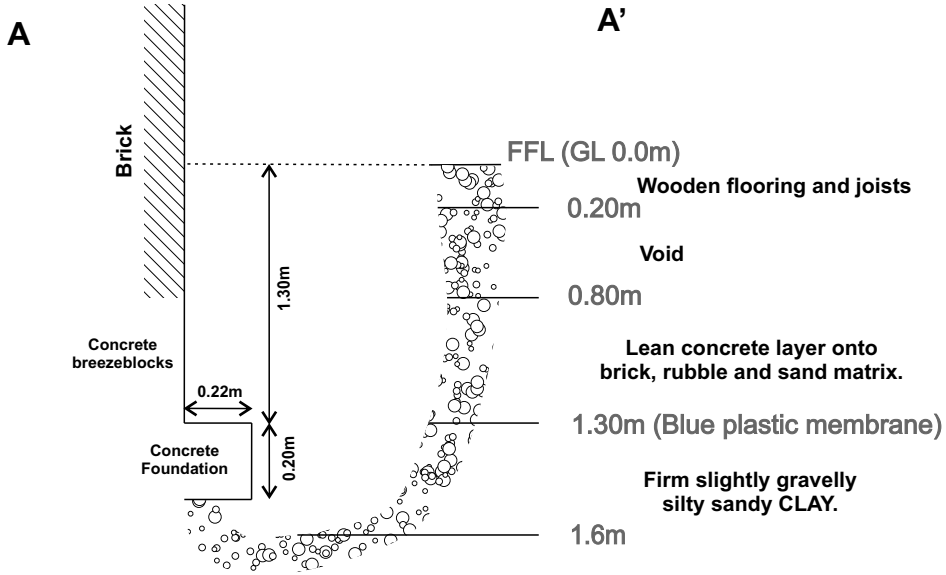
A

A’

TP3 Photograph



TP3 - Side Wall Section



PADDOCK GEO ENGINEERING

Trial Pit TP3 - Schematic Section

Burgess Hill Community Entertainment Centre
Cyprus Road
Rh15 8DX

Burgess Hill Town Council

January 2019

Samples:
ES - 1.30-1.50m

Hand Vane:
Unable to undertake test

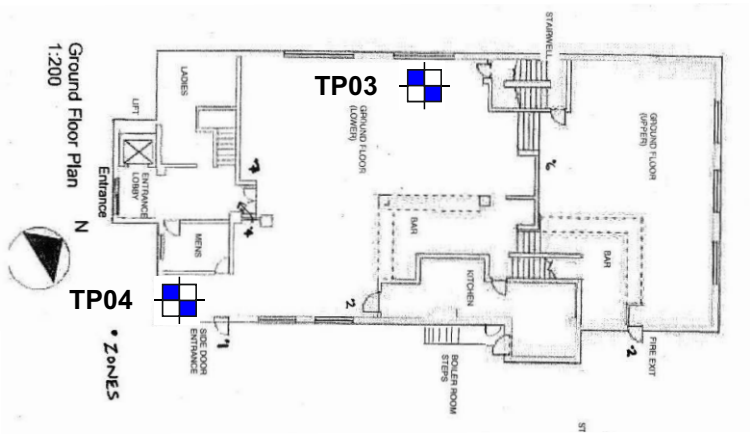
Groundwater - None

Not to scale.
All positions are approximate
Plan based on GI mark up plan provided by Sinclair Johnston and Partners

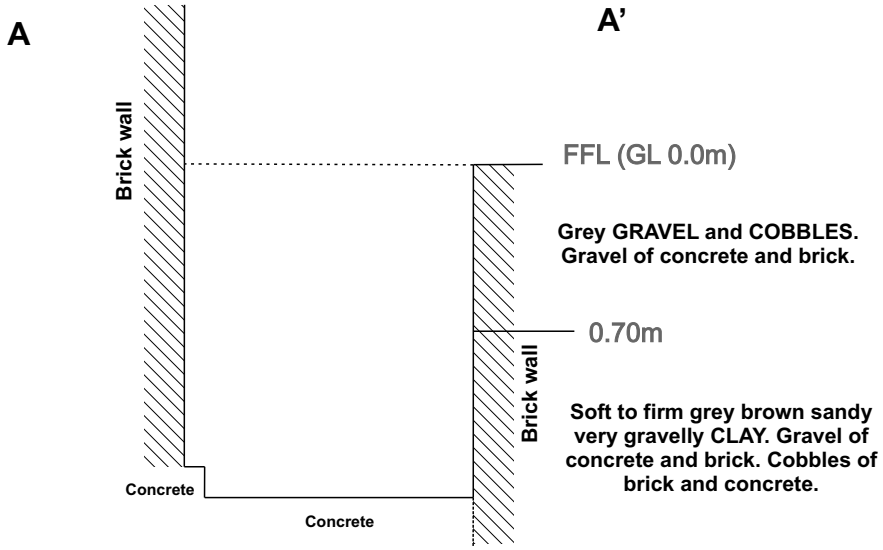
A

A’

TP4 Photograph



TP4- Side Wall Section



PADDOCK GEO ENGINEERING

Trial Pit TP4 - Schematic Section

Burgess Hill Community Entertainment Centre
Cyprus Road
RH15 8DX

Burgess Hill Town Council

January 2019

Samples:
ES - 0.8m
D - 1.0m

Hand Vane:
Unable to undertake test

Groundwater - Perched GW encountered at 1.08m depth. Remaining constant

Notes:
Terminated due to concrete at base.
Could no expand pit due to historical brick wall and pipe covered by thick concrete.

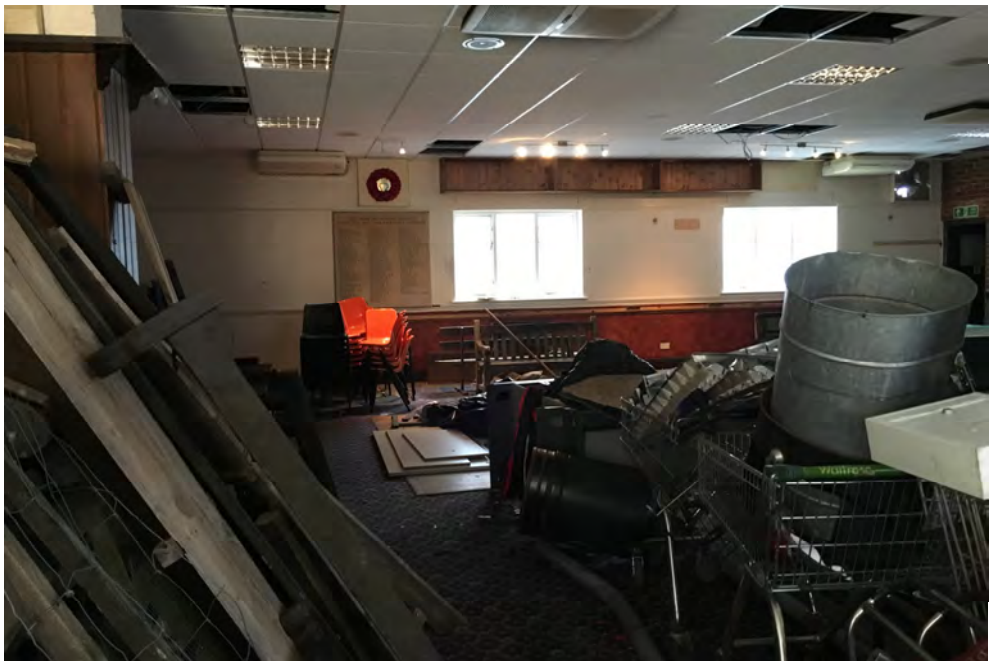
Not to scale.
All positions are approximate
Plan based on GI mark up plan provided by Sinclair Johnston and Partners

Eastern elevation of site structure

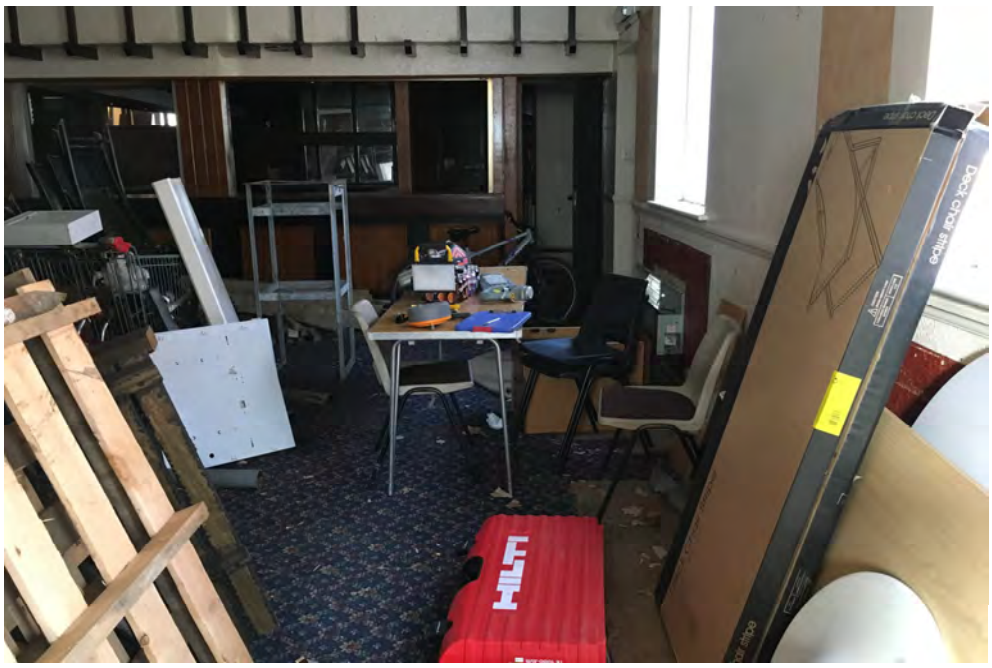
Southern elevation of site structure

PADDOCK GEO ENGINEERING

Client:	**Burgess Hill Town Council**
Project No:	**P18-193pra**
Project Title:	**Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX**
Date:	**December 2018**



Internal—main seating area



Internal—main seating area

PADDOCK GEO ENGINEERING

Client:	**Burgess Hill Town Council**
Project No:	**P18-193pra**
Project Title:	**Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX**
Date:	**December 2018**

Internal—bar area

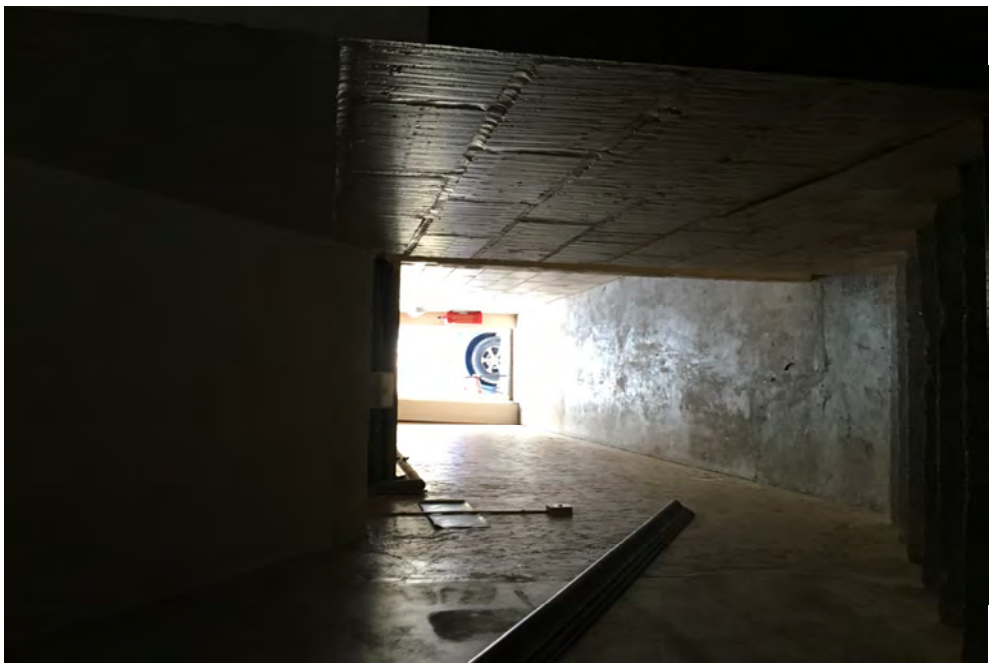
Internal—bar area

Western front area of the site

PADDOCK GEO ENGINEERING

Client:	Burgess Hill Town Council
Project No:	P18-193pra
Project Title:	Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX
Date:	December 2018

Internal—bar area



Internal—Cellar entrance

PADDOCK GEO ENGINEERING

Client:	**Burgess Hill Town Council**
Project No:	**P18-193pra**
Project Title:	**Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX**
Date:	**December 2018**

Northern elevation of main structure

Northern elevation of main structure

PADDOCK GEO ENGINEERING

Client:	**Burgess Hill Town Council**
Project No:	**P18-193pra**
Project Title:	**Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX**
Date:	**December 2018**

APPENDIX C – CHEMICAL ASSESSMENT DATA

Chemical Analysis Reports

Chemical Analysis Results Summary

PGE In-House GACs

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Analytical Report Number : 18-21194

Project / Site name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road, RH15	**Samples received on:**	03/12/2018
Your job number:	P18-193 S01	**Samples instructed on:**	05/12/2018
Your order number:	P18-193	**Analysis completed by:**	18/12/2018
Report Issue Number:	1	**Report issued on:**	18/12/2018
Samples Analysed:	7 soil samples		

Signed

Jordan Hill
Reporting Manager
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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 18-21194

Project / Site name: Burgess Hill Community Entertainment and Events Centre, Cyprus Road, RH15
Your Order No: P18-193

Lab Sample Number				1107899	1107900	1107901	1107902	1107903
Sample Reference				BH1	BH1	BH1	BH1	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70	3.00	6.50	12.50	22.45
Date Sampled				26/11/2018	26/11/2018	26/11/2018	26/11/2018	26/11/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	22	13	11	16	12
Total mass of sample received	kg	0.001	NONE	1.1	0.50	0.48	0.60	1.1
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.7	9.1	9.1	9.7	9.2
Total Sulphate as SO_4	%	0.005	MCERTS	0.077	0.019	0.014	0.069	0.027
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.22	0.048	0.018	0.0021	0.015

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 18-21194

Project / Site name: Burgess Hill Community Entertainment and Events (
Your Order No: P18-193

Lab Sample Number				1107904	1107905			
Sample Reference				BH2	BH2			
Sample Number				None Supplied	None Supplied			
Depth (m)				5.45	9.50			
Date Sampled				26/11/2018	26/11/2018			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	11	11			
Total mass of sample received	kg	0.001	NONE	0.95	0.46			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.2	9.2			
Total Sulphate as SO_4	%	0.005	MCERTS	0.021	0.016			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.036	0.015			

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 18-21194

Project / Site name: Burgess Hill Community Entertainment and Events Centre, Cyprus Road, RH15

* 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 *
1107899	BH1	None Supplied	0.70	Grey clay and sand with gravel.
1107900	BH1	None Supplied	3.00	Brown clay and sand with gravel.
1107901	BH1	None Supplied	6.50	Brown clay and sand with gravel.
1107902	BH1	None Supplied	12.50	Brown clay and sand with gravel.
1107903	BH2	None Supplied	22.45	Brown clay and sand with gravel.
1107904	BH2	None Supplied	5.45	Brown clay and sand with gravel.
1107905	BH2	None Supplied	9.50	Grey clay and sand with gravel.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 18-21194

Project / Site name: Burgess Hill Community Entertainment and Events Centre, Cyprus Road, RH15

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
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.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L038	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' 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.

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 18-21364

Replaces Analytical Report Number : 18-21364, issue no. 1

Project / Site name:	Burgess Hill Community Entertainment Centre, Cyprus Road, RH15	**Samples received on:**	03/12/2018
Your job number:	P18-193	**Samples instructed on:**	03/12/2018
Your order number:		**Analysis completed by:**	19/12/2018
Report Issue Number:	2	**Report issued on:**	19/12/2018
Samples Analysed:	4 soil samples		

Signed

Jordan Hill
Reporting Manager
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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 18-21364

Project / Site name: Burgess Hill Community Entertainment Centre, Cyprus Road, RH15

Lab Sample Number				1108945	1108946	1108947	1108948	
Sample Reference				TP1A	TP2A	TP2A	TP4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.70	0.40	0.90	0.80	
Date Sampled				26/11/2018	26/11/2018	26/11/2018	26/11/2018	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	8.4	9.9	19	21	
Total mass of sample received	kg	0.001	NONE	0.50	0.49	0.54	0.45	
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	Chrysotile	Chrysotile	-	
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Detected	Detected	Not-detected	
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	0.060	0.005	-	
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	0.060	0.005	-	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.8	10.0	8.0	8.5	
Total Sulphate as SO_4	mg/kg	50	MCERTS	2500	1900	530	620	
Loss on Ignition @ 450°C	%	0.2	MCERTS	1.1	1.7	4.0	3.3	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.53	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.6	
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.31	
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.2	
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.42	0.76	15	
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.13	0.30	4.6	
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.5	2.3	31	
Pyrene	mg/kg	0.05	MCERTS	< 0.05	1.4	2.0	25	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.82	1.5	16	
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.70	1.2	11	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.1	1.7	15	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.40	0.86	7.3	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.87	1.4	13	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.49	0.85	6.3	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.7	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.54	0.99	6.8	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	8.29	13.8	157	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.0	4.5	19	9.9	
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.40	0.39	1.2	0.99	
Boron (water soluble)	mg/kg	0.2	MCERTS	2.3	2.9	2.7	2.5	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	11	25	25	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	12	38	29	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	32	29	150	68	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	8.0	17	20	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	2.2	1.5	
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	34	22	41	38	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	46	41	150	110	
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	97	110	310	

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 18-21364
Project / Site name: Burgess Hill Community Entertainment Centre, Cyprus Road, RH15
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1108945	TP1A	0.70	106	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1108946	TP2A	0.40	152	Loose Fibres & Hard/Cement Type Material	**Chrysotile**	0.060	**0.060**
1108947	TP2A	0.90	123	Loose Fibres	**Chrysotile**	0.005	**0.005**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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Analytical Report Number : 18-21364

Project / Site name: Burgess Hill Community Entertainment Centre, Cyprus Road, RH15

* 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 *
1108945	TP1A	None Supplied	0.70	Brown sand with rubble and brick.
1108946	TP2A	None Supplied	0.40	Light brown sand with gravel.
1108947	TP2A	None Supplied	0.90	Brown clay and sand with gravel.
1108948	TP4	None Supplied	0.80	Light brown clay and sand with brick.

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Analytical Report Number : 18-21364

Project / Site name: Burgess Hill Community Entertainment Centre, Cyprus Road, RH15

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

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 disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
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	L038-PL	D	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
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.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
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.	L019-UK/PL	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 based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' 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.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 18-21367

Project / Site name:	Burgess Hill Community Entertainment Centre, Cyprus Road RH15	**Samples received on:**	03/12/2018
Your job number:	P18-193 S01	**Samples instructed on:**	03/12/2018
Your order number:	P18-193	**Analysis completed by:**	17/12/2018
Report Issue Number:	1	**Report issued on:**	17/12/2018
Samples Analysed:	2 10:1 WAC samples		

Signed

Jordan Hill
Reporting Manager
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

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Waste Acceptance Criteria Analytical Results

Report No:	**18-21367**						
					Client:	**PADDOCK**	
Location	**urgess Hill Community Entertainment Centre, Cyprus Road RH1**						
Lab Reference (Sample Number)	1108967 / 1108968				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	26/11/2018				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP1B+BH2						
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	0.4				3%	5%	6%
Loss on Ignition (%) **	-				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	20				500	--	--
Total PAH (WAC-17) (mg/kg)	4.6				100	--	--
pH (units)**	-				--	>6	--
Acid Neutralisation Capacity (mol / kg)	-				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0067			0.0571	0.5	2	25
Barium *	0.0071			0.0612	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0039			0.033	0.5	10	70
Copper *	0.0043			0.037	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0019			0.0165	0.5	10	30
Nickel *	0.0014			0.012	0.4	10	40
Lead *	0.0030			0.026	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 *	0.0018			0.015	4	50	200
Chloride *	1.9			16	800	4000	25000
Fluoride	1.6			14	10	150	500
Sulphate *	13			110	1000	20000	50000
TDS*	82			710	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	2.96			25.4	500	800	1000
Leach Test Information							
Stone Content (%)	17						
Sample Mass (kg)	0.80						
Dry Matter (%)	88						
Moisture (%)	12						

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.

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Waste Acceptance Criteria Analytical Results

Report No:	**18-21367**						
					Client:	**PADDOCK**	
Location	**urgess Hill Community Entertainment Centre, Cyprus Road RH1**						
Lab Reference (Sample Number)	1108969 / 1108970				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	26/11/2018				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP3+BH1						
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	0.5				3%	5%	6%
Loss on Ignition (%) **	-				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	47				500	--	--
Total PAH (WAC-17) (mg/kg)	8.2				100	--	--
pH (units)**	-				--	>6	--
Acid Neutralisation Capacity (mol / kg)	-				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0082			0.0720	0.5	2	25
Barium *	0.0067			0.0586	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.013			0.11	0.5	10	70
Copper *	0.0031			0.027	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0015			0.0133	0.5	10	30
Nickel *	< 0.0003			< 0.0030	0.4	10	40
Lead *	< 0.0010			< 0.010	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 *	< 0.0004			< 0.0040	4	50	200
Chloride *	34			300	800	4000	25000
Fluoride	0.16			1.4	10	150	500
Sulphate *	39			340	1000	20000	50000
TDS*	160			1400	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	3.38			29.4	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.78						
Dry Matter (%)	85						
Moisture (%)	15						

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 discrepencies with current legislation
** = MCERTS accrediited

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.

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Analytical Report Number : 18-21367

Project / Site name: Burgess Hill Community Entertainment Centre, Cyprus Road RH15

* 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 *
1108967	TP1B+BH2	None Supplied	1.00	Brown clay and sand with gravel and stones.
1108969	TP3+BH1	None Supplied	1.00	Brown clay and sand with gravel.

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Analytical Report Number : 18-21367

Project / Site name: Burgess Hill Community Entertainment Centre, Cyprus Road RH15

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
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-PL	W	ISO 17025
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""	L039-PL	W	ISO 17025
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	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
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	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.	L019-UK/PL	D	NONE
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
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	L004-PL	W	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' 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.

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Analytical Report Number : 19-64467

Project / Site name:	Burgess Hill Community Centre, Cyprus Road, RH15 8DX	**Samples received on:**	04/10/2019
Your job number:	P18-193 G02	**Samples instructed on:**	04/10/2019
Your order number:	P18-193	**Analysis completed by:**	15/10/2019
Report Issue Number:	1	**Report issued on:**	15/10/2019
Samples Analysed:	12 soil samples		

Signed: Karolina Marek

Karolina Marek
Technical Reviewer (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

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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.

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Analytical Report Number: 19-64467

Project / Site name: Burgess Hill Community Centre, Cyprus Road, RH15 8DX
Your Order No: P18-193

Lab Sample Number				1323425	1323426	1323427	1323428	1323429
Sample Reference				WS01	WS02	WS03	WS04	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.80	1.10	1.00	1.80
Date Sampled				01/10/2019	01/10/2019	01/10/2019	01/10/2019	01/10/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	6.6	24	14	3.9	16
Total mass of sample received	kg	0.001	NONE	0.49	0.54	0.47	0.34	0.59
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.7	8.3	7.7	8.0	8.2
Total Sulphate as SO_4	mg/kg	50	MCERTS	5100	410	950	4800	360
Loss on Ignition @ 450°C	%	0.2	MCERTS	1.0	1.9	3.2	1.3	3.1
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.41	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.68	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.22	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.33	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.93	1.4	6.3	0.49
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.19	0.43	1.9	0.21
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.6	3.7	22	2.8
Pyrene	mg/kg	0.05	MCERTS	< 0.05	1.3	2.9	19	2.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.62	1.8	12	1.8
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.66	1.8	11	1.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.61	2.5	14	2.4
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.45	0.72	7.4	1.3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.54	1.9	11	2.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.25	0.79	7.4	1.2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.23	2.0	0.34
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.29	0.98	9.2	1.5
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	7.46	19.2	124	18.6
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.2	19	12	9.5	15
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.30	1.5	1.0	0.36	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	5.9	1.7	4.8	4.2	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	0.9	< 0.2	0.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	22	20	16	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	88	42	37	29	36
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	36	150	18	51
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	35	17	16	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	19	44	34	19	39
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	36	70	660	33	100
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	40	< 10	320	140	110

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Analytical Report Number: 19-64467

Project / Site name: Burgess Hill Community Centre, Cyprus Road, RH15

Your Order No: P18-193

Lab Sample Number				1323430	1323431	1323432	1323433	1323434
Sample Reference				WS06	WS07	WS08	WS09	WS10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.40	1.10	0.80	0.30	1.00
Date Sampled				01/10/2019	02/10/2019	02/10/2019	02/10/2019	02/10/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	14	10	16	18	16
Total mass of sample received	kg	0.001	NONE	0.50	0.46	0.59	0.59	0.54
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	8.4	8.3	8.1	7.9
Total Sulphate as SO_4	mg/kg	50	MCERTS	1100	5000	420	800	550
Loss on Ignition @ 450°C	%	0.2	MCERTS	2.2	1.7	2.1	4.1	2.6
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.39	17	0.42
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.33	0.74	2.4	0.74
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	35	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.21	38	0.20
Phenanthrene	mg/kg	0.05	MCERTS	1.5	1.8	4.3	250	4.0
Anthracene	mg/kg	0.05	MCERTS	0.57	0.48	1.4	66	1.3
Fluoranthene	mg/kg	0.05	MCERTS	4.8	8.6	19	220	17
Pyrene	mg/kg	0.05	MCERTS	4.2	7.6	17	180	15
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.2	5.0	10	82	10
Chrysene	mg/kg	0.05	MCERTS	2.7	4.6	9.7	83	9.5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.3	5.7	12	77	13
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.7	3.2	6.9	26	6.3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.2	5.5	11	63	12
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.5	2.9	6.3	31	5.7
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.42	0.74	1.7	9.7	1.6
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.7	3.4	7.2	35	7.5
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	28.8	49.7	109	1210	104
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	9.3	12	26	17
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.68	1.1	0.90	0.94	0.81
Boron (water soluble)	mg/kg	0.2	MCERTS	2.6	2.6	1.3	2.5	2.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	28	24	21	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	35	35	82	52	33
Lead (aqua regia extractable)	mg/kg	1	MCERTS	79	37	73	150	120
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	15	19	18	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	29	32	31	33	36
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	45	75	87	73
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	77	130	330	1700	340

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Analytical Report Number: 19-64467

Project / Site name: Burgess Hill Community Centre, Cyprus Road, RH15

Your Order No: P18-193

Lab Sample Number				1323435	1323436			
Sample Reference				WS11	WS12			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.30	0.70			
Date Sampled				02/10/2019	02/10/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	7.0	16			
Total mass of sample received	kg	0.001	NONE	0.51	0.53			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.5	8.3			
Total Sulphate as SO_4	mg/kg	50	MCERTS	2500	720			
Loss on Ignition @ 450°C	%	0.2	MCERTS	1.0	2.4			
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	0.20			
Phenanthrene	mg/kg	0.05	MCERTS	1.5	1.7			
Anthracene	mg/kg	0.05	MCERTS	0.42	0.29			
Fluoranthene	mg/kg	0.05	MCERTS	3.9	2.1			
Pyrene	mg/kg	0.05	MCERTS	3.6	1.7			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.8	0.83			
Chrysene	mg/kg	0.05	MCERTS	1.6	0.81			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.1	0.86			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.95	0.54			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.8	0.78			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.93	0.42			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.25	< 0.05			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	0.55			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	20.0	10.8			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.5	18			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.28	0.93			
Boron (water soluble)	mg/kg	0.2	MCERTS	2.1	1.1			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15	25			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	29			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	17	76			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.2	17			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	17	36			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	19	63			
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	100	53			

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Analytical Report Number : 19-64467

Project / Site name: Burgess Hill Community Centre, Cyprus Road, RH15 8DX

* 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 *
1323425	WS01	None Supplied	0.20	Brown clay and sand with gravel and rubble.
1323426	WS02	None Supplied	0.80	Brown clay.
1323427	WS03	None Supplied	1.10	Brown clay and sand with gravel.
1323428	WS04	None Supplied	1.00	Light brown clay and sand with gravel.
1323429	WS05	None Supplied	1.80	Brown clay and sand with gravel.
1323430	WS06	None Supplied	1.40	Brown clay and sand with gravel and rubble.
1323431	WS07	None Supplied	1.10	Brown clay and sand with gravel and rubble.
1323432	WS08	None Supplied	0.80	Brown clay and sand with gravel and rubble.
1323433	WS09	None Supplied	0.30	Brown loam and clay with gravel and vegetation.
1323434	WS10	None Supplied	1.00	Brown loam and clay with gravel and vegetation.
1323435	WS11	None Supplied	0.30	Brown clay and sand with gravel and rubble.
1323436	WS12	None Supplied	0.70	Brown loam and clay with gravel and rubble.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 19-64467

Project / Site name: Burgess Hill Community Centre, Cyprus Road, RH15 8DX

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

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 disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
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	L038-PL	D	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
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.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
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.	L019-UK/PL	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 based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' 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.

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The results included within the report are representative of the samples submitted for analysis.

Human Health Generic Contamination Risk Assessment - Burgess Hill Community Centre (16 samples)

SOIL SAMPLES < 1.0m DEPTH

Determinand	Units	95th Percentile Upper Confidence Limit (Mean)	Assessment Criteria Residential with Home Grown Produce Concentration (cc)	Mean Exceeds cc	Outliers	True Mean (μ)	Exceeding Samples
Metals/Metaloids							
Arsenic	mg kg^{-1}	16.84	37.0				
Berylium	mg kg^{-1}	1.05	1.7				
Cadmium	mg kg^{-1}	0.38	11.0				
Chromium	mg kg^{-1}	23	910				
Inorganic Mercury	mg kg^{-1}	0.30	40.0				
Nickel	mg kg^{-1}	21	180				
Lead	mg kg^{-1}	101	190				
Selenium	mg kg^{-1}	1.31	250				
Copper	mg kg^{-1}	52	2400				
Zinc	mg kg^{-1}	210	3700				
Vanadium	mg kg^{-1}	36.92	410				
Phytotoxic Metals (Phytotoxicity)							
Copper	mg kg^{-1}	52	111				
Zinc	mg kg^{-1}	210	330				
Hydrocarbons							
Total Petroleum Hydrocarbons							
TPH EC6-EC10 (PRO)	mg kg^{-1}	N/A	65				
TPH EC10-EC21 (DRO)	mg kg^{-1}	N/A	300				
TPH EC21-EC40 (Min.Oil)	mg kg^{-1}	N/A	1500				
Total TPH	mg kg^{-1}	190.53	600				
Poly Aromatic Hydrocarbons							
Benzo(a)pyrene	mg kg^{-1}	18.13	2.70	Y	N	6.59	Numerous
Napthalene	mg kg^{-1}	3.98	5.60				
Dibenzo(a,h) anthracene	mg kg^{-1}	2.75	0.28	Y	N	0.16	Numerous
Flourene	mg kg^{-1}	8.76	400.00				
Phenols	mg kg^{-1}	N/A	420.00				
OTHER							
pH	-	8.9	<5, >12				
Sulphate (Total)	mg kg^{-1}	#REF!	2500				
Sulphur	mg kg^{-1}	N/A	2500				
Water Soluble Boron	mg kg^{-1}	3.52	290				
Asbestos Screen	Detection	Y	Detection				All
Asbestos Quantification	%	Y	Detection Limit	Highest value - 0.06% TP2a			

NOTE:

na - Not applicable
ne - Not evaluated, all results below the appropriate guideline level
nc - not displayed as results are not meaningful due to large uncertainty from small data set

RESULTS SUMMARY - MAX VALUE TEST - LESS THAN 1.0M DEPTH (Residential)

Burgess Hill Community Centre

DETERMINAND	**Benzo[a]pyrene**
SITE ASSESSMENT CRITERIA	**2.7 mg/kg**

LOCATION	DEPTH	CONC ($mgkg^{-1}$)
WS01	0.2	0.05
WS02	0.8	0.54
WS03	1.1	1.9
WS04	1	11
WS05	1.8	2.1
WS06	1.4	3.2
WS07	1.1	5.5
WS08	0.8	11
WS09	0.3	63
WS10	1	12
WS11	0.3	1.8
WS12	0.7	0.78
TP1A	0.7	0.05
TP2A	0.4	0.87
TP2A	0.9	1.4
TP4	0.8	13

N	T Values
2	6.314
3	2.92
4	2.353
5	2.132
6	2.015
7	1.943
8	1.895
9	1.86
10	1.833
11	1.812
12	1.796
13	1.782
14	1.771
15	1.761
16	1.753
17	1.746
18	1.74
19	1.734
20	1.729
21	1.725
22	1.721
N	1.717
24	1.714
25	1.711
26	1.708
27	1.706
28	1.703
29	1.701
30	1.699

MEAN CONC (x)	**8.01**
CONC ST. DEV. (s	**15.38902**
Number (n)	**16**
Y Max	**63.00**
Calculated T value	**3.5732**
Representitive T value	**1.753**

Max Value Test	**Failed**
Outlier?	**Contamination Hotspots Present**

PADDOCK GEO ENGINEERING

Client: Burgess Hill Town Council

Project No: P18-193gi

Project: Burgess Hill Community Entertainment and Events Centre

RESULTS SUMMARY - MAX VALUE TEST - LESS THAN 1.0M DEPTH (Residential)

Burgess Hill Community Centre

DETERMINAND	**Dibenzo[a,h,]anthracene**
SITE ASSESSMENT CRITERIA	**0.28 mg/kg**

LOCATION	DEPTH	CONC ($mgkg^{-1}$)
WS01	0.2	0.05
WS02	0.8	0.05
WS03	1.1	0.23
WS04	1	2
WS05	1.8	0.34
WS06	1.4	0.42
WS07	1.1	0.74
WS08	0.8	1.7
WS09	0.3	9.7
WS10	1	1.6
WS11	0.3	0.25
WS12	0.7	0.05
TP1A	0.7	0.05
TP2A	0.4	0.05
TP2A	0.9	0.05
TP4	0.8	1.7

N	T Values
2	6.314
3	2.92
4	2.353
5	2.132
6	2.015
7	1.943
8	1.895
9	1.86
10	1.833
11	1.812
12	1.796
13	1.782
14	1.771
15	1.761
16	1.753
17	1.746
18	1.74
19	1.734
20	1.729
21	1.725
22	1.721
N	1.717
24	1.714
25	1.711
26	1.708
27	1.706
28	1.703
29	1.701
30	1.699

MEAN CONC (x)	**1.19**
CONC ST. DEV. (s	**2.378865**
Number (n)	**16**
Y Max	**9.70**
Calculated T value	**3.57891**
Representitive T value	**1.753**

Max Value Test	**Failed**
Outlier?	**Contamination Hotspots Present**

PADDOCK GEO ENGINEERING

Client: Burgess Hill Town Council

Project No: P18-193gi

Project: Burgess Hill Community Entertainment and Events Centre

GENERIC HUMAN HEALTH SCREENING TOTAL SOIL CONCENTRATION ASSESSMENT CRITERIA (GAC)

DETERMINAND		RESIDENTIAL (mg/kg)		COMMERCIAL (mg/kg)
Chemical	**GAC Sources and units**	**With Home Grown produce**	**Without Home Grown produce**	
Asbestos Screen & ID*	-	Detected	Detected	Detected
Cyanide - Total	SNIFFER	53.25	53.25	53.25
Cyanide - Free	SNIFFER	53.25	53.25	53.25
Loss on Ignition @ 450^{o}C	-	-	-	-
Sulphate (as SO_4) - Total	BRE****	2400	2400	2400
Sulphide	ICRCL	2500	2500	2500
Sulphur - Total	ICRCL	2500	2500	2500
Phenol (Total Monohydric)	CLEA	420	420	3200
pH	ICRCL	<5,>12	<5,>12	-
Metals and Metalloids (CLEA Metals)				
Arsenic	LQM S4UL	37	40	640
Beryllium	LQM S4UL	1.7	1.7	12
Cadmium	LQM S4UL	11	85	190
Chromium III	LQM S4UL	910	910	8600
Lead	DEFRA C4SL	190	310	2300
Mercury (Total)	LQM S4UL (Inorganic)	40	56	1100
Selenium	LQM S4UL	250	430	12000
Copper (phytotoxicity)	LQM S4UL	2400 (111)	7100	68000
Nickel	LQM S4UL	180	180	980
Zinc (phytotoxicity)	LQM S4UL	3700 (330)	40000	730000
Vanadium	LQM S4UL	410	1200	9000
Boron - Water Soluble	LQM S4UL	290	11000	240000
Total Petroleum Hydrocarbons**				
TPH (EC6-EC10) - PRO	LQM S4UL (2.5% SOM)	65	100	4800
TPH (EC10-EC21) - DRO	LQM S4UL (2.5% SOM)	300	600	23000
TPH (EC21-EC40) - Min. Oil	LQM S4UL (2.5% SOM)	1500	1900	28000
Total TPH (EC10-EC40)	LQM S4UL (2.5% SOM)	600	900	23000
Polycyclic Aromatic Hydrocarbons***				
Naphthalene	LQM S4UL (2.5% SOM)	5.6	5.6	460
Flourene	LQM S4UL (2.5% SOM)	400	3800	68000
Benzo[a]pyrene	LQM S4UL (2.5% SOM)	2.7	3.2	35
Dibenzo[a,h]anthracene	LQM S4UL (2.5% SOM)	0.28	0.32	3.6

Notes

The Generic Assessment Criteria (GAC) are based on CLEA Soil Guidance Values published values and CIEH/LQM S4CLs where available or ICRCL, DoE, BRE and HSE levels where necessary.
Where gaps remain GACs were calculated using the latest CLEA spreadsheet using DEFRA C4SL toxicology and physiochemical parameters from DEFRA SP1010.

* Guidance level set at any fibre identification.

** TPH 3 band is employed as a screening tool to instigate detailed speciated analysis to the TPHCWG methodology. Based on mean of fractions included

*** Testing based on USEPA Priority 16 compounds. GACs for four compounds and total PAH with published GACs only, used as a screening tool.

**** BRE SD1 - DS-1 Concrete Sulphate Design Class limit. Sulphate is not considered to pose a significant risk to human health under normal circumstances.

PADDOCK GEO ENGINEERING

CLIENT:	Burgess Hill Town Council
PROJECT No:	P18-193gi
PROJECT TITLE:	Burgess Hill Community Entertainment and Events Centre

APPENDIX D – GROUND GAS ASSESSMENT DATA

Conceptual Ground Gas Model

Ground Gas Monitoring Results

GROUND GAS MONITORING SHEET

PADDOCK GEO ENGINEERING

SITE:	Burgess Hill Community Entertainment and Evenst Centre
JOB No.:	P18-193
DATE:	08/12/2018

BOREHOLE	**BH1**					Initial/ 30 secs	2 mins	Stable / 3 mins	GSV (l/h)
TIME:	08:00	Flow l/h:	12.3	CH4 %		0.10	0.10	0.10	
TEMP deg C:	6	DP Pa:		LEL					
Weather:	Overcast	GW m:	1.20	CO2 %		0.50	0.50	0.50	
Atm Pressure mb:	1002	BH Level		O2 %		14.60	14.60	14.60	
Operator:	PM	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE	**BH2**								
TIME:	08:20	Flow l/h:	14.3	CH4 %		0.10	0.10	0.10	
TEMP deg C:	6	DP Pa:		LEL					
Weather:	Overcast	GW m:	Dry	CO2 %		1.10	1.10	1.10	
Atm Pressure mb:	1002	BH Level		O2 %		16.70	16.10	16.00	
Operator:	PM	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE									
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE						1min	2min	3min	
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

GROUND GAS MONITORING SHEET

PADDOCK GEO ENGINEERING

SITE:	Burgess Hill Community Entertainment and Evenst Centre
JOB No.:	P18-193
DATE:	16/12/2018

BOREHOLE	**BH1**					Initial/ 30 secs	2 mins	Stable / 3 mins	GSV (l/h)
TIME:	07:30	Flow l/h:	10.5	CH4 %		0.20	0.20	0.10	
TEMP deg C:	6	DP Pa:		LEL					
Weather:	Overcast	GW m:	0.80	CO2 %		0.30	0.30	0.30	
Atm Pressure mb:	1000	BH Level		O2 %		16.90	20.90	21.00	
Operator:	PM	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE	**BH2**								
TIME:	07:50	Flow l/h:	5.5	CH4 %		0.20	0.20	0.20	
TEMP deg C:	6	DP Pa:		LEL					
Weather:	Overcast	GW m:	Dry	CO2 %		1.50	1.50	1.50	
Atm Pressure mb:	1000	BH Level		O2 %		16.50	12.60	12.60	
Operator:	PM	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE									
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE						1min	2min	3min	
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

GROUND GAS MONITORING SHEET

PADDOCK GEO ENGINEERING

SITE:	Burgess Hill Community Entertainment and Evenst Centre
JOB No.:	P18-193
DATE:	22/12/2018

BOREHOLE	BH1					Initial/ 30 secs	2 mins	Stable / 3 mins	GSV (l/h)
TIME:	08:00	Flow l/h:	9.7	CH4 %		0.10	0.10	0.10	
TEMP deg C:	10	DP Pa:		LEL					
Weather:	Dry	GW m:	1.05	CO2 %		0.20	0.20	0.20	
Atm Pressure mb:	1015	BH Level		O2 %		17.20	17.80	17.80	
Operator:	MIP	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE	BH2								
TIME:	08:20	Flow l/h:	7.2	CH4 %		0.10	0.20	0.10	
TEMP deg C:	10	DP Pa:		LEL					
Weather:	Dry	GW m:	Dry	CO2 %		1.00	1.20	1.20	
Atm Pressure mb:	1015	BH Level		O2 %		17.00	16.80	16.50	
Operator:	MIP	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE									
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE						1min	2min	3min	
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

GROUND GAS MONITORING SHEET

PADDOCK GEO ENGINEERING

SITE:	Burgess Hill Community Entertainment and Evenst Centre
JOB No.:	P18-193
DATE:	05/01/2019

BOREHOLE	BH1					Initial/ 30 secs	2 mins	Stable / 3 mins	GSV (l/h)
TIME:	12:00	Flow l/h:	0.4	CH4 %		0.10	0.10	0.10	
TEMP deg C:	4	DP Pa:		LEL					
Weather:	Dry	GW m:	1.10	CO2 %		0.30	0.30	0.30	
Atm Pressure mb:	1038	BH Level		O2 %		17.00	17.00	17.00	
Operator:	MIP	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE	BH2								
TIME:	12:15	Flow l/h:	0.5	CH4 %		0.10	0.20	0.10	
TEMP deg C:	4	DP Pa:		LEL					
Weather:	Dry	GW m:	Dry	CO2 %		1.20	1.20	1.40	
Atm Pressure mb:	1038	BH Level		O2 %		16.50	16.80	15.80	
Operator:	MIP	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE									
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE						1min	2min	3min	
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

GROUND GAS MONITORING SHEET

PADDOCK GEO ENGINEERING

SITE:	Burgess Hill Community Entertainment and Evenst Centre
JOB No.:	P18-193
DATE:	12/10/2019

BOREHOLE	**BH1**				Initial/ 30 secs	2 mins	Stable / 3 mins	GSV (l/h)
TIME:	15:00	Flow l/h:	0.4	CH4 %	0.10	0.10	0.10	
TEMP deg C:	13	DP Pa:		LEL				
Weather:	Dry	GW m:	1.20	CO2 %	0.20	0.30	0.20	
Atm Pressure mb:	1018	BH Level		O2 %	18.00	17.50	17.80	
Operator:	MC	mAOD		H2S ppm				
				VOCs %				
Comments								

BOREHOLE	**BH2**							
TIME:	15:15	Flow l/h:	0.3	CH4 %	0.10	0.10	0.10	
TEMP deg C:	13	DP Pa:		LEL				
Weather:	Dry	GW m:	Dry	CO2 %	1.00	1.10	1.10	
Atm Pressure mb:	1018	BH Level		O2 %	17.00	16.80	16.80	
Operator:	MC	mAOD		H2S ppm				
				VOCs %				
Comments								

BOREHOLE	**WS8**							
TIME:	15:30	Flow l/h:	0	CH4 %	0.00	0.00	0.00	
TEMP deg C:	13	DP Pa:		LEL				
Weather:	Dry	GW m:	Dry	CO2 %	0.10	0.20	0.10	
Atm Pressure mb:	1018	BH Level		O2 %	19.50	19.50	19.50	
Operator:	MC	mAOD		H2S ppm				
				VOCs %				
Comments								

BOREHOLE					1min	2min	3min	
TIME:		Flow l/h:		CH4 %				
TEMP deg C:		DP Pa:		LEL				
Weather:		GW m:		CO2 %				
Atm Pressure mb:		BH Level		O2 %				
Operator:		mAOD		H2S ppm				
				VOCs %				
Comments								

GROUND GAS MONITORING SHEET

PADDOCK GEO ENGINEERING

SITE:	Burgess Hill Community Entertainment and Evenst Centre
JOB No.:	P18-193
DATE:	22/10/2019

BOREHOLE	**BH1**					Initial/ 30 secs	2 mins	Stable / 3 mins	
TIME:	09:25	Flow l/h:	1.3	CH4 %		0.00	0.00	0.00	
TEMP deg C:	11	DP Pa:		LEL					
Weather:	Cold but sunny, dry	GW m:	0.87	CO2 %		0.50	0.50	0.50	
Atm Pressure mb:	1018	BH Level		O2 %		9.10	9.00	8.90	
Operator:	SJF	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE	**BH2**								
TIME:	09:25	Flow l/h:	0.3	CH4 %		0.00	0.00	0.00	
TEMP deg C:	11	DP Pa:		LEL					
Weather:	Cold but sunny, dry	GW m:	9.20	CO2 %		3.00	3.00	3.10	
Atm Pressure mb:	1018	BH Level		O2 %		2.00	0.90	0.70	
Operator:	SJF	mAOD		H2S ppm					
				VOCs %					
Comments									

BOREHOLE	**WS08**								
TIME:	09:30	Flow l/h:	0.1	CH4 %		0.00	0.00	0.00	
TEMP deg C:	11	DP Pa:		LEL					
Weather:	Cold but sunny, dry	GW m:	DRY	CO2 %		0.30	0.30	0.30	
Atm Pressure mb:	1018	BH Level		O2 %		20.70	21.60	21.60	
Operator:	SJF	mAOD		H2S ppm					
				VOCs %					
Comments									

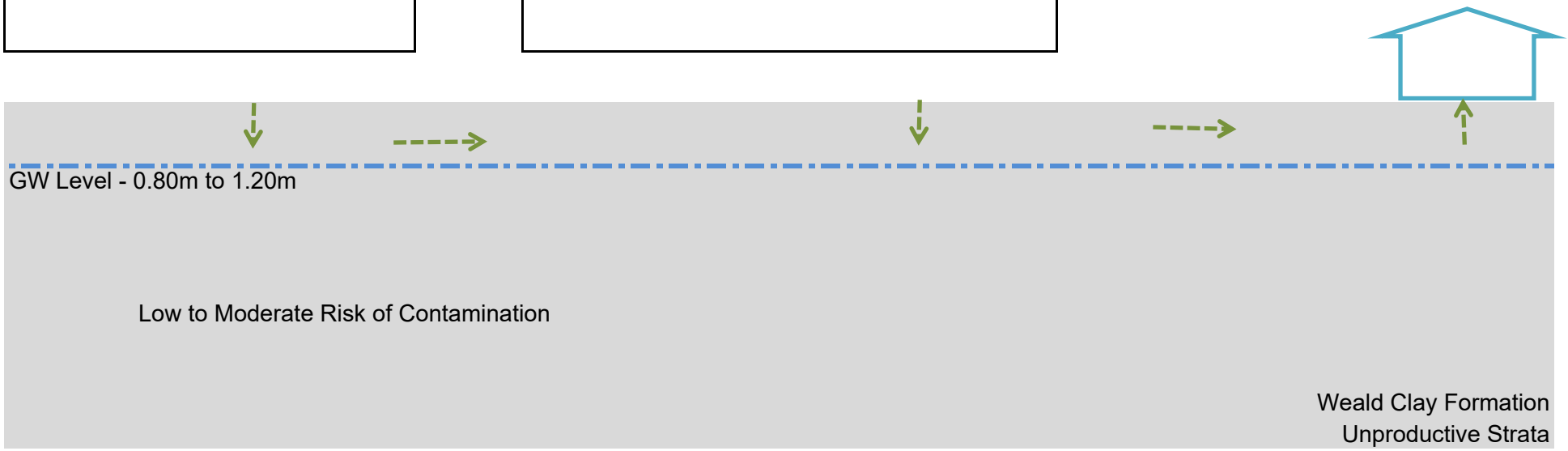
BOREHOLE						1min	2min	3min	
TIME:		Flow l/h:		CH4 %					
TEMP deg C:		DP Pa:		LEL					
Weather:		GW m:		CO2 %					
Atm Pressure mb:		BH Level		O2 %					
Operator:		mAOD		H2S ppm					
				VOCs %					
Comments									

CONCEPTUAL CONTAMINATION GROUND MODEL

Offsite Potential Sources -
Infilled and levelled former Clay Pit adj. to north before 1967

Onsite Potential Sources -
Made Ground associated with previous development

Proposed Community Centre Land Use



Potential Hydrocarbon vapour, Ground gas and Radon pathway

PADDOCK GEO ENGINEERING

CLIENT:	Burgess Hill Town Council
PROJECT No:	P18-193gi
PROJECT TITLE:	Burgess Hill Community Entertainment and Events Centre, Cypress Road, Burgess Hill, RH15 8DX

APPENDIX E – GEOTECHNICAL DATA

Geotechnical Laboratory Testing Results

Geotechnical Site Testing Data

Geotechnical Data Summaries

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

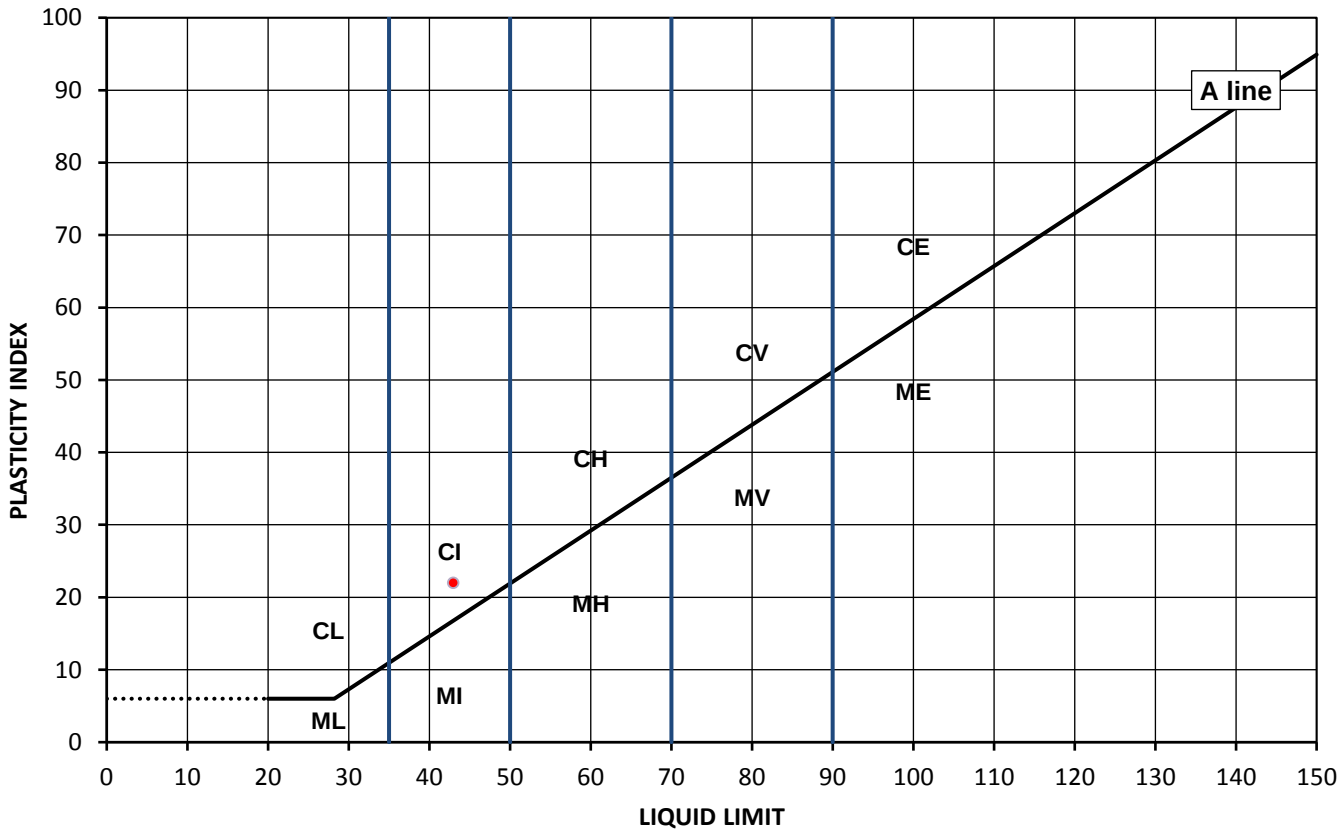
Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Paddock Geo Engineering	Client Reference:	P18-193
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	1107816	Depth Top [m]:	2.45
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown mottled grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
20	43	21	22	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

GF 232.3

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for and on behalf of i2 Analytical Ltd

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i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

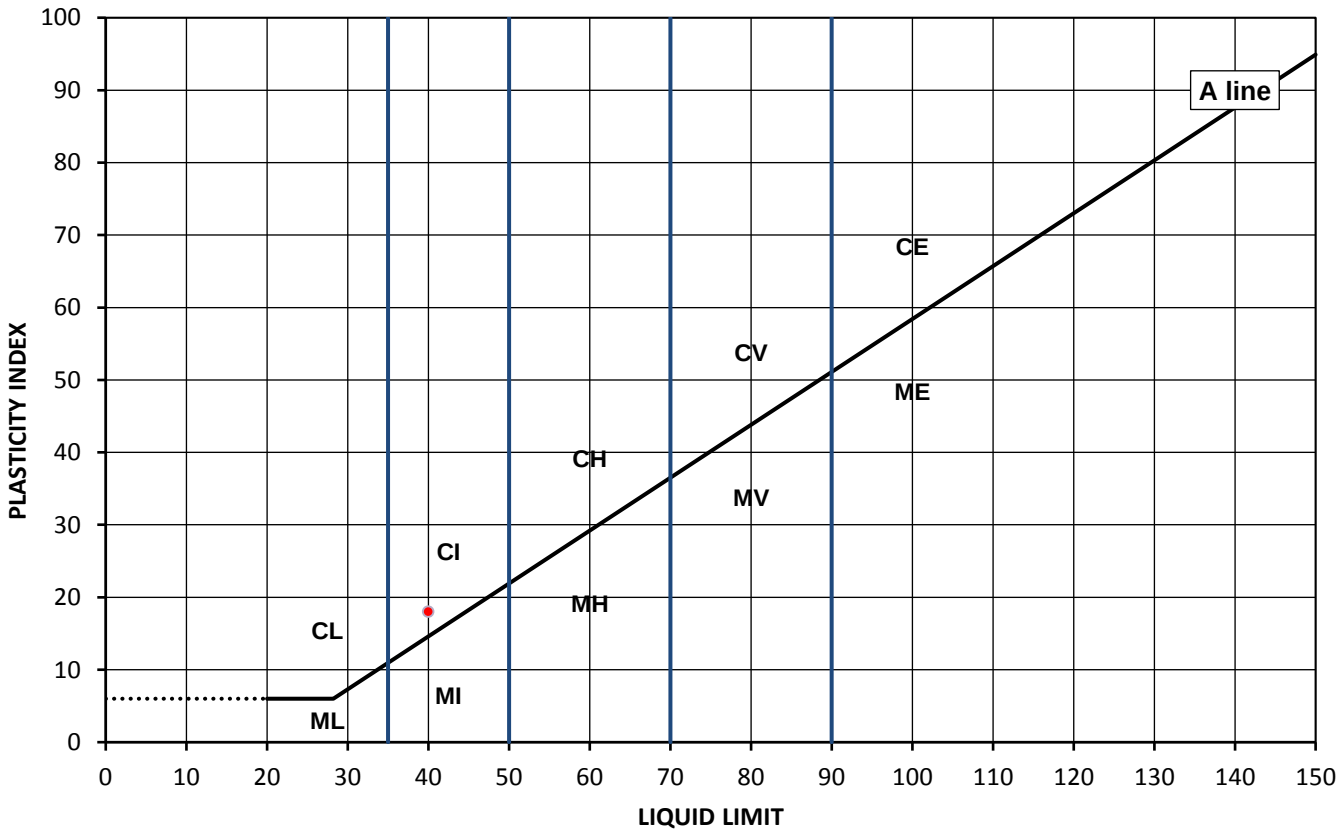
Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Paddock Geo Engineering	Client Reference:	P18-193
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	1107817	Depth Top [m]:	5.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown to grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
20	40	22	18	100



Legend, based on BS 5930:2015 Code of practice for site investigations

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C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
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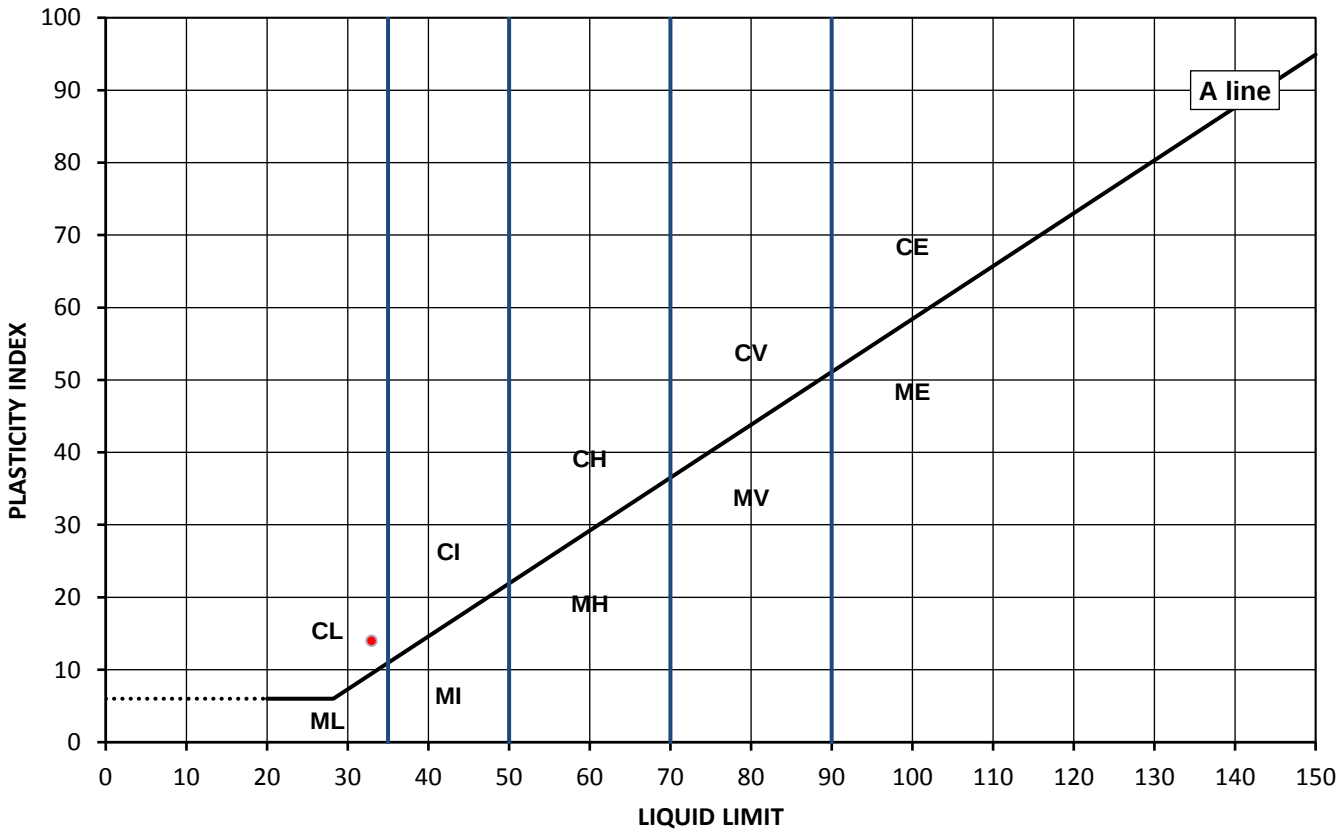
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	1107818	Depth Top [m]:	11.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Grey very sandy CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
22	33	19	14	100



Legend, based on BS 5930:2015 Code of practice for site investigations

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C	Clay	L	Low	below 35
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		H	High	50 to 70
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Remarks:

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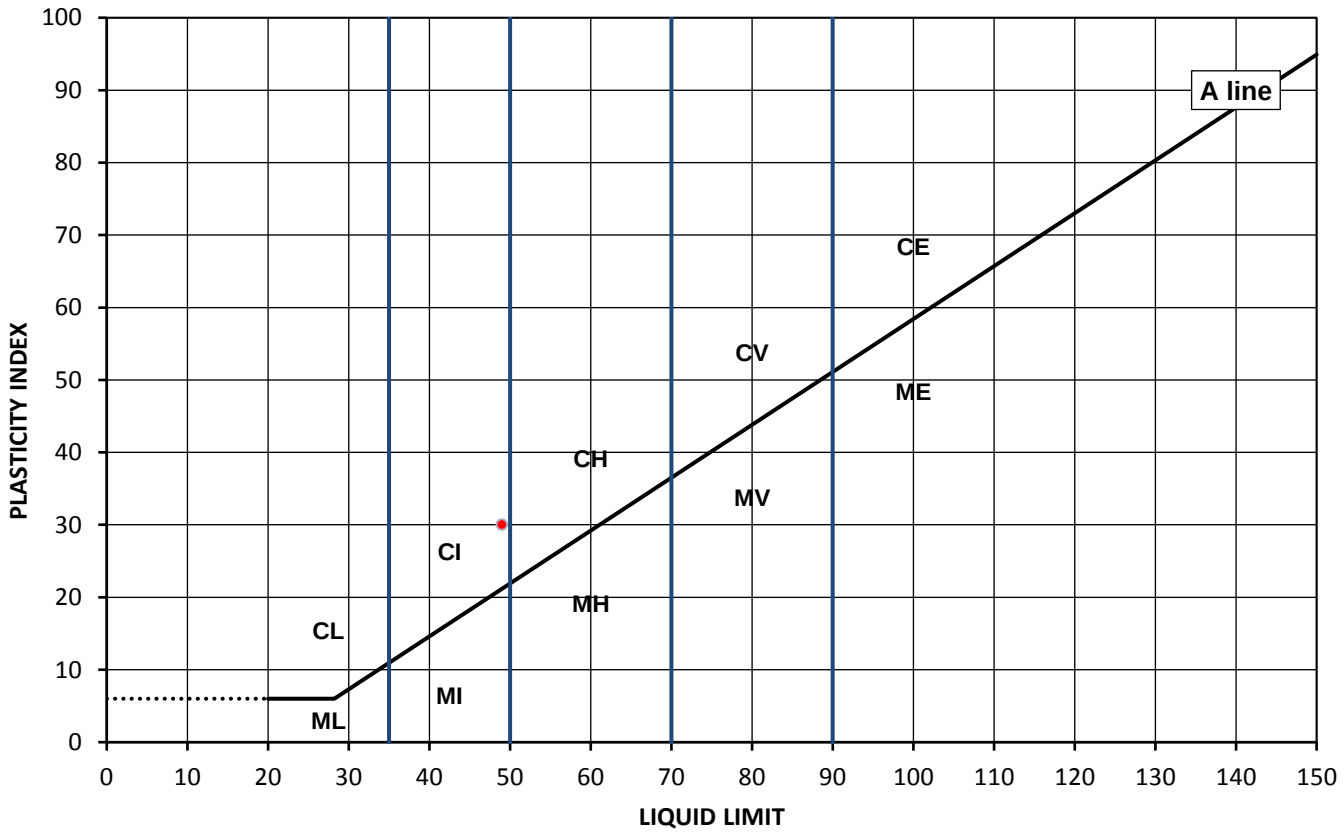
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	1107820	Depth Top [m]:	0.60
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Mottled grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
26	49	19	30	94



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
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M	Silt	I	Medium	35 to 50
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		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

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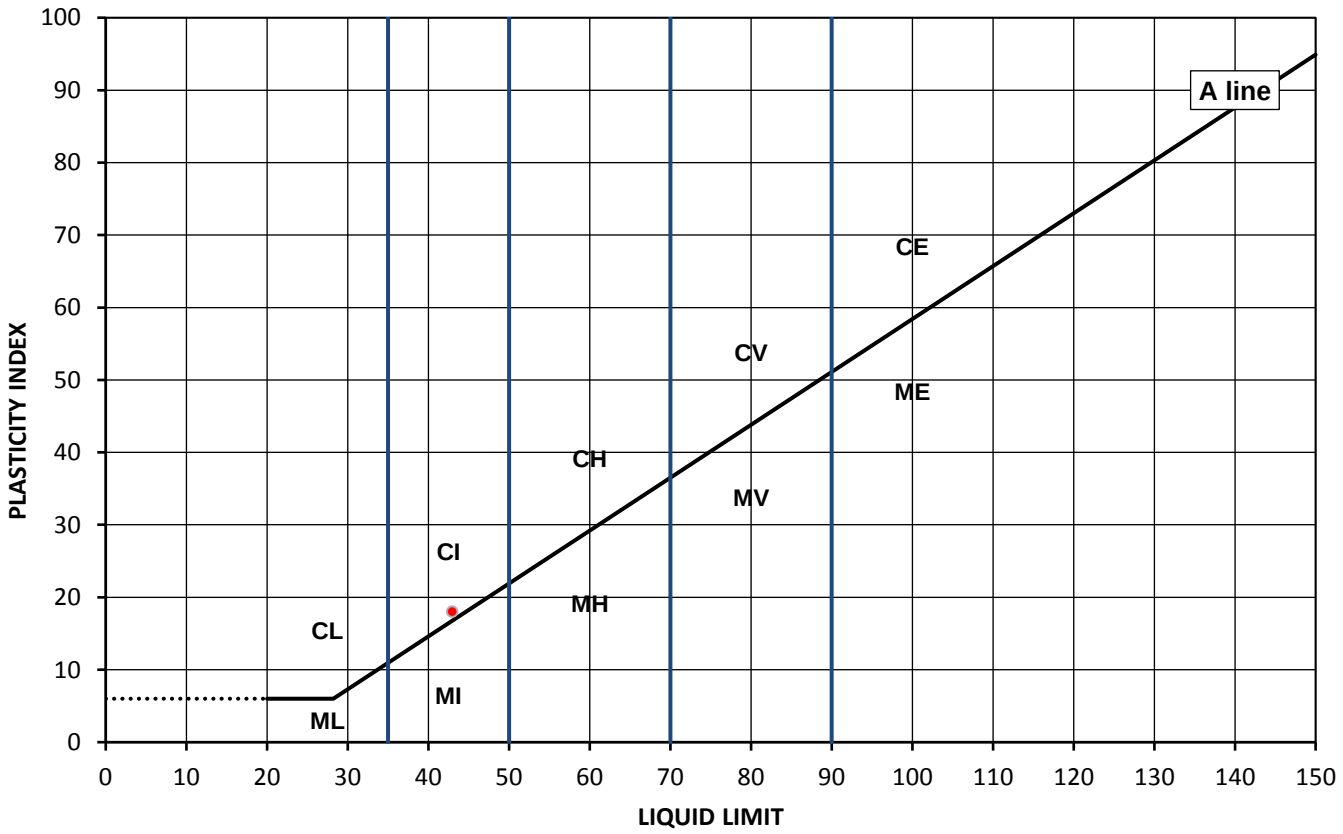
Client:	Paddock Geo Engineering	Client Reference:	P18-193
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	1107821	Depth Top [m]:	3.45
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown sandy CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
19	43	25	18	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
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i2 Analytical Ltd
7 Woodshots Meadow
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Watford Herts WD18 8YS

UKAS TESTING 4041

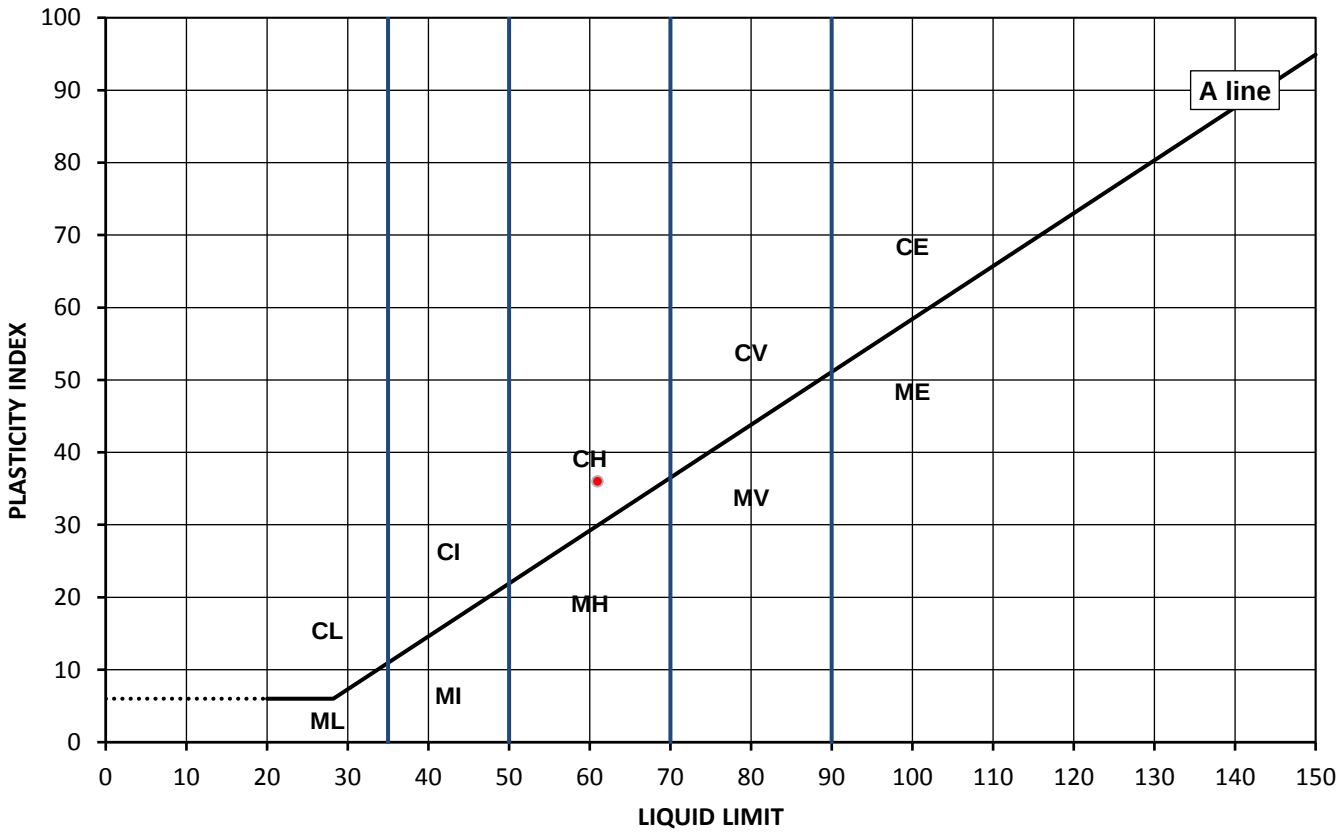
Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Paddock Geo Engineering	Client Reference:	P18-193
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	1107822	Depth Top [m]:	8.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
15	61	25	36	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

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for and on behalf of i2 Analytical Ltd

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990: Clause 8.2

Client:	Paddock Geo Engineering
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL
Contact:	Matt Paddock
Site Name:	Burgess Hill Community Entertainment and E\
Site Address:	Not Given

Client Reference:	P18-193
Job Number:	18-21178
Date Sampled:	26/11/2018
Date Received:	03/12/2018
Date Tested:	13/12/2018
Sampled By:	Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC#	Atterberg#				Density		Total Porosity				
		Reference	Depth Top m	Depth Base m	Type			%	% Passing 425um %	LL %	PL %	PI %	bulk Mg/m3	PD Mg/m3	Mg/m3				
1107816	BH1	Not Given	2.45	Not Given	D	Brown mottled grey sandy CLAY	Atterberg 1 Point	20	100	43	21	22							
1107817	BH1	Not Given	5.00	Not Given	D	Brown to grey sandy CLAY	Atterberg 1 Point	20	100	40	22	18							
1107818	BH1	Not Given	11.00	Not Given	D	Grey very sandy CLAY	Atterberg 1 Point	22	100	33	19	14							
1107820	BH2	Not Given	0.60	Not Given	D	Mottled grey slightly gravelly sandy CLAY	Atterberg 1 Point	26	94	49	19	30							
1107821	BH2	Not Given	3.45	Not Given	D	Brown sandy CLAY	Atterberg 1 Point	19	100	43	25	18							
1107822	BH2	Not Given	8.00	Not Given	D	Brown slightly sandy CLAY	Atterberg 1 Point	15	100	61	25	36							

Note: # UKAS accredited; NP - Non plastic

Comments:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

GF 234.4

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for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	Paddock Geo Engineering	Client Reference:	P18-193
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

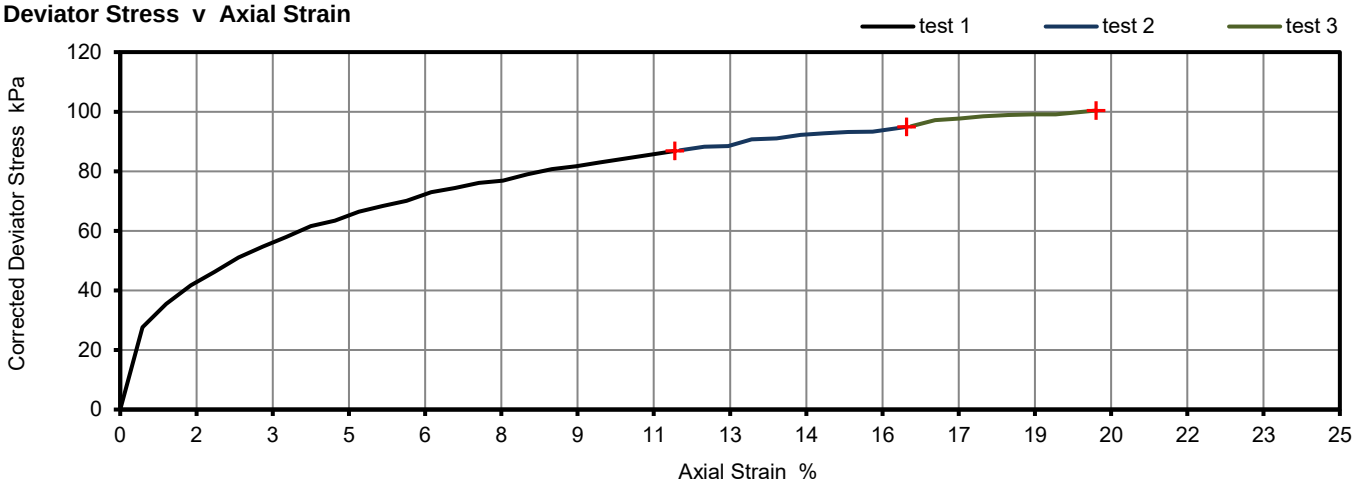
Test Result

Laboratory Reference:	1107819	Depth Top [m]:	2.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Reddish brown to grey CLAY		

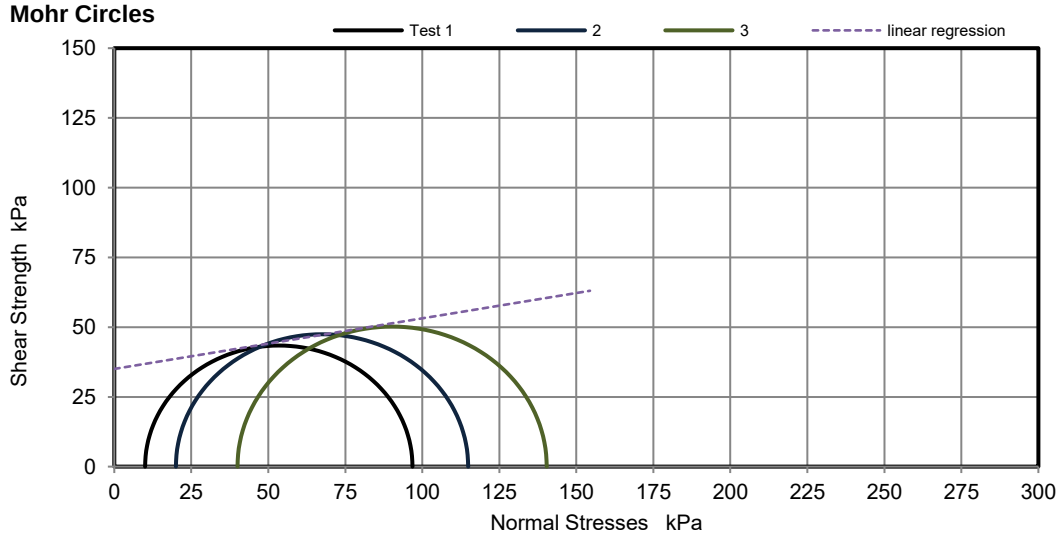
Length	183.30	mm
Diameter	101.70	mm
Bulk Density	2.07	Mg/m3
Moisture Content	25	%
Dry Density	1.66	Mg/m3
Membrane thickness	0.20	mm

Rate of Strain	2.00			%/min
Stage Number	1	2	3	
Cell Pressure	10	20	40	kPa
Axial Strain at failure	11.4	16.1	20.0	%
Deviator Stress, (σ1 - σ3)f	87	95	100	kPa
Shear strength, cu	43	47	50	kPa
Mode of failure	Compound			
Membrane Correction	0.48	0.63	0.76	kPa

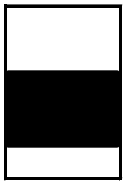
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	10.3	°
cu	35	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 10kPa=8N, 20kPa=8N, 40kPa=9N

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

GF 186.6

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		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

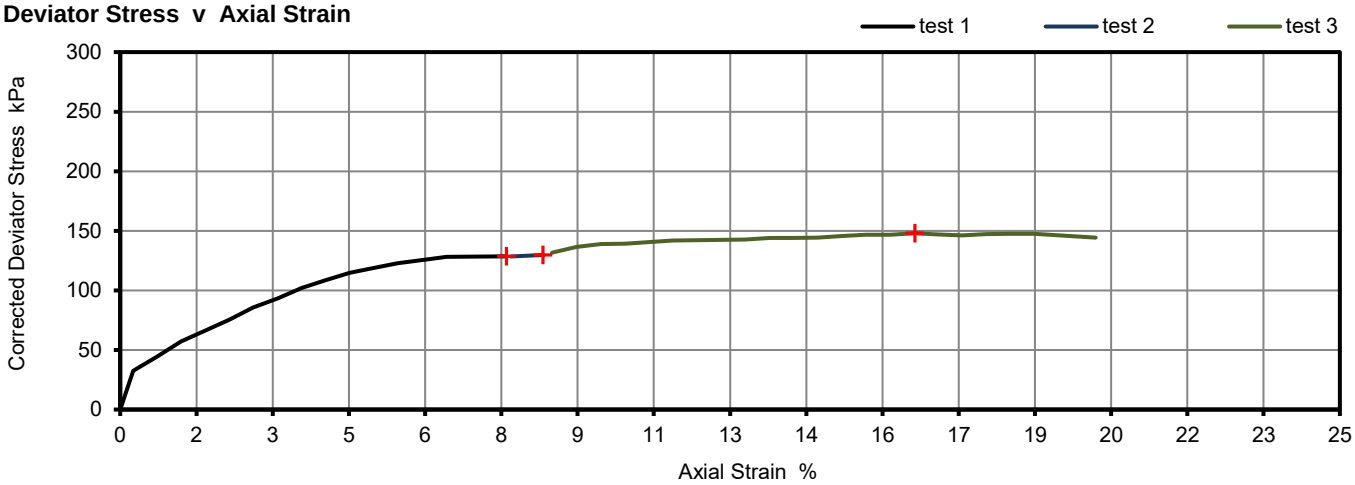
Test Result

Laboratory Reference:	1107823	Depth Top [m]:	1.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		

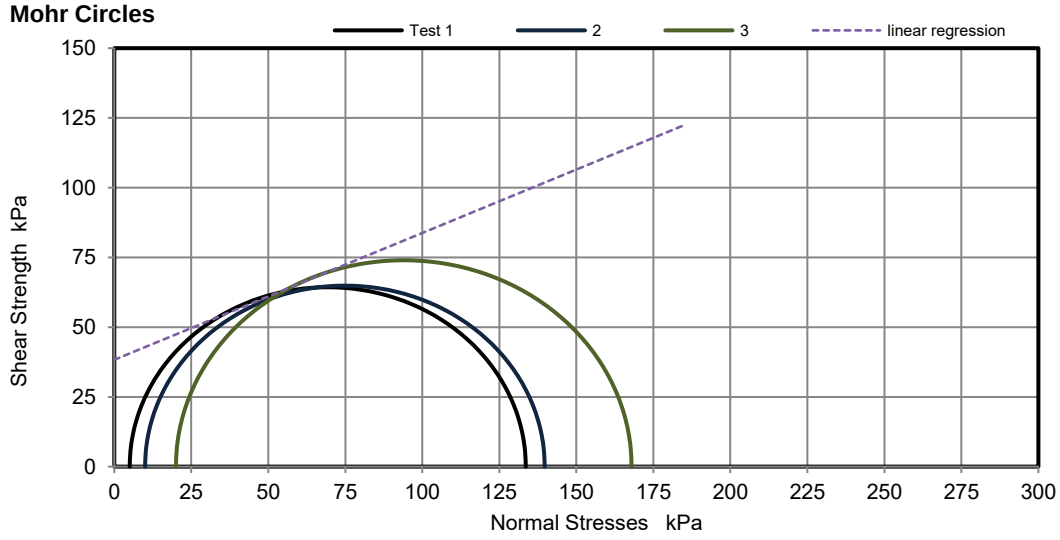
Length	192.30	mm
Diameter	102.70	mm
Bulk Density	2.10	Mg/m3
Moisture Content	21	%
Dry Density	1.74	Mg/m3
Membrane thickness	0.19	mm

Rate of Strain	2.00			%/min
Stage Number	1	2	3	
Cell Pressure	5	10	20	kPa
Axial Strain at failure	7.9	8.7	16.3	%
Deviator Stress, (σ1 - σ3)f	129	130	148	kPa
Shear strength, cu	64	65	74	kPa
Mode of failure	Compound			
Membrane Correction	0.35	0.37	0.60	kPa

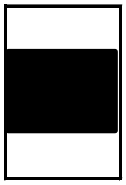
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	24.4	°
cu	38	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 5kPa=0N, 10kPa=0N, 20kPa=0N

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

GF 186.6

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Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

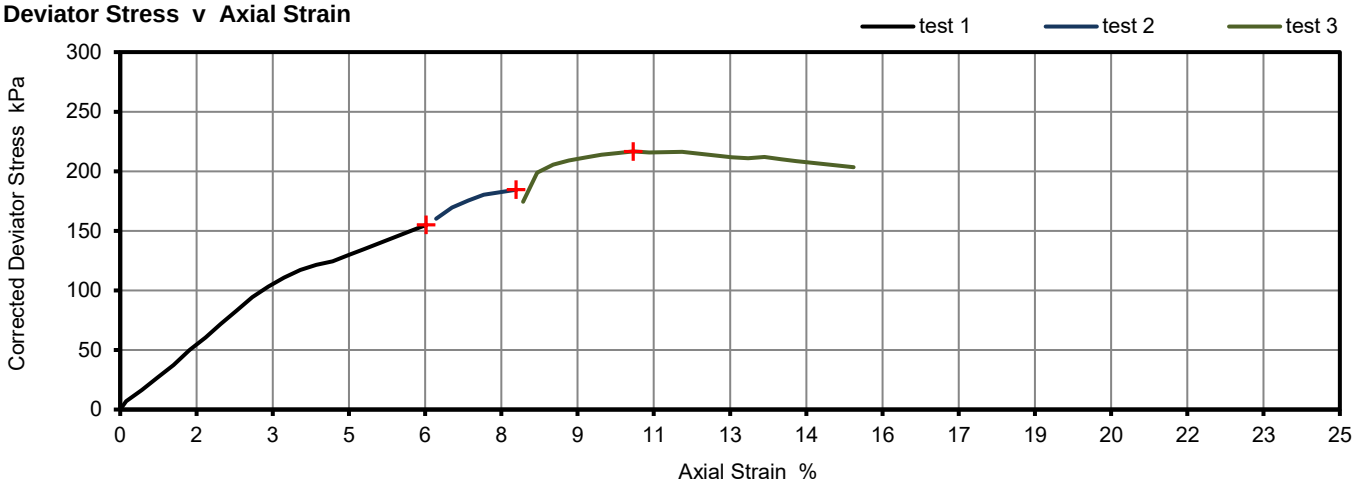
Test Result

Laboratory Reference:	1107824	Depth Top [m]:	2.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		

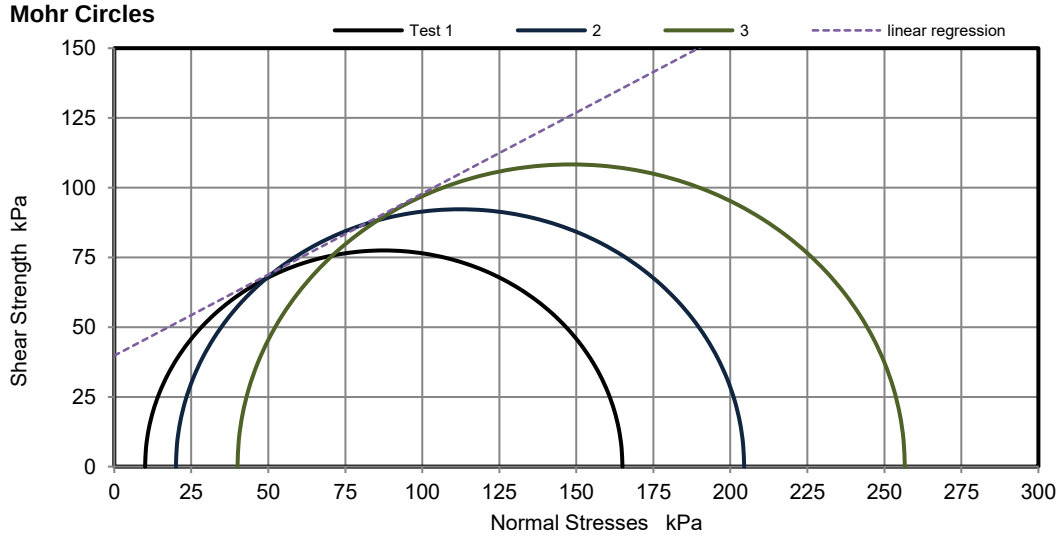
Length	200.90	mm
Diameter	103.70	mm
Bulk Density	2.09	Mg/m3
Moisture Content	16	%
Dry Density	1.81	Mg/m3
Membrane thickness	0.25	mm

Rate of Strain	1.99			%/min
Stage Number	1	2	3	
Cell Pressure	10	20	40	kPa
Axial Strain at failure	6.3	8.1	10.5	%
Deviator Stress, (σ1 - σ3)f	155	184	217	kPa
Shear strength, cu	77	92	108	kPa
Mode of failure	Compound			
Membrane Correction	0.39	0.46	0.56	kPa

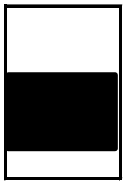
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	30.2	°
cu	40	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 10kPa=0N, 20kPa=0N, 40kPa=20N

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

GF 186.6

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The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	Paddock Geo Engineering	Client Reference:	P18-193
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

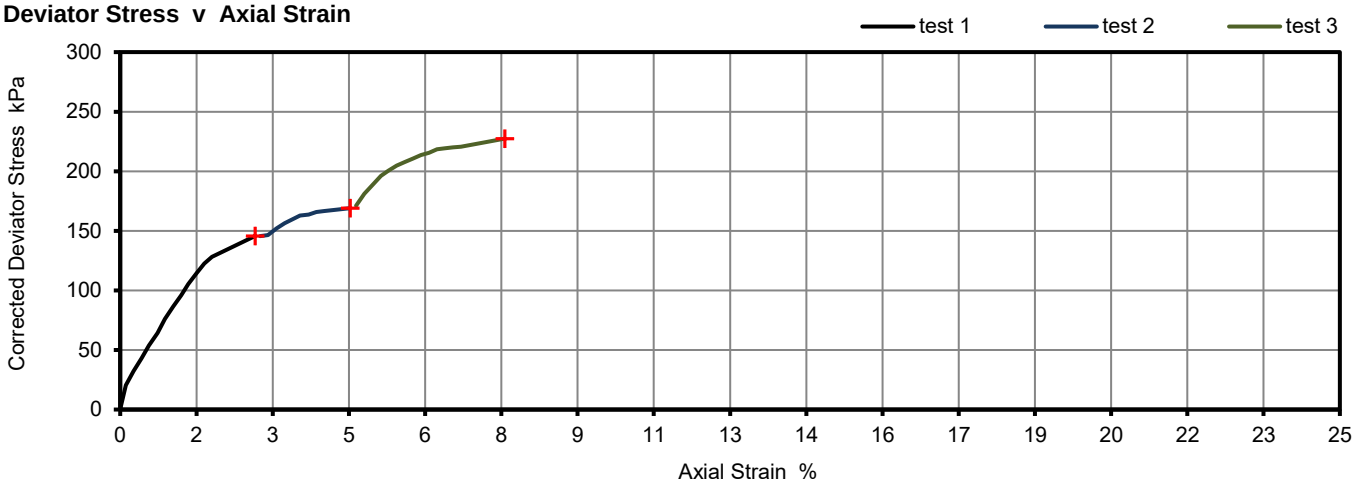
Test Result

Laboratory Reference:	1107827	Depth Top [m]:	5.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Multicolour CLAY		

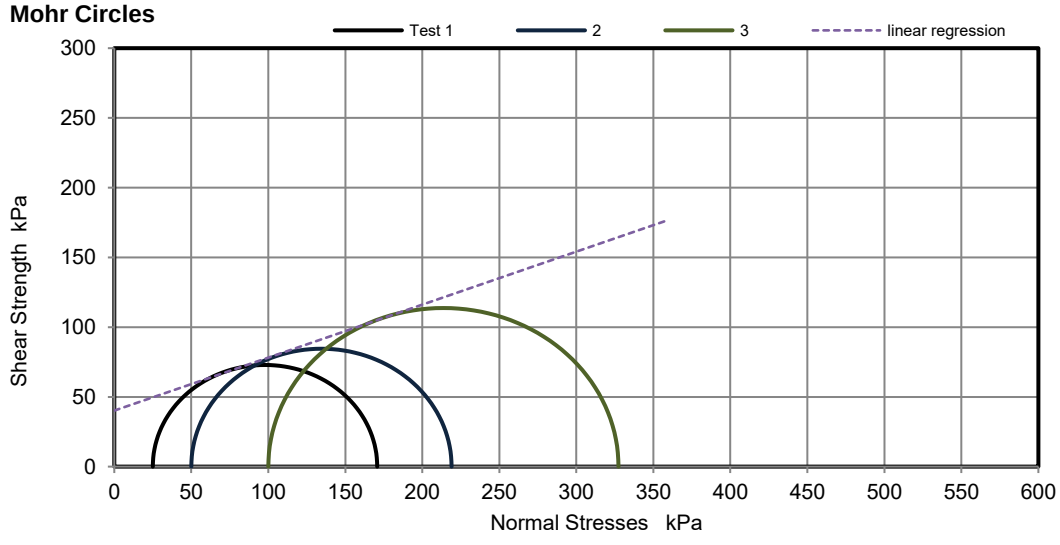
Length	193.20	mm
Diameter	103.00	mm
Bulk Density	2.16	Mg/m3
Moisture Content	15	%
Dry Density	1.87	Mg/m3
Membrane thickness	0.20	mm

Rate of Strain	2.00			%/min
Stage Number	1	2	3	
Cell Pressure	25	50	100	kPa
Axial Strain at failure	2.8	4.7	7.9	%
Deviator Stress, (σ1 - σ3)f	146	169	227	kPa
Shear strength, cu	73	84	114	kPa
Mode of failure	Brittle			
Membrane Correction	0.15	0.25	0.37	kPa

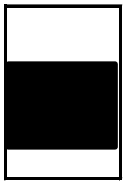
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	20.8	°
cu	40	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 25kPa=10N, 50kPa=20N, 100kPa=40N

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

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for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

Tested in Accordance with:
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

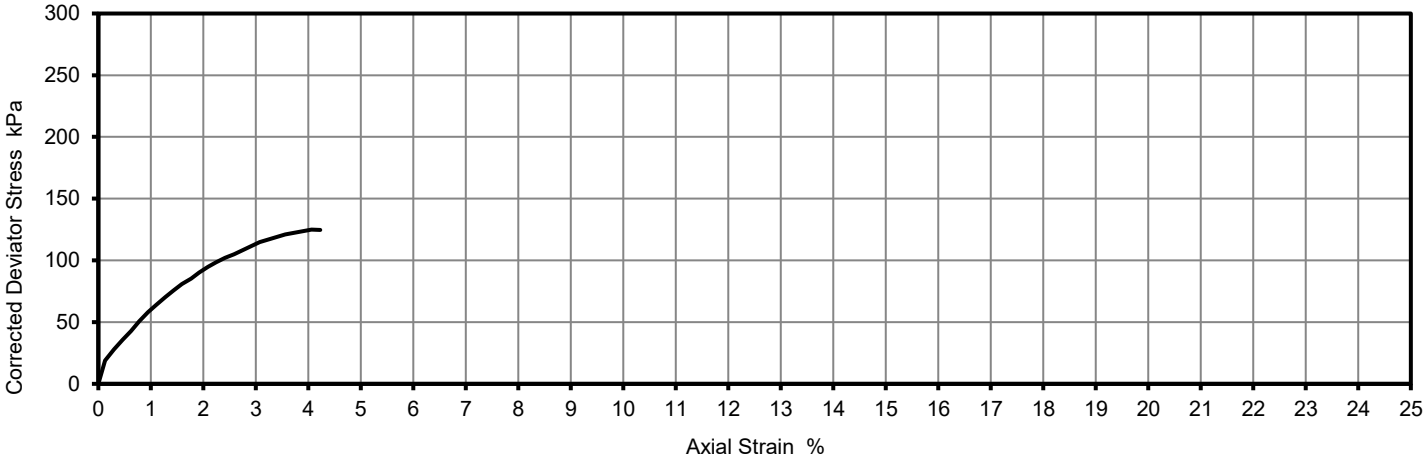
Client:	Paddock Geo Engineering	Client Reference:	P18-193
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

Test Result

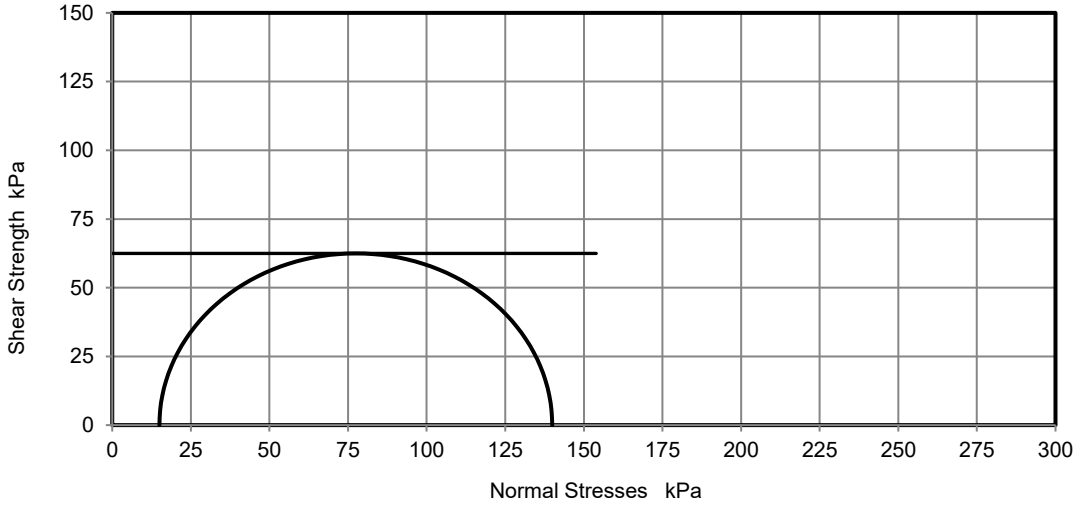
Laboratory Reference:	1107825	Depth Top [m]:	3.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Multicolour CLAY		

Test Number	1		Rate of Strain	2.00	%/min	
Length	196.36	mm	Cell Pressure	15	kPa	
Diameter	102.14	mm	Axial Strain at failure	4.1	%	
Bulk Density	2.17	Mg/m3	Deviator Stress, (σ1 - σ3)f	125	kPa	
Moisture Content	19	%	Undrained Shear Strength, cu	62	kPa	½(σ1 - σ3)f
Dry Density	1.83	Mg/m3	Mode of Failure	Compound		
Membrane Correction	0.00	kPa	Membrane thickness	0.00	mm	

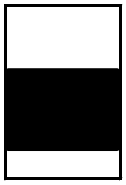
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks: Report as a single stage - brittle failured

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

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for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

Tested in Accordance with:
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd
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Watford Herts WD18 8YS

UKAS TESTING 4041

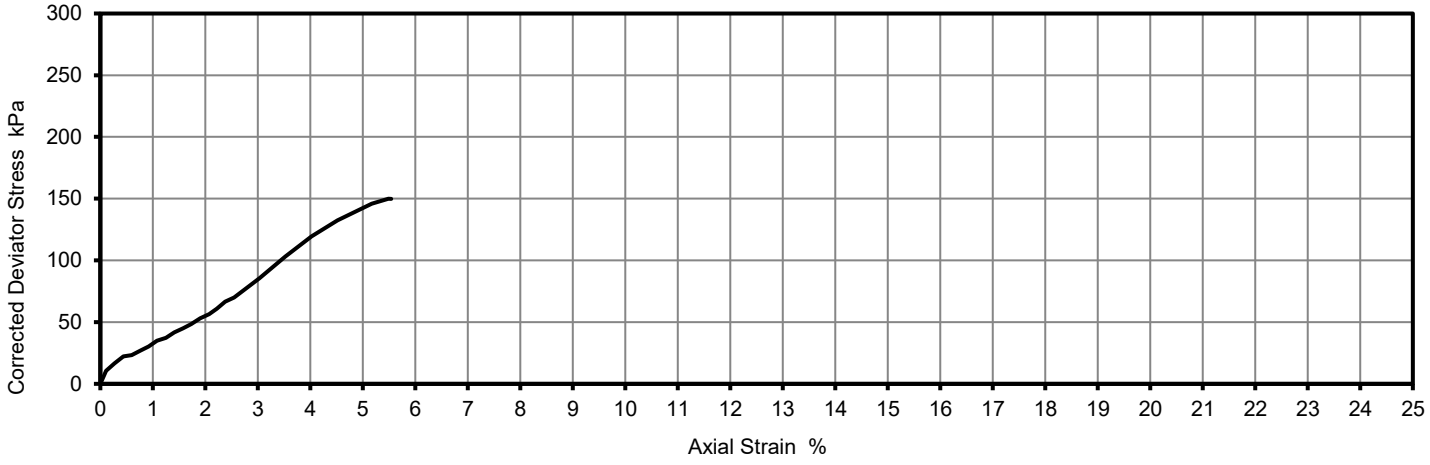
Client:	Paddock Geo Engineering	Client Reference:	P18-193
Client Address:	14 Burns Road Bletchley Milton Keynes, MK3 5AL	Job Number:	18-21178
		Date Sampled:	26/11/2018
		Date Received:	03/12/2018
Contact:	Matt Paddock	Date Tested:	13/12/2018
Site Name:	Burgess Hill Community Entertainment and Events Centre, Cyprus Road	Sampled By:	Not Given
Site Address:	Not Given		

Test Result

Laboratory Reference:	1107826	Depth Top [m]:	4.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Reddish brown CLAY		

Test Number	1		Rate of Strain	2.00	%/min	
Length	195.66	mm	Cell Pressure	20	kPa	
Diameter	103.95	mm	Axial Strain at failure	5.5	%	
Bulk Density	2.01	Mg/m3	Deviator Stress, (σ1 - σ3)f	150	kPa	
Moisture Content	18	%	Undrained Shear Strength, cu	75	kPa	½(σ1 - σ3)f
Dry Density	1.70	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.40	kPa	Membrane thickness	0.28	mm	

Deviator Stress v Axial Strain



Mohr Circles

Position within sample

Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks: Report as a single stage - brittle failured

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 18/12/2018

Signed: Darren Berrill
Geotechnical General Manager

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