



INVESTIGATE



REMEDIATE



REGENERATE



GROUND INVESTIGATION REPORT

**FOR
FORMER CALL BOY PUBLIC HOUSE,
HARMER STREET,
GRAVESEND, KENT,
DA12 2AX**

**PREPARED FOR
CLEADON DEVELOPMENTS LIMITED**

**REPORT NO. SE1540A
JULY 2020**

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GROUND INVESTIGATION FOR FORMER CALLBOY PUBLIC HOUSE, HARMER STREET, GREAVESEND, KENT, DA12 2AX

CLIENT: CLEADON DEVELOPMENTS LIMITED

ARCHITECTS: BBD ARCHITECTURE

1. INTRODUCTION

This report has been prepared in accordance with an email dated 30th April 2020, from the Client.

The brief was set out in our estimate, ref. ESE2374A and dated 26th February 2020, with amendments as the investigation proceeded and includes:

- 3 No. cable percussive boreholes
- Insitu testing
- Geotechnical laboratory testing
- Contamination analyses
- Installation of standpipes followed by groundwater and ground gas monitoring
- Provision of an interpretative report on the above.

It should be noted that we have previously issued a Walkover Survey and Desk Study Report for this site, ref. SE1540 and dated February 2020 which should be read in conjunction with this report.

1.1 Site Location and Description

The site is located at the Former Callboy Public House, Harmer Street, as indicated on Figure 1. The approximate National Grid Reference of the centre of the site is E565097, N174258.

As shown on Figure 2, the rectangular shaped about 0.06 hectare site is bounded to the north by the rear garden areas of dwellings situated on Harmer Street and The Terrace, to east is rear gardens situated on East Terrace, to the south is East Crescent Road, to the west is Harmer Street.

1.2 Proposed Development and Purpose of the Ground Investigation

We understand that it is proposed to convert the existing Former Public House into a residential dwelling comprising flats and construct a two storey detached mews block comprising flats to the rear with associated garden areas, as shown on Figure 3.

The purpose of the investigation was to determine the ground conditions at the positions of the exploratory holes, to assess the likelihood of a general pattern of strata being present below the site and to establish the load bearing characteristics of the strata deriving if possible an assessment of the suitability of appropriate founding techniques.

In addition, contamination analyses and assessment were required in order to determine necessary precautions and/or remedial measures required for the proposed development and to ascertain the need for any further sampling and analysis.

Ground gas monitoring and assessment was also required to determine necessary precautions and/or remedial measures.

2. INVESTIGATION

2.1 Investigation Details

Three 150mm diameter boreholes were put down by cable percussive boring techniques at the positions determined and set out by Sub Surface South East Limited as shown on Figure 2. The boreholes were put down to a depth of 15.45m, samples taken were logged in accordance with BS EN ISO 14688-1: 2002 and BS EN ISO 14689-1: 2003 and the resulting Borehole Records are appended.

2.2 Sub Surface Detail

Details of the strata encountered in the ground investigation are given on the appended Borehole Records. The exploratory holes found made ground overlying natural structureless chalk strata. A general summary of the strata found is as follows:

2.2.1 Made Ground

Made ground was encountered in all three boreholes to depths of between 1.90m and 2.20m and comprised mainly dark brown or brown silty very sandy fine to coarse gravel sized fragments of concrete, brick, and stone with localised metal nails and with low concrete cobble content, locally underlain by light brown slightly silty fine to coarse sand and fine to coarse gravel sized fragments of stone and brick with low stone cobble content.

2.2.3 Bedrock

The made ground was directly underlain by structureless chalk composed of mainly off white and occasional brownish yellow slightly gravelly slightly sandy silt with localised flint gravel., or slightly sandy gravel and cobbles (interbedded grades Dm and Dc). The chalk clasts were predominantly extremely weak or weak, low density and off white.

2.2.4 Groundwater

No groundwater was encountered in the exploratory holes although it should be noted that they were only left open for a short period of time and groundwater levels and rates of inflow and may be subject to seasonal and/ or climatic variations.

Monitoring of standpipes installed in the boreholes were found to be dry during the first three monitoring visits.

3. SAMPLING, TESTING AND MONITORING

3.1 Sampling

Small disturbed and bulk disturbed samples were obtained for the strata encountered and were subjected to careful examination.

The samples will be retained for a period of one month after the issue of this report, for reference purposes, and then disposed of unless otherwise instructed.

3.2 Field Testing

Thirty Standard Penetration Tests (SPTs) were performed in the made ground and chalk strata the results of which are recorded on the appended Standard Penetration Test Results Sheet with 'N' values and indicative relative density and shear strength, where appropriate, given on the appended Borehole Records.

3.3 Installations and Monitoring

On completion of BH1 a single hdpe standpipe was installed to a depth of 5.00m, and in BH2 and BH3 dual hdpe standpipes were installed depths of 2.00m and 5.00m. The 2.00m standpipes are slotted from 0.50m depth and 5.00m standpipes are slotted from 2.50m depth, both have an internal diameter of 50mm and have removable quick release gas valves to enable both ground gas and groundwater monitoring and sampling to be undertaken. Details of the installations are given on the appended Borehole Records.

Monitoring of the standpipes for ground gas and groundwater has been undertaken on three of six scheduled occasions to date using portable equipment. A Gas Data GFM 435 was used for monitoring methane, carbon dioxide, oxygen, gas flows and atmospheric pressure. The results of the monitoring are given on the appended Ground Gas and Groundwater Monitoring Results sheet.

3.4 Laboratory Testing

The following laboratory tests were carried out in accordance with BS.1377: 1990, where applicable, and the results are appended.

- Moisture content, plastic limit and liquid limit tests
- A saturated moisture content of chalk test
- Particle size distribution by wet sieve analysis
- Soluble sulphate content and pH value tests (including pyritic ground testing)

Contamination analyses have been performed on three samples to determine : pH and concentrations of sulphate, sulphide, arsenic, boron (soluble), cyanide, cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, the speciated total petroleum hydrocarbons (TPHs), the speciated polynuclear aromatic hydrocarbons (PAHs) suite, the benzene/ ethylbenzene/ toluene/ xylene (BTEX) suite and phenols.

In addition, two soil samples were subjected to an asbestos screen.

Three leachate samples have been prepared in accordance with the Environment Agency protocol and contamination analyses have been performed to determine: pH and concentrations of sulphate, sulphide, cyanide, arsenic, boron (soluble), cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, speciated TPHs, the speciated PAHs suite, the BTEX suite and phenols.

The results of the above analyses are appended.

4. APPRAISAL AND RECOMMENDATIONS

4.1 Comments on the Profile

At the outset it should be appreciated that only a small proportion of the area to be developed has been investigated and consequently the recommendations made and opinions expressed in this report can only be applied to such conditions as were encountered in the exploratory holes.

The exploratory holes indicate a nature and degree of similarity to the extent that we consider them likely to be representative of the natural ground conditions. However, no guarantee can be given.

It should be noted that the site is underlain by chalk strata and that solution features associated with such strata may be present for which no evidence has been found during the ground investigation. Observations should be kept throughout all groundworks for broken and/ or voided ground, found in association with such features, and appropriate action taken in the light of inspection and further investigation where necessary.

Due to the site having been previously developed, and the nature of Made Ground, localised variations in thickness and composition should be anticipated and hence interpolation or extrapolation from the exploratory holes to adjoining areas should only be undertaken with caution.

Details of the findings of the investigation are given on the appended Borehole Records and a summary of the ground conditions is given in Section 2.2.

4.2 Foundations

We understand that it is proposed to convert the existing Former Public House into a residential dwelling comprising flats and construct a two storey detached mews block comprising flats to the rear with associated garden areas, as shown on Figure 3. However, at the time of writing this report no specific details regarding the proposed foundations and design loadings for the extension were available and consequently the recommendations given are in general terms only.

The ground investigation found made ground in all three boreholes to depths of between 1.90m and 2.20m, directly underlain by structureless chalk composed of mainly off white and occasional brownish yellow slightly gravelly slightly sandy silt with localised flint gravel, or slightly sandy gravel and cobbles (interbedded grades Dm and Dc).

We would not recommend founding in the made ground in its present condition because of its inherent variability in consistency and compaction, and in parts the nature of its constituents.

Providing there is sufficient load bearing capability we recommend that the proposed extension is founded on strip footings for wall loads and pad foundations for column loads in the natural structureless chalk strata.

Atterberg limit tests on the cohesive strata indicate silt of low plasticity which are considered to have a low susceptibility to shrinkage and swelling with varying moisture content. Given the above foundations should be taken down to a minimum 0.75m below finished ground level to avoid the zone which is subject to seasonal moisture content variation and frost action. If buildings are to be constructed adjacent to existing trees, trees are to be removed and/or trees are to be planted then the guidelines given in the National House Building Council (NHBC) Standards Chapter 4.2, 'Building Near Trees', should be followed for silt of low shrinkage and swelling potential.

It should be noted that in the boreholes the natural strata were encountered at a depth of in excess of 0.75m and in these areas foundations should be taken down to a minimum 0.10 m below the base of the made ground unless the NHBC guidelines indicate a greater depth.

Taking the results of the field tests and our inspection of the samples obtained, for foundations in the Grade Dm structureless chalk beneath the made ground we would recommend that safe bearing capacity values of 50kNm⁻² for strip footings and square pads should not be exceeded.

All formation levels should be carefully inspected by an experienced and qualified engineer to confirm the appropriateness of the design figures used with any soft, loose, or rubbly zones removed and replaced with lean mix concrete. The formation should then be blinded with lean mix concrete as soon as possible after exposure, if there is to be a delay before construction, to prevent water softening or disturbance.

It should be noted that the safe bearing pressures given for the cohesive strata do not take into consideration settlement. Settlement is dependent upon loading intensity, the width of the foundation and the coefficient of volume compressibility (M_v) of the compressible strata. When details of the foundations are formulated we recommend that total and differential settlements are assessed to ensure that they are within acceptable limits.

In view of the relatively low safe bearing pressures determined above shallow foundations in natural ground may not be feasible and hence alternative foundations may need to be considered. For this site we would recommend piled foundations.

With regard to the choice of pile type, consideration could be given to driven piles, continuous flight auger (CFA) piles or cast in-situ bored piles with the driven pile option probably being the most economical. However, in considering piles driven to a pre-determined set in the more competent strata at depth, it is essential to ensure that any vibrations set up during the driving process are not transmitted to adjacent/ nearby buildings, structures, services and/or slopes/ retaining walls as they may be detrimentally affected. Consequently, in respect of driven piles, we recommend that any tendering Specialist Piling Contractor confirm that vibrations will not detrimentally affect adjacent/ nearby buildings, structures, services and/or slopes/ retaining walls. If such confirmation cannot be given, as is likely, then we would recommend using either CFA or cast in-situ bored piles.

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In determining the final pile design it should be noted that up to 2.20m of the piles will be in made ground and due regard should be paid to the lack of lateral restraint over this length in cases where significant lateral forces are to be catered for.

To formulate the most satisfactory and economic scheme we suggest that competitive tenders and designs from Specialist Piling Contractors should be sought using the borehole information obtained.

It should be noted that no investigation of the nature, depth, and size of the foundations to the existing property has been undertaken. Consequently, if any major change in loadings of the existing property is to be made then we would recommend that a check is made to ensure that the existing foundations are adequate for the new loads.

We recommend that a flexible joint is provided between the existing and proposed buildings to allow for differential movement.

4.3 Floor Slab Construction

With regard to the design and construction of normal ground bearing floor slabs, it should be noted that due to the thickness of made ground there will be a risk of significant total and differential settlements, the extent of which will be a matter of chance rather than being assessable by calculation.

To obviate any significant damaging settlements we would recommend using a suspended floor slab with intermediate support designed on the same basis as the main foundations where the spans are too large for economical single suspended slab design.

4.4 Excavations and Groundwater

There should be no particular difficulties in excavating the strata indicated in the exploratory holes utilising an appropriate and suitably sized mechanical excavator.

It is recommended that all excavations to greater than 1.20m depth, or for shallower excavations where groundwater is encountered above this level, are closely supported, especially where man entry is required. Alternatively, where space permits, the excavations might be battered back to an appropriate angle.

The boreholes did not encounter groundwater, although it should be noted that they were only left open for a relatively short period of time and groundwater levels and rates of inflow may be subject to seasonal and/ or climatic variations.

The standpipes installed in the boreholes were found to be dry during the first three monitoring visits.

Given the limited information, groundwater seepages or inflows are not anticipated in shallow excavations.

4.5 Buried Concrete

For the design of buried concrete the recommendations given in Building Research Establishment (BRE) Special Digest 1 (February 2017 revision), "Concrete in Aggressive Ground", should be followed.

Determination of pH on the soil samples gave values in the range of 7.8 to 9.0.

Soluble sulphate concentrations were also determined for the soil samples and the results ranged from <0.01 to 0.61 g/l.

The results indicate that the Design Sulphate Class for the site should be DS-2.

Our knowledge of the site and ground conditions indicates that the site is “brownfield” with potentially mobile groundwater. Consequently, in accordance with the Design Sulphate Class for the site together with the site and groundwater conditions an Aggressive Chemical Environment for Concrete (ACEC) classification of AC-2 should be used as detailed on the appended extract.

4.6 Contamination Considerations

We have previously undertaken a Phase I Report, ref. SE1540 and dated February 2020 and this Phase II ground investigation has been undertaken to provide an initial contamination risk assessment in accordance with the Phase I Conceptual Ground Model. Based upon the findings of the above additional sampling, analysis and assessment may be required.

It should be appreciated that the suite of determinants analysed for consists of a range of contaminants identified in the Conceptual Ground Model. However, the absence of any other specific contaminants cannot be guaranteed.

4.6.1 Assessment (Soil)

In order to provide an assessment of the presence of contamination three soil samples have been analysed for a suite of determinants and the results are appended.

The concentrations of the determinants have been compared against published generic assessment criteria (GACs). The Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency published soil guideline values (SGVs) for mercury, selenium, benzene, toluene, ethylbenzene and xylene on 31 March 2009, arsenic and nickel on 12 May 2009 and cadmium and phenols in June 2009. Contaminated Land: Applications in Real Environments (CL:AIRE) guideline values were also published in December 2009 to supplement the above. DEFRA published in March 2014 Category 4 Screening Levels (C4SLs) for arsenic, cadmium, lead, hexavalent chromium, benzo(a)pyrene and benzene. In November 2014 Suitable for Use Levels (S4ULs) were then published by LQM/ CIEH and updated S4ULs values for cadmium and phenols were published in July 2015 and for nickel in August 2015. The assessment criteria (SGVs, S4ULs, CL:AIRE and C4SLs) vary dependent upon the land use; allotment and residential use being the most sensitive and commercial/ industrial use being the least sensitive.

For the purposes of assessment, as the proposed development is a residential dwelling contamination analyses have been compared with the guideline values for a standard land use of residential with plant uptake (with homegrown produce).

To assess the polycyclic aromatic hydrocarbon (PAH) contamination the surrogate marker approach has been used. The ratios of the seven genotoxic PAHs (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(123-cd)pyrene, dibenzo(ah)anthracene and benzo(ghi)perylene) to benzo(a)pyrene, have been determined and compared with the published ratio profile of a coal tar test material (Culp et al in 1998). The comparison indicates that the PAH contamination matches the Culp profile within reasonable bounds (as defined in DEFRA 2014) allowing the genotoxic PAHs to be assessed against the C4SL for benzo(a)pyrene as a surrogate marker. The concentrations of benzo(a)pyrene in BH1 and BH3 were 2.1mg/kg and 3.8mg/kg respectively, both below the C4SL level of 5.0mg/kg and therefore within acceptable bounds.

The contamination analyses determined an elevated concentration of benzo(a)pyrene in the sample taken from BH2 (12mg/kg) and elevated levels of lead in all three boreholes (1500mg/kg in BH1, 1200mg/kg in BH2, 920mg/kg in BH3) when compared with the C4SL for a residential with homegrown produce end use (200mg/kg).

An asbestos screen was undertaken on two soil samples and no asbestos was detected.

In addition to the above, an assessment of risk to personnel who will come into contact with on-site materials throughout the site has been undertaken.

4.6.2 Assessment (Leachate)

To assess the leachability of contaminants, and the consequent pollution potential of the on-site material to “controlled waters”, three samples of made ground have been processed in accordance with the Environment Agency’s protocol, the leachate has then been analysed for a suite of determinants in accordance with the Conceptual Ground Model and the results are appended.

To assess the risk to surface water bodies the results have been compared with the Environmental Quality Standards (EQS) for annual allowable concentrations, published in the Department of Environment Food and Rural Affairs (DEFRA) Water Framework Directive Directions 2015, or the best equivalent (e.g. the Dangerous Substance Directive List II Substances).

To assess the risk to groundwater resources the results have been compared with the United Kingdom Drinking Water Standards (UK DWS), published in the Water Supply (Water Quality) Regulations 2016. Where no UK DWS is available the World Health Organisation Drinking Water Guidelines (WHO) have been adopted.

The bioavailability of copper, lead, nickel and zinc has been estimated using the Water Framework Directive UKTAG Metal Biodiversity Assessment Tools (M-BAT) spreadsheets using typical assumed values for dissolved organic carbon and dissolved calcium sourced from WFD UKTAG (2009) *‘The importance of dissolved organic carbon in the assessment of environmental quality standard compliance for copper and zinc’*. Copies of the UKTAG M-BAT results sheets are appended.

The analyses found elevated concentrations of metals when compared to the EQS, UK DWS and/ or WHO. The exceedances are summarised in the following table:

TABLE 2 ASSESSMENT OF LEACHATE CONTAMINATION

Determinant	EQS (µg/l)	UK DWS (µg/l)	WHO (µg/l)	BH1 0.00m (µg/l)	BH2 0.00m (µg/l)	BH3 0.00m (µg/l)
Arsenic	50	10	10	-	13	-
Cadmium	<0.08*	5	3	-	0.15	-
Chromium	4.7	50	50	9.3	6.3	6.5
Copper	1.0 _{bio}	2000	2000	3.46	5.64	2.56
Lead	1.2 _{bio}	10	10	26	25	21

*Hardness dependent threshold, varies from <0.08 up to 0.25 µg/l.

bio = bioavailable component.

It should be noted that the UK DWS is a post treatment standard and as such is very stringent.

4.6.3 Conclusions and Recommendations

Section 78a(2) of the Environmental Protection Act: 1990 as amended by the Contaminated Land (England) (Amendment) regulations 2012, and Section 86 of the Water Act 2003, defines CONTAMINATED LAND for the purposes of Part IIA as:

“any land which appears to the LOCAL AUTHORITY in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

- (a) SIGNIFICANT HARM is being caused or there is a SIGNIFICANT POSSIBILITY of such harm being caused; or
- (b) SIGNIFICANT POLLUTION OF CONTROLLED WATERS is being, or is likely to be, caused”

Before a LOCAL AUTHORITY can make the judgement that land appears to be CONTAMINATED LAND on the basis that SIGNIFICANT HARM is being caused, or that there is a SIGNIFICANT POSSIBILITY of such harm being caused, the LOCAL AUTHORITY must identify a SIGNIFICANT POLLUTANT LINKAGE. This means that each of the following has to be identified:

- (a) a CONTAMINANT;
- (b) a relevant RECEPTOR (defined as living organisms, ecological systems, controlled waters or property); and
- (c) a PATHWAY by means of which either:
 - (i) the CONTAMINANT is causing SIGNIFICANT HARM to that RECEPTOR, or
 - (ii) there is a SIGNIFICANT POSSIBILITY of such harm being caused by that CONTAMINANT to that RECEPTOR

It should be noted that the words in capitals have a legal definition within the legislation.

Without a clear identification of all three elements of the pollutant linkage, land cannot be identified as contaminated under the regime.

The National Planning Policy Framework states that, “after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990”. Therefore, the general principles detailed above apply to this assessment.

End Users

Our assessment, based on the soil samples tested, indicates elevated levels of PAHs are present in the near surface made ground in the area of BH2, and elevated levels of lead are present in the near surface made ground/ soils (source) in all three locations tested. The pathway from the source to site operatives during earthworks, the end users of the development and any proposed planting (receptors) will need to be removed by precautions and/ or remedial measures.

Where the contaminated materials are covered by buildings or a hard surface cover of concrete or bituminous macadam no clean cover will be required. However, in gardens and other open space areas the end users should be protected from the contaminated materials and plants should be provided with a medium in which they can safely grow.

We recommend a 600mm blanket of clean topsoil/ subsoil (equivalent to two spade depths) is provided in back gardens and a 450mm blanket of imported clean topsoil/ subsoil is provided in front and side gardens and other open spaces. In addition, deeper rooted bushes and trees should be pit planted on and in clean topsoil.

Waste Soil Management

Contaminated materials should, where possible, be retained on site. However, it should be appreciated that contaminated material left on site is the legal responsibility of the landowner, unless the person who created the contamination can be identified.

If waste materials are to be removed from the site, classification of the waste should be undertaken to determine the most appropriate tip to use and the associated costs. It should be noted that significant cost savings can sometimes be made on waste disposal by correct classification of the waste, a service that we can provide.

Waste acceptance criteria (WAC) analyses have been undertaken on one sample and the results are appended.

It should be noted that all vehicles carrying contaminated material should be securely sheeted and the wheels and undercarriages cleaned before leaving site to ensure that hazardous materials are not dropped onto public roads.

Site Operatives

S4ULs, C4SLs and CL:AIRE assume long term contact with contamination and assess chronic health risk. The risk of short term acute exposure to site personnel is dealt with in the remit of the Health and Safety Executive under the Health and Safety at Work Act: 1974 and Regulations made under the Act, including the Control of Substances Hazardous to Health (COSHH) Regulations. The levels of contamination and risk to site personnel should be considered under the Construction Design and Management (CDM) Regulations at the planning stage and in the development of the designers and contractors Health and Safety Plans and Method Statements. The risk of contact with on-site soils should be minimised and the following precautions should be taken as a minimum requirement.

Site personnel involved in earthworks and excavations should wear suitable personal protective equipment (PPE) and smoking should be prohibited.

Earthworks undertaken during dry weather might generate dust and in this instance dust should be damped down and dust masks made available to site operatives. In addition stockpiled materials should be sheeted over to prevent excessive airborne dust being formed.

Controlled Waters

Contaminants have been identified in the prepared leachate samples which suggests permeating rainfall or surface water run-off could potentially mobilise the leachable metals and put at risk controlled waters including the underlying Principal Aquifer and local surface water. However, given the relatively low exceedances, the depth to the groundwater table, the cohesive nature of the near surface weathered chalk, the distance to the nearest surface water (River Thames 160m to the north) and the distance to the nearest potable water abstraction (976m to the south), in our opinion the risks are very low and no precautions or remedial measures will need to be put in place.

4.6.4 Risk Assessment for Water Pipes

If it is intended to use standard polyethylene (PE) pipes for new water supply connections to the site, then as the site has previously been developed a risk assessment will be required by the Local Water Authority (in this case Southern Water) this is a service we can provide.

It should be noted that some Water Authorities require a pipeline risk assessment to be completed even if it is intended to use barrier pipe for new water supply connection and in this case, we would recommend contacting Southern Water for approval prior to installation.

4.7 Ground Gas Considerations

Ground gas monitoring has been undertaken on three of six scheduled occasions to date and the results of the monitoring visits are appended.

Ground gases: methane, carbon dioxide and oxygen and flow rate have been monitored and the ranges of ground gases and flow rate during the monitoring period are as follows:

TABLE 3 GROUND GAS CONCENTRATIONS AND FLOW RATE

Methane (% vol. in air)	Carbon Dioxide (% vol. in air)	Oxygen (% vol. in air)	Gas Flow Rate (litres/ hour)
0.0	0.1 – 0.4	17.9 – 19.9	<0.1

To date it can be seen from the monitoring that no elevated levels of methane or carbon dioxide, and no gas flows have been recorded. However, a depleted level of associated oxygen was recorded in BH3a (0.5m to 2.0m response zone) during the third monitoring visit.

Methane gas when present between 5% volume in air (Lower Explosive Limit - L.E.L.) and 15% volume in air (Upper Explosive Limit - U.E.L.) is potentially explosive and inflammable whilst carbon dioxide in conjunction with depleted oxygen is an asphyxiant. Both methane and carbon dioxide are a by-product of the anaerobic and aerobic decomposition of biodegradable materials.

The levels of gas have been assessed in accordance with British Standard 8485, "Code of practice for the design of protective measures for methane and carbon dioxide gasses for new buildings", published in June 2015 (BS.8485:2015).

The characteristic hazardous gas flow rate (Q_{ngs}) is calculated by dividing the maximum gas (methane or carbon dioxide) concentration by 100 and multiplying by the maximum flow rate in litres per hour (minimum 0.1 l/hr for Sub Surface monitoring equipment). For this site $Q_{ngs} = 0.4 / 100 \times 0.1 = 0.0004$ l/hr

Based on the monitoring to date BS.8485: 2015, Table 2, indicates that the site falls into Characteristic Situation CS1 (very low).

BS.8485: 2015, Table 4, indicates that for a CS1 and the type of development proposed no remedial measures are required.

All excavations of greater than 1.20m depth should be routinely checked for air quality prior to man entry and appropriate precautions taken.

Any manholes, inspection chambers or other void spaces formed beneath the sites ground surface are potential ground gas traps. Precautions, as per the excavations above, should be taken.

It should be noted that it is our intention to update this section of the report on completion of the ground gas monitoring.

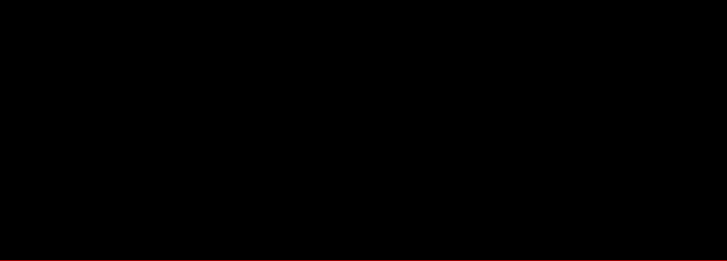
4.8 General

We recommend that consultation should be undertaken with the Local Authority Environmental Health Officer and the Local Authority Building Control Officer prior to development

Following completion of the gas monitoring a Phase III remediation statement should be compiled and submitted to the Regulator for approval prior to development.

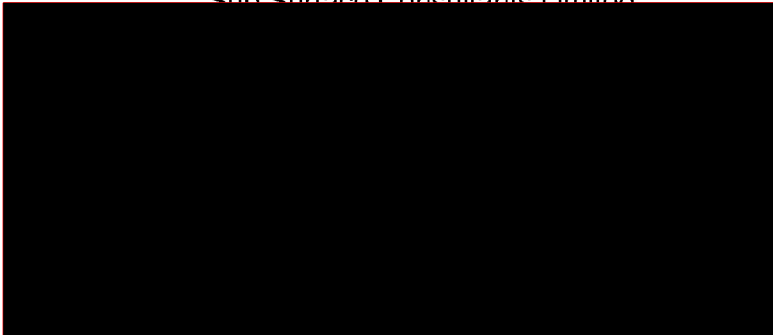
We trust that this report fulfils your present requirements but if you have any queries or we can be of further assistance please contact the undersigned or Mr Gurbinder Singh Mann at our High Wycombe office.

SUB SURFACE CONSULTANTS LIMITED
REPORT No. SE1540A
JULY 2020



ns.), MSc., CEnv, MEnvSc,

AMRSC
Senior Geoenvironmental Engineer
For and on behalf of
Sub Surface Consultants Limited



E.

For and on behalf of
Sub Surface Consultants Limited.

INSITU TEST RESULTS

SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
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Insitu Test Results

Site: THE FORMER CALL BOY PUB., HARMER STREET, GRAVESEND, KENT

Client: CLEADON DEVELOPMENTS LIMITED

Engineer:

Job Number

SE1540A

Sheet:

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Ground Gas and Groundwater Monitoring Results Sheet

[illegible]

Remarks: Elevated levels of methane and carbon dioxide and depleted levels of oxygen are shown in ***bold/italics***.
BH2 and BH3 dual Installations
Response Zones BH2a 0.5-2.0m and BH2 2.5-5.0m, BH3a 0.5-2.0m and BH3 2.5-5.0m.

LABORATORY TEST RESULTS

Site : FORMER CALL BOY PUBLIC HOUSE, HARMER STREET, GRAVESEND, KENT

Job Number
SE1540A

Client : CLEADON DEVELOPMENTS LIMITED

Sheet
1 / 1

Engineer :

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

Borehole/ Trial Pit	Depth (m)	Sample	Natural Moisture Content %	Sample Passing 425µm Sieve		Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Group Symbol	Laboratory Description
				Percentage %	Moisture Content %						
BH1	2.00	D	32	99	32	25	7	18	1.39	CL	Structureless CHALK comprising off white slightly gravelly slightly sandy clayey silt.
BH1	8.50	D	30	96	31	33	25	8	0.75	ML	Structureless CHALK comprising off white slightly gravelly slightly sandy clayey silt.
BH1	14.50	D	33	97	34	28	22	6	2.00	CL/ML	Structureless CHALK comprising off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt.
BH2	3.00	D	27	96	28	33	24	9	0.44	ML	Structureless CHALK composed of off white gravelly slightly sandy clayey silt.
BH2	4.50	D	28	94	30	32	25	7	0.71	ML	Structureless CHALK, composed of off white slightly sandy gravel and cobbles.
BH2	5.00	D	29	97	30	34	21	13	0.69	CL	Structureless CHALK, composed of off white and occasional brownish yellow and dark brown gravelly slightly sandy clayey silt.
BH2	8.50	D	30	95	32	34	27	7	0.71	ML	Structureless CHALK composed of off white and occasional brownish yellow and dark brown gravelly slightly sandy clayey silt.
BH3	4.00	D	30	96	31	32	26	6	0.83	ML	Structureless CHALK composed of off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt.
BH3	7.00	D	29	96	30	32	24	8	0.75	ML	Structureless CHALK composed of off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt.
BH3	14.50	D	27	96	28	32	23	9	0.56	CL	Structureless CHALK composed of off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt.

Method of Preparation : BS 1377:PART 1:1990:7.4 Preparation of samples for classification tests BS 1377:PART 2:1990:4.2 & 5.2 Sample preparations

Method of Test : BS 1377:PART 2:1990:3 Determination of moisture content 1990:4 Determination of the liquid limit BS 1377:PART 2:1990:5 Determination of the plastic limit and plasticity index

Remarks :

Job Number
SE1540A

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Engineer :

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

The figure displays a grading analysis graph and a corresponding data table. The graph plots the percentage of material passing through various sieve sizes (logarithmic scale) against the sieve size in millimeters (logarithmic scale). The data points are connected by a smooth curve, showing the distribution of particle sizes. The data points are as follows:

Sieve / Particle Size	% Passing
60 mm	100.0
37.5 mm	70.7
19 mm	53.2
9.5 mm	47.9
5.6 mm	40.1
3.35 mm	39.0
2.36 mm	36.4
1.4 mm	33.6
710 µm	30.7
425 µm	25.8
300 µm	23.7
212 µm	20.8
150 µm	18.2
63 µm	15.2

The graph also includes a classification table below the x-axis:

CLAY	Fine SILT	Medium	Coarse	Fine SAND	Medium	Coarse	Fine GRAVEL	Medium	Coarse	COBBLES	BOULDERS

Below the graph, there are two summary tables:

Grading Analysis	
D85	48.5 mm
D60	26.2 mm
D10	<63.0 µm
Uniformity Coefficient	-

Particle Proportions	
Cobbles + Boulders	-
Gravel	64.5%
Sand	20.3%
Silt	-
Clay	-

Remarks :

Site : FORMER CALL BOY PUBLIC HOUSE, HARMER STREET, GRAVESEND, KENT

Client : CLEADON DEVELOPMENTS LIMITED

Engineer :

Job Number
SE1540A

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DETERMINATION OF THE pH VALUE AND THE SULPHATE CONTENT OF SOIL AND GROUNDWATER

Borehole/ Trial Pit	Depth (m)	Sample	Concentration of Soluble Sulphate			Percentage of sample passing 2mm Sieve %	pH	Classification	Laboratory Description
			Soil		Groundwater g /l				
			Total S04 %	S04 in 2:1 water:soil g /l					
BH1	1.20	B		0.61			9.0	DS-2	MADE GROUND: dark brown silty sandy fine to coarse gravel sized fragments of concrete, brick and stone.
BH1	2.00	D		0.15			8.4	DS-1	Structureless CHALK comprising off white slightly gravelly slightly sandy clayey silt.
BH1	8.50	D		<0.01			8.9	DS-1	Structureless CHALK comprising off white slightly gravelly slightly sandy clayey silt.
BH1	14.50	D		0.08			8.6	DS-1	Structureless CHALK comprising off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt.
BH2	1.00	D		0.26			7.8	DS-1	MADE GROUND: brown slightly silty very sandy gravel sized fragments of stone, concrete and brick.
BH2	3.00	D		0.02			8.6	DS-1	Structureless CHALK composed of off white gravelly slightly sandy clayey silt.
BH2	5.00	D		0.01			8.9	DS-1	Structureless CHALK, composed of off white and occasional brownish yellow and dark brown gravelly slightly sandy clayey silt.
BH2	8.50	D		<0.01			8.7	DS-1	Structureless CHALK composed of off white and occasional brownish yellow and dark brown gravelly slightly sandy clayey silt.
BH3	0.50	B		0.22			8.6	DS-1	MADE GROUND: friable dark brown gravelly sandy silty clay.
BH3	3.50	D		0.10			8.9	DS-1	Structureless CHALK composed of slightly sandy subangular gravel and cobbles.
BH3	7.00	D		0.08			8.4	DS-1	Structureless CHALK composed of off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt.
BH3	14.50	D		0.08			8.3	DS-1	Structureless CHALK composed of off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt.

Method of Preparation : BS 1377:PART 1:1990:7.5 Preparation of soil for chemical tests BS 1377:PART 3:1990:5.2, 5.3, 5.4 & 9.4

Method of Test : Laboratory in-house methods based on BS1377: Part 3 for contents of water soluble sulphate, total sulphate and pH.

Remarks : Classification relates to Design Sulphate Class of BRE Special Digest 1 (2005)



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

BRE Special Digest 1

AGGRESSIVE CHEMICAL ENVIRONMENT FOR CONCRETE (ACEC) SITE CLASSIFICATION

Table C1 Aggressive Chemical Environment for Concrete (ACEC) classification for natural ground locations^a

Sulfate Design Sulfate Class for Location	2:1 water/soil extract ^b	Groundwater	Total potential sulfate ^c	Groundwater		ACEC Class for location
				Static water	Mobile water	
1	2 (SO ₄ mg/l)	3 (SO ₄ mg/l)	4 (SO ₄ %)	5 (pH)	6 (pH)	7
DS-1	<500	<400	<0.24	≥2.5	>5.5 ^d 2.5 - 5.5	AC-1s AC-1 ^d AC-2z
DS-2	500 - 1500	400 - 1400	0.24 - 0.6	>3.5 2.5-3.5	>5.5 2.5 - 5.5	AC-1s AC-2 AC-2s AC-3z
DS-3	1600-3000	1500-3000	0.7 - 1.2	>3.5 2.5 - 3.5	>5.5 2.5 - 5.5	AC-2s AC-3 AC-3s AC-4
DS-4	3100 - 6000	3100 - 6000	1.3 - 2.4	>3.5 2.5 - 3.5	>5.5 2.5 - 5.5	AC-3s AC-4 AC-4s AC-5
DS-5	>6000	>6000	>2.4	>3.5 2.5 - 3.5	≥2.5	AC-4s AC-5

Notes

- a Applies to locations on sites that comprise either undisturbed ground that is in its natural state (ie not brownfield - Table C2) or clean fill derived from such ground
b The limits of Design Sulfate Classes based on 2:1 water/soil extracts have been lowered relative to previous Digests (Box C7).
c Applies only to locations where concrete will be exposed to sulfate ions (SO₄) which may result from the oxidation of sulfides (eg pyrite) following ground disturbance (Appendix A1 and Box C8).
d For flowing water that is potentially aggressive to concrete owing to high purity or an aggressive carbon dioxide level greater than 15mg/l (Section C2.2.3), increase the ACEC Class to AC-2z.

Explanation of suffix symbols to ACEC Class

- Suffix 's' indicates that the water has been classified as static
- Concrete placed in ACEC Classes that included the suffix 'z' primarily have to resist acid conditions and may be made with any of the cements or combinations listed in Table D2 on page 42.

Table C2 Aggressive Chemical Environment for Concrete (ACEC) classification for brownfield locations^a

Sulfate						Groundwater		ACEC Class for location
Design Sulfate Class for Location	2:1 water/soil extract ^b		Groundwater		Total potential sulfate ^c	Static water	Mobile water	
1	2 (SO ₄ mg/l)	3 (Mg mg/l)	4 (SO ₄ mg/l)	5 (Mg mg/l)	6 (SO ₄ %)	7 (pH) ^d	8 (pH) ^d	9
DS-1	<500		<400		<0.24	≥2.5	>6.5 ^d 5.5 - 6.5 4.5 - 5.5 2.5 - 4.5	AC-1s AC-1 AC-2z AC-3z AC-4z
DS-2	500 - 1500		400 - 1400		0.24 - 0.6	>5.5 2.5 - 5.5	>6.5 5.5 - 6.5 4.5 - 5.5 2.5 - 5.5	AC-1s AC-2 AC-2s AC-3z AC-4z AC-5z
DS-3	1600 - 3000		1500 - 3000		0.7 - 1.2	>5.5 2.5 - 5.5	>6.5 5.5 - 6.5 2.5 - 5.5	AC-2s AC-3 AC-3s AC-4 AC-5
DS-4	3100 - 6000	≤1200	3100 - 6000	≤1000	1.3 - 2.4	>5.5 2.5 - 5.5	>6.5 2.5 - 6.5	AC-3s AC-4 AC-4s AC-5
DS-4m	3100 - 6000	>1200 ^e	3100 - 6000	>1000 ^e	1.3 - 2.4	>5.5 2.5 - 5.5	>6.5 2.5 - 6.5	AC-3s AC-4m AC-4ms AC-5m
DS-5	>6000	≤1200	>6000	≤1000	>2.4	>5.5 2.5 - 5.5	≥2.5	AC-4s AC-5
DS-5m	>6000	>1200 ^e	>6000	>1000 ^e	>2.4	>5.5 2.5 - 5.5	≥2.5	AC-4ms AC-5m

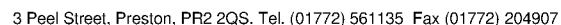
Notes

- a Brownfield sites are those sites, or parts of sites, that might contain chemical residues produced by or associated with industrial production (Section C5.1.3).
b The limits of Design Sulfate Classes based on 2:1 water/soil extracts have been lowered relative to previous Digests (Box C7).
c Applies only to locations where concrete will be exposed to sulfate ions (SO₄) which may result from the oxidation of sulfides (eg pyrite) following ground disturbance (Appendix A1 and Box C8).
d An additional account is taken of hydrochloric and nitric acids by adjustment to sulfate content (Section C5.1.3).
e The limit on water-soluble magnesium does not apply to brackish groundwater (chloride content between 12 000 mg/l and 17000 mg/l). This allows 'm' to be omitted from the relevant ACEC Classification. Seawater (chloride content about 18 000 mg/l) and stronger brines are not covered by this table.

Explanation of suffix symbols to ACEC Class

- Suffix 's' indicates that the water has been classified as static.
- Concrete placed in ACEC Classes that included the suffix 'z' primarily have to resist acid conditions and may be made with any of the cements or combinations listed in Table D2 on page 42.
- Suffix 'm' relates to the higher levels of magnesium in Design Sulfate Classes 4 and 5.

CONTAMINATION ANALYSIS RESULTS



Engineer:

Job Number:

SE1540A

Sheet:

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Benzo(a)pyrene Surrogate Marker Test

Comments:

*CULP, S.J., GAYLOR, D.W., SHELDON, W.G. GOLDSTEIN, L.W., BELAND, F.A., 1998. A comparison of the tumors induced by coal tar and benzo(a)pyrene in a 2-year bioassay.

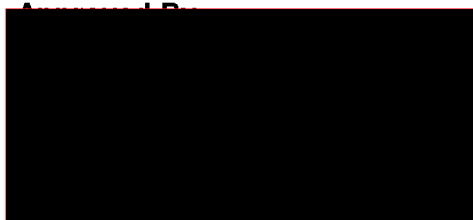
Assessed in accordance with Development of Category 4 Screening Levels for assessment of land affected by contamination - SP1010 Appendix E



Amended Report

Report No.:	20-12783-4		
Initial Date of Issue:	29-May-2020	Date of Re-Issue:	17-Jul-2020
Client	Sub Surface		
Client Address:	3 Peel Street Preston Lancashire PR2 2QS		
Contact(s):	Simon Gabbatt		
Project	SE1540A Former Call Boy Pub, Harmer Street, Gravesend		
Quotation No.:		Date Received:	20-May-2020
Order No.:		Date Instructed:	20-May-2020
No. of Samples:	3		
Turnaround (Wkdays):	40	Results Due:	15-Jul-2020
Date Approved:	17-Jul-2020		

Amended By:



Harvey, Technical Manager

Results - Soil

**Project: SE1540A Former Call Boy Pub, Harmer Street,
Gravesend**

Client: Sub Surface	Chemtest Job No.:				20-12783	20-12783	20-12783
Quotation No.:	Chemtest Sample ID.:				1006467	1006468	1006469
	Client Sample ID.:				391	221	971
	Sample Location:				BH1	BH2	BH3
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.0	0.0	0.0
	Bottom Depth (m):				1.00	1.00	0.50
	Date Sampled:				07-May-2020	07-May-2020	07-May-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-		-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected		No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-		-
Moisture	N	2030	%	0.020	13	16	16
pH	M	2010		4.0	8.1	8.1	8.3
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.4	1.4	3.0
Cyanide (Total)	M	2300	mg/kg	0.50	1.8	0.90	0.60
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	2.3	3.6	3.5
Sulphate (Total)	M	2430	%	0.010	0.61	0.32	0.31
Arsenic	M	2450	mg/kg	1.0	18	26	27
Cadmium	M	2450	mg/kg	0.10	0.50	1.3	0.91
Chromium	M	2450	mg/kg	1.0	23	35	37
Molybdenum	M	2450	mg/kg	2.0	< 2.0	2.8	2.3
Copper	M	2450	mg/kg	0.50	56	77	160
Mercury	M	2450	mg/kg	0.10	0.31	0.35	0.38
Nickel	M	2450	mg/kg	0.50	24	32	31
Lead	M	2450	mg/kg	0.50	1500	1200	920
Selenium	M	2450	mg/kg	0.20	0.21	0.39	0.20
Zinc	M	2450	mg/kg	0.50	180	460	330
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
TPH >C6-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C21	N	2670	mg/kg	1.0	27	32	34
TPH >C21-C40	N	2670	mg/kg	1.0	36	74	85
Total TPH >C6-C40	M	2670	mg/kg	10	62	110	120
Naphthalene	M	2700	mg/kg	0.10	0.35	1.2	0.42
Acenaphthylene	M	2700	mg/kg	0.10	0.35	0.75	0.46
Acenaphthene	M	2700	mg/kg	0.10	0.16	1.3	0.14
Fluorene	M	2700	mg/kg	0.10	< 0.10	1.7	0.15
Phenanthrene	M	2700	mg/kg	0.10	2.4	21	2.7
Anthracene	M	2700	mg/kg	0.10	0.68	5.0	0.77
Fluoranthene	M	2700	mg/kg	0.10	3.9	25	5.9
Pyrene	M	2700	mg/kg	0.10	3.7	23	5.9
Benzo[a]anthracene	M	2700	mg/kg	0.10	2.2	12	3.5
Chrysene	M	2700	mg/kg	0.10	2.2	8.6	3.2
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	2.2	12	3.7

Results - Soil

**Project: SE1540A Former Call Boy Pub, Harmer Street,
Gravesend**

Client: Sub Surface	Chemtest Job No.:				20-12783	20-12783	20-12783
Quotation No.:	Chemtest Sample ID.:				1006467	1006468	1006469
	Client Sample ID.:				391	221	971
	Sample Location:				BH1	BH2	BH3
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.0	0.0	0.0
	Bottom Depth (m):				1.00	1.00	0.50
	Date Sampled:				07-May-2020	07-May-2020	07-May-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	1.7	6.3	2.1
Benzo[a]pyrene	M	2700	mg/kg	0.10	2.1	12	3.8
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	1.3	7.5	2.6
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	1.1	2.9	1.1
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	1.8	7.8	2.7
Total Of 16 PAH's	M	2700	mg/kg	2.0	26	150	39
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30

Results - Single Stage WAC

Project: SE1540A Former Call Boy Pub, Harmer Street, Gravesend

Chemtest Job No: 20-12783					Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 1006469					Limits		
Sample Ref:					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID: 971							
Sample Location: BH3							
Top Depth(m): 0.0							
Bottom Depth(m): 0.50							
Sampling Date: 07-May-2020							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	M	%	2.6	3	5	6
Loss On Ignition	2610	M	%	7.4	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg	120	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	39	100	--	--
pH	2010	M		8.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.12	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	0.016	0.16	0.5	2	25
Barium	1450	U	0.048	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.018	0.18	0.5	10	70
Copper	1450	U	0.0073	0.073	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.021	0.21	0.5	10	30
Nickel	1450	U	0.0034	< 0.050	0.4	10	40
Lead	1450	U	0.0020	0.020	0.5	10	50
Antimony	1450	U	0.090	0.90	0.06	0.7	5
Selenium	1450	U	0.0017	0.017	0.1	0.5	7
Zinc	1450	U	0.0029	< 0.50	4	50	200
Chloride	1220	U	77	770	800	15000	25000
Fluoride	1220	U	0.25	2.5	10	150	500
Sulphate	1220	U	99	990	1000	20000	50000
Total Dissolved Solids	1020	N	340	3400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	10	100	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	16

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)

Test Methods

SOP	Title	Parameters included	Method summary
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
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- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Bioavailability Assessment

[illegible][illegible][illegible]



2183

Final Report

Report No.: 20-13179-1

Initial Date of Issue: 01-Jun-2020

Client Sub Surface

Client Address: 3 Peel Street
Preston
Lancashire
PR2 2QS

Contact(s): Simon Gabbatt

Project SE1540A Former Call Boy Pub, Harmer
Street, Gravesend

Quotation No.: **Date Received:** 26-May-2020

Order No.: **Date Instructed:** 26-May-2020

No. of Samples: 3

Turnaround (Wkdays): 5 **Results Due:** 01-Jun-2020

Date Approved: 01-Jun-2020

Approved By:

[Redacted Signature]vey, Technical Manager

Project: SE1540A Former Call Boy Pub, Harmer Street,

Gravesend

Client: Sub Surface	Chemtest Job No.:					20-13179	20-13179	20-13179
Quotation No.:	Chemtest Sample ID.:					1008617	1008618	1008619
	Client Sample ID.:					391	221	971
	Sample Location:					BH1	BH2	BH3
	Sample Type:					SOIL	SOIL	SOIL
	Top Depth (m):					0.00	0.00	0.00
	Bottom Depth (m):					1.00	1.00	0.50
	Date Sampled:					07-May-2020	07-May-2020	07-May-2020
Determinand	Accred.	SOP	Type	Units	LOD			
pH	U	1010			N/A	8.1	8.1	8.3
Sulphate	U	1220		mg/l	1.0	200	41	52
Cyanide (Total)	U	1300		mg/l	0.050	< 0.050	< 0.050	< 0.050
Sulphide	U	1325		mg/l	0.050	0.075	0.074	0.071
Arsenic (Dissolved)	U	1450		µg/l	1.0	4.3	13	6.1
Boron (Dissolved)	U	1450		µg/l	20	< 20	28	30
Cadmium (Dissolved)	U	1450		µg/l	0.080	< 0.080	0.15	< 0.080
Chromium (Dissolved)	U	1450		µg/l	1.0	9.3	6.3	6.5
Copper (Dissolved)	U	1450		µg/l	1.0	5.4	8.8	4.0
Mercury (Dissolved)	U	1450		µg/l	0.50	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450		µg/l	1.0	1.3	2.9	< 1.0
Lead (Dissolved)	U	1450		µg/l	1.0	26	25	21
Selenium (Dissolved)	U	1450		µg/l	1.0	< 1.0	< 1.0	< 1.0
Zinc (Dissolved)	U	1450		µg/l	1.0	16	14	10
Chromium (Hexavalent)	U	1490		µg/l	20	[B] < 20	[B] < 20	[B] < 20
TPH >C6-C10	N	1670		µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
TPH >C10-C21	N	1670		µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
TPH >C21-C40	N	1670		µg/l	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
Total TPH >C6-C40	U	1670		µg/l	10	[B] < 10	[B] < 10	[B] < 10
Naphthalene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700		µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700		µg/l	2.0	< 2.0	< 2.0	< 2.0
Benzene	U	1760		µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0

Project: SE1540A Former Call Boy Pub, Harmer Street,

Gravesend

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	Sample Type:					SOIL	SOIL	SOIL
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	Bottom Depth (m):					1.00	1.00	0.50
	Date Sampled:					07-May-2020	07-May-2020	07-May-2020
Determinand	Accred.	SOP	Type	Units	LOD			
Toluene	U	1760		µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Ethylbenzene	U	1760		µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
m & p-Xylene	U	1760		µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
o-Xylene	U	1760		µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Methyl Tert-Butyl Ether	N	1760		µg/l	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Total Phenols	U	1920		mg/l	0.030	< 0.030	< 0.030	< 0.030

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BOREHOLE RECORD SHEETS

SUB SURFACE SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907						Site FORMER CALL BOY PUBLIC HOUSE, HARMER STREET, GRAVESEND, KENT		Borehole Number BH1		
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 150mm to 15.00m			Ground Level (mOD)		Client CLEADON DEVELOPMENTS LIMITED		Job Number SE1540A	
		Location AS PLAN			Dates 07/05/2020- 08/05/2020		Engineer		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-1.00	B						MADE GROUND: dark brown silty very sandy fine to coarse gravel sized fragments of concrete, brick and stone with low cobble sized fragments of concrete.			
1.20-1.65 1.20-1.65	SPT(C) N=16 B			2,2/4,4,4,4		(1.90)				
2.00-2.45 2.00-2.45 2.00-2.50	SPT N=8 D B			1,2/1,2,3,2		1.90	CHALK recovered as structureless chalk composed of off white slightly gravelly slightly sandy clayey silt. Gravel is extremely weak low density off white and subangular. (Grade Dm).			
3.00-3.45 3.00-3.45 3.00-3.50	SPT N=9 D B			1,2/2,2,2,3		(3.60)				
4.00-4.45 4.00-4.45 4.00-4.50	SPT N=11 D B			2,2/2,2,3,4			 below 4.00m : off white and occasional brownish yellow			
5.00-5.45	U									
5.50	D					5.50 (0.50)	CHALK recovered as structureless chalk composed sandy subangular GRAVEL and COBBLES. Clasts are very weak low density off white. Matrix is off white and occasional brownish yellow. (Grade Dc).			
6.00-6.45 6.00-6.45 6.00-6.50	SPT N=12 D B			2,2/2,3,4,3		6.00 (1.50)	CHALK recovered as structureless chalk composed of off white and occasional brownish yellow slightly gravelly sandy silt. Gravel is very weak low density off white and subangular. (Grade Dm).			
7.00	D									
7.50-7.95 7.50-7.95 7.50-8.00	SPT N=14 D B			1,2/4,3,4,3		7.50 (1.50)	CHALK recovered as structureless chalk composed of off white and occasional dark brown slightly gravelly slightly sandy clayey silt. Gravel is extremely weak low density off white and subangular. (Grade Dm).			
8.50	D									
9.00-9.45 9.00-9.45 9.00-9.50	SPT N=18 D B			2,2/3,4,5,6		9.00	CHALK recovered as structureless chalk composed slightly silty sandy subangular GRAVEL and COBBLES. Clasts are weak low density off white. Matrix is off white and occasional brownish yellow. (Grade Dc).			
Remarks Hand dug inspection pit from GL to 1.20m to check for services - 1hr On completion backfilled with arisings and installed a 50mm dia slotted standpipe with a gas valve and a gravel surround to 5.00m, a Bentonite seal from 5.00m to 6.00m and 1.00m to 0.20m and a concreted in lockable steel protective cover from 0.20m to GL.								Scale (approx)	Logged By	
								1:50	MSB/SJ	
								Figure No. SE1540A.BH1		



Site

FORMER CALL BOY PUBLIC HOUSE, HARMER STREET,
GRAVESEND. KENT

Borehole

BH1

Boring Method

LIGHT CABLE PERCUSSIVE

Casing Diameter

150mm to 15.00m

Ground Level (mOD)

Client

CI FADON DEVELOPMENTS LIMITED

Job

Number
SF1540A

Location

AS PLAN

Dates

07/05/2020-
08/05/2020

Engineer

Sheet

2/2

Remarks

Scale (approx)

1:50

Logged
By

MSB/S.J

Figure No.

SE1540A.BH1

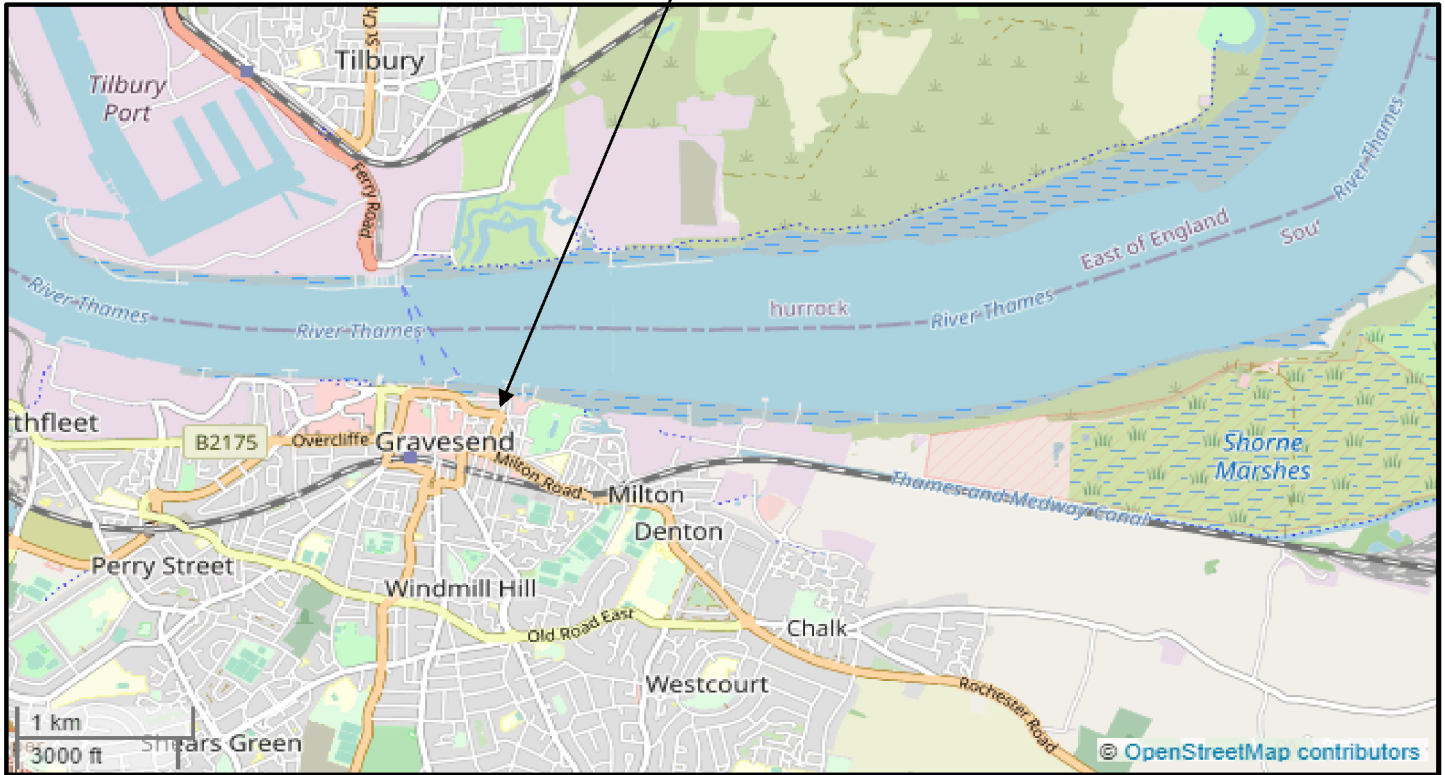
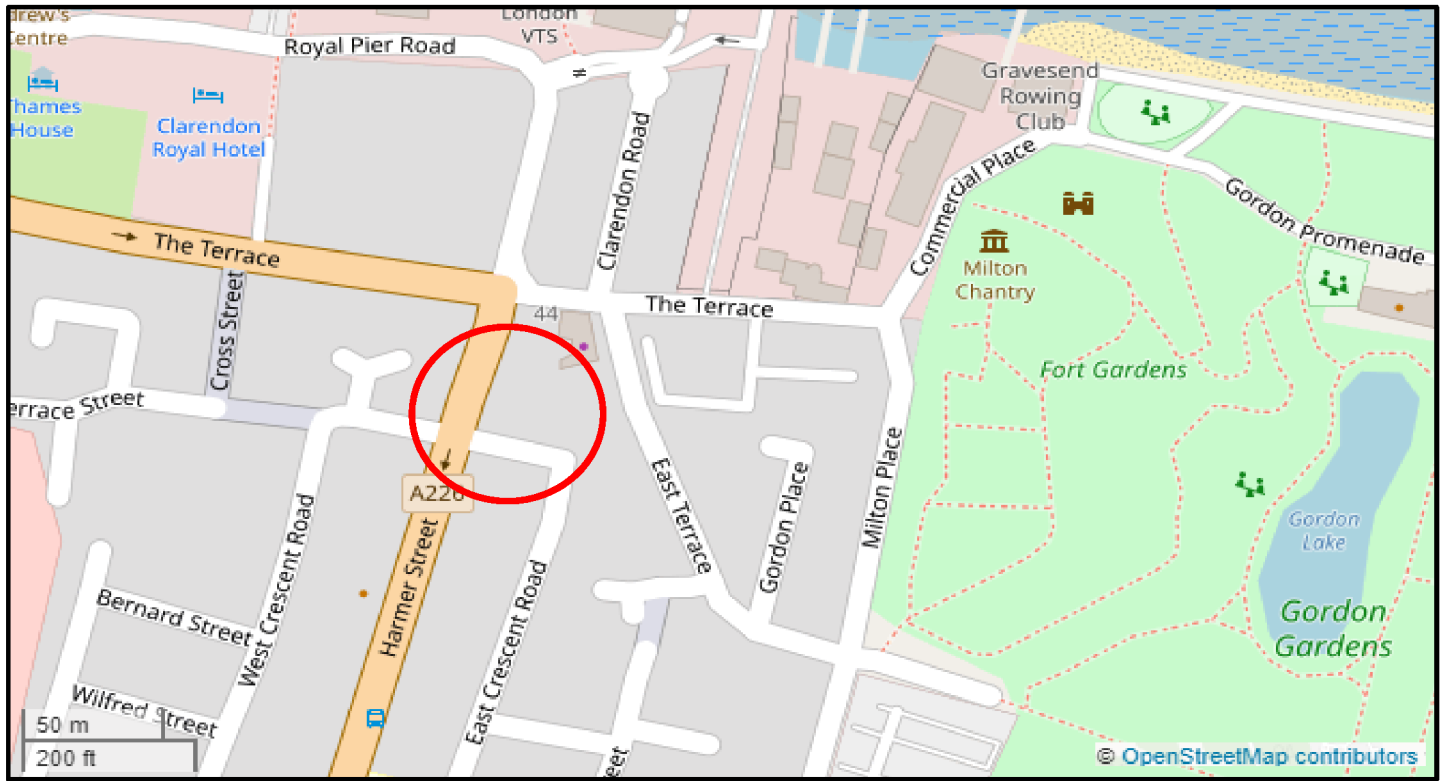
SUB SURFACE SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907							Site FORMER CALL BOY PUBLIC HOUSE, HARMER STREET, GRAVESEND, KENT		Borehole Number BH2	
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 200mm to 3.00m 150mm to 15.00m			Ground Level (mOD)		Client CLEADON DEVELOPMENTS LIMITED		Job Number SE1540A	
		Location AS PLAN			Dates 06/05/2020		Engineer		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-1.00	B					(1.20)	MADE GROUND: brown slightly silty very sandy fine to coarse gravel sized fragments of stone, concrete and brick with low cobble sized fragments of brick and occasional rootlets.			
1.20-1.45 1.20-1.45	SPT(C) 50/95 B			4,19/29,21		1.20 (0.90)	MADE GROUND: light brown slightly silty fine to coarse sand and fine to coarse gravel sized fragments of stone and brick with low cobble sized fragments of stone.			
2.00-2.45 2.20-2.70	SPT(C) N=7 B			7,3/1,1,2,3		2.10	CHALK recovered as structureless chalk composed of off white gravelly slightly sandy clayey silt. Gravel is extremely weak low density off white and subangular. (Grade Dm).			
3.00-3.45 3.00-3.45 3.00-3.50	SPT N=11 D B			2,2/2,2,3,4		(2.40)				
4.00-4.45	U									
4.50	D					4.50 (0.50)	CHALK recovered as structureless chalk composed of slightly sandy subangular GRAVEL and COBBLES. Clasts are very weak low density off white with occasional black specks. Matrix is off white. Occasional subangular flint. (Grade Dc).			
5.00-5.45 5.00-5.45 5.00-5.50	SPT N=14 D B			2,1/3,3,4,4		5.00	CHALK recovered as structureless chalk composed of off white and occasional brownish yellow and dark brown gravelly slightly sandy clayey silt. Gravel is extremely weak low density off white and subangular. Occasional angular to subangular flint. (Grade Dm).			
6.00-6.45 6.00-6.45 6.00-6.50	SPT N=12 D B			2,2/2,3,3,4		(2.50)				
7.00	D									
7.50-7.95 7.50-7.95 7.50-8.00	SPT N=11 D B			1,2/2,3,3,3		7.50	CHALK recovered as structureless chalk composed of off white and occasional brownish yellow and dark brown gravelly slightly sandy clayey silt. Gravel is extremely weak low density off white and subangular. Occasional angular to subangular flint.. (Grade Dm).			
8.50	D									
9.00-9.45	U					(3.00)				
9.50	D						 below 9.50m : no flint			
Remarks Hand dug inspection pit from GL to 1.20m to check for services - 2hrs On completion backfilled with arisings and installed a 50mm dia slotted standpipe with a gas valve and a gravel surround to 5.00m and 2.00m, a Bentonite seal from 5.00m to 6.00m, 2.00m to 2.50m and 0.50m to 0.10m and a concreted in lockable steel protective cover from 0.10m to GL.								Scale (approx)	Logged By	
								1:50	MSB/SJ	
								Figure No. SE1540A.BH2		

SUB SURFACE SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907						Site FORMER CALL BOY PUBLIC HOUSE, HARMER STREET, GRAVESEND, KENT		Borehole Number BH2		
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 200mm to 3.00m 150mm to 15.00m			Ground Level (mOD)		Client CLEADON DEVELOPMENTS LIMITED		Job Number SE1540A	
		Location AS PLAN			Dates 06/05/2020		Engineer		Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
10.00	D									
10.50-10.95 10.50-10.95 10.50-11.00	SPT N=20 D B			4,4/4,5,6,5		10.50	CHALK recovered as structureless chalk composed off off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt. Gravel is very weak low density off white and subangular. (Dm).			
11.50	D						 at 11.50m : occasional angular to subangular flint			
12.00-12.45 12.00-12.45 12.00-12.50	SPT N=19 D B			1,3/5,4,5,5						
13.00	D					(4.95)				
13.50-13.95 13.50-13.95 13.50-14.00	SPT N=22 D B			2,4/5,5,6,6 Water Inflow(1) at 13.70m, rose to 13.00m in 20 mins, not sealed.			 below 13.50m : occasional angular to subangular flint			
14.50	D									
15.00-15.45 15.00-15.45	SPT N=22 D			3,3/5,5,6,6		15.45	Complete at 15.45m			

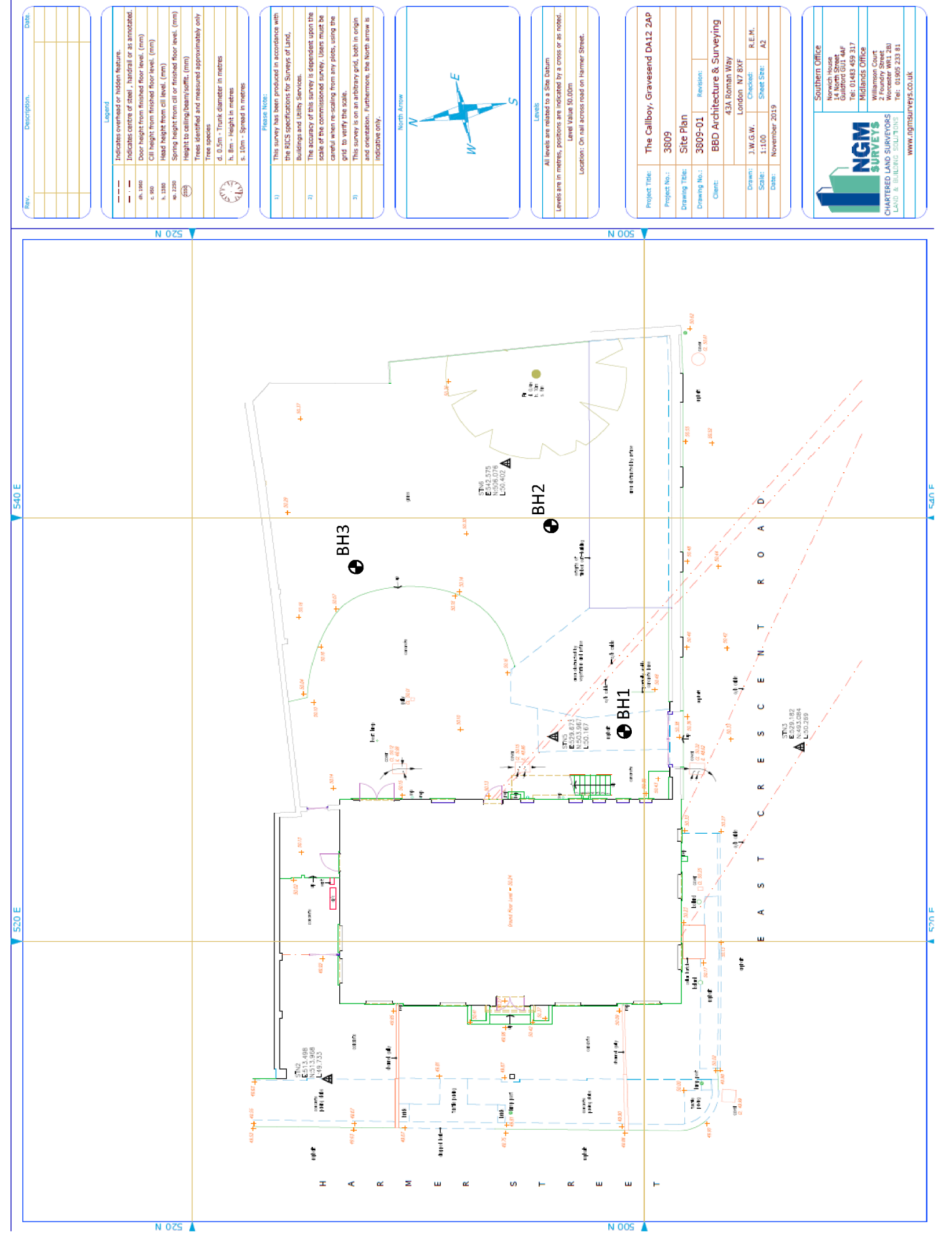
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Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 200mm to 3.00m 150mm to 15.00m			Ground Level (mOD)		Client CLEADON DEVELOPMENTS LIMITED		Job Number SE1540A	
		Location AS PLAN			Dates 07/05/2020		Engineer		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.50	B						MADE GROUND: friable dark brown gravelly sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and metal nails.			
0.50-1.00	B					(1.20)				
1.20-1.65 1.20-1.65	SPT(C) N=30 B			2,3/4,7,9,10		1.20 (1.00)	MADE GROUND: light brown slightly silty fine to coarse sand and fine to coarse gravel sized fragments of stone, brick and concrete with low cobble sized fragments of stone.			
2.00-2.45 2.20-2.70	SPT(C) N=5 B			3,1/1,1,1,2		2.20				
3.00-3.45	U					(1.80)	CHALK recovered as structureless chalk composed of slightly sandy subangular GRAVEL and COBBLES. Clasts are very weak low density off white with occasional black specks. Matrix is off white and occasional brownish yellow. Occasional angular to subangular flint. (Grade Dc).			
3.50	D									
4.00-4.45 4.00-4.45 4.00-4.50	SPT N=13 D B			3,3/3,4,3,3		4.00	CHALK recovered as structureless chalk composed of off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt. Gravel is extremely weak low density off white and subangular. (Grade Dm).			
5.00-5.45 5.00-5.45 5.00-5.50	SPT N=21 D B			2,4/5,6,7,3						
6.00-6.45 6.00-6.45 6.00-6.50	SPT N=19 D B			2,3/4,5,4,6		(4.00)				
7.00	D									
7.50-7.95	U						 at 7.00m : occasional flint			
8.00	D					8.00				
8.50	D					(1.00)	CHALK recovered as structureless chalk composed of sandy sandy subangular GRAVEL and COBBLES. Clasts are very weak low density off white with occasional black specks. Matrix is off white and occasional brownish yellow. (Grade Dc).			
9.00-9.45 9.00-9.45 9.00-9.50	SPT N=21 D B			3,5/6,4,5,6		9.00				
							CHALK recovered as structureless chalk composed of off white and occasional brownish yellow slightly gravelly slightly sandy clayey silt. Gravel is very weak low density off white and subangular. (Grade Dm).			
Remarks Hand dug inspection pit from GL to 1.20m to check for services - 1.5hrs On completion backfilled with arisings and installed a 50mm dia slotted standpipe with a gas valve and a gravel surround to 5.00m and 2.00m, a Bentonite seal from 5.00m to 6.00m, 2.50m to 2.00m and 0.50m to 0.10m and a concreted in lockable steel protective cover from 0.10m to GL.								Scale (approx) 1:50	Logged By MSB/SJ	
								Figure No. SE1540A.BH3		

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		Location AS PLAN		Dates 07/05/2020		Engineer		Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00	D						 at 10.00m : band of structureless chalk comprised of sandy subangular gravel and cobbles.		
10.50-10.95 10.50-10.95 10.50-11.00	SPT N=11 D B			2,2/2,2,3,4					
11.50	D						 at 11.50m : band of structureless chalk comprised of sandy subangular gravel and cobbles		
12.00-12.45 12.00-12.45 12.00-12.50	SPT N=15 D B			2,3/4,3,4,4		(6.45)			
13.00	D								
13.50-13.95 13.50-13.95 13.50-14.00	SPT N=17 D B			1,2/3,5,4,5			 at 13.50m : occasional angular to subangular flint		
14.50	D								
15.00-15.45 15.00-15.45	SPT N=17 D			2,4/4,4,4,5		15.45			
				07/05/2020: DRY			Complete at 15.45m		
Remarks								Scale (approx) 1:50	Logged By MSB/SJ
								Figure No. SE1540A.BH3	

FIGURES



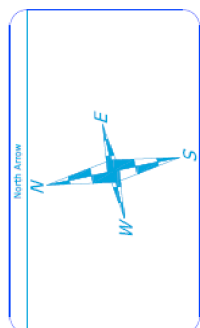
 SUB SURFACE SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907	Site Location			
Site FORMER CALLBOY PUBLIC HOUSE, HARMER STREET, GRAVESEND, KENT	Date Drawn 03/07/2020	Date Checked	Orientation 	Job No. S1540A
Client: CLEADON DEVELOPMENTS LIMITED	Drawn By DJ	Checked By	Scale As Shown	Figure No. 1



Rev.	Description	Date

Legend	
---	Indicates overhead or hidden feature.
---	Indicates centre of steel, handrail or as associated.
dh. 1360	Door height from finished floor level. (mm)
h. 900	Cill height from finished floor level. (mm)
h. 1300	Head height from cill level. (mm)
sh. 1320	Spring height from cill or finished floor level. (mm)
---	Height to ceiling/beam/skirt. (mm)
---	Trees identified and measured approximately only
---	Tree species
d. 0.5m	Trunk diameter in metres
h. 8m	Height in metres
s. 10m	Spread in metres

Please Note:	
1)	This survey has been produced in accordance with the RICS specifications for Surveys of Land, Buildings and Utility Services.
2)	The accuracy of this survey is dependent upon the scale of the commissioned survey. Users must be careful when re-scaling from any plots, using the grid to verify the scale.
3)	This survey is on an arbitrary grid, both in origin and orientation. Furthermore, the North arrow is indicative only.



Levels	
All levels are related to a Site Datum	
Levels are in metres, positions are indicated by a cross or as noted.	
Level Value 50.00m	
Location: On rail across road on Harmer Street.	

Project Title:	The Callboy, Gravesend DA12 2AP
Project No.:	38009
Drawing Title:	Site Plan
Drawing No.:	38009-01
Revision:	
Client:	BBD Architecture & Surveying
	43A Roman Way
	London N7 8XF
Drawn:	J.W.G.W.
Scale:	1:100
Checked:	R.E.M.
Sheet Size:	A2
Date:	November 2019



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Southern Office
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Tel: 01483 459 317

Midlands Office
Williamson Court
2 Woodville Road
Worcester WR1 2BJ
Tel: 01902 233 81

	SUB SURFACE		Locations of Boreholes			
	SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS					
	3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907					
Site	FORMER CALLBOY PUBLIC HOUSE, HARMER STREET, GRAVESEND, KENT		Date Drawn 03-Jul-20	Date Checked	Orientation 	Job No. S1540A
Client	CLEADON DEVELOPMENTS LIMITED		Drawn By DJ	Checked By	Scale —	Figure No. 2

- Do not scale from this drawing.
- All dimensions to be verified on site.
- Builder to verify all dimensions, heights and levels prior to commencement of work.
- All documents shall be checked to ensure that they are compatible by the contractor before construction commences. In the event of apparent ambiguity or contradiction the engineer and/or architect shall be notified immediately.
- The contractor in preparing his estimate shall visit the site and acquaint himself with the problems involved.
- The contractor shall issue all statutory notices to the local Authority during progress and completion of works.

Scale
1:500

Project Title
CALL BOY
Harmer street,
Gravesend.
DA12 2AP

Drawing Title

- Site Location Plan
- Existing and Proposed:

- **Block Plans**
- **Basement Plans**

DW'G No.

Date 7/08/17

Rev. 12

EA



BARRONEDWARDS
PLANNING & ARCHITECTURE

399 Wrotham Road.
Gravesend, Kent DA11 0PN.

t: 01474 24778
w: <http://barronwards.co.uk>
e: info@barronwards.co.uk



Existing Book Plan (200)



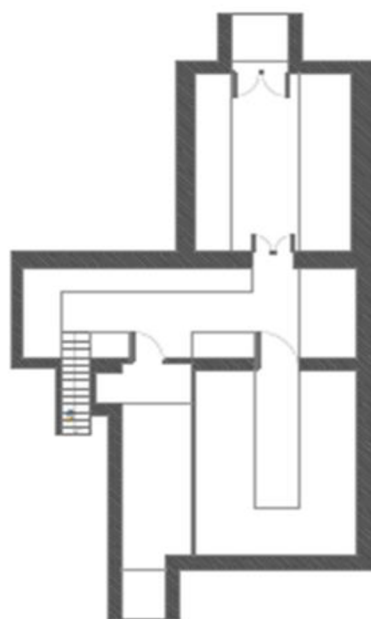
Approved Budget Plan (2000)



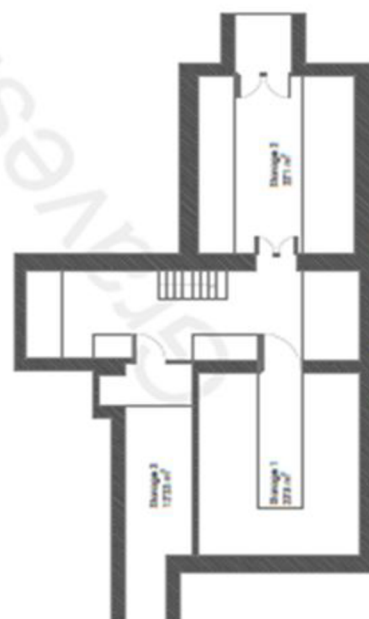
[Colored View from street](#)



The Location Plan (1930)



Colony Investment Plan 4100



Proposed Amendment Plan 1/1/00



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site
FORMER CALLBOY PUBLIC HOUSE, HARMER STREET,
GRAVESEND, KENT

Client
CLEADON DEVELOPMENTS LIMITED

Proposed Development

Date Drawn	03-Jul-20
------------	-----------

Date Checked



Job No.	S1540A
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Drawn By	DJ
----------	----

Checked By	
------------	--

Scale	
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Figure No.	3
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