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LAND AT LAWNFIELD HOUSE, MAIDENHEAD

Site Investigation & Ground Assessment

Prepared for:

Whitberry Limited

Report Ref: BEK-23079-2 Rev A

October 2023

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Project Quality Assurance Information Sheet

Site	Land at Lawnfield House, Maidenhead
Report Title	Site Investigation & Ground Assessment
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Date	October 2023
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REVISION STATUS / HISTORY

Rev	Date	Issue / Comment	Prepared	Checked
A	06/10/23	Addition of amended proposed development	A Hope	MB

GENERAL REPORT LIMITATIONS

BEK Enviro Limited (BEK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and BEK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by BEK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of BEK and the party for whom it was prepared. Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

Unless explicitly agreed otherwise, in writing, this report has been prepared under BEK's limited standard Terms and Conditions as included within our proposal to the Client.

The report needs to be considered in the light of the BEK proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Appointment

1.1.1 BEK Enviro (BEK) have been commissioned by 'Whitberry Limited' to carry out a site investigation & contamination assessment for the land located at Lawnfield House, Maidenhead (hereafter referred to as 'the site'). The site investigation will inform a quantitative risk assessment with respect to contamination and ground gas and provide recommendations for foundation design site considering the development proposals.

1.1.2 The site occupies an irregular shaped plot of land of approximately 4100 m^2 and is occupied by two large detached buildings which make up the residential development at No 6 Westmorland Road. The buildings are surrounded by well-maintained gardens and an access road/parking in the west. There are numerous mature/semi-mature trees around the site boundaries.

1.1.3 The site location and layout is illustrated on BEK Drawing No 23079-1 and 23079-2 copies of which are presented in Appendix E.

1.2 Proposed Development

1.2.1 This report has been produced to support a planning application for the construction of a 3 storey residential care home with associated car parking, access and landscaped areas.

1.2.2 The proposed development plan is shown on RM Design Group Drawing 'Proposed Site Plan', Drawing No: 42, Project No: B01-02, dated August 2023, a copy of which is presented in Appendix E.

1.3 Objective & Scope of Work

1.3.1 The site investigation was undertaken by BEK during June 2023 in accordance with the recommendations detailed in the BEK Preliminary Risk Assessment (PRA) (Report Ref: 23079-1, dated June 2023).

1.3.2 This report has been prepared to provide a summary of the site details and ground conditions encountered as well as a quantitative assessment of the potential pollutant linkages identified within the PRA.

1.3.3 The PRA should be read in conjunction with this report.

1.4 Limitations

1.4.1 The conclusions and recommendations presented in this report are the result of our professional interpretation of the information currently available. BEK reserve the right to amend the conclusions and recommendations if further information becomes available.

1.4.2 However, it should be noted that much of the information has been derived from reports written by others and BEK takes no responsibility for the accuracy of that information. Notwithstanding the above, the reports reviewed have all been written by professional environmental consultants with a duty of care to provide relevant and accurate information.

1.4.3 The comments given in this report and the opinions expressed are based on review of reports provided to BEK, ground conditions encountered during site works and the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigations and therefore could not be taken into account.

1.4.4 The presence of invasive plant species (ie Japanese Knotweed) is outside the remit of this assessment.

2. BACKGROUND INFORMATION

2.0.1 This section provides an overview of the findings and recommendations presented in the PRA.

2.1 Site Location, Layout & History

2.1.1 The site is located at Lawnfield House, approximately 0.75 km west of Maidenhead and some 9 km north-west of Windsor. The National Grid Reference for the centre of the site is 487844, 181048.

2.1.2 The site occupies a square shaped plot of land some 4100 m^2 which is occupied by two large detached residential dwelling in the north-west of the site and generally occupies overgrown grasses and reeds across the majority of the site with some semi-mature trees around the site boundaries.

2.1.3 The majority of the site boundaries consist of wooden panel fencing, which separate the site from adjacent properties to the east. The south-eastern site boundary is open to a gravel/tarmac access road. Large stone bunds separate the road from the site. Gravels were also present on site, along the south-eastern site boundary

Site History

2.1.4 The earliest available maps dating from 1975 show the site to be vacant with the exception of a wooded area in the north-east corner. Circa 1897 a large residential property is located near the center of the site surrounded by gardens. The building configuration changes slightly overtime with extensions to the east and by 1954 the extension is separate from the main residential building. There are no signific at changes to the site over time with the exception of a greenhouse located to the south of the building and another in the east of the site; these are absent from 1993.

2.1.5 The offsite history is generally characterized by residential dwellings. A gravel pit appears 105 m north of the site circa 1875. A garage is located adjacent to the north-east site boundary from 1954. The garage appears on the maps until present. It is unclear if the garage was used to sell fuel/service or repair vehicles, although the current layout does suggest that more recently it was a car showroom.

2.2 Environmental Setting

Geology

2.2.1 BEK has sought site investigation information from the BGS website. There are four BGS boreholes available to view within 250 m of the site. The boreholes reviewed and their distance/directions from the site are provided within Table 1.

Borehole Reference	Distance/Direction	Date	Borehole Depth (m)
SU88SE165	64 m West	September 1990	6.0
SU88SE164	81 m North-West	September 1990	6.0
SU88SE167	114 m West	September 1990	6.5
SU88SE166	127 m West	September 1990	6.0

Table 1: Summary of Reviewed Boreholes

2.2.2 The boreholes encountered 'gravelly and topsoil' to depths varying from 0.1 m to 0.2 m overlying 'clayey sandy gravel' to depths varying from 6.0 m (SU88SE165) to 3.9 m (SU88SE166). The majority of boreholes encountered 'firm rubbly chalk' to the base of the boreholes at 6.0 m (SU88SE166, SU88SE164, SU88SE165), to 6.5 m (SU88SE167).

2.2.3 According to the Enviro+GeoInsight Report there are no record of artificial deposits (made ground) within 250 m of the site. However, as the site has been subject to significant development BEK considers it highly likely that significant made ground will be present.

2.2.4 The superficial deposits consist of Boyn Hill Gravel Member (sand and gravel). This strata has a high permeability. This is congruent with the BGS records reviewed within close proximity to the site.

2.2.5 The underlying solid geology comprises of the Seaford Chalk Formation and Newhaven Chalk Formation' which is dominated by chalk. This strata has a moderate to very high permeability.

Linear Features

2.2.6 There are no linear features/faults located within 250 m of the site

Mining and Ground Stability

2.2.7 Information in the Enviro+GeoInsight Report indicates that the site is not located in an area which could be affected by past, current or future coal mining.

2.2.8 There is one BritPit record located 187 m south-west of the site, named 'Rutland Road Gravel Pit'.

2.2.9 There are five surface ground workings within 250 m of the site, the closest of which is located 147 m south-west of the site, described as an Unspecified Pit'.

2.2.10 There are six natural cavities recorded within 250 m of the site. The closest of which is located 62 m south-west of the site.

2.2.11 Hazard ratings associated with ground subsidence at the site, as summarised below:

Shrink-Swell Clay: Negligible
Landslides: Very Low
Dissolution of Soluble Rocks: Very Low
Compressible Deposits: Negligible
Collapsible Deposits: Very Low
Running Sands: Very Low

2.2.12 It can be seen from the above that the site is unlikely to be affected by natural ground instability issues.

Hydrogeology

2.2.13 The underlying Boulder Clay is classified by the Environment Agency (EA) as 'Secondary A Aquifer'. These aquifers are described as 'permeable layers capable if supporting local water supplies at a local rather than strategic scale and in some cases forming an important source for base flow to rivers.

2.2.14 The bedrock is classified as a 'Principle Aquifer' which is described as 'geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale'

2.2.15 The site is located within type 1 & 2 groundwater source protection zone.

Hydrology

2.2.16 There are no surface water features on or within 250 m of the site.

2.2.17 There are no licensed water discharge consents or surface water abstractions within 250 m of the site.

Contaminated Land & Landfill Activities

2.2.18 There are no records of current/historic landfills or waste management facilities located on/within 250 m of the site.

2.2.19 There are no registered waste exemptions located within 250 m of the site.

2.2.20 There has been no EA recorded pollution incidents within 250 m of the site.

2.2.21 There are no NIHHS or COMAH sites, recorded Part A(1), Part A(2), or IPPC Authorised Activities within 250 m of the site.

2.2.22 There are two registered Part B processes situated within 250 m of the site as summarized in Table 2.

Location	Address	Process	Status	Enforcement Date
48 m North-east	Whichford Honda, 14-20 Bath Road, Miadenhead, Berks, SL6 4JT	Unloading of Petrol into Storage at Services Stations	Historical Permit	No
111 m North	Boyn Hill Garage, Bath Road, Maidenhead, SL6 3BQ	Waste oil burner 0.4 MW	Historical Permit	No

Table 2: Waste exemptions registered on/within 250 m of the Site

2.2.23 There is a garage located adjacent to the north-east site boundary. It is unclear if the garage was used to dispense fuel or repair vehicles in the past, however, the more recently the garage has been used as a cat showroom.

2.2.24 According to the Enviro+GeoInsight Report there are six potentially contaminative industrial sites located within 250 m of the site, the closest of which is an electricity substation, located 130 m north-east of the site. This is unlikely to have impacted the site.

<u>Sensitive Land Use</u>

2.2.25 The site is not affected by any of the ecological systems identified as a statutory receptor in the DETR Circular 01/2006.

<u>Radon</u>

2.2.26 <1 % and 3 % of the homes are affected by Radon' and that no radon protective measures are not required.

<u>Unexploded Ordnance</u>

2.2.27 The regional unexploded bomb risk map from Zetica indicates that the site is in an area of LOW risk from Unexploded Ordnance (UXO) resulting from the Second World War.

2.2.28 BEK do not consider any further assessment to be required with respect to UXO.

2.3 Preliminary Conceptual Model

2.3.1 This section identifies the potential contaminants of concern, sources, pathways and receptors that may be associated with the site based on its known history and the current condition and with respect to the redevelopment of the site for residential use.

2.3.2 The preliminary conceptual model is summarised in the following table:

Link	Source	Hazard	Transport Mechanism	Pathway	Medium of Exposure	Receptor	Risk Summary*
1	Contaminated soils	Direct contact /ingestion of soil or dust	Direct contact with contaminated soil	Dermal contact/ingestion of soil at surface	Soil	Humans (on-site/off-site), domestic pets	Low
2	Contaminated soils	Particulate inhalation	Wind blown particulates	Inhalation of particulates	Air	Humans (on-site/off-site), domestic pets	Low
3	Contaminated Soils	Impaired produce growth	Uptake of contaminants by homegrown produce resulting in loss	Uptake during growth	Vegetable produce	Property (domestic produce)	Low
4	Contaminated Soils	Ingestion of Contaminants	Uptake of contaminants by homegrown produce	Consumption of homegrown produce	Vegetable produce	Humans	Low
5	Contaminated Soils	Vapour Inhalation	Volatalisation of organic compounds through unsaturated zone of soil leading to inhalation	Inhalation of Vapours	Air	Humans (on-site/ off-site, domestic pets)	Low
6	Contaminated Soils	Damage to structure/services	Direct contact of contaminants with building structures/services	Direct contact	Soil/Water	Flora, services	Low
7	Contaminated Soils	Pollution of underlying groundwater	Dissolution or suspension of contaminants into groundwaters (Superficial Secondary A and Bedrock Principle Aquifers)	Dissolution or Suspension	Water	Groundwaters	Low-Medium

Table 3: Preliminary Conceptual Model

*Relative Risk Screening and Prioritisation for further Investigation & or Assessment

High	Higher probability of occurrence and identification of primary sources of contamination with respect to most sensitive receptors.
Medium	Pollutant linkage generally dependent on the presence of other primary pollutant linkages and/or where pollutant linkage generally associated with less sensitive receptors.
Low	Lower probability of occurrence such as based on requirement for significant migration pathway or where pollutant linkage requires the presence of source contaminants at concentration likely to be much higher than other identified pollutant linkages.

3. SITE INVESTIGATION

3.1 General

3.1.1 This section provides a summary of the site investigation works undertaken by BEK during June 2023.

3.1.2 The site investigation has been designed to provide indicative information for the ground conditions across the site and to provide a quantitative assessment of potential risks associated with contamination and ground gas.

3.1.3 Eight exploratory locations were set out by the site engineer to establish representative conditions at the site. The exploratory locations are illustrated on BEK Drawing No 23079-3, a copy of which is presented in Appendix E.

3.2 Window Sample Boreholes

3.2.1 Five window samples were drilled using a window sample borehole rig to a maximum depth of 5 m and dynamic probe to 10 m. Borehole locations were set out by the site engineer in order to establish representative conditions at the site. In-situ testing (SPTs) were carried out in each of the boreholes.

3.2.2 The ground conditions were recorded by an engineer from BEK and samples were recovered for chemical testing.

3.2.3 Copies of the borehole records are presented in Appendix A.

3.3 Machine Excavated Trial Pits

3.3.1 Three excavated trial pits were excavated across the site using a 6 tonne tracked excavator to expose the natural strata.

3.3.2 Representative samples were recovered for chemical and geotechnical testing in accordance with the requirements set out in the PRA.

3.3.3 The ground conditions were recorded by an engineer from BEK and copies of the trial pit records are presented in Appendix A.

3.3.4 All exploratory locations were set out by the site engineer and the exploratory locations are illustrated on BEK Drawing No 23079-3 presented in Appendix E.

3.4 Infiltration Testing

3.4.1 Three soakaway test were carried out to assist with the drainage assessment.

3.4.2 The soakaway locations were set out by the site engineer and the exploratory locations are illustrated on BEK Drawing No 23079-3 are presented in Appendix E.

3.5 Laboratory Testing

Chemical Testing

3.5.1 Following a review of the ground conditions, BEK selected nine samples for chemical testing based on the recommendations set out in the PRA and ground conditions encountered during the investigation.

3.5.2 The samples were delivered to the UKAS laboratory of Envirolab for the following selected analysis:

Eight samples were tested for a standard BEK soil suite which includes: Arsenic (Total), Cadmium (Total), Copper (Total), Lead (Total), Nickel (Total), Zinc (Total), Chromium (Total), Selenium (Total), Mercury (Total), Boron (Soluble), Hexavalent Chromium, Cyanide (Total), pH, 16 EPA Poly-Aromatic Hydrocarbons (PAH), Total Phenols, Total Sulphate, Sulphate 2:1 extract, Soil Organic Matter, Total Petroleum Hydrocarbons (TPH-CWG).

3.5.3 Two samples were tested for Asbestos ID

3.5.4 Copies of the chemical test results are presented in Appendix B.

3.6 Ground Conditions

Made Ground

3.6.1 No Made Ground was identified within any of the exploratory locations.

Topsoil

3.6.2 Topsoil was encountered within all of the exploratory locations within the site investigation. The topsoil was generally described as two main sub types:

'Reddish brown slightly clayey significantly gravelly sand. Sand is fine to coarse. Grave is fine to medium flint gravels. Frequent rootlets' - this strata was identified from the surface in Borehole WS1 to 0.4 m, and in Borehole WS4 to 0.9 and in of Borehole WS5 to 0.5 m, in Trial Pit TP1 to 0.4 m and in Trial Pit TP3 to 0.3 m.

'Greyish brown gravelly sand. Sand is fine to coarse. Gravel is fine to coarse flint- this strata was identified at the surface of Boreholes WS2, WS3 and Trial Pit TP2 to 0.5 m, 0.9 m and 0.4 m.

Superficial Deposits

3.6.3 The superficial strata of sand was encountered below the topsoil all locations with the exception of WS3. This strata ranged from 'Very loose to very dense' with each exploratory location.

Bedrock

3.6.4 The bedrock was not encountered during the site investigation works.

Visual/Olfactory Contamination

3.6.5 No visual/olfactory evidence of contamination was encountered during the site investigation.

Groundwater

3.6.6 Groundwater was not encountered within any of the exploratory locations during the site investigation.

3.7 Dynamic Cone Penetrometer

3.7.1 A total of 3 TRL dynamic cone penetrometer (DCP) locations were progressed across the site to a maximum depth of 1 m below ground level in order to provide an indicative CBR value for the shallow ground on site. The DCP locations were progressed at the location of the trial pits.

3.7.2 The results of the TRL results are presented in Appendix C.

3.7.3 The TRL Probe test locations are presented in Appendix E of this report.

3.8 Infiltration Testing

3.8.1 The site investigation works included an infiltration test to determine soil infiltration rates using the BRE 365 (2016) methodology to assess the viability of disposal of surface water from the site via infiltration.

3.8.2 BEK undertook three infiltration tests within two trial pits at the site in accordance with BRE 365 (2016) methodology.

3.8.3 The results of infiltration testing indicates an infiltration rate varying between 1.28 $x 10^{-4}$ (Trial Pit 1 Test 1) and 3.61 $x 10^{-5}$ (Trial Pit 2 Test 1) at the development site.

3.8.4 The locations of the infiltration test pits are included within Appendix E and copies of the infiltration test results are presented in Appendix D.

4. CONTAMINATION RISK ASSESSMENT

4.1 Potentially Significant Pollutant Linkages

4.1.1 Potentially significant pollutant linkages have been identified in Section 5 of this report as listed below:

(i) Human Health - risks associated with contamination in the made ground and/or natural strata: risk via ingestion (soil or homegrown produce), inhalation (dust or vapour) or direct contact.

(ii) Human Health - risks associated with indoor inhalation of volatile organic compounds and/or ground gas.

(iii) Controlled Waters - risks associated with contamination in the made ground and/or natural strata affecting the quality of water held within the bedrock aquifer. Risk are associated with dissolution of contamination and vertical migration to the bedrock Principal Aquifer.

(iv) Property (including services and flora) - risks associated contamination affecting concrete, service pipes and flora.

4.2 Risk Assessment: Human Health Risks from Exposure to Contaminated Soil

4.2.1 The risks to human health have been assessed by inspection of shallow soils for the presence of elevated contaminants based on the expected contaminant findings detailed in the conceptual model and completion of a quantitative risk assessment.

4.2.2 The soil contamination concentrations have initially been compared to a range of generic assessment criteria. These include the use of the Land Quality Management and Chartered Institute of Environmental Health assessment criteria (S4ULs), the Contaminated Land: Applications in Real Environments assessment criteria (CL:AIRE) Category 4 Screening Levels (C4SLs) and the ATKINS ATRISK Screening Criteria.

4.2.3 These assessment criteria have been derived using the CLEA model and fully justified input parameters. The derivation of the assessment criteria assumes a residential end use without home grown produce. The initial assessment assumes a soil organic matter (SOM) of 1% as a conservative approach.

4.2.4 Table 4 summarises the chemical test results for the samples tested and lists the relevant assessment criteria and the samples with a concentration in excess of the assessment criteria. Note that only determinands with a concentration above the laboratory limit of detection are presented in the table below:

Determinand	Range of Concentrations (mg/kg)	Assessment Criteria (mg/kg)	Samples Fail
Arsenic	6 – 10	40^1	---
Cadmium	<0.5 – 0.9	85^1	---
Copper	5 - 26	7100^1	---
Chromium	15 - 21	910^1	---
Lead	7 - 225	330^2	---
Mercury	<0.17 – 0.5	56^1	---
Nickel	11 - 16	180^1	---
Zinc	1 - 199	430^1	---
Acenaphthene	<0.01 - 0.01	3000^1	---
Acenaphthylene	<0.01 - 0.04	2900^1	---
Anthracene	<0.02 - 0.06	3100^1	---
Benzo(a)anthracene	<0.04 - 0.39	11^1	---
Benzo(a)pyrene	<0.04 - 0.53	5.3^2	---
Benzo(b)fluoranthene	<0.05 - 0.61	2.6^1	---
Benzo(ghi)perylene	<0.05 - 0.35	360^1	---
Benzo(k)fluoranthene	<0.07 - 0.25	110^1	---
Chrysene	<0.06 - 0.46	30^1	---
Dibenzo(ah)anthracene	<0.04 - 0.07	0.31^1	---
Fluoranthene	<0.08 – 0.76	1500^1	---
Indeno(123-cd)pyrene	<0.03 - 0.36	45^1	---
Phenanthrene	<0.03 - 0.26	1300^1	---
Pyrene	<0.07 - 0.66	3700^1	---
Ali HCs >C8-C10	<1 - 1	27^1	---
Ali HCs >C21-C35	<1 - 11	65000^{*1}	---
Aro HCs >C8-C10	<1 - 3	47^{*1}	---
Aro HCs >C10-C12	<1 - 3	250^1	---
Aro HCs >C12-C16	<1 - 7	1800^1	---
Aro HCs >C16-C21	1 - 65	1900^1	---
Aro HCs >C21-C35	<1 - 28	1900^1	---
Asbestos ID	0 of 8 samples	N.A.D	---

Table 4: Summary of Elevated Contaminants of Concern in Soils

1 CIEH/LQM Derived Assessment Criteria (S4ULs based on 1% SOM)

4.2.5 It can be seen from the above table that there are no elevated contaminants of concern when the soil chemical test results for the site are compared against assessment criteria for a residential (without home grown) end use.

4.2.6 None of the samples tested positive for asbestos at the site.

4.4 Risk Assessment: Controlled Waters

4.4.1 Potential risks to the quality of groundwater has been identified in the ground conceptual model.

4.4.2 The underlying superficial aquifer is classified as Secondary A Aquifer and the bedrock is classified as a Principle Aquifer represents a potential. The PRA indicates that pollution of groundwaters could occur through the vertical migration of leachable contaminants, however the presence of laterally continuous impermeable superficial deposits across the site will likely inhibit vertical migration of contamination to the underlying superficial and bedrock aquifer.

4.4.3 The superficial strata comprises of sand any water trapped/ held within the deposits are considered to represent a sensitive receptor. The site investigation works confirmed the presence of laterally continuous sand across the site. Hydraulic continuity between perched water trapped above the Boulder Clay and the deep aquifer is considered likely. The presence of laterally continuous permeable superficial deposits across the site will likely enable vertical migration of contamination to the underlying bedrock.

4.4.4 In any case the profile of contamination across the site from the intrusive site investigations is very low and no significant contamination is considered to be present. Risk to controlled waters are therefore considered to be negligible.

4.5 Risk Assessment: Buildings

4.5.1 Risks to buildings include the assessment of the aggressive nature of the shallow ground with respect to concrete, the risks to the degradation of water pipes and flora due to contamination.

Risk to Concrete

4.5.2 To assess the potential risks to concrete, BEK has compared the previous site investigation data to assessment criteria presented in the BRE Special Digest 1: Concrete in Aggressive Ground.

4.5.3 The sulphate concentrations (water soluble 2:1) in the shallow ground range between <0.01 to 0.02 g/l which fall below the maximum concentration for the BRE 2:1 water/soil extract concentration of Class DS-1 concrete.

4.5.4 With consideration to the range of pH values 6.61 to 8), the concrete classification suitable for the site would be DS-1 AC-1d.

Risks to Services

4.5.5 Potable water supply pipes can be at risk from degradation if the shallow ground consists of specific organic contamination. Guidance published by UK WIR includes a methodology for the site investigation and risk assessment to determine pipe specification.

4.5.6 For brownfield sites, site investigation may be required along the intended route of the water pipeline and samples recovered from specific depths and tested for specific contaminants of concern.

4.5.7 On the basis of the ground conditions encountered, risks to water supply pipelines are considered to be low, however it is recommended that consultation is undertaken with the water service supplier to confirm this.

Risks to Flora

4.5.8 Copper, nickel and zinc are toxic to plants. The effects of copper, nickel and zinc are often regarded as additive.

4.5.9 The assessment criteria used for copper, nickel and zinc, are 'pseudo total concentrations' are derived from BS3882:2007 as follows:

Phytotoxic Contaminant	pH Range		
	<6.0	6.0 to 7.0	>7.0
Zinc (nitric acid extractable)	<200	<200	<300
Copper (nitric acid extractable)	<100	<135	<200
Nickel (nitric acid extractable)	<60	<75	<110

Table 5: Limits for Phytotoxic Contaminants (Units mg/kg)

4.5.10 By comparing the chemical test results (Appendix B) to the concentrations in the above table, it can be seen that there are no elevations of phytotoxic contaminants of zinc copper or nickel within the topsoil located at the site.

4.6 Risk Assessment: Conclusions

4.6.1 Topsoil was identified within all exploratory locations, to a maximum depth of 0.9 m. The topsoil was generally described as 'Reddish brown slightly clayey slightly gravelly sand. Sand is fine to coarse. Gravel is of fine to medium flint fragments. Frequent rootlets' – this strata was identified from the surface of Borehole WS1, WS4, WS5 and Trial Pit TP1 and TP3 to 0.4 m, 0.9 m, 0.5 m, 0.4 m and 0.3 m respectively. The superficial sand was encountered below the topsoil in all locations.

4.6.2 Representative samples recovered from the site investigation have been tested for a wide range of contaminants of concern in accordance with the recommendations outlined within the PRA and based on the observations made during the site investigation.

4.6.3 The chemical test results have been compared to relevant generic assessment criteria to identify potential contaminants of concern. Based on the contamination assessment herein and with respect to the redevelopment of the site for residential use without home grown produce, there are no identified contaminants of concern at the site.

4.6.4 Risks to controlled waters are considered to be negligible and potential risk to service pipes are considered to be very low/negligible but advice should be sought from the water supply provider.

4.6.5 Risks to concrete are considered to be low and concrete classification of DS-1 AC-1d will be suitable.

5. GEOTECHNICAL ASSESSMENT

5.1 General

5.1.1 The proposed development consists of the construction of a two storey residential care home with external car parking areas and landscaping. It is presumed that the care home will be constructed using loadbearing masonry, a tiled covered trussed rafter roof and suspended concrete floors. The guidance given herein will therefore need to be reviewed in terms of the actual building type to be adopted, by a suitably qualified and experienced engineer.

5.1.2 Site investigation has confirmed that the site is overlain with topsoil varying in thickness from 0.4m to 0.9m; the topsoil is generally described as reddish/brown gravelly sand. Underlying the topsoil in Borehole WS1 is very dense gravelly sands which extend to the base of the borehole. In WS2 the topsoil is underlain with a band of slightly sandy clay down to 1.5 m, beneath which is a band of gravelly sand to 3.2 m before medium dense gravelly sands are found, which extend to the base of the borehole. At WS3 and WS4, the topsoil is underlain with very dense sandy gravels which extend to the base of the borehole. At WS5, the topsoil is underlain with a band of loose gravelly sand to a depth of 1.4m before a band of very loose sandy gravel is encountered to a depth of 3.4m before loose gravelly sand is encountered, which extends to the base of the borehole.

5.1.3 Groundwater was not encountered in any of the boreholes during the course of the investigation. Bedrock is not believed to have been encountered.

5.1.4 Standard Penetration Tests (SPT) were conducted in the window sample boreholes, starting at a depth of 1.0 m and repeated at 1.0 m levels from 2.0 m onwards. The SPT results are summarised in Table 6 below.

Locations	Depth of Test (m)			
	1.0 – 1.45m	2.0 – 2.45m	3.0 – 3.45m	3.0 – 3.45m
WS1	>50	-	-	-
WS2	8	25	22	20
WS3	>50	-	-	-
WS4	54	-	-	-
WS5	6	2	4	4

Table 6: Window Sample SPT 'N' Results

5.1.5 From the trial pit logs, it can be seen that the topsoil has a relatively consistent depth of between 0.3 m and to 0.4 m. The topsoil is made up of reddish/brown gravelly sand. Underlying the made ground at all locations is slightly gravelly, clayey sands which extend to the base of the trial pits.

5.1.6 Groundwater was not encountered in any of the trial pits and bedrock was not believed to have been found. As non-cohesive soils were identified, samples for plasticity analysis have not been taken. Volume change potential of the underlying soils is not relevant.

5.2 Assessment and Conclusions

5.2.1 The site investigation has indicated that the underlying soils to the perimeter of the site in Borehole WS1 to WS4 are dense sands and gravels. The SPT results indicate that these soils have a high bearing capacity of at least 90 kN/m^2 at a depth of 1.0 m beneath the surface which increases to over 200 kN/m^2 from 2.0 m depth and greater. Of concern is the results obtained from Borehole WS5 which is located near the centre of the site. Results at formation level and down to 4.0 m indicate that these soils are very loose, with a possible bearing capacity as low as 25 kN/m^2. It is possible that this is a localised defect, for which further investigation may clarify. The material found in Borehole WS5 would suggest that simple foundations will not be sufficient.

5.2.2 The proposed building is presumed to be of masonry construction with concrete suspended floors and a tiled trussed rafter roofing system. This is likely to generate loadings from 60 to 70 kN/m to the foundations. Based upon the findings in Borehole WS5, this would require the installation of a pile and ground beam foundation system. Measures to improve the softer ground could be considered and the adoption of vibro replacement or dynamic compaction may be beneficial. All foundations, however, must be formed on the same foundation type, to alleviate potential differential settlements.

5.2.3 All formations must be checked on site to confirm that the design bearing capacity is extent before foundations are installed. Should areas of poor ground be encountered, the excavations may require extending until suitable strata is found, and the design engineer’s instruction must be sought.

5.2.4 Local trees are not likely to have a bearing on the proposed building foundations, although this should be appraised by the foundation designer. Foundations will need to be designed to comply with any LABC requirements and NHBC Ch.4.2 guidance.

5.2.5 All foundation designs must be reviewed and designed by a suitably qualified design engineer. The above advice is based upon the ground condition information obtained during the survey. The design engineer must satisfy themselves that the information meets with their design requirements.

6. RECOMMENDATIONS

6.1 This report provides an assessment of the ground conditions based on the assessment of available site investigation information by quantifies the potential risks associated with contamination with consideration to the proposed re-development of the site for a residential end use (without home grown produce). The report also provides recommendations for foundation design considering the redevelopment proposals.

Contamination Assessment

6.2 Representative samples recovered from the site investigation have been tested for a wide range of contaminants of concern and the results have been assessed as part of a quantitative risk assessment using appropriate assessment criteria, derived for residential use without homegrown produce.

6.3 Based on the results of the contamination risk assessment undertaken at the site and with consideration to the environmental setting and the proposed redevelopment of the site for residential use (without homegrown produce), no risks associated with ground contamination have been identified.

6.4 However, BEK recommends the following:

All groundworkers adopt standard PPE when on site and remain vigilant during ground excavations for the presence (or suspected presence) of contamination. If visual or olfactory evidence of contamination is encountered then works should cease and specialist advice sought.

Consideration should be given to the requirements of the water supply provider. They may require the UKWIR risk assessment to be completed to confirm the specification for the water pipes.

The concrete classification suitable for the site is DS-1 AC-1d.

6.4 The ground conditions should be as anticipated during all excavations. Advice should be sought if ground conditions are significantly different or if visual/olfactory evidence of contamination is encountered.

Geotechnical Assessment

6.5 The site investigation has indicated that the underlying soils to the perimeter of the site in Borehole WS1 to WS4 are dense sands and gravels. The SPT results indicate that these soils have a high bearing capacity of at least 90 kN/m^2 at a depth of 1.0 m beneath the surface which increases to over 200 kN/m^2 from 2.0 m depth and greater. Of concern is the results obtained from Borehole WS5 which is located at the centre of the site.

6.6 Results at formation level and down to 4.0 m indicate that these soils are very loose, with a possible bearing capacity as low as 25 kN/m^2. It is possible that this is a localised defect, for which further investigation may identify. The material found in Borehole WS5 would suggest that simple foundations will not be sufficient.

6.7 We understand that the proposed building is presumed to be of masonry construction with concrete suspended floors and a tiled trussed rafter roofing system. This is likely to generate loadings from 60 to 70 kN/m to the foundations. Based upon the findings in Borehole WS5, this would require the installation of a pile and ground beam foundation system. Measures to improve the softer ground could be considered and the adoption of vibro replacement or dynamic compaction may be beneficial. All foundations, however, must be formed on the same foundation type, to alleviate potential differential settlements.

6.8 All formations must be checked on site to confirm that the design bearing capacity is extent before foundations are installed. Should areas of poor ground be encountered, the excavations may require extending until suitable strata is found, and the design engineer’s instruction must be sought.

6.9 Local trees may have a bearing on the proposed building foundations, which will need to be appraised by the foundation designer. Formation levels must be designed to comply with LABC requirements and NHBC Ch.4.2 guidance.

6.10 All foundation designs must be reviewed and designed by a suitably qualified design engineer. The above advice is based upon the ground condition information obtained during the survey. The design engineer must satisfy themselves that the information meets with their design requirements.

6.11 Precautions are required with respect to concrete classification. BEK recommends that as a minimum the design sulphate class for the site should comply with DS-1 and the ACEC class AC-1d.

Waste Soil Management

6.12 Careful management of soils during the excavation works will ensure optimum utilisation of soil resources.

6.13 Excavated soils which require off-site disposal are anticipated to be classified in accordance with the following document: Guidance on the Disposal of “Contaminated Soils” Version 3 (April 2001); produced by the Environment Agency. On the basis it is considered likely that soils from the majority of the site would classify as “Non-hazardous”/”Inert” for disposal; however this is subject to confirmation of the potential landfill use.

6.14 In all cases where excess soils require off-site disposal, the materials needs to be managed under the appropriate legislation and consideration given to any remedial techniques that could be used to improve the soil.

6.15 If waste soils are to be re-used on site then a suitable permit exemption should be put in place (if appropriate) or a Material Management Plan should be prepared as part of compliance with the CL:AIRE Definition of Waste:Code of Practice.

Water Pipe Specification

6.16 Consideration should be given to the requirements of the water supply provider. They are likely to require the UKWIR risk assessment to be completed to determine the specification for the water pipes. It is recommended that the water supply provider is contacted and enquiries made.

APPENDIX A

Exploratory Logs

GEO-ENVIROMENTAL CONSULTING ENGINEERS

GEO-ENVIRONMENTAL CONSULTANTS

PROJECT NUMBER 23064	**DATE** 13th June 2023
PROJECT NAME Lawnfield House, Maidenhead	**DRILLING METHOD** Window Sample Borehole
CLIENT Whitberry Limited	**BOREHOLE NO** WS1
	SHEET 1/8

COMPLETION **CASING** uPVC **SCREEN** uPVC Factory Slotted

COMMENTS Borehole dry. Abrupt refusal at 1.4 m. DPSH refusal at 1.52 m..

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
0.1 0.2 0.3						▨	Reddish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium flint fragments. Frequent rootlets. (TOPSOIL)	0.1 0.2 0.3
0.4 0.5 0.6 0.7 0.8 0.9						○	Very dense orange brown very gravelly SAND. Sand is fine to coarse. Gravel is fine to medium flint fragments	0.4 0.5 0.6 0.7 0.8 0.9
1 1.1 1.2 1.3	1.0 - 1.4	SPT (C) N= >50	9,12/13,14,17,22			○		1 1.1 1.2 1.3
1.4	1.4 - 1.5	SPT (C) N= 30					Dynamic Probe from 1.4 m to 1.52 m	1.4
1.5	1.5 - 1.52	SPT (C) N= >50 (50/20mm)						1.5
							Termination Depth at: 1.52 m	

GEO-ENVIROMENTAL CONSULTING ENGINEERS

GEO-ENVIRONMENTAL CONSULTANTS

PROJECT NUMBER 23064
PROJECT NAME Lawnfield House, Maidenhead
CLIENT Whitberry Limited

DATE 13th June 2023
DRILLING METHOD Window Sample Borehole
BOREHOLE NO WS2
SHEET 2/8

COMPLETION
CASING uPVC
SCREEN uPVC Factory Slotted

COMMENTS Borehole dry. Refusal at 5 m.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
	0.3	D = 0.3 m					Greyish brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse flint fragments. (TOPSOIL)	
0.5							Firm/stiff orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium flint fragments	0.5
1	1.0 - 1.45	SPT (C) N=8	1,1/2,2,2,2					1
1.5							Medium dense orangish brown very gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse flint fragments	1.5
2	2.0 - 2.45	SPT (C) N= 25	3,5/3,4,6,12					2
2.5								2.5
3	3.0 - 3.45	SPT (C) N= 22	7,9/7,6,4,5					3
3.5							Medium dense orangish brown slightly gravelly SAND. Sand is well-sorted fine to coarse. Gravel is fine to cobble flint fragments	3.5
4	4.0 - 4.45	SPT (C) N= 20	4,4/4,5,5,6					4
4.5								4.5
5	5.0 - 5.5	SPT (C) N= >50					Dynamic Probe from 5 m to 10 m	5
5.5	5.5 - 6.0	SPT (C) N= >50						5.5
6	6.0 - 6.5	SPT (C) N= >50						6
6.5	6.5 - 7.0	SPT (C) N= 34						6.5
7	7.0 - 7.5	SPT (C) N= 42						7
7.5	7.5 - 8.0	SPT (C) N= 43						7.5
8	8.0 - 8.5	SPT (C) N= >50						8
8.5	8.5 - 9.0	SPT (C) N= >50						8.5
9	9.0 - 9.5	SPT (C) N= >50						9
9.5	9.5 - 10.0	SPT (C) N= >50						9.5
10							Termination Depth at: 10.0 m	10

GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 23064
PROJECT NAME Lawnfield House, Maidenhead
CLIENT Whitberry Limited

DATE 13th June 2023
DRILLING METHOD Window Sample Borehole
BOREHOLE NO WS3
SHEET 3/8

COMPLETION
CASING uPVC
SCREEN uPVC Factory Slotted

COMMENTS Borehole dry. Abrupt refusal at 1.3 m. DPSH refusal at 1.57 m.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
0.1	0.15	D = 0.15 m				▨	Brown slightly clayey very gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse flint fragments. Occasional rootlets. (TOPSOIL)	0.1
0.2						▨		0.2
0.3						▨		0.3
0.4						▨		0.4
0.5						▨		0.5
0.6						▨		0.6
0.7						▨		0.7
0.8						▨		0.8
0.9						○	Very dense reddish brown slightly clayey very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to cobble flint fragments	0.9
1	1.0 - 1.3	SPT (C) N= >50	7,13/13,12,15,15			○		1
1.1						○		1.1
1.2						○		1.2
1.3						○		1.3
1.4	1.4 - 1.5	SPT (C) N= 24					Dynamic Probe from 1.4 m to 1.57 m	1.4
1.5	1.5 - 1.57	SPT (C) N= >50 (50/75mm)						1.5
							Termination Depth at: 1.57 m	

GEO-ENVIRONMENTAL CONSULTANTS

PROJECT NUMBER 23064	**DATE** 13th June 2023
PROJECT NAME Lawnfield House, Maidenhead	**DRILLING METHOD** Window Sample Borehole
CLIENT Whitberry Limited	**BOREHOLE NO** WS4
	SHEET 4/8

COMPLETION **CASING** uPVC **SCREEN** uPVC Factory Slotted

COMMENTS Borehole dry. Abrupt refusal at 1.7 m. DPSH refusal at 1.83 m.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
0.0						▨	Reddish brown slightly clayey very gravelly SAND. Sand is fine to coarse. Gravel is fine to cobble flint fragments. Occasional rootlets. (TOPSOIL)	
0.2	0.2	D = 0.2 m				▨		0.2
0.9						∘	Medium dense becoming very dense reddish brown slightly clayey very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to cobble flint fragments.	0.9
1	1.0	D = 1.0 m				∘		1
1	1.0 - 1.45	SPT (C) N= 29	2,4/6,7,8,8			∘		1
1.5	1.5 - 1.7	SPT (C) N= >50	8,14/10,10,14,20			∘		1.5
1.7	1.7 - 1.8	SPT (C) N= 20					Dynamic Probe from 1.7 m to 1.83 m	1.7
1.8	1.8 - 1.83	SPT (C) N= 30 (30/30mm)						1.8
							Termination Depth at: 1.83 m	

GEO-ENVIROMENTAL CONSULTING ENGINEERS

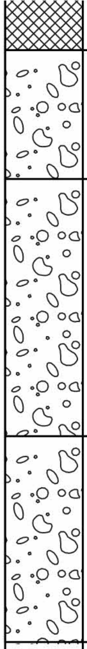
GEO-ENVIRONMENTAL CONSULTANTS

PROJECT NUMBER 23064
PROJECT NAME Lawnfield House, Maidenhead
CLIENT Whitberry Limited

DATE 13th June 2023
DRILLING METHOD Window Sample Borehole
BOREHOLE NO WS5
SHEET 5/8

COMPLETION **CASING** uPVC **SCREEN** uPVC Factory Slotted

COMMENTS Borehole dry. Refusal at 5 m.



Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
	0.1	D = 0.1 m					Reddish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium flint fragments. Occasional rootlets. (TOPSOIL)	
0.5							Loose reddish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse flint fragments	0.5
1	1.0 - 1.45	SPT (C) N= 6	1,2/1,2,1,2					1
1.5							Very loose becoming loose reddish brown slightly clayey very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to cobble flint fragments	1.5
2	2.0 - 2.45	SPT (C) N= 2	2,1/1,0,1,0					2
2.5								2.5
3	3.0 - 3.45	SPT (C) N= 4	1,1/1,1,1,1					3
3.5							Very loose/loose reddish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to cobble flint fragments.	3.5
4	4.0 - 4.45	SPT (C) N= 4	1,1/1,1,1,1					4
4.5								4.5
5	5.0 - 5.5	SPT (C) N= 3					Dynamic Probe from 5 m to 10 m	5
5.5	5.5 - 6.0	SPT (C) N= 4						5.5
6	6.0 - 6.5	SPT (C) N= 5						6
6.5	6.5 - 7.0	SPT (C) N= 5						6.5
7	7.0 - 7.5	SPT (C) N= 9						7
7.5	7.5 - 8.0	SPT (C) N= 10						7.5
8	8.0 - 8.5	SPT (C) N= 16						8
8.5	8.5 - 9.0	SPT (C) N= 31						8.5
9	9.0 - 9.5	SPT (C) N= 38						9
9.5	9.5 - 10.0	SPT (C) N= 39						9.5
10							Termination Depth at: 10.0 m	10

GEO-ENVIROMENTAL CONSULTING ENGINEERS

GEO-ENVIRONMENTAL CONSULTANTS

PROJECT NUMBER 23064
PROJECT NAME Lawnfield House, Maidenhead
CLIENT Whitberry Limited

DATE 13th June 2023
DRILLING METHOD Trial Pit
BOREHOLE NO TP1
SHEET 6/8

COMPLETION

CASING

SCREEN

COMMENTS Trial pit dry.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
						▨	Brown brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse flint fragments. Occasional rootlets. (TOPSOIL)	
0.05						▨		0.05
0.1						▨		0.1
0.15						▨		0.15
0.2						▨		0.2
0.25						▨		0.25
0.3						▨		0.3
0.35						▨		0.35
0.4						∘	Reddish brown slightly clayey very gravelly SAND. Sand is fine to coarse. Gravel is fine to cobble flint fragments	0.4
0.45						∘		0.45
0.5						∘		0.5
0.55						∘		0.55
0.6						∘		0.6
0.65						∘		0.65
0.7						∘		0.7
0.75						∘		0.75
0.8						∘		0.8
0.85						∘		0.85
0.9						∘		0.9
0.95						∘		0.95
1						∘		1
1.05						∘		1.05
1.1							Termination Depth at: 1.1 m	1.1
1.15								1.15

GEO-ENVIROMENTAL CONSULTING ENGINEERS

GEO-ENVIRONMENTAL CONSULTANTS

PROJECT NUMBER 23064
PROJECT NAME Lawnfield House, Maidenhead
CLIENT Whitberry Limited

DATE 13th June 2023
DRILLING METHOD Trial Pit
BOREHOLE NO TP2
SHEET 7/8

COMPLETION
CASING
SCREEN

COMMENTS Trial pit dry.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
0.05						▨	Greyish brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse flint fragments. Occasional rootlets. (TOPSOIL)	0.05
0.1								0.1
0.15								0.15
0.2	0.2	D = 0.2 m						0.2
0.25								0.25
0.3								0.3
0.35								0.35
0.4						∘	Reddish brown slightly clayey very gravelly SAND. Sand is fine to coarse. Gravel is fine to cobble flint fragments	0.4
0.45								0.45
0.5								0.5
0.55								0.55
0.6								0.6
0.65								0.65
0.7								0.7
0.75								0.75
0.8	0.8	D = 0.8 m						0.8
0.85								0.85
0.9								0.9
0.95								0.95
1								1
1.05								1.05
1.1							Termination Depth at: 1.1 m	1.1
1.15								1.15

GEO-ENVIROMENTAL CONSULTING ENGINEERS

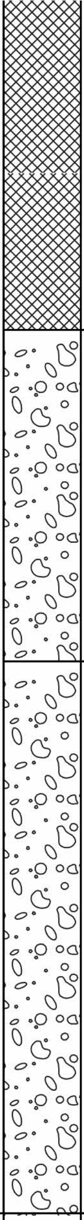
GEO-ENVIRONMENTAL CONSULTANTS

PROJECT NUMBER 23064
PROJECT NAME Lawnfield House, Maidenhead
CLIENT Whitberry Limited

DATE 13th June 2023
DRILLING METHOD Trial Pit
BOREHOLE NO TP3
SHEET 8/8

COMPLETION
CASING
SCREEN

COMMENTS Trial pit dry.



Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
0.00–0.30	0.25	D = 0.25 m					Reddish brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium flint fragments, Frequent rootlets. (TOPSOIL)	
0.30–0.60							Reddish brown slightly clayey very gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse flint fragments	0.3
0.60–1.1							Reddish brown slightly clayey very gravelly SAND. Sand is fine to coarse. Gravel is fine to cobble flint fragments	0.6
1.1							Termination Depth at: 1.1 m	1.1

Page 1 of 1

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APPENDIX B

Chemical Test Results

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 23/06016
Issue Number: 1 **Date:** 27 June, 2023

Client:
BEK Enviro Ltd
2 Landwick Court
Metcalfe Drive
Altham Business Park
Altham
Lancashire
BB5 5GY

Project Manager: Mick Buckley
Project Name: Lawnfield, Maidenhead
Project Ref: Not specified
Order No: 7845-23079-J
Date Samples Received: 19/06/23
Date Instructions Received: 19/06/23
Date Analysis Completed: 27/06/23

Approved by:

[redacted]

Danielle Brierley
Deputy Client Services Supervisor

Lab Sample ID	23/06016/1	23/06016/2	23/06016/3	23/06016/4	23/06016/5	23/06016/6	23/06016/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP2	WS3	WS2	WS4	WS5	TP3	TP2			
Depth to Top	0.20	0.15	0.30	0.20	0.10	0.25	0.80			
Depth To Bottom										
Date Sampled	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES			
Sample Matrix Code	4ABE	4AB	4ABE	4ABE	4AE	4AE	1A			
% Stones >10mm$_A$	32.1	41.7	4.0	18.8	2.1	3.8	5.7	% w/w	0.1	A-T-044
Asbestos in soil$_D^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD	-			A-T-045
Asbestos Matrix (visual)$_D$	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope)$_D$	-	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	N/A	N/A	N/A	N/A	N/A	-			A-T-045
pH$_D^{M\#}$	7.49	7.21	6.61	8.04	6.79	6.58	7.42	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D^{M\#}$	290	310	410	<200	210	230	<200	mg/kg	200	A-T-028s
Cyanide (total)$_A^{M\#}$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Organic Matter$_D^{M\#}$	1.3	2.9	3.1	0.6	1.3	1.5	0.2	% w/w	0.1	A-T-032s
Arsenic$_D^{M\#}$	8	7	8	6	7	7	10	mg/kg	1	A-T-024s
Boron (water soluble)$_D^{M\#}$	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium$_D^{M\#}$	0.7	0.8	0.9	0.6	<0.5	0.6	0.8	mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	14	24	26	6	9	21	8	mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	15	13	18	14	18	15	21	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Lead$_D^{M\#}$	117	212	225	21	69	39	17	mg/kg	1	A-T-024s
Mercury$_D$	0.50	0.20	0.20	<0.17	0.47	<0.17	<0.17	mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	13	14	14	11	12	13	14	mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	100	199	139	21	49	38	27	mg/kg	5	A-T-024s

Lab Sample ID	23/06016/1	23/06016/2	23/06016/3	23/06016/4	23/06016/5	23/06016/6	23/06016/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP2	WS3	WS2	WS4	WS5	TP3	TP2			
Depth to Top	0.20	0.15	0.30	0.20	0.10	0.25	0.80			
Depth To Bottom										
Date Sampled	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES			
Sample Matrix Code	4ABE	4AB	4ABE	4ABE	4AE	4AE	1A			
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.03	0.04	0.05	<0.01	0.02	0.02	<0.01	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.04	0.06	0.06	<0.02	0.03	0.05	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.25	0.36	0.39	<0.04	0.19	0.31	<0.04	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.31	0.44	0.53	<0.04	0.24	0.39	<0.04	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.37	0.54	0.61	<0.05	0.27	0.43	<0.05	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.20	0.32	0.35	<0.05	0.15	0.24	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.15	0.20	0.25	<0.07	0.13	0.18	<0.07	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	0.28	0.40	0.46	<0.06	0.22	0.39	<0.06	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	0.06	0.07	<0.04	<0.04	0.04	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	0.49	0.67	0.73	<0.08	0.38	0.76	<0.08	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.22	0.35	0.36	<0.03	0.16	0.25	<0.03	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	0.13	0.20	0.18	<0.03	0.11	0.26	<0.03	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	0.43	0.59	0.66	<0.07	0.32	0.65	<0.07	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	2.90	4.24	4.70	<0.08	2.22	3.99	<0.08	mg/kg	0.01	A-T-019s

Lab Sample ID	23/06016/1	23/06016/2	23/06016/3	23/06016/4	23/06016/5	23/06016/6	23/06016/7	**Units**	**Limit of Detection**	**Method ref**
Client Sample No										
Client Sample ID	TP2	WS3	WS2	WS4	WS5	TP3	TP2			
Depth to Top	0.20	0.15	0.30	0.20	0.10	0.25	0.80			
Depth To Bottom										
Date Sampled	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23	13-Jun-23			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES			
Sample Matrix Code	4ABE	4AB	4ABE	4ABE	4AE	4AE	1A			
TPH CWG with Clean Up										
Ali >C5-C6$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_{A}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_{A}$	<1	1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_{A}^{M\#}$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_{A}^{M\#}$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_{A}^{M\#}$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C21-C35$_{A}^{M\#}$	4	11	7	<1	2	3	<1	mg/kg	1	A-T-055s
Total Aliphatics$_{A}$	4	13	7	<1	2	3	<1	mg/kg	1	Calc-As Recd
Aro >C5-C7$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_{A}$	2	2	3	<1	2	2	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_{A}$	<1	1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_{A}$	1	2	2	<1	1	2	<1	mg/kg	1	A-T-055s
Aro >C16-C21$_{A}^{M\#}$	4	7	6	<1	2	5	<1	mg/kg	1	A-T-055s
Aro >C21-C35$_{A}^{M\#}$	18	28	28	<1	10	19	<1	mg/kg	1	A-T-055s
Total Aromatics$_{A}$	26	40	39	<1	15	29	<1	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35)$_{A}$	30	53	46	<1	17	32	<1	mg/kg	1	Calc-As Recd
BTEX - Benzene$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE$_{A}^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 23/06016 **Client Project Name: Lawnfield, Maidenhead**

Client Project Ref: Not specified

Lab Sample ID	23/06016/8							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS4									
Depth to Top	1.00									
Depth To Bottom										
Date Sampled	13-Jun-23									
Sample Type	SOIL - ES									
Sample Matrix Code	1AB									
% Stones >10mm$_{A}$	38.8							% w/w	0.1	A-T-044
pH$_{D}^{M\#}$	8.00							pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_{D}^{M\#}$	<0.01							g/l	0.01	A-T-026s
Sulphate (acid soluble)$_{D}^{M\#}$	<200							mg/kg	200	A-T-028s
Cyanide (total)$_{A}^{M\#}$	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_{A}$	<0.2							mg/kg	0.2	A-T-050s
Organic Matter$_{D}^{M\#}$	0.2							% w/w	0.1	A-T-032s
Arsenic$_{D}^{M\#}$	6							mg/kg	1	A-T-024s
Boron (water soluble)$_{D}^{M\#}$	<1.0							mg/kg	1	A-T-027s
Cadmium$_{D}^{M\#}$	<0.5							mg/kg	0.5	A-T-024s
Copper$_{D}^{M\#}$	5							mg/kg	1	A-T-024s
Chromium$_{D}^{M\#}$	18							mg/kg	1	A-T-024s
Chromium (hexavalent)$_{D}$	<1							mg/kg	1	A-T-040s
Lead$_{D}^{M\#}$	7							mg/kg	1	A-T-024s
Mercury$_{D}$	<0.17							mg/kg	0.17	A-T-024s
Nickel$_{D}^{M\#}$	16							mg/kg	1	A-T-024s
Selenium$_{D}^{M\#}$	<1							mg/kg	1	A-T-024s
Zinc$_{D}^{M\#}$	16							mg/kg	5	A-T-024s

Envirolab Job Number: 23/06016

Client Project Name: Lawnfield, Maidenhead

Client Project Ref: Not specified

Lab Sample ID	23/06016/8							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS4									
Depth to Top	1.00									
Depth To Bottom										
Date Sampled	13-Jun-23									
Sample Type	SOIL - ES									
Sample Matrix Code	1AB									
PAH-16MS										
Acenaphthene$_{A}^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Acenaphthylene$_{A}^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Anthracene$_{A}^{M\#}$	<0.02							mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_{A}^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_{A}^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_{A}^{M\#}$	<0.05							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_{A}^{M\#}$	<0.05							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_{A}^{M\#}$	<0.07							mg/kg	0.07	A-T-019s
Chrysene$_{A}^{M\#}$	<0.06							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_{A}^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene$_{A}^{M\#}$	<0.08							mg/kg	0.08	A-T-019s
Fluorene$_{A}^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_{A}^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Naphthalene $_{A}^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene$_{A}^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Pyrene$_{A}^{M\#}$	<0.07							mg/kg	0.07	A-T-019s
Total PAH-16MS$_{A}^{M\#}$	<0.08							mg/kg	0.01	A-T-019s

Lab Sample ID	23/06016/8							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS4									
Depth to Top	1.00									
Depth To Bottom										
Date Sampled	13-Jun-23									
Sample Type	SOIL - ES									
Sample Matrix Code	1AB									
TPH CWG with Clean Up										
Ali >C5-C6$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8$_{A}$	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10$_{A}$	<1							mg/kg	1	A-T-055s
Ali >C10-C12$_{A}^{M\#}$	<1							mg/kg	1	A-T-055s
Ali >C12-C16$_{A}^{M\#}$	<1							mg/kg	1	A-T-055s
Ali >C16-C21$_{A}^{M\#}$	<1							mg/kg	1	A-T-055s
Ali >C21-C35$_{A}^{M\#}$	<1							mg/kg	1	A-T-055s
Total Aliphatics$_{A}$	<1							mg/kg	1	Calc-As Recd
Aro >C5-C7$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10$_{A}$	<1							mg/kg	1	A-T-055s
Aro >C10-C12$_{A}$	<1							mg/kg	1	A-T-055s
Aro >C12-C16$_{A}$	<1							mg/kg	1	A-T-055s
Aro >C16-C21$_{A}^{M\#}$	<1							mg/kg	1	A-T-055s
Aro >C21-C35$_{A}^{M\#}$	<1							mg/kg	1	A-T-055s
Total Aromatics$_{A}$	<1							mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35)$_{A}$	<1							mg/kg	1	Calc-As Recd
BTEX - Benzene$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s
MTBE$_{A}^{\#}$	<0.01							mg/kg	0.01	A-T-022s

Report Notes

General

This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **six weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and Interpretations expressed are outside our scope of accreditation.
The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.
A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Key

Superscript “#”	Accredited to ISO 17025
Superscript “M”	Accredited to MCertS
Superscript “U”	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript “A”	Analysis performed on as-received Sample
Subscript “D”	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript “^”	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
N/A	Not applicable

Asbestos

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing, and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:

All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results “with Clean up” indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from “TPH CWG with clean up” please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25^{o}C / 11550µS/cm @ 20^{o}C fall outside the accreditation range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	BEK Enviro Ltd, 2 Landwick Court, Metcalfe Drive, Altham Business Park, Altham, Lancashire , BB5 5GY	**Project No:**	23/06016
		Date Received:	19/06/2023 (am)
Project:	Lawnfield, Maidenhead	**Cool Box Temperatures (°C):**	19.9
Clients Project No:			

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	23/06016/1	23/06016/2	23/06016/3	23/06016/4	23/06016/5	23/06016/6	23/06016/7	23/06016/8
Client Sample No								
Client Sample ID/Depth	TP2 0.20m	WS3 0.15m	WS2 0.30m	WS4 0.20m	WS5 0.10m	TP3 0.25m	TP2 0.80m	WS4 1.00m
Date Sampled	13/06/23	13/06/23	13/06/23	13/06/23	13/06/23	13/06/23	13/06/23	13/06/23
A-T-019s	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
A-T-022s	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
A-T-024s	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023
A-T-026s	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023
A-T-027s	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023
A-T-028s	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023
A-T-031s	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023
A-T-032s	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023
A-T-040s	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023	27/06/2023
A-T-042sTCN	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
A-T-044	23/06/2023	23/06/2023	23/06/2023	23/06/2023	23/06/2023	23/06/2023	23/06/2023	23/06/2023
A-T-045	21/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023	21/06/2023		
A-T-050s	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023	22/06/2023
A-T-055s	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023
Calc-As Recd	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023	26/06/2023

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

APPENDIX C

TRL to CBR Test Results

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

TRL to CBR Relationship

Project Name	Lawnfield House, Maidenhead	Location Reference	TP1
Project Number	23079	Test Level	Surface
Test Date	13/06/2023	Weather	Very Sunny

Calculation of Calafornia Bearing Ratio (CBR) values as per Interim Advice Note 73/06 Revision 1 (2009) "Design Guidance for Road Pavement Foundations (Draft HD25)" published by the Highways Agency.

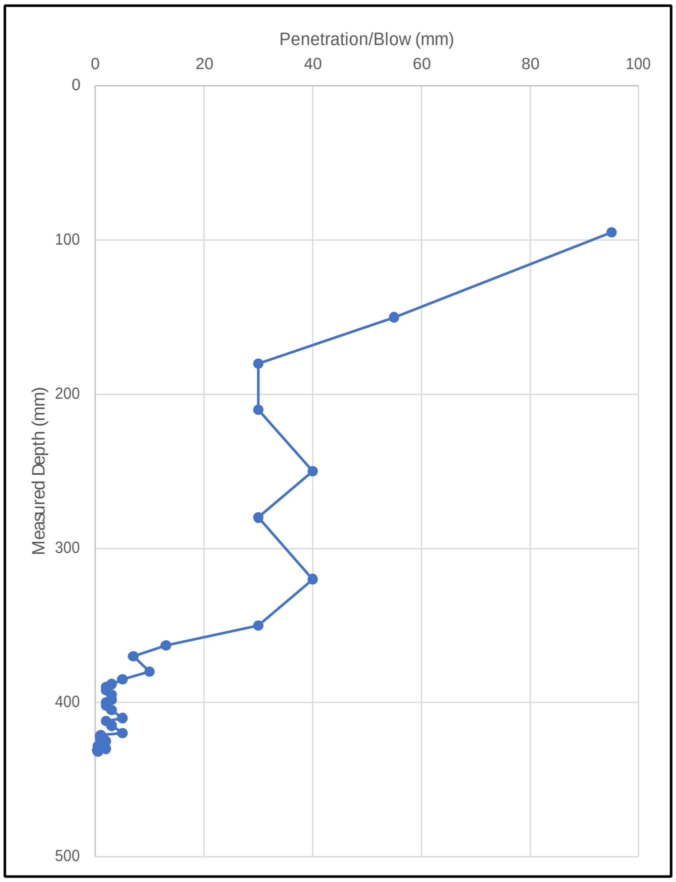
Using:

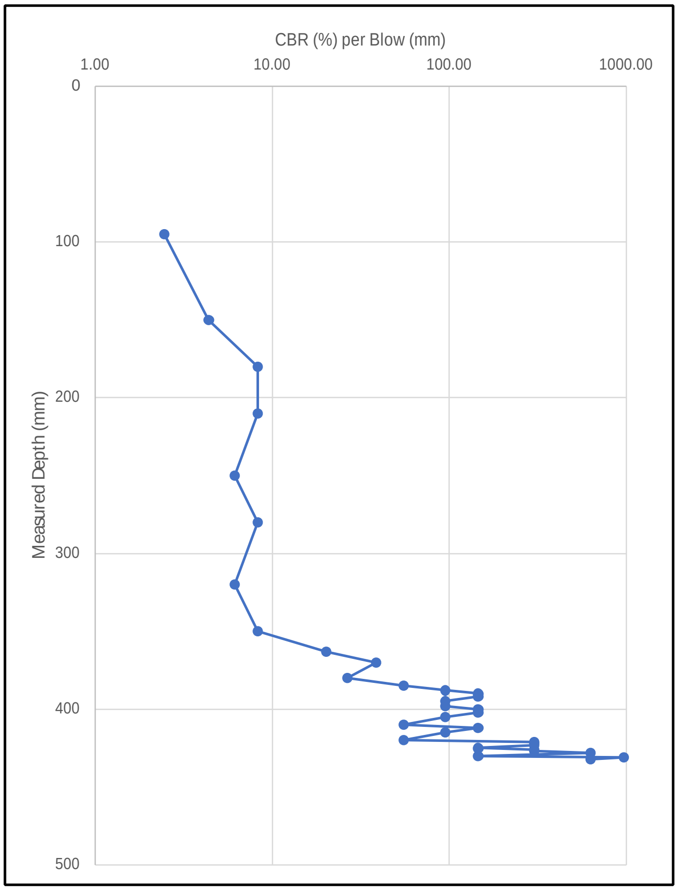
$$\log 10(CBR) = 2.48 - 1.057 \cdot \log 10(mm\ per\ blow)$$

Material at Surface	Grass
Test Start Depth (mm BGL)	0
Error Reading (mm)	0

Measured Depth (mm)	Blows	Penetration (mm)	Penetration/ blow	CBR per blow (%)
0				
95	1	95	95	2.45
150	1	55	55	4.37
180	1	30	30	8.29
210	1	30	30	8.29
250	1	40	40	6.12
280	1	30	30	8.29
320	1	40	40	6.12
350	1	30	30	8.29
363	1	13	13	20.07
370	1	7	7	38.61
380	1	10	10	26.49
385	1	5	5	55.10
388	1	3	3	94.55
390	1	2	2	145.15
392	1	2	2	145.15
395	1	3	3	94.55
398	1	3	3	94.55
400	1	2	2	145.15
402	1	2	2	145.15
405	1	3	3	94.55
410	1	5	5	55.10
412	1	2	2	145.15
415	1	3	3	94.55
420	1	5	5	55.10
421	1	1	1	302.00
422	1	1	1	302.00
423	1	1	1	302.00
425	1	2	2	145.15
426	1	1	1	302.00
427	1	1	1	302.00
428	2	1	1	628.33
430	1	2	2	145.15
431	3	1	0	964.53
432	2	1	1	628.33
	Refusal			

Average CBR	162.43





GEO-ENVIRONMENTAL CONSULTING ENGINEERS

TRL to CBR Relationship

Project Name	Lawnfield House, Maidenhead	Location Reference	TP2
Project Number	23079	Test Level	Surface
Test Date	13/06/2023	Weather	Very Sunny

Calculation of Calafornia Bearing Ratio (CBR) values as per Interim Advice Note 73/06 Revision 1 (2009) "Design Guidance for Road Pavement Foundations (Draft HD25)" published by the Highways Agency.

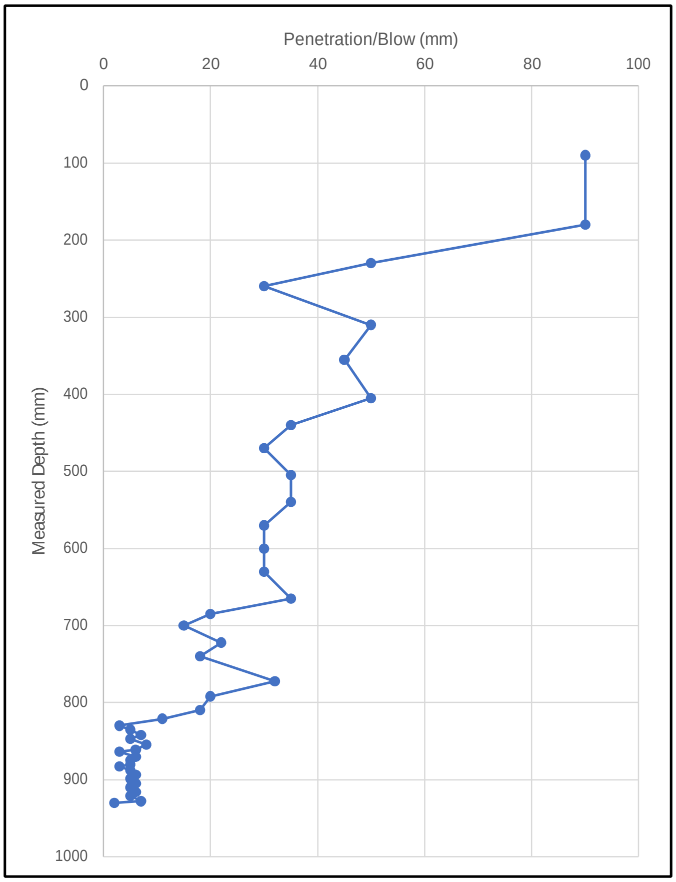
Using:

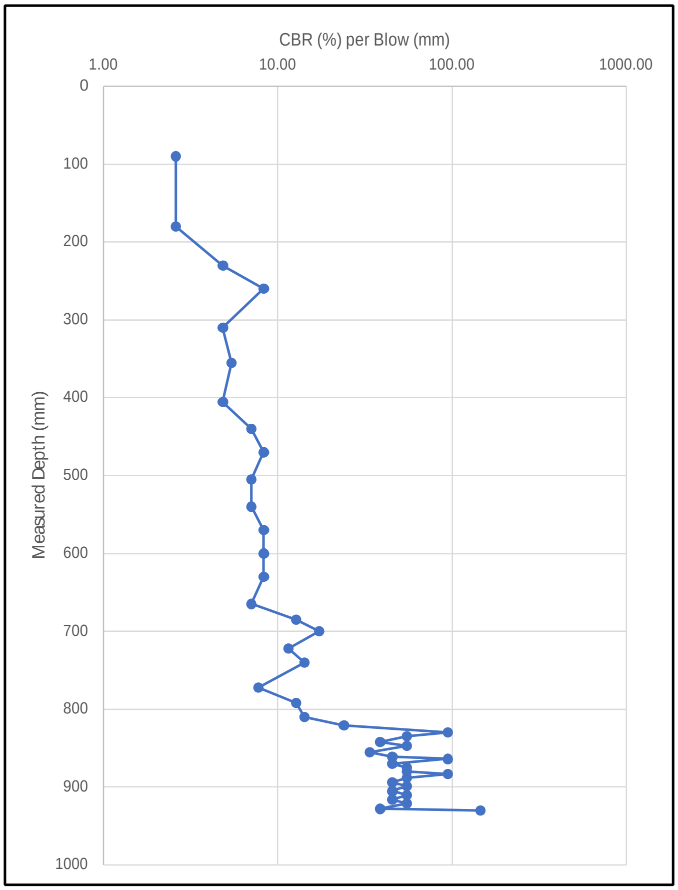
$$\log 10(CBR) = 2.48 - 1.057 \cdot \log 10(mm\ per\ blow)$$

Material at Surface	Grass
Test Start Depth (mm BGL)	0
Error Reading (mm)	0

Measured Depth (mm)	Blows	Penetration (mm)	Penetration/ blow	CBR per blow (%)
0				
90	1	90	90	2.60
180	1	90	90	2.60
230	1	50	50	4.83
260	1	30	30	8.29
310	1	50	50	4.83
355	1	45	45	5.40
405	1	50	50	4.83
440	1	35	35	7.05
470	1	30	30	8.29
505	1	35	35	7.05
540	1	35	35	7.05
570	1	30	30	8.29
600	1	30	30	8.29
630	1	30	30	8.29
665	1	35	35	7.05
685	1	20	20	12.73
700	1	15	15	17.25
722	1	22	22	11.51
740	1	18	18	14.23
772	1	32	32	7.75
792	1	20	20	12.73
810	1	18	18	14.23
821	1	11	11	23.95
830	3	9	3	94.55
835	1	5	5	55.10
842	1	7	7	38.61
847	1	5	5	55.10
855	1	8	8	33.53
861	1	6	6	45.45
864	1	3	3	94.55
870	1	6	6	45.45
875	1	5	5	55.10
880	1	5	5	55.10
883	1	3	3	94.55
888	1	5	5	55.10
894	1	6	6	45.45
899	1	5	5	55.10
905	1	6	6	45.45
910	1	5	5	55.10
916	1	6	6	45.45
921	1	5	5	55.10
928	1	7	7	38.61
930	1	2	2	145.15
	Complet			

Average CBR	32.95





GEO-ENVIRONMENTAL CONSULTING ENGINEERS

TRL to CBR Relationship

Project Name	Lawnfield House, Maidenhead	Location Reference	TP3
Project Number	23079	Test Level	Surface
Test Date	13/06/2023	Weather	Very Sunny

Calculation of Calafornia Bearing Ratio (CBR) values as per Interim Advice Note 73/06 Revision 1 (2009) "Design Guidance for Road Pavement Foundations (Draft HD25)" published by the Highways Agency.

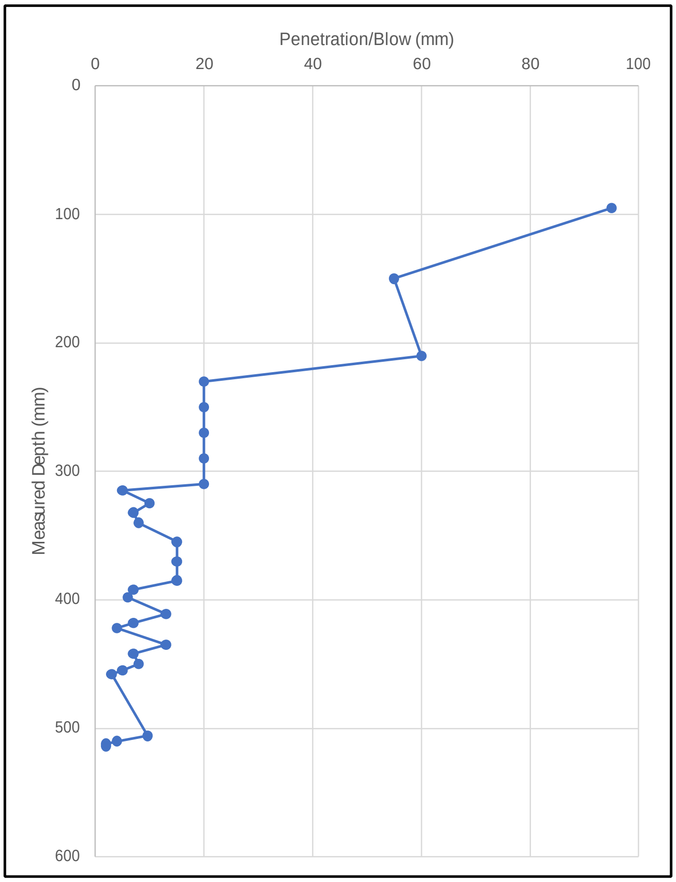
Using:

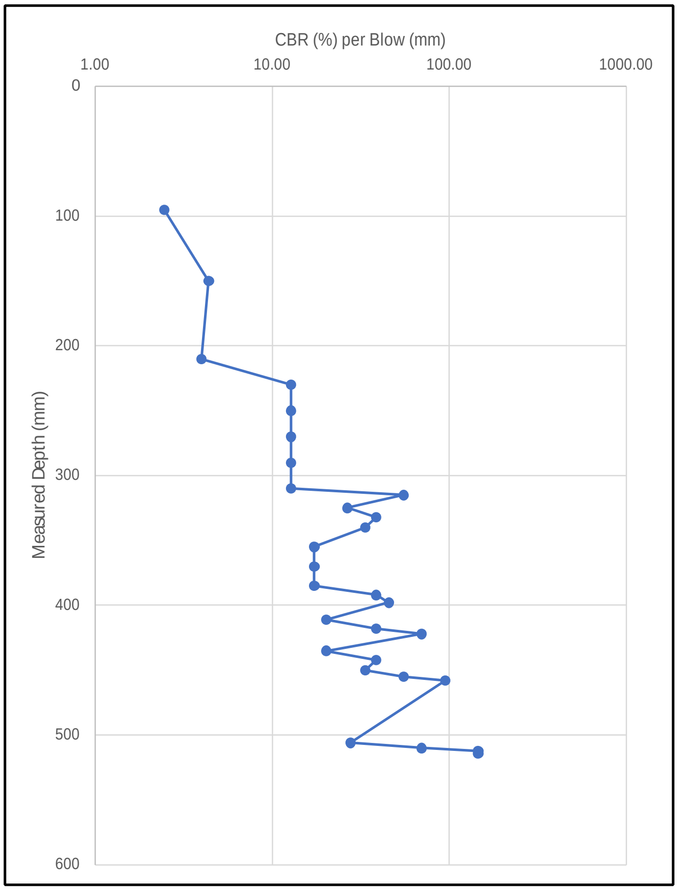
$$\log 10(CBR) = 2.48 - 1.057 \cdot \log 10(mm\ per\ blow)$$

Material at Surface	Grass
Test Start Depth (mm BGL)	0
Error Reading (mm)	0

Measured Depth (mm)	Blows	Penetration (mm)	Penetration/ blow	CBR per blow (%)
0				
95	1	95	95	2.45
150	1	55	55	4.37
210	1	60	60	3.99
230	1	20	20	12.73
250	1	20	20	12.73
270	1	20	20	12.73
290	1	20	20	12.73
310	1	20	20	12.73
315	1	5	5	55.10
325	1	10	10	26.49
332	1	7	7	38.61
340	1	8	8	33.53
355	1	15	15	17.25
370	1	15	15	17.25
385	1	15	15	17.25
392	1	7	7	38.61
398	1	6	6	45.45
411	1	13	13	20.07
418	1	7	7	38.61
422	1	4	4	69.76
435	1	13	13	20.07
442	1	7	7	38.61
450	1	8	8	33.53
455	1	5	5	55.10
458	1	3	3	94.55
506	5	48	10	27.65
510	1	4	4	69.76
512	1	2	2	145.15
514	1	2	2	145.15
	Refusal			

Average CBR	38.69





APPENDIX D

Soakaway Test Results

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Soakaway Testi

Project Name	Lawnfield House, Maidenhead	Location Reference:	TP1
Project Number	23079	Test Number:	1
Test Date	13/06/2023	Weather:	Very Sunny

FIELD MEASUREMENTS

Elapsed Time, t (m)	Water Level (mBGL)
0	0.850
2	0.870
4	0.900
6	0.930
8	0.950
10	0.975
12	0.985
14	1.000
16	1.035
18	1.055
20	1.075
22	1.100

INFILTRATION CALCULATION

Calculation of Soil Infiltration Rate (f) as per BRE Digest 365 "Soakaway Design".

Using:

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Where:

V_{p75-25}	The effective storage volume of water (m^3)in the trial pit between 75% and 25% effective depth	0.25
a_{p50}	The internal surface area of the trial pit (m^2) up to 50% effective depth and including the base area	2.75
t_{p75-25}	The time (s) for the water level to fall from 75% to 25% effective depth	710

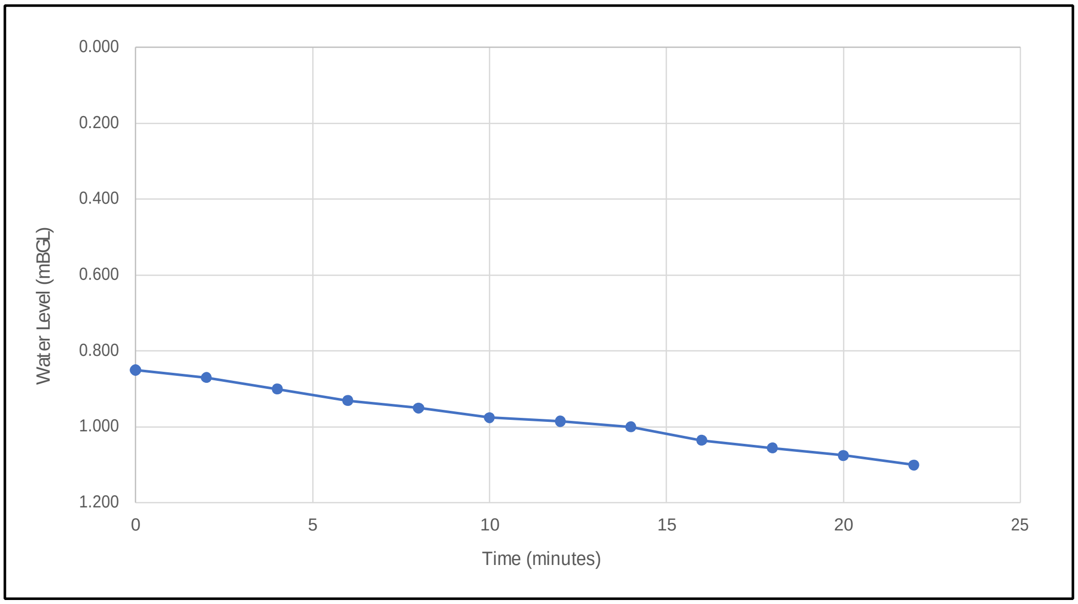
Soakage Pit Length (m)	2.00
Soakage Pit Width (m)	1.00
Soakage Pit Depth (m)	1.10
Soakage Pit Area (m^3)	2.20

Start Water Level (mBGL)	0.85
Total Depth of Test (m)	0.25
75% Effective Depth (mBGL)	0.91
50% Effective Depth (mBGL)	0.13
25% Effective Depth (mBGL)	1.04

Time at **75%** Effective Depth (minutes)	4.66
Time at **25%** Effective Depth (minutes)	16.5

INFILTRATION RATE

Soil Infiltration Rate (*f*)	**1.28E-04**
m/s	**0.00012797**
m/hour	**0.4607**



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Soakaway Testi

Project Name	Lawnfield House, Maidenhead	Location Reference:	TP1
Project Number	23079	Test Number:	2
Test Date	13/06/2023	Weather:	Very Sunny

FIELD MEASUREMENTS

Elapsed Time, t (m)	Water Level (mBGL)
0	0.850
2	0.870
4	0.880
6	0.920
8	0.950
10	0.960
12	0.980
14	0.995
16	1.020
18	1.030
20	1.065
22	1.085
24	1.100

INFILTRATION CALCULATION

Calculation of Soil Infiltration Rate (f) as per BRE Digest 365 "Soakaway Design".

Using:

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Where:

V_{p75-25}	The effective storage volume of water (m^3)in the trial pit between 75% and 25% effective depth	0.25
a_{p50}	The internal surface area of the trial pit (m^2) up to 50% effective depth and including the base area	2.75
t_{p75-25}	The time (s) for the water level to fall from 75% to 25% effective depth	844

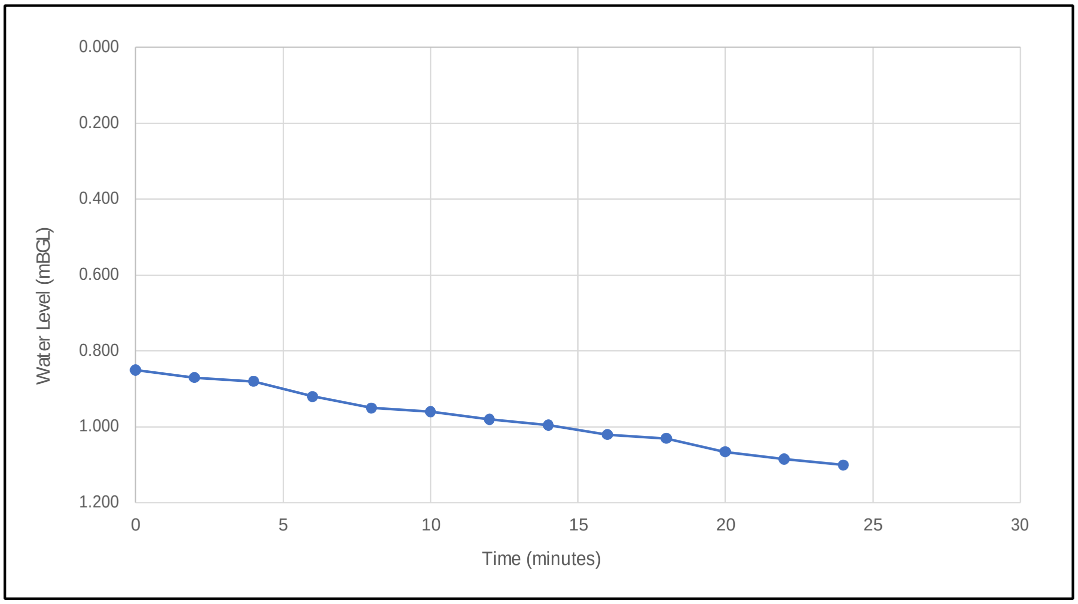
Soakage Pit Length (m)	2.00
Soakage Pit Width (m)	1.00
Soakage Pit Depth (m)	1.10
Soakage Pit Area (m^3)	2.20

Start Water Level (mBGL)	0.85
Total Depth of Test (m)	0.25
75% Effective Depth (mBGL)	0.91
50% Effective Depth (mBGL)	0.13
25% Effective Depth (mBGL)	1.04

Time at **75%** Effective Depth (minutes)	4.5
Time at **25%** Effective Depth (minutes)	18.57

INFILTRATION RATE

Soil Infiltration Rate (*f*)	**1.08E-04**
m/s	**0.00010769**
m/hour	**0.3877**



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Soakaway Testi

Project Name	Lawnfield House, Maidenhead	Location Reference:	TP2
Project Number	23079	Test Number:	1
Test Date	13/06/2023	Weather:	Very Sunny

FIELD MEASUREMENTS

Elapsed Time, t (m)	Water Level (mBGL)
0	0.650
2	0.680
4	0.710
6	0.730
8	0.745
10	0.760
11	0.785
12	0.800
14	0.805
16	0.815
18	0.822
20	0.830
22	0.845
24	0.850
26	0.855
28	0.860
30	0.870
32	0.875
34	0.880
36	0.890
38	0.895
40	0.890
42	0.895
44	0.900
46	0.902
48	0.903
50	0.906
52	0.910
54	0.915
56	0.925
58	0.940
60	0.950
62	0.955
64	0.960
66	0.965
68	0.975
70	0.985
72	0.990
74	0.993
76	0.995
78	0.998
80	1.000
84	1.010
88	1.020
92	1.035
96	1.045
100	1.051
104	1.056
108	1.063
112	1.068
116	1.075
120	1.082
124	1.089
128	1.095
132	1.100

INFILTRATION CALCULATION

Calculation of Soil Infiltration Rate (f) as per BRE Digest 365 "Soakaway Design".

Using:

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Where:

V_{p75-25}	The effective storage volume of water (m^3)in the trial pit between 75% and 25% effective depth	0.45
a_{p50}	The internal surface area of the trial pit (m^2) up to 50% effective depth and including the base area	3.35
t_{p75-25}	The time (s) for the water level to fall from 75% to 25% effective depth	3720

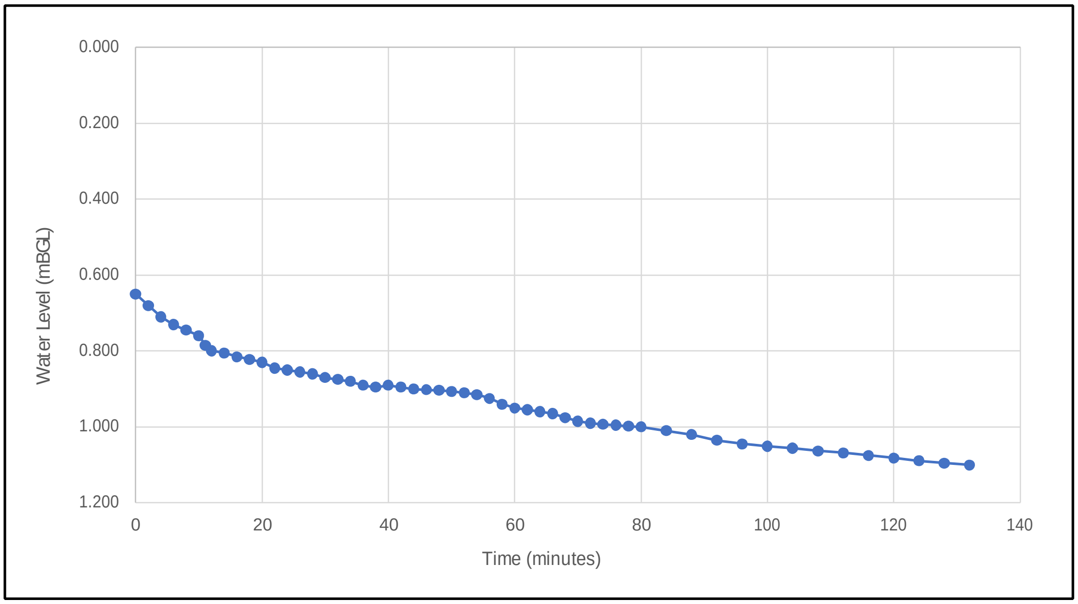
Soakage Pit Length (m)	2.00
Soakage Pit Width (m)	1.00
Soakage Pit Depth (m)	1.10
Soakage Pit Area (m^3)	2.20

Start Water Level (mBGL)	0.65
Total Depth of Test (m)	0.45
75% Effective Depth (mBGL)	0.76
50% Effective Depth (mBGL)	0.23
25% Effective Depth (mBGL)	0.99

Time at **75%** Effective Depth (minutes)	10
Time at **25%** Effective Depth (minutes)	72

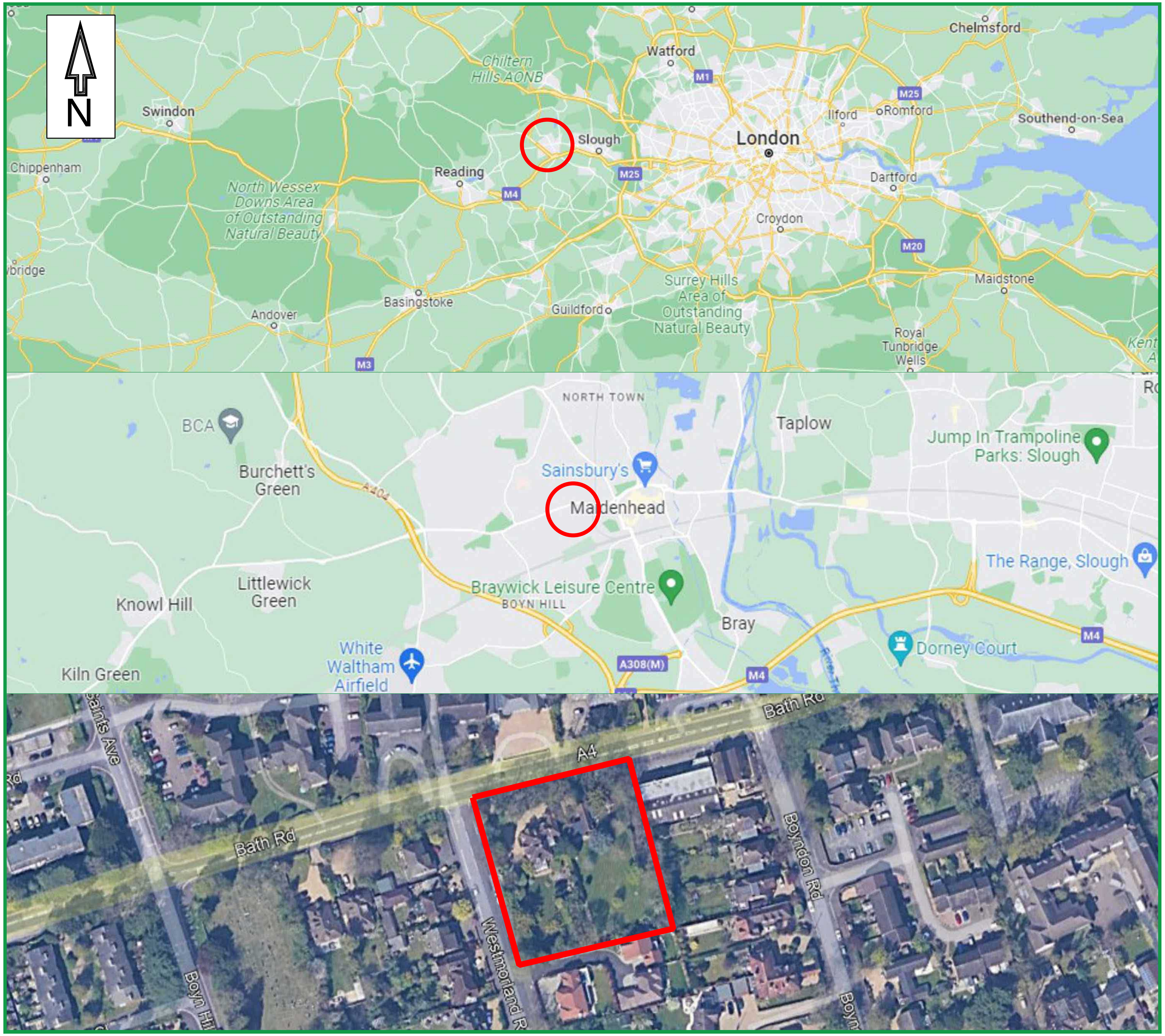
INFILTRATION RATE

Soil Infiltration Rate (*f*)	**3.61E-05**
m/s	**0.00003611**
m/hour	**0.1300**



APPENDIX E

Drawings



LEGEND

🟥 SITE LOCATION

REV	DESCRIPTION	DATE	BY

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Suite One, No 3 Mitton Road Business Park,
Mitton Road, Whalley, Lancashire, BB7 9YE
Tel: 01254 377 622
Email: mbuckley@bekenviro.co.uk
Web: www.bekenviro.co.uk

CLIENT.
CHURCHGATE SERVICES

JOB TITLE.
LAWNFIELD, 1 WESTMORLAND ROAD, MAIDENHEAD

DRAWING TITLE.
SITE LOCATION PLAN

SCALE @ A3.	DRAWN BY.	APPROVED BY.	DATE.
NTS	D.E.	M.B.	06/06/23

DRAWING No.	REV.
23079-1	-

LEGEND

━ SITE FOOTPRINT

REV	DESCRIPTION	DATE	BY

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Suite One, No 3 Mitton Road Business Park,
Mitton Road, Whalley, Lancashire, BB7 9YE
Tel: 01254 377 622
Email: mbuckley@bekenviro.co.uk
Web: www.bekenviro.co.uk

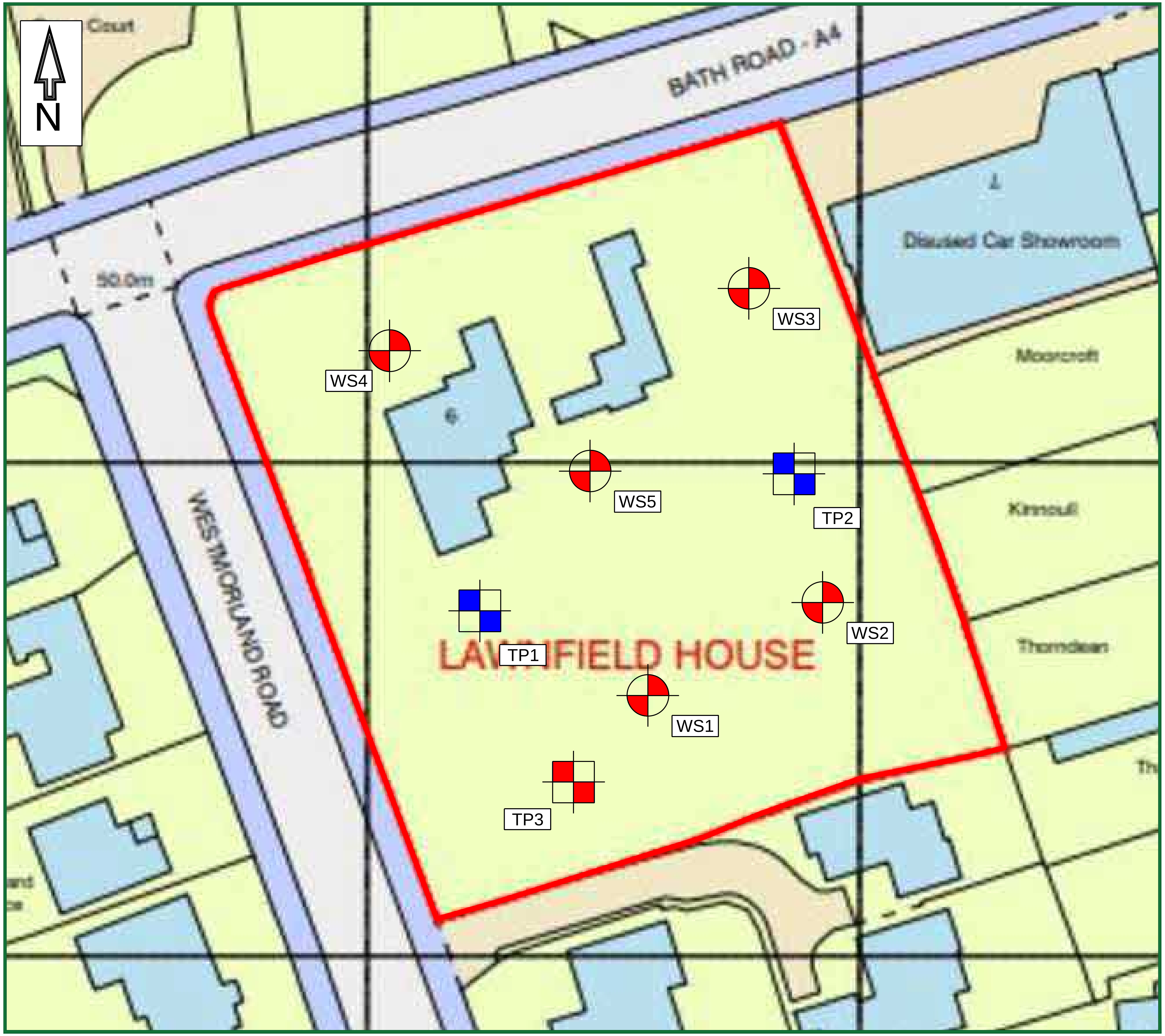
CLIENT.
CHURCHGATE SERVICES

JOB TITLE.
LAWNFIELD, 1 WESTMORLAND ROAD, MAIDENHEAD

DRAWING TITLE.
SITE LAYOUT PLAN

SCALE @ A3.	DRAWN BY.	APPROVED BY.	DATE.
NTS	D.E.	M.B.	06/ 06/ 23

DRAWING No.	REV.
23079-2	-



LEGEND

⊕	WINDOW SAMPLE BOREHOLE
▚	TRIAL PIT WITH CBR & BRE 365 TESTING
▚	TRIAL PIT WITH CBR TESTING

REV	DESCRIPTION	DATE	BY

GEO-ENVIRONMENTAL CONSULTING ENGINEERS
Suite One, No 3 Mitton Road Business Park,
Mitton Road, Whalley, Lancashire, BB7 9YE
Tel: 01254 377 622
Email: mbuckley@bekenviro.co.uk
Web: www.bekenviro.co.uk

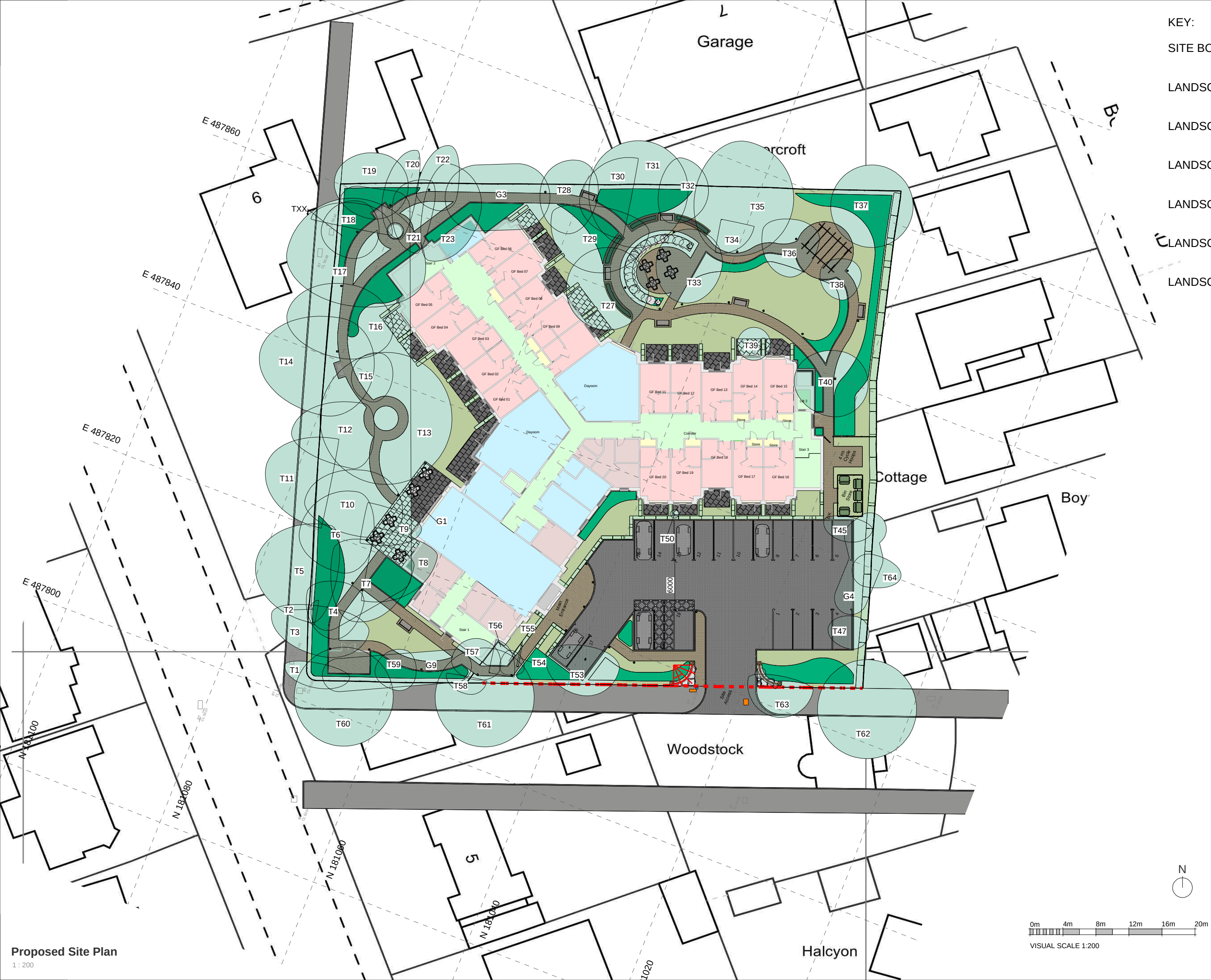
CLIENT.
CHURCHGATE SERVICES

JOB TITLE.
LAWNFIELD, 1 WESTMORLAND ROAD, MAIDENHEAD

DRAWING TITLE.
SITE INVESTIGATION PLAN

SCALE @ A3.	DRAWN BY.	APPROVED BY.	DATE.
NTS	D.E.	M.B.	06/06/23

DRAWING No.	REV.
23079-3	-



Proposed Site Plan

1 : 200

KEY:

- SITE BOUNDARY 🟥
- LANDSCAPING - LAWN 🟩
- LANDSCAPING - PLANTING 🟩
- LANDSCAPING - PATH ▨
- LANDSCAPING - CAR PARK ▨
- LANDSCAPING - PATIO ▨
- LANDSCAPING - TREES ●

Note: Refer to drawing 'Tree Constraints Plan' for additional information with regards to existing trees on site

REV	DESCRIPTION	BY	DATE

RM Design Group

Email: ray@rmdesigngroup.co.uk

NOTE:

ALL DIMENSIONS TO BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORK OR THE PRODUCTION OF ANY SHOP DRAWING. ALL DISCREPANCIES TO BE REPORTED TO RM DESIGN GROUP.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELATED ARCHITECT'S AND ENGINEER'S DRAWINGS AND ANY OTHER RELEVANT INFORMATION

CLIENT

Propco (Maidenhead) Ltd

PROJECT

Propco (Maidenhead) Ltd

DRAWING TITLE

Proposed Site Plan

DRAWING STATUS

PLANNING

SCALE AT A1:	DATE:	DRAWN:	CHECKED:
As indicated	07.08.23	Author	Checker
PROJECT NO:	DRAWING NO:.		REVISION:
B01-02	**42**		