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Our Ref: P8079 - AGIR
Date: 17th April 2024

Sutton Land Development
The Chapel
21 Leicester Road
Mountsorrel
Leicestershire
LE12 7AJ
By email only

Attention of Peter Sutton (Director)

Dear Peter,

**Re: Additional Ground Investigation Letter Report for Upton Steel, Stanton Lane,
Stanton under Bardon – Phase 1**

GRM Development Solutions Limited (GRM) were appointed by Sutton Land Development (Client), to undertake additional ground investigation works for the new commercial development (referred to as 'Phase 1') at 'Upton Steel, Stanton Lane, Stanton under Bardon'. It should be noted that previous reports were issued in 2017 and 2018 for this site, and then an updated Phase II Site Appraisal Report covering 'Phase 1' of the development was issued in November 2023 (Ref: P8079/PIISAR.1_Rev A).

The works detailed within this letter report covered an area of the field (south eastern corner of the site) that was previously inaccessible, and comprised trial pits and chemical soil testing. These works were an addendum to the previously issued updated Phase II Site Appraisal Report covering 'Phase 1' of the development.

In addition, reference in this letter report has been made to another investigation undertaken by Nicolls Colton in December 2021 (Report Ref No. G21159-IR). These works were undertaken in the field (which makes up the majority of the development area) and within the adjacent Upton Steel loading yard area of the site. At the request of the Client, relevant information from the Nicolls Colton report has been included in this additional letter report, to provide a full overview to satisfy the LPA requirements.

This letter report should be read in conjunction with GRM Standard Limitations of Reporting, which is presented in Appendix A.

The development proposals comprise a new commercial development that includes the construction of a steel framed warehouse (with individual units) and associated infrastructure. The proposed end



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use includes a new yard area with lorry parking and areas of soft landscaping. The proposed Phase 1 development layout plan provided by the Client is presented in Appendix B. A site location and boundary plan is presented in Appendix C.

GROUND INVESTIGATION

South Eastern Corner of Field

Ground investigation fieldwork was undertaken by GRM on the 14th March 2024, where four trial pits were completed in the south eastern corner of the field (which had previously been inaccessible). The trial pits (TP201-TP204 inclusive) were undertaken to a maximum depth of 1.90m begl. The exploratory hole location plan is presented in Appendix D, whilst the exploratory hole logs are presented in Appendix E.

Previously, Nicholls Colton (NC) had undertaken four window sample boreholes in the south eastern corner of the field on the 12th October 2021. These boreholes were located adjacent to the fence which marked the boundary to the overgrown, previously inaccessible area. The NC window sample boreholes (WS01-WS04 inclusive) were undertaken to a maximum depth of 1.58m begl. The NC exploratory hole location plan along with the window sample borehole logs are presented in Appendix F.

The following ground conditions were encountered during the GRM investigation fieldwork:

- Made Ground
- Head Deposits

Made Ground

Made Ground was encountered in all the exploratory holes completed, to a depth of between 0.10m and 0.60m begl.

The made ground generally comprised:

- Ø Dark brown, slightly clayey gravelly fine to coarse SAND. Gravel is fine to coarse, angular to subangular, of brick, metal, pipe, plastic and siltstone. Rare cobbles of angular to subangular brick and siltstone.

No evidence of foundations or buried structures from any former buildings was recorded.

Head Deposits

The natural granular strata are considered to be representative of the Head Deposits. These strata were recorded in all the exploratory holes completed. The full thickness of these Head Deposits was not proven.

The strata typically comprised:

- Ø Medium dense to very dense, light brown / orangish brown slightly clayey sandy GRAVEL. Gravel is fine to coarse, angular to subrounded, of volcanic sandstone and siltstone. High cobble content – cobbles are angular to subrounded of volcanic sandstone and siltstone. Encountered in all trial pits.
- Ø Very dense, light brown, clayey gravelly COBBLES. Gravel and cobbles are subangular to subrounded of volcanic sandstone and siltstone. Encountered in TP201 only, between 1.7m and 1.9m begl.

- Ø Medium dense to dense, light brown, gravelly very silty fine to coarse SAND. Gravel is fine to coarse, subangular to subrounded of volcanic sandstone and siltstone. Encountered in TP203 only, between 0.6m and 1.5m begl.
- Ø Light brown, clayey gravelly very sandy SILT. Gravel is fine to coarse, subangular to subrounded of volcanic sandstone and siltstone. Encountered in TP202 only, between 0.1m and 0.9m begl.

Groundwater

No groundwater ingresses were recorded during the siteworks.

Upton Steel Loading Yard Area

Ground investigation fieldwork was undertaken by NC between the 18th and 21st October 2021, where eight window sample boreholes were completed in the Upton Steel loading yard area. The window sample boreholes WS11-WS15 inclusive, were undertaken around the perimeter of an underground fuel tank, to a maximum depth of 5.0m begl. Window sample boreholes WS17 & WS17A were undertaken in the soft landscaped area immediately south of the fuel tank, to a maximum depth of 5.0m begl. Window sample WS16 was undertaken in the entrance to the yard area, to a maximum depth of 5.0m begl. The NC exploratory hole location plan and window sample borehole logs are presented in Appendix G.

The following ground conditions were encountered during the NC investigation fieldwork:

- Made Ground
- Head Deposits

Made Ground

Made Ground was encountered in all the exploratory holes completed, to a depth of between 0.41m and 0.82m begl.

The made ground generally comprised:

- Ø Tarmacadam / asphalt. Encountered in WS11-WS16 inclusive.
- Ø Greyish brown, slightly clayey sandy GRAVEL. Gravel is fine to coarse, subangular to subrounded of brick, concrete, igneous rock, mudstone and limestone. Low cobble content of subangular igneous rock.

A fabric membrane was encountered within each exploratory hole (except for WS16), at depths in the range of 0.33m to 0.50m begl.

No visual or olfactory evidence of contamination was recorded.

Head Deposits

The natural cohesive strata are considered to be representative of the Head Deposits. These strata were recorded in all the exploratory holes completed. The full thickness of these Head Deposits was not proven.

The strata typically comprised:

- Ø Variably soft to stiff, orangish brown occasionally mottled grey, slightly sandy slightly gravelly CLAY. Gravel is fine to coarse, subangular to subrounded of quartzite, chalk, igneous rock and mudstone. Low cobble content of subangular chalk.

- Ø Stiff to very stiff, reddish brown mottled grey, slightly sandy slightly gravelly CLAY. Gravel is fine to coarse, subangular to subrounded of quartzite and chalk. Low cobble content of subangular chalk. Encountered only in WS11 from 4.80m begl.
- Ø Brown, slightly clayey, gravelly, fine to coarse SAND. Gravel is fine to coarse, subangular to subrounded of quartzite, chalk and mudstone. Encountered only in WS16 between 2.54m and 2.80m begl.

No visual or olfactory evidence of contamination was recorded.

Groundwater

No groundwater ingresses were recorded in any of the exploratory holes, except for WS16. There was a groundwater strike in WS16 at a depth of 0.82m begl, which rose to 0.76m begl after 20 minutes.

CONTAMINATION RISK ASSESSMENT

Human Health

The development proposals (which form Phase 1) comprise a new commercial development that includes the construction of a steel framed warehouse building (divided into individual units) and associated infrastructure. The proposed end use includes a new yard area with lorry parking and areas of soft landscaping.

Neither the GRM or NC fieldwork has revealed any significant contamination. The material on site identified as being the most likely to be contaminated was the made ground. The rationale for the end use specific Tier 1 Acceptance Criteria (TAC) used by GRM is outlined in Appendix A (vi) and for this site the chemical analysis results are being compared against the TAC for a commercial / industrial end use. Samples of both made ground and natural strata (Head Deposits) have been analysed from the GRM and NC investigations.

To provide an initial assessment, the results have been assessed to determine whether benzo(a)pyrene could be used as a surrogate marker in the assessment of carcinogenic risks posed by genotoxic PAHs in soils. It is recommended that such assessments should be based upon toxicological benchmarks derived from the data for two coal tar mixtures presented by Culp et al. (1998) and as described in the Public Health England document contaminated land information sheet: risk assessment approaches for polycyclic aromatic hydrocarbons (PAHs) dated 2017. The graph completed shows that benzo(a)pyrene can be used as a surrogate marker for genotoxic PAHs, with the exception of naphthalene, for the made ground and natural strata soils. GRM's TACs use published C4SL values which are based on minimal risk levels and have been confirmed to be suitable for use in a planning context by the UK Government. Other commercially available values have been published and have been used where C4SLs are not available.

The GRM and NC chemical analysis results are presented in Appendices H and I respectively. The GRM contaminant screening values and a copy of the PAH profile graph are presented in Appendix J. The PAH profile graph confirms that the use of benzo(a)pyrene as a marker is appropriate.

The analysis results have been compared directly against the relevant TAC values. Representative samples of the made ground and natural strata have been analysed for a general suite of contaminants.

GRM General Suite

Fifteen representative samples of the made ground (10) and natural strata (5) have been analysed for a general suite of contaminants. The recorded concentrations of all the contaminants were below the relevant TAC for a commercial / industrial end use.

Asbestos Screening

Ten representative samples of the made ground have been screened for the presence of asbestos. No asbestos has been detected in any of the samples.

Petroleum Hydrocarbons

Eighteen representative samples of the made ground (10) and natural strata (8) were tested for banded TPHCWG so that the risk to end users from potential petroleum hydrocarbons could be assessed.

For a commercial / industrial end use, the sample analysis did not reveal elevated concentrations of either Aliphatic or Aromatic hydrocarbons in excess of the relevant TAC.

Summary

The risk to end users from soil contamination is considered to be negligible.

Therefore, remedial works are not considered to be necessary.

Risk to Site Workers

The investigation has not revealed any specific contamination risk to site workers; however, the general comments outlined in Appendix A (vii) should be considered when site specific risk assessments are completed. The use of suitable PPE should be enforced during the ground works stage of construction.

Controlled Waters

A potential source of contamination has not been identified at the site (field area or Upton Steel loading yard area) and, in the absence of a source, there is considered to be no risk to controlled waters. The primary receptors for the site are the Secondary Undifferentiated Aquifer (Superficial Head Deposits) and the underlying Secondary A & B Aquifers (bedrock).

Water Supply Pipes

It is considered that, based on the UKWIR guidance, the concentrations of contaminants recorded to date are such that standard PVC water supply pipes should be suitable for the site (field area). However, within the existing yard area of the Upton Steel warehouse facility, Barrier Type B water supply pipes should be allowed for.

It is recommended that the local water supply company for the site be contacted to confirm their requirements with regard to pipe materials.

Waste Classification & Disposal

Based on the chemical test results (within this report) from the most recent GRM investigation and from the previous NC investigation, the made ground and natural strata have been classified using the HazWaste Online software, should they require disposal offsite.

Based on the Waste Classification Report Summary Sheets presented in Appendix K, it is considered that the made ground and natural strata will be classed as Non-Hazardous Waste. The natural strata underlying the site are likely to be classified as Inert for disposal purposes; however, further testing will be required to confirm.

Care should be taken to keep natural arisings separate from any made ground and free from construction materials, as natural soils mixed with made ground and / or construction materials may attract additional disposal costs.

It is recommended that any materials to be exported are stockpiled and tested to confirm disposal rates, as this may be more cost effective than using the results contained within this report.

Tarmacadam Assessment

Within the yard area of the Upton Steel warehouse facility, at the northern end of the site, asphalt / tarmac hardstanding is present. If some of it is to be removed as part of the redevelopment works (to accommodate the new warehouse building), further testing of the asphalt / tarmac hardstanding will be required to determine the absence of coal tar and if it can be classified as a non-hazardous product. Until this is done, the hardstanding material should be treated as hazardous waste.

If required, it is recommended that the hardstanding material is excavated and stockpiled separately from other made ground materials on site. Analysis of the hardstanding material can then be undertaken using PAK marker spray. The PAK marker spray contains a solvent which dissolves tar-based products and discolours the paint as it dries; indicating if coal tar is present.

If the hardstanding material does include coal tar, it should be disposed of as Tarmacadam/asphalt: 17 03 01 (bituminous mixtures containing coal tar) or recycled through a waste disposal / recycling facility. If the hardstanding material does not include coal tar, it should be disposed as Tarmacadam/asphalt: 17 03 02 (bituminous mixtures other than those mentioned in 17 03 01) or recycled through a waste disposal / recycling facility.

GROUND GAS RISK ASSESSMENT

The proposed land use is classed as low sensitivity (commercial / industrial). From the Nicolls Colton December 2021 ground investigation report, a number of gas monitoring standpipes were installed within the Phase 1 site development area; in the field area (WS01 & WS04) and the Upton Steel loading yard area (WS11, WS13, WS15 & WS17A). All response zones were targeted at the natural strata (either clay or granular), as only a limited thickness (less than 1m) of made ground was present.

Based on 'BS8576:2013 Guidance on investigations for ground gas – Permanent Gases and Volatile Organic Compounds', the gas hazard is considered to be very low (natural soil strata with low degradable organic content / off site historic landfill in former quarry).

The primary guidance document to determine if protection measures are required is BS8485:2015+A1:2019 *Code of practice for the design of protective measures from methane and carbon dioxide ground gases for new buildings*. This uses hazardous gas flow rates (Q_{hg}), which are gas concentrations multiplied by borehole flow rates, to derive a Gas Screening Value (GSV) for the site. The gas regime is then determined based on the GSV and other limiting factors such as gas concentrations.

The NC monitoring was undertaken over three weekly monitoring visits, in October and November 2021. During this monitoring period, the gas flow rate was generally either below the monitor's lower limit of detection or was up to 0.2l/hr. Only on one occasion, from one installation (WS17A), was a maximum gas flow of 6.4l/hr recorded.

For each individual monitoring installation, the following GSVs were determined:

Borehole	Maximum Gas Flow (l/hr)	Maximum Methane (%v/v)	Maximum Carbon Dioxide (%v/v)	Maximum GSV (l/hr)
WS01	0.1	1.0	1.1	0.0011
WS04	0.1	0.1	0.3	0.0003
WS11	0.2	0.1	3.3	0.0066
WS13	0.2	0.6	4.0	0.008
WS15	0.1	0.2	0.7	0.0007
WS17A	6.4	0.1	0.2	0.0128

Based on the above table, the maximum GSV for the site is determined as 0.0128l/hr.

Although the maximum concentration of methane was recorded as 1%v/v, as the maximum concentration of carbon dioxide is <5% and the maximum GSV for the site is <0.07l/hr, it is considered that 'Characteristic Situation 1' or CS1 as outlined in BS8485:2015+A1:2019 is justified for the site as no significant gas source has been identified. Therefore, gas protection measures (for methane and carbon dioxide) for the site are not required. The updated Phase II Site Appraisal Report covering 'Phase 1' of the development, previously issued in November 2023, also confirmed that no gas protection measures were required.

It should also be noted that hydrogen sulphide concentrations of up to 65ppm have been recorded in WS17A (in the Upton Steel loading yard area) during the NC monitoring. As much lower concentrations (less than 5ppm) were recorded from the other monitoring installations in the vicinity of WS17A, this abnormally high concentration is considered an isolated occurrence. Given the proposed commercial end use, the size of the building, the requirement for ventilation from suspended floor slabs and the attenuation between inground concentrations and concentrations entering the building, the hydrogen sulphide observed is unlikely to pose a risk to end users.

The desk study risk assessment determined that **Basic** radon gas protection measures are required. A previously obtained BGS radon report (see previously issued GRM Report - Ref: P8079/PIISAR.1_Rev A) confirmed that basic radon for new dwellings was required in the south west corner of the Phase 1 development site area. However, the proposed commercial development is not a dwelling. The source of the radon being the Bradgate Formation and Head derived deposits from it, are present on site to a greater extent than the BGS mapping suggests. Therefore, at this stage, basic radon protection should be allowed for, unless the BGS are able to confirm level of radon produced by the Bradgate Formation strata is such that a commercial building does not require protection measures.

In addition, the previous GRM investigation work within the field area of the site confirmed the potential for depleted oxygen levels, which may pose a potential hazard to site workers working in confined spaces.

FOUNDATION DESIGN

For recommendations regarding the foundation design of the new commercial development, reference should be made to the previously issued updated GRM Phase II Site Appraisal Report covering 'Phase 1' of the development (Ref: P8079/PIISAR.1_Rev A).

We trust that the information provided is sufficient for your current requirements. If you require any additional information or clarification of the contents of this letter report then do not hesitate to contact us.

Yours sincerely,
for GRM Development Solutions Ltd

Prepared By



Robert H Crossland MSc FGS CGeol
Senior Engineering Geologist / Project Manager

Approved By



Richard Upton BSc MSc CEnv
Director

APPENDICES

Appendix A: General Appraisal Comments and Standard Limitations
Appendix B: Proposed Phase 1 Development Layout Plan
Appendix C: Site Location and Boundary Plan
Appendix D: GRM Exploratory Hole Location Plan
Appendix E: GRM Trial Pit Logs
Appendix F: NC Exploratory Hole Location Plan & Window Sample Borehole Logs WS01-WS04
Appendix G: NC Exploratory Hole Location Plan & Window Sample Borehole Logs WS11-WS17
Appendix H: GRM Chemical Analysis Results
Appendix I: NC Chemical Analysis Results WS01-WS04 & WS11-WS17
Appendix J: GRM Contaminant Screening Values & PAH Profile Graph
Appendix K: Waste Classification Report Summary Sheets



A P P E N D I X A

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GENERAL APPRAISAL COMMENTS

i INFORMATION SOURCES

Where available the following sources have been used for the identification and assessment of potential ground hazards:

- Relevant British Standards
- British Geological Survey (BGS) Geology Map Scale 1:10,000 for local area
- British Geological Survey (BGS) Geology Map Scale 1:50,000/1:63,320
- BGS Memoir
- BGS Borehole Records: <https://mapapps2.bgs.ac.uk/geoindex/home.html>
- BGS online viewer: <https://geologyviewer.bgs.ac.uk>
- Magic Groundwater Vulnerability Maps
- Historical Ordnance Survey (OS) Maps
- Environmental Data Report
- Environment Agency Website: <http://www.environment-agency.gov.uk/>
- Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UKWIR, 2010.
- Coal Authority Records / Coal Mining Report
- DEFRA/Environment Agency Contaminated Land publications and DoE Industry Profiles
- BRE Guide BR211 (2023), 'Radon: Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects)'
- UK HSA Radon Maps: <https://www.ukradon.org/information/ukmaps>
- CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings'
- BS8485:2015 +A1: 2019, 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'
- Other technical references used throughout this document are detailed in the text.

ii CONTAMINANTS OF CONCERN

The DoE Industry Profiles are normally used to assess likely contaminants from past land use and potential nearby industrial sources. For land uses where no profile is available, likely contaminants of concern are selected by GRM based on past experience of similar sites, a general screening suite of contaminants covered by CLEA and common contaminants from the Industry Profiles.

- | | | |
|------------|-------------------|--|
| · Arsenic | · Copper | · Water soluble sulphate |
| · Cadmium | · Nickel | · PAH (polycyclic aromatic hydrocarbons) |
| · Chromium | · Zinc | |
| · Lead | · Phenols | |
| · Mercury | · cyanide (total) | |
| · Selenium | · pH | |

Asbestos and PCBs are listed in the vast majority of profiles. PCBs are listed as the profiles expect electricity substations and switch boxes on all industrial sites. There is the potential for asbestos containing material to be mixed up with made ground, following any demolition works.

iii CONCEPTUAL MODEL METHODOLOGY

The consideration of contamination is based upon the principles of risk assessment, using the 'source-pathway-receptor' model in order to establish the presence, or potential presence, of a pollutant linkage.

To create a risk, contamination must have the potential to cause harm to susceptible targets or receptors such as humans, the water environment or the built environment. The potential for harm to occur requires three conditions to be satisfied to form a pollutant linkage:

- The presence of substances that may cause harm (SOURCE).
- The presence of a target which may be harmed (RECEPTOR).
- The existence of a plausible migration route between the source and the receptor (PATHWAY).

In the absence of a plausible pollutant linkage there is no risk. Where a potential linkage is identified in order for it not to pose a risk to the identified receptor it must be broken.

iv INTRUSIVE INVESTIGATION SAMPLING METHODOLOGY

The ground investigation (including fieldwork, sampling, monitoring and laboratory analyses) has been designed to identify and assess potential ground related problems and to allow cost effective solutions to be advised. It has been planned on the basis of the desk study, site inspection and the proposed development layout (where available). All fieldwork and soil descriptions were carried out in general accordance with relevant British Standards.

The exploratory holes have been positioned and advanced to depths to determine the general ground/groundwater/gas conditions below the site. A general grid pattern has been adopted, where possible, to provide sufficient information based on the current proposed layout scheme. Some holes have been targeted at particular hazards identified in the Phase I assessment. The resultant exploratory hole density is considered to be commensurate with the complexity of the site conditions and detail of information required for this phase of the investigation.

v GROUND GAS RISK ASSESSMENT METHODOLOGY

Gas monitoring programmes undertaken by GRM are designed to broadly comply with the recommendations outlined in CIRIA Report C665 'Assessing risks posed by hazardous ground gas to buildings' (2007) and BS8576 'Guidance on Investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs) (2013).

To assess the risks posed by ground gases such as radon, carbon dioxide and methane, the relevant current guidance has been used. For radon the site has been assessed following the guidelines in 'Radon: guidance on protective measures for new dwellings (including supplementary advice for extensions, conversions and refurbishment projects) (BR211: 2023)'. For methane and carbon dioxide the primary guidance document used to determine if protection measures are required is *BS8485:2015 Code of practice for the design of protective measures from methane and carbon dioxide ground gases for new buildings*. This uses hazardous gas flow rates (Q_{hg}), which are gas concentrations multiplied by borehole flow rates, to derive a Gas Flow Rate (GSV) for the site. The gas regime is then determined based on the GSV and other limiting factors such as gas concentrations.

Where flow is not recorded during the monitoring a default flow rate of 0.1l/hr will be used in the assessment to produce a positive result.

vi HUMAN HEALTH RISK ASSESSMENT METHODOLOGY

Guidance contained in the Environment Agency's CLEA Reports has been used to assess the risks posed to human health.

For residential developments that include domestic gardens the default Tier 1 Assessment Criteria (TAC) for 'residential land with plant uptake' are used, i.e. a female with a start age class of one and an end age class of six. All pathways are considered including the consumption of home-grown vegetables.

For residential developments that do not include domestic gardens the default Tier 1 Assessment Criteria (TAC) for 'residential land without plant uptake' are used, i.e. a female with a start age class of one and an end age class of six. All pathways are considered except the consumption of home-grown vegetables. For commercial/industrial developments the default Tier 1 Assessment Criteria (TAC) for 'commercial/industrial' are used, i.e. a female with a start age class of sixteen and an end age class of eighteen. All pathways are considered except the consumption of home-grown vegetables.

The TAC used by GRM include Category 4 Screening Levels (C4SLs) published by DEFRA, values calculated by GRM using the CLEA v1.071 risk assessment, and values and Suitable for Use Levels (S4UL) developed by LQM/CIEH. The TAC used in the assessment are selected based on the lowest site specific SOM values returned as part of the chemical analysis.

Where soil chemical analysis results are found to exceed the TAC, Site-Specific Risk Assessments may be undertaken using the CLEA v1.071 risk assessment software using the age classes and pathways described above.

vii RISK TO SITE WORKERS – GENERAL COMMENTS

The risks to site workers are similar to those posed to site end users, although likely to be less severe due to the site workers' shorter exposure to the identified contamination. However, site workers (particularly groundworkers) are more likely to come into direct contact with contaminated soils due to the nature of their work. On this basis ground and construction workers should be provided with basic Personal Protective Equipment based on the site's general health and safety risk assessment, but including as a minimum safety footwear, gloves and overalls.

A site specific risk assessment should be carried out for all hazards identified within the ground investigation in accordance with current health and safety legislation. This assessment should identify any measures required to further reduce risks i.e. providing further Personal Protective Equipment, welfare facilities and if necessary preventing access to certain areas.

Demolition and dismantling of existing structures on the site must be carried out to a safe and acceptable standard, in accordance with current UK guidance and best practice. Whilst not ground related, asbestos and hazardous substances surveys should be conducted prior to any demolition.

Any unusual colours, odours and suspicious ground should be reported immediately to site management and then GRM.

Whilst this appraisal has considered the long-term effects of contamination, GRM can also help during the formulation of Health and Safety documentation, if required.

viii CONTROLLED WATERS RISK ASSESSMENT METHODOLOGY

Where the desk study and fieldwork do not reveal a potential source of contamination no leachate or groundwater testing will be performed. Where a potential source is identified the testing will comprise leachate testing on the material considered most likely to pose a risk, groundwater testing will be undertaken if water is present at shallow depth.

The UK Drinking Water Standards (UKDWS) or Environmental Quality Standards (EQS) are usually adopted for comparison with the leachate/groundwater test results. When the most sensitive receptor is considered to be the aquifer (groundwater) UKDWS will be adopted as the Initial Tier 1 screening values.

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Where the most sensitive receptor is a surface water feature the EQS values will be used as Initial Tier I Screening values.

ix CONSTRUCTION MATERIALS RISK ASSESSMENT METHODOLOGY

The 'screening levels' adopted for the assessment of risk to construction materials are taken from the following documents:

- UK Water Industry Research (UKWIR) Contamination thresholds for sub-surface water pipes, for the protection of buried pipes.
- Building Research Establishment (BRE) Special Digest SD1 (2005), 'Concrete in Aggressive Ground', for the protection of buried concrete.

x WASTE DISPOSAL, SITE WASTE MANAGEMENT PLANS AND MATERIAL MANAGEMENT PLANS

Under current Waste Management Regulations, waste soil materials produced from the site will require characterisation to enable it to be disposed of correctly.

The chemical analysis results included in this report should be provided to the relevant landfill operators to establish the characterisation of the waste, confirm its suitability for landfill disposal and provide estimated costings. If material is classified as hazardous, then the site will need to be registered with the Environment Agency prior to the movement of the waste. Depending on the receiving landfill's current permit, further chemical analysis, incorporating Waste Acceptance Criteria (WAC) leachate analysis, may be required.

All materials removed from the site will be classified as 'waste' and therefore must be removed by a suitably licensed carrier of waste. This applies whether or not the waste is contaminated. All waste removed to landfill will attract Landfill Tax.

The developer/builder is likely to be classed as the waste producer and therefore, has a duty of care to ensure that all waste is disposed of appropriately. This includes ensuring the waste carrier is licensed and disposes of the waste to a suitably licensed landfill site. They are also required to keep a paper trail from 'cradle to grave' including copies of the waste disposal tickets.

Efficient materials management on site is recommended as it can lead to significant cost savings when compared to the traditional side casting or single stockpile of arisings. GRM can assist in the production of Material Management Plans under the CL:AIRE Definition of Waste: Code of Practice. The DoWCoP enables:

- The direct transfer and re-use of clean naturally occurring soil materials between sites, and
- The re-use of both contaminated and uncontaminated materials on their site of origin and between sites within defined Cluster projects.

GRM can also undertake the role of Qualified Person and submit the DoW CoP project Declaration.

Likewise making the site as volume neutral as possible will reduce the costs of development. Whilst not a statutory requirement, Site Waste Management Plans allow better waste management practices, help to reduce the amount of waste produced and identify best environmental disposal options. Implementing a Site Waste Management Plan (SWMP) can reduce costs (increasing business profits) and maximise resource efficiency.

xi GEOTECHNICAL ASSESSMENT GENERAL COMMENTS

Where finished floor levels of proposed structures have not been provided by the Client, then for the purposes of initial assessment, GRM will assume that finished levels will not vary appreciably from the existing ground levels. If the depths of any underground engineering works (i.e. sewers, pumping stations etc.) are unknown they will not be taken in to account in the assessment and it will be assumed that any such works will not compromise foundation or ground stability.

Should the development proposals or finished levels be different from these assumptions then the comments/recommendations in the Geotechnical Assessment may require revising.

It should be noted that the results of window sampling and/or cable percussive boreholes may not give a true indication of a soils actual engineering properties (i.e. stability, mass structure etc). GRM consider that that prior to development trial pitting should be undertaken to confirm the recommendations in the Geotechnical Assessment.

xii GEOTECHNICAL ASSESSMENT – ENGINEERING GROUND TREATMENT

Near surface soils have the potential to be disturbed by weathering and site traffic. Precautions should always be taken to avoid this, as excessive disturbance may leads to more onerous floor slab designs, road cap thickness and increased amounts of off-site disposal etc.

Near surface soils may need treatment or reinforcing to allow safe movement of construction plant and labour. An assessment by the contractor should be undertaken once the type of machinery/plant needed to complete the development is known.

xiii GEOTECHNICAL ASSESSMENT – EXCAVATIONS

Excavation instability (over-break) can result in damage to existing services or structures (e.g. foundations, roads or boundary walls/fences) both on and off-site, as well as increased foundation concrete costs. In order to minimise this, all excavations deeper than 1.2m deep (or any excavation within 1.5m of any existing structure or service) should be supported. Full support should be provided to the full depth of all near vertically sided excavations in made ground, soft and very soft clays and granular soils. A reduction to intermediate support should be acceptable within firm and stiffer natural clays.

Wherever possible, man entry into excavations should be prevented; however, where this is not possible, entry to, and time spent in, excavations should be kept to a minimum.

The build program should be tailored to reflect the impact that deep excavations through potentially unstable strata can have on adjacent properties, so that they are not undermined.

All excavations on site should be in accordance with HSE guidelines and stability should be practically maintained at all times. Reference should be made to HSE construction information sheet No. 8 (Revision 1) 'Safety in Excavations'.

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

If contaminated water enters excavations it should be removed and transported to an appropriate treatment facility by a suitably licensed carrier before construction begins.

xiv GEOTECHNICAL ASSESSMENT – SUBSTRUCTURES

Where practicable, existing buried construction should be fully removed; however, if this is not practicable all new foundations should be carried down to fully penetrate it and it should be broken well away from all new structures.

There may be existing structures and/or infrastructure in close proximity to the proposed development. New build foundations may be constructed next to pavements with existing underground services beneath them, or excavations may be required near existing footings associated with adjacent properties. These potential hazards need to be taken into consideration when designing foundations and the groundworker needs to be made aware of their potential impact during the redevelopment works. Foundations close to existing underground services or buildings may require alternative foundation techniques (such as piling) to protect the integrity of these structures.

The contractor for the works should carry them out in such a fashion so as to not cause excessive overbreak, concrete usage or undermine existing buildings/roads/ services that are to be retained.

xv **GEOTECHNICAL ASSESSMENT – SOAKAWAYS**

Soakaway testing in trial pits by GRM is broadly carried out in accordance with BRE DG 365 (2016). The testing comprises the excavation of a test pit to a suitable depth, and the placement of water into the pit. The level of water present is then monitored over time. For borehole installations, the permeability testing (falling head/rising head) is undertaken in accordance with BS5930.

If it is decided to proceed with the use of soakaway drainage, then the following general points should be noted:

- Soakaways should not be placed so that water can be discharged through potentially contaminated made ground.
- The Environment Agency may require soakaways to be sealed systems such that only roof run off falls to soakaway.
- Interceptors are likely to be required for soakaways for highway drainage. The adopting authority for the highways should be consulted at the earliest opportunity regarding the use of soakaways for highways drainage.
- Consideration of site levels and slopes should be taken into account during the design.
- The construction of all soakaways should be in accordance with the current building regulations.
- Soakaways should not be placed within 5m of a proposed building.
- Placement of soakaways needs to be considered so as to avoid ponding of water down slope.
- The base of a soakaway should not be below the highest recorded water level.
- The Environment Agency prefer 1m of dry soil to be present between the base of a soakaway and the water table to provide attenuation for contamination.

xvi **GEOTECHNICAL ASSESSMENT – FOUNDATIONS**

If soft or hard spots are encountered during foundation excavation then they should be replaced with suitably compacted material or the footings deepened to suitable strata, to avoid differential settlement.

If strata of differing bearing character (e.g. sand and clay) are encountered at foundation levels within the excavations for a single plot then the excavation depths should be altered as appropriate to ensure the foundations rest on a single stratum, or strata that will not induce differential settlement. Where this is impractical then GRM should be contacted to assess a reinforced concrete detail or an alternative foundation solution (e.g. piles or vibro-replacement).

NOTES ON LIMITATIONS

General

GRM Development Solutions Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement had been executed, or with whom an assignment had been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from GRM Development Solutions Limited; a charge may be levied against such approval.

GRM Development Solutions Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) the consequences of this document being used by any third party with whom an agreement has not been executed.

Phase I Environmental Audits/ Desk Studies

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, GRM Development Solutions Limited reserves the right to review such information and as considered necessary and appropriate to modify the opinions accordingly. It should be noted that any risks identified in a Phase 1 report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits (Contamination Investigations)

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated with potential human targets, building materials, and controlled waters.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as provisional only and must, in any event, be confirmed by a commercial adviser.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. Whilst exploratory testing is intended to gain an accurate representation of the site, the very nature of sampling and testing is such that it cannot ensure that all localised conditions are detected.

The risk assessment and opinions provided take in to consideration, inter alia, currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

Phase II Geo-environmental Investigations (Combined Geotechnical and Contamination Investigations)

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions to provide a reasonable assessment of the environment risks together with engineering and development implications. If costs have been included in relation to site development a commercial adviser must confirm these.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site for each of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time the site work was conducted. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects. The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.



The risk assessment and opinions provided take in to consideration, inter alia, currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.



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DO NOT SCALE

NOTES:



Approximate site
boundary



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Burton-on-Trent, Staffordshire
Tel: 01283 551 249
info@grm-uk.com www.grm-uk.com

CLIENT:

Sutton Land Development

PROJECT:

**Upton Steel, Stanton Lane,
Stanton under Bardon**

TITLE:

**Proposed Phase 1
Development Layout Plan**

SCALE@SIZE:

NTS

ISSUE:

FINAL

DESIGN/DRAWN:

RHC

DATE:

Apr 2024

PROJECT No:

P8079

DRAWING No:

Figure 1

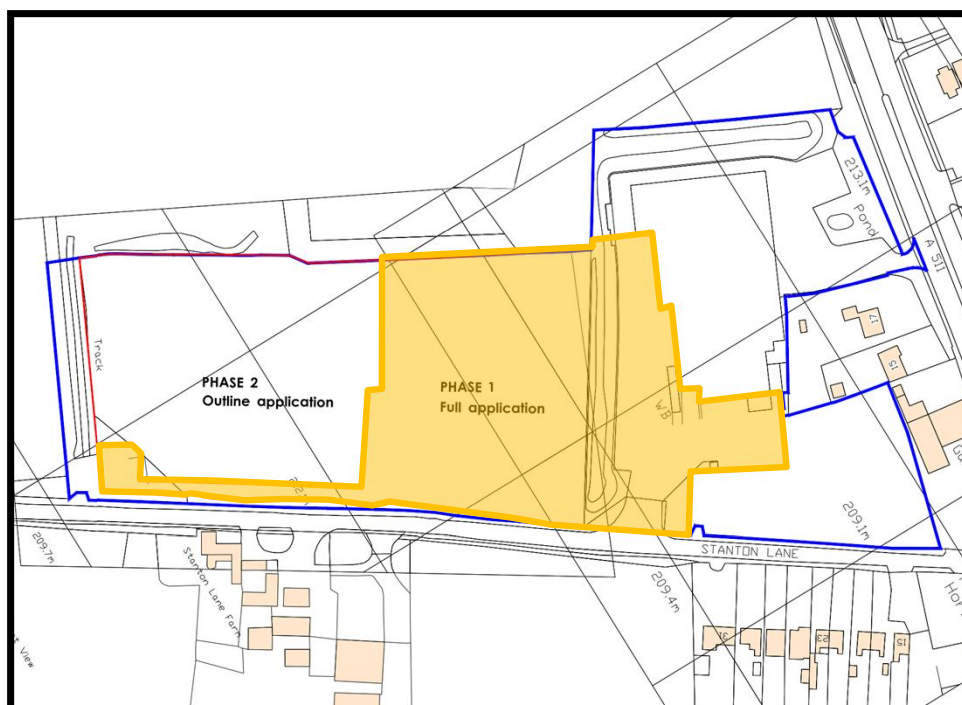
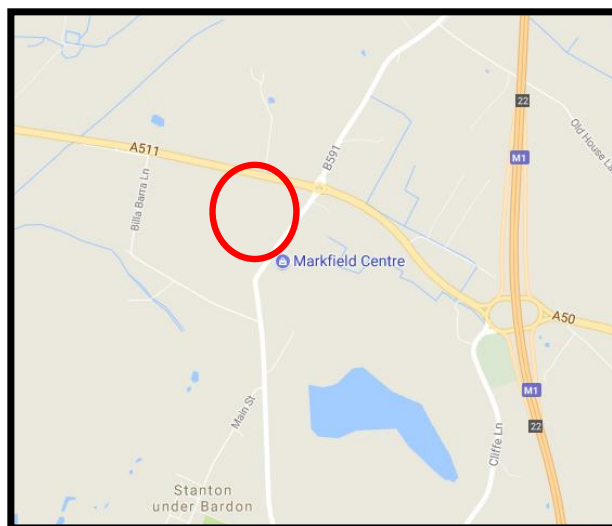
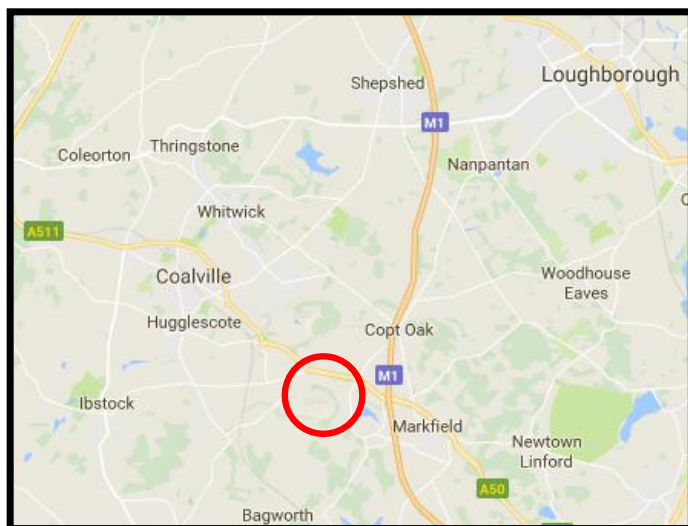
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DO NOT SCALE

NOTES:



Approximate site location



Approximate site boundary



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Burton-on-Trent, Staffordshire

Tel: 01283 551 249

info@grm-uk.com www.grm-uk.com

CLIENT:

Sutton Land Development

PROJECT:

**Upton Steel, Stanton Lane,
Stanton under Bardon**

TITLE:

Site Location and Boundary Plan

SCALE@SIZE:

NTS

ISSUE:

FINAL

DESIGN/DRAWN :

RHC

DATE:

Apr 2024

PROJECT No:

P8079

DRAWING No:

Figure 2

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NOTES:

CLIENT:	Sutton Land Development Ltd
PROJECT:	Stanton Lane Stanton under Bardon
TITLE:	Exploratory Hole Location Plan

PROJECT No:	P8079	DATE:	March 2024	DESIGN/DRAWN:	RHC
DRAWING NUMBER:	Figure 3	ISSUE:	Final	© GRM Development Solutions Ltd © Crown Copyright. AL 100014100	

GRM

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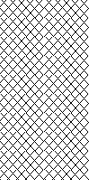
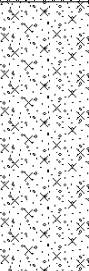
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		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Trial Pit Log			Trial Pit No TP201 Sheet 1 of 1	
Site Name: Stanton Lane, Stanton under Bardon							Ground Level (mAOD) 211.45	
Client: Sutton Land Development					GRM Project Ref: P8079		Coordinates 446918 E 311325 N	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.20	ES		0.30	211.15		Dark brown, slightly clayey, gravelly, SAND with rare cobbles. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular siltstone, brick and metal. Cobbles are angular to subangular siltstone and brick.	1
	0.40 - 0.50	ES					MADE GROUND Medium dense to dense, light brown, slightly clayey, sandy GRAVEL with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular, volcanic sandstone and siltstone. Cobbles are angular to subangular volcanic siltstone and sandstone.	
	0.90 - 1.00	D					HEAD	
	Medium to high cobble content at 1.60m.							
				1.70	209.75		Very dense, light brown, clayey, gravelly COBBLES. Gravel is fine to coarse, subangular to subrounded volcanic sandstone and siltstone. Cobbles are subangular to subrounded volcanic sandstone and siltstone.	2
			1.90	209.55	HEAD			
End of Pit at 1.700m								3
								4
Date Excavated: 14/03/2024				Groundwater Observations:				
Date Backfilled: 14/03/2024				No groundwater encountered.				
Shoring: None								
Stability: Stable.								
Plant Used: JCB 3CX				Trial Pit Dimensions (m):		Reason for termination of Trial Pit:		
Logged by: AW				0.20 		Hard digging.		
General Remarks: None.								
Relative density is approximate and determined by observation only.				Version: FINAL			Scale: 1:25	

		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Trial Pit Log			Trial Pit No TP202 Sheet 1 of 1	
Site Name: Stanton Lane, Stanton under Bardon							Ground Level (mAOD) 212.10	
Client: Sutton Land Development					GRM Project Ref: P8079		Coordinates 446907 E 311333 N	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.00 - 0.10	ES					Dark brown, slightly clayey, gravelly SAND with rare cobbles. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular brick and siltstone. Cobbles angular to subangular brick and siltstone. MADE GROUND	
	0.30 - 0.40	D					Light brown, clayey, gravelly, very sandy SILT. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded volcanic sandstone and siltstone. HEAD <i>Becomes orangish-brown in color at 0.70m.</i>	
	0.90 - 1.00	D					Dense, orangish-brown, slightly clayey, sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded volcanic sandstone and siltstone. HEAD	
				1.70	210.40		End of Pit at 1.700m	
Date Excavated: 14/03/2024				Groundwater Observations:				
Date Backfilled: 14/03/2024				No groundwater encountered.				
Shoring: None				Trial Pit Dimensions (m): 0.20  0.60				
Stability: Stable.								
Plant Used: JCB 3CX				Reason for termination of Trial Pit:				
Logged by: AW				Hard digging.				
General Remarks: None.								
Relative density is approximate and determined by observation only.				Version: FINAL		Scale: 1:25		

		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Trial Pit Log			Trial Pit No TP203 Sheet 1 of 1		
Site Name: Stanton Lane, Stanton under Bardon							Ground Level (mAOD) 212.19		
Client: Sutton Land Development					GRM Project Ref: P8079			Coordinates 446924 E 311339 N	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.50 - 0.60	ES		0.60	211.59		Very dark brown, slightly gravelly SAND. Sand fine to coarse. Gravel fine to coarse, angular to subangular brick, pipe, plastic. MADE GROUND		
	0.60 - 0.70	D					Medium dense to dense, light brown, gravelly, very silty SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded volcanic sandstone and siltstone. HEAD		
	1.50 - 1.60	D		1.50	210.69		Very dense light brown, sandy GRAVEL with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular volcanic sandstone and siltstone. Cobbles are subangular to subrounded volcanic sandstone and siltstone. HEAD		
			1.80	210.39		End of Pit at 1.800m			
Date Excavated: 14/03/2024				Groundwater Observations:					
Date Backfilled: 14/03/2024				No groundwater encountered.					
Shoring: None									
Stability: Stable.									
Plant Used: JCB 3CX				Trial Pit Dimensions (m):		Reason for termination of Trial Pit:			
Logged by: AW				0.30  0.70					
General Remarks: None.									
Relative density is approximate and determined by observation only.				Version: FINAL			Scale: 1:25		

		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Trial Pit Log			Trial Pit No TP204 Sheet 1 of 1	
Site Name: Stanton Lane, Stanton under Bardon							Ground Level (mAOD) 212.59	
Client: Sutton Land Development					GRM Project Ref: P8079		Coordinates 446914 E 311345 N	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.20	ES		0.20	212.39		Dark brown, slightly clayey, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded slate and siltstone.	1
	0.40 - 0.50	D					MADE GROUND Medium dense to dense, light brown, clayey, sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded volcanic sandstone and siltstone. Cobbles are subangular to subrounded volcanic sandstone and siltstone.	
							HEAD Land drain at 0.65m.	
							Becomes high cobble content and orangish brown in colour at 1.00m.	
				1.70	210.89		End of Pit at 1.700m	2
								3
								4
Date Excavated: 14/03/2024				Groundwater Observations:				
Date Backfilled: 14/03/2024				No groundwater encountered.				
Shoring: None								
Stability: Stable.								
Plant Used: JCB 3CX				Trial Pit Dimensions (m):		Reason for termination of Trial Pit:		
Logged by: AW				0.20 		Hard digging.		
General Remarks: None.								
Relative density is approximate and determined by observation only.				Version: FINAL		Scale: 1:25		

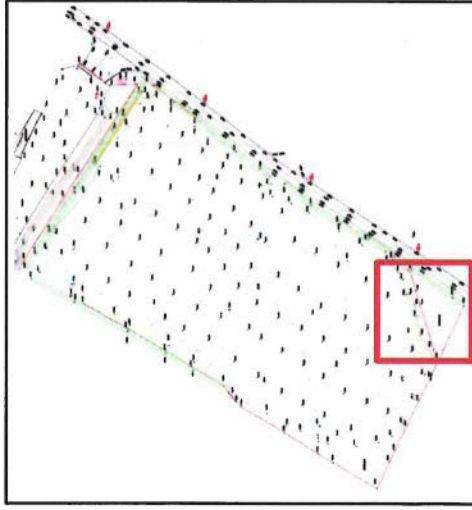


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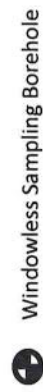
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North

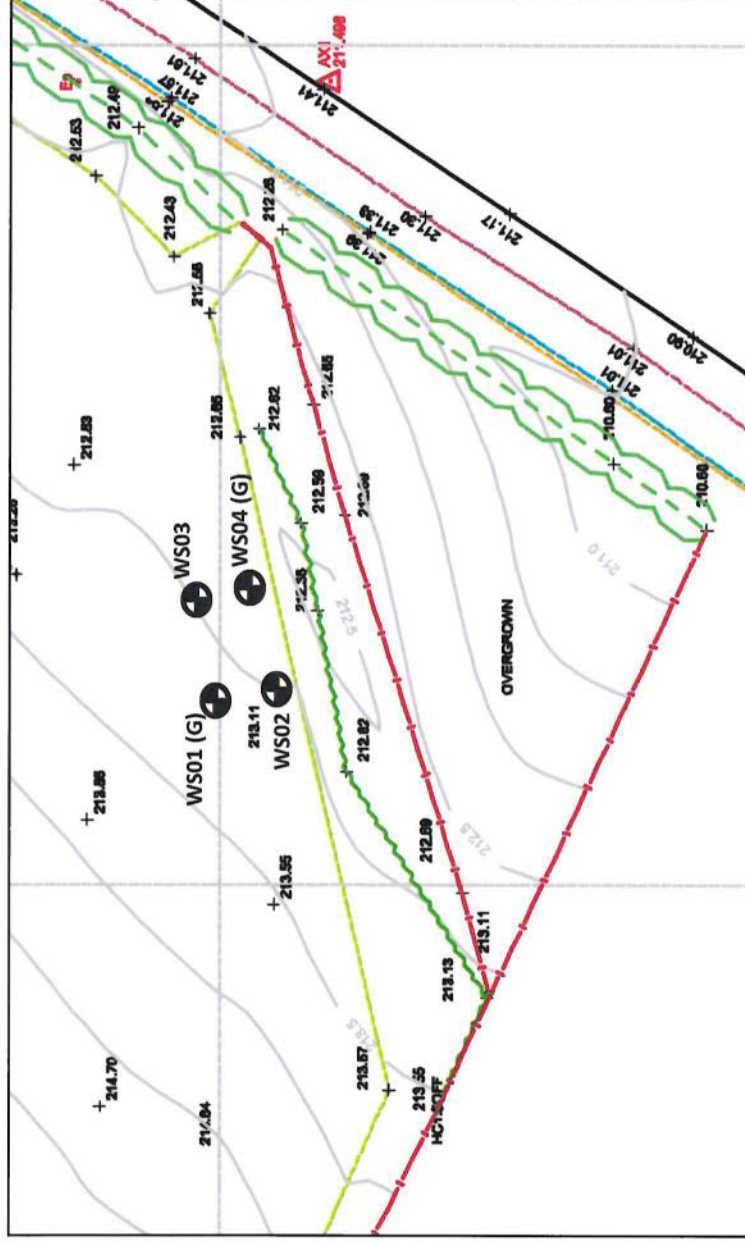


KEY:



Windowless Sampling Borehole

(G) Monitoring Well Installed



Client:

C J Upton & Sons Ltd.

Project:
CIU Land Project, Markfield.

Drawing No:
G21159-IR/03

Title:
Exploratory Hole Location Plan – Area B

Date:
December 2021

1. Hand dug starter pit to 1.20m, to confirm absence of underground services.
2. Borehole installed with 50mm HDPE slotted pipe, response zone from 0.58m to 1.58m, backfilled with bentonite 0.58m to 0.40m, then postmix from 0.40m to ground level with flush cover.
3. No groundwater seepages encountered during boring operations.
4. Borehole refused at 1.58mbgl.

BOREHOLE RECORD - WS02

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

1.00m

Casing Diameter:

Project No.:

G21159

Logged by: EP

Ground Level:

Date: 12/10/21

Location: -

Scale:

1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.10				0.26	MADE GROUND: Brown slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse granite, slate and mudstone. Rare sub-angular fine to medium fragments of brick. Orangeish brown slightly sandy clayey sub-angular to sub-rounded fine to coarse GRAVEL of igneous rock and mudstone. Sand is fine to coarse. Moderate cobble content of sub-angular igneous rock. ... becoming slightly clayey from 0.90m.		
ES2	0.50				1.00			

Remarks and Water Observations

Sheet 1 of 1

1. Hand dug starter pit to 1.00m, to confirm absence of underground services.
2. Borehole backfilled with bentonite and arisings upon completion.
3. No groundwater seepages were encountered
4. Borehole could not advance past 1.00m due to hard strata.

BOREHOLE RECORD - WS03

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

0.82m

Casing Diameter:

Project No.:

G21159

Logged by: EP

Ground Level:

Date: 12/10/21

Location: -

Scale:

1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.15				0.27	MADE GROUND: Brown slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse granite, slate and mudstone.		
ES2	0.50				0.82	Orangeish brown slightly sandy slightly clayey sub-angular to sub-rounded fine to coarse GRAVEL of igneous rock and mudstone with low cobble content of sub-angular igneous rock. Sand is fine to coarse.		

Remarks and Water Observations

Sheet 1 of 1

1. Hand dug starter pit to 0.82m, to confirm absence of underground services.
2. Borehole backfilled with bentonite and arisings upon completion.
3. No groundwater seepages were encountered.
4. Borehole could not advance past 0.82mbgl due to hard strata.

BOREHOLE RECORD - WS04

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

1.40m

Casing Diameter:

Project No.:

G21159

Logged by: EP

Ground Level:

Date: 12/10/21

Location: -

Scale: 1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.10				0.31	MADE GROUND: Black slightly sandy slightly gravelly clayey TOPSOIL. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of igneous rock and mudstone with fine to cobble sized fragments of brick and pipe. Occasional half bricks present. MADE GROUND: Soft orangeish brown slightly sandy slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and igneous rock with fine to cobble brick fragments, granite and metal pipe. MADE GROUND: Firm to stiff orangeish brown speckled black slightly sandy slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and igneous rock with fine to cobble sized fragments of brick and granite. Occasional black staining, possible organic matter.		
ES2	0.40				0.52			
ES3	1.00				1.40			

Remarks and Water Observations

Sheet 1 of 1

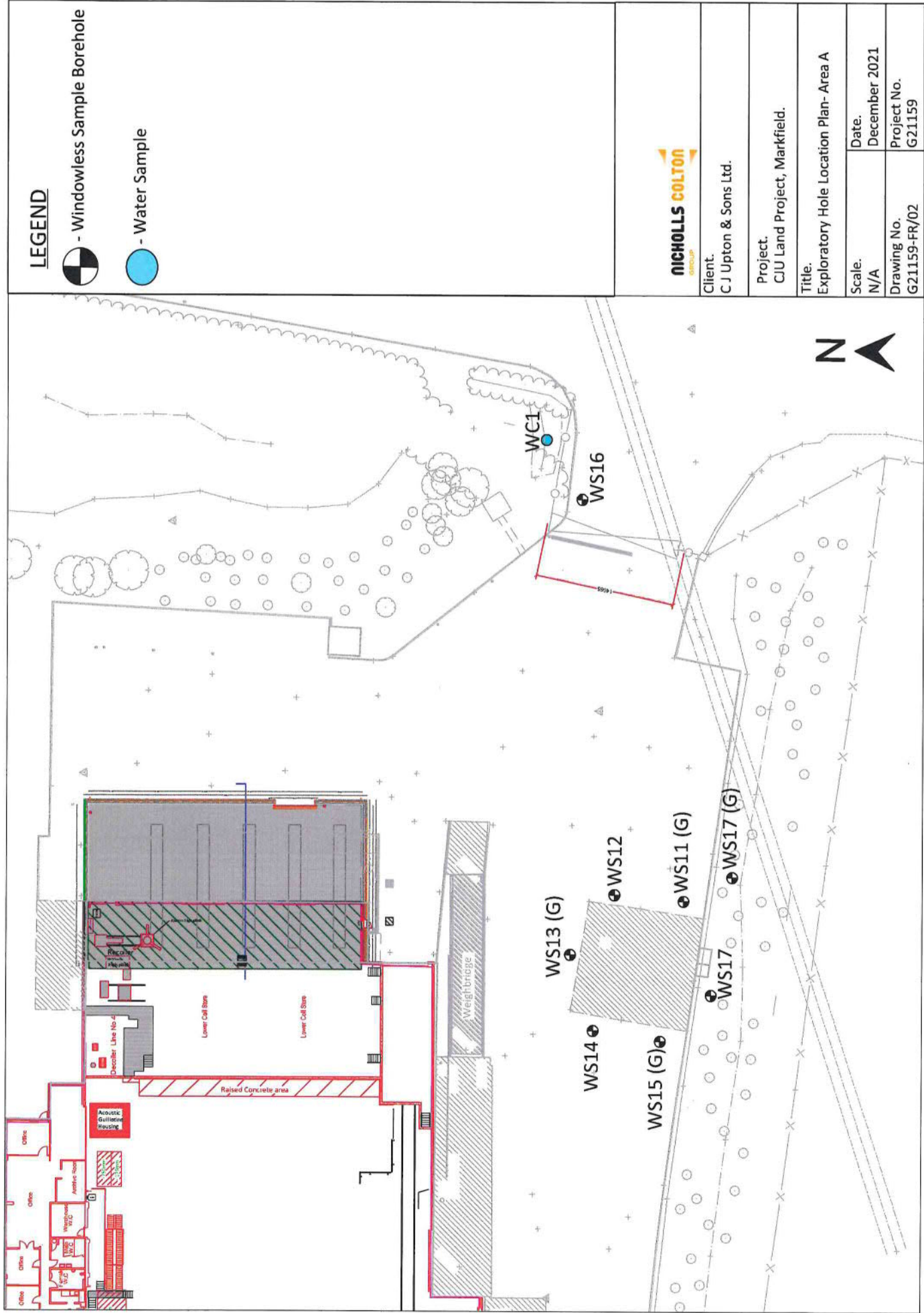
1. Hand dug starter pit to 1.20m, to confirm absence of underground services.
2. Borehole installed with 50mm HDPE slotted pipe, response zone from 0.40m to 1.40m and backfilled with postmix from 0.40m to ground level with flush cover.
3. No groundwater seepages were encountered.
4. Borehole could not advance past 1.40mbgl due to hard strata.



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BOREHOLE RECORD - WS11

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

5.00m

Casing Diameter:

Project No.:

G21159

Logged by: EP

Ground Level:

Date: 18/10/21

Location: -

Scale: 1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.30				0.23	MADE GROUND: MACADAM MADE GROUND: Grey sandy slightly clayey sub-angular to sub-rounded fine to coarse GRAVEL of igneous rock, mudstone, sandstone with fine to coarse fragments of brick. Low cobble content of sub-angular igneous rock. <i>...fabric membrane present at 0.44m.</i> Soft to firm orangeish brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz, chalk and mudstone. Low cobble content of sub-angular chalk. <i>...becoming firm to stiff from 1.89m.</i> <i>...becoming stiff to very stiff from 4.50m.</i> Stiff to very stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz and chalk. Low cobble content of sub-angular chalk.		
ES2	0.80				0.44			
ES3	1.60							
ES4	2.50							
ES5	3.90							
					4.80			
					5.00			

Remarks and Water Observations

Sheet 1 of 1

1. Hand dug starter pit to 1.20m, to confirm absence of underground services.
2. Borehole installed with 50mm HDPE slotted pipe, response zone from 1.00m to 4.00m, backfilled with bentonite 1.00m to 0.30m, then postmix from 0.30m to ground level with flush cover.
3. No groundwater seepages were encountered.
4. Borehole achieved target depth of 5.00m.

BOREHOLE RECORD - WS12

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

5.00m

Casing Diameter:

Project No.:

G21159

Logged by: EP

Ground Level:

Date: 18/10/21

Location: -

Scale: 1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.35				0.21	MADE GROUND: MACADAM MADE GROUND: Greyish brown sandy slightly clayey sub-angular to sub-rounded fine to coarse GRAVEL of igneous rock and limestone. Low cobble content of sub-angular igneous rock. <i>...fabric membrane present at 0.42m.</i> Soft to firm orangeish greyish brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of quartz, chalk and mudstone. Low cobble content of sub-angular chalk.		
					0.42			
ES2	1.50							
ES3	2.50				2.00	Firm to stiff reddish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz, chalk and mudstone. Low cobble content of sub-angular chalk. <i>...becoming firm to stiff from 2.00m.</i>		
ES4	3.50							
ES5	4.50					<i>...becoming stiff to very stiff from 4.50m.</i>		
					5.00			

Remarks and Water Observations

1. Hand dug starter pit to 1.20m, to confirm absence of underground services.
2. Borehole backfilled with bentonite and re-instated with macadam on completion.
3. No groundwater seepages were encountered.
4. Borehole achieved target depth of 5.00m.

Sheet 1 of 1

BOREHOLE RECORD - WS13

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

5.00m

Casing Diameter:

Project No.:

G21159

Logged by: EP

Ground Level:

Date: 21/10/21

Location: -

Scale: 1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.40				0.20	MADE GROUND: MACADAM MADE GROUND: Greyish brown sandy slightly clayey sub-angular to sub-rounded fine to coarse GRAVEL of igneous rock and limestone with fine to coarse fragments of brick. Low cobble content of sub-angular igneous rock. <i>... fabric membrane present at 0.42m.</i> Orangeish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz, igneous rock and chalk. <i>... becoming firm to stiff at 2.50m</i> <i>... containing occasional gravel from 3.00m</i>		
ES2	1.00				0.42			
ES3	1.60							
ES4	2.80							
ES5	3.80							
ES6	4.80				5.00			

Remarks and Water Observations

Sheet 1 of 1

1. Hand dug starter pit to 1.20m, to confirm absence of underground services.
2. Borehole installed with 50mm HDPE slotted pipe, response zone from 1.00m to 2.50m, backfilled with bentonite 1.00m to 0.50m, then postmix from 0.50m to ground level with flush cover.
3. No groundwater seepages were encountered.
4. Borehole achieved target depth of 5.00m.

BOREHOLE RECORD - WS14

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

5.00m

Casing Diameter:

Project No.:

G21159

Logged by: EP

Ground Level:

Date: 21/10/21

Location: -

Scale:

1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.40				0.19	MADE GROUND: MACADAM		
ES2	0.80				0.41	MADE GROUND: Greyish brown sandy slightly clayey sub-angular to sub-rounded fine to coarse GRAVEL of igneous rock, quartz, flint and limestone with fine to coarse fragments of brick. ... <i>fabric membrane present at 0.41m.</i>		
ES3	1.50					Orangeish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz, igneous rock and chalk. ... <i>becoming sandy clay between 1.20m to 1.60m.</i>		
ES4	2.50					... <i>containing black speckled organic staining between 2.00m to 3.00m.</i>		
ES5	3.50					... <i>becoming firm from 2.90m.</i>		
ES6	4.50					... <i>becoming stiff from 3.65m.</i>		
					5.00			

Remarks and Water Observations

1. Hand dug starter pit to 1.20m, to confirm absence of underground services.
2. Borehole backfilled with bentonite and re-instated with macadam.
3. No groundwater seepages were encountered.
5. Borehole achieved target depth of 5.00m.

Sheet 1 of 1

BOREHOLE RECORD - WS15

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

5.00m

Casing Diameter:

Project No.:

G21159

Logged by: EP

Ground Level:

Date: 21/10/21

Location: -

Scale: 1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.40				0.20	MADE GROUND: MACADAM		
ES2	0.60				0.50	MADE GROUND: Greyish brown sandy slightly clayey sub-angular to sub-rounded fine to coarse GRAVEL of igneous rock and limestone with fine to coarse fragments of brick. Low cobble content of sub-angular igneous rock. ... <i>fabric membrane present at 0.50m.</i>		
ES3	1.50					Orangeish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz, igneous rock and chalk. ... <i>containing occasional quartz and flint gravel from 1.50m.</i> ... <i>containing organic staining at 1.80m</i> ... <i>containing black speckled staining between 2.00m to 3.00m.</i>		
ES4	2.50					... <i>becoming stiff from 3.00m.</i>		
ES5	3.50					... <i>containing pockets of orange medium to coarse sand from 3.55m.</i>		
ES6	4.50					... <i>becoming reddish brown from 4.30m.</i>		
					5.00			

Remarks and Water Observations

Sheet 1 of 1

- Hand dug starter pit to 1.20m, to confirm absence of underground services.
- Borehole installed with 50mm HDPE slotted pipe, response zone from 1.00m to 5.00m, backfilled with bentonite 1.00m to 0.50m, then postmix from 0.50m to ground level with flush cover
- No groundwater seepages were encountered.
- Borehole achieved target depth of 5.00m.

BOREHOLE RECORD - WS16

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

5.00m

Casing Diameter:

Project No.:

G21159

Logged by: EP

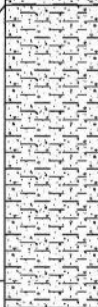
Ground Level:

Date: 18/10/21

Location: -

Scale:

1:50

Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description	Legend	Backfill
Ref:	Depth (m)	SPT N						
ES1	0.30				0.20	MADE GROUND: MACADAM		
						MADE GROUND: Brown sandy slightly clayey sub-angular fine to coarse GRAVEL of igneous rock with fragments of concrete.		
ES2	1.00				0.82	Soft to firm orangeish brown mottled yellow and grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz, sandstone and chalk with occasional black organic staining.		
					2.54	Brown gravelly slightly clayey fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of quartz, chalk and mudstone.		
ES3	2.80				2.80			
ES4	3.50							
ES5	4.50							
					5.00			

Remarks and Water Observations

Sheet 1 of 1

1. Hand dug starter pit to 1.20m, to confirm absence of underground services.
2. Borehole backfilled with bentonite and arisings and re-instated with Macadam.
3. Groundwater strike encountered at 0.82m, rising to 0.76m after 20 minutes.
4. Borehole achieved target depth of 5.00m.

BOREHOLE RECORD - WS17

Window Sampler

Site:

CJU Land Project, Markfield

Client:

C J Upton & Sons Ltd.

Boring Diameter:

100mm

0.45m

Casing Diameter:

Project No.:

G21159

Logged by:

EP

Ground Level:

Date:

21/10/21

Location: -

Scale:

1:50

Samples and In situ Tests

Ref:

Depth (m)

SPT N

Water

Level (mAOD)

Depth (m)

Strata Description

Legend

Backfill

ES1

0.40

0.45

MADE GROUND: Black slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz, igneous rock and chalk with fine to coarse fragments of fabric, tape and metal.
...smooth black 20mm plastic coated cable found at 0.40m.

Remarks and Water Observations

1. Hand dug starter pit to 0.45m, confirmed underground service at 0.40m, 20mm smooth black plastic cable encountered.
2. Borehole backfilled with arisings.
3. No groundwater seepages were encountered
4. Borehole terminated at 0.45m and position moved to WS17A.

Sheet 1 of 1

						BOREHOLE RECORD - WS17A Window Sampler					
						Site: CJU Land Project, Markfield					
Client: C J Upton & Sons Ltd.						Boring Diameter: 100mm 5.00m		Casing Diameter: 		Project No.: G21159	
Logged by: EP		Ground Level:				Date: 21/10/21		Location: -		Scale: 1:50	
Samples and In situ Tests			Water	Level (mAOD)	Depth (m)	Strata Description		Legend	Backfill		
Ref:	Depth (m)	SPT N									
ES1	0.30				0.04	MADE GROUND: MACADAM - Loose Fragmented MADE GROUND: Greyish brown sandy slightly clayey sub-angular to sub-rounded fine to coarse GRAVEL of igneous rock, limestone and mudstone with fine to coarse fragments of brick. Low cobble content of sub-angular igneous rock. <i>...fabric membrane present at 0.33m.</i> Orangeish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of quartz, igneous rock and chalk. Occasional black organic staining. <i>... becoming firm from 1.50m.</i>					
ES2	0.70			0.33							
ES3	1.60										
ES4	2.60										
ES5	3.60										
ES6	4.60										
					5.00						
Remarks and Water Observations											
1. Hand dug starter pit to 1.20m, to confirm absence of underground services. 2. Borehole installed with 50mm HDPE slotted pipe, response zone from 0.30m to 5.00m, backfilled with bentonite 1.00m to 0.50m, then postmix from 0.50m to ground level with flush cover. 3. No groundwater seepages were encountered. 4. Borehole achieved target depth of 5.00m.											



A P P E N D I X H

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GRM Development Solutions

Laurus House
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Burton Upon Trent
DE14 2WH

Analytical Test Report: L24/02331/GRM - 24-42959

Your Project Reference:	Stanton Lane, Stanton under Bardon P8079		
Your Order Number:	P8079	Samples Received / Instructed:	15/03/2024 / 15/03/2024
Report Issue Number:	1	Sample Tested:	15/03 to 26/03/2024
Samples Analysed:	6 soil samples	Report issued:	26/03/2024

Signed

James Gane
Analytical Services Manager
CTS Group

Notes:**General**

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report with the exception of the asbestos test portion which is held for 6 months unless otherwise requested.

Moisture Content was determined in accordance with CTS method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with CTS method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Asbestos

Please note: Where further analysis is required samples identified as containing asbestos are screened and tested on an as received basis. No correction is made for moisture content and these results are not covered by our accreditation

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

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited, subUKAS - Subcontracted to a laboratory UKAS accredited for this test

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of Issue: 18.03.2024

Issued by: J. Gane

Issue No: 4

Rev No: 6

L24/02331/GRM - 24-42959

Project Reference - Stanton Lane, Stanton under Bardon

P8079

Analytical Test Results - Solid

Lab Reference			347335	347336	347337	347338
Client Sample ID			-	-	-	-
Client Sample Location			TP201	TP202	TP203	TP204
Client Sample Type			ES	ES	ES	ES
Client Sample Number			-	-	-	-
Depth - Top (m)			0.10	0.00	0.50	0.10
Depth - Bottom (m)			0.20	0.10	0.60	0.20
Date of Sampling			14/03/2024	14/03/2024	14/03/2024	14/03/2024
Time of Sampling			-	-	-	-
Sample Matrix			Clay	Sand	Sand	Sand
Determinant	Units	Accreditation				
Arsenic	(mg/kg)	MCERTS	< 10	< 10	14	< 10
Cadmium	(mg/kg)	MCERTS	0.6	0.5	1.1	0.7
Chromium (Total)	(mg/kg)	UKAS	10	3.7	4.9	6.7
Copper	(mg/kg)	MCERTS	78	36	80	36
Lead	(mg/kg)	MCERTS	30	48	160	110
Mercury	(mg/kg)	UKAS	< 2.5	< 2.5	< 2.5	< 2.5
Nickel	(mg/kg)	MCERTS	16	8.8	23	16
Selenium	(mg/kg)	u	< 8.0	< 8.0	< 8.0	< 8.0
Zinc	(mg/kg)	MCERTS	120	160	340	180
Total Phenols	(mg/kg)	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Cyanide (Total)	(mg/kg)	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Chromium (Hexavalent)	(mg/kg)	u	< 1.0	1.4	< 1.0	< 1.0
pH	pH Units	MCERTS	7.1	6.9	6.9	6.5
Sulphate (Water soluble as SO ₄)	(mg/l)	u	< 10	< 10	11	< 10
Acenaphthene	(mg/kg)	MCERTS	< 0.02	< 0.20	< 0.02	< 0.02
Acenaphthylene	(mg/kg)	UKAS	< 0.02	< 0.20	< 0.02	< 0.02
Anthracene	(mg/kg)	UKAS	0.02	0.30	0.09	0.05
Benzo (a) anthracene	(mg/kg)	MCERTS	0.25	2.0	0.80	0.26
Benzo (a) pyrene	(mg/kg)	MCERTS	0.23	1.2	0.51	0.37
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.42	2.0	1.2	0.31
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.21	0.86	0.43	0.23
Benzo (k) fluoranthene	(mg/kg)	MCERTS	0.13	0.58	0.37	0.14
Chrysene	(mg/kg)	MCERTS	0.30	1.8	0.69	0.42
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	0.03	< 0.20	0.09	0.04
Fluoranthene	(mg/kg)	MCERTS	0.43	3.1	0.88	0.72
Fluorene	(mg/kg)	MCERTS	< 0.02	< 0.20	< 0.02	< 0.02
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	0.23	0.99	0.55	0.16
Naphthalene	(mg/kg)	MCERTS	< 0.02	< 0.20	< 0.02	< 0.02
Phenanthrene	(mg/kg)	MCERTS	0.13	1.3	0.40	0.34
Pyrene	(mg/kg)	MCERTS	0.41	2.8	0.84	0.60
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	2.9	18	7.0	3.8
SOM (via TOC)	(%)	UKAS	3.0	9.1	21	7.5
Asbestos	-	UKAS	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected



L24/02331/GRM - 24-42959

Project Reference - Stanton Lane, Stanton under Bardon

P8079

Analytical Test Results - Chemical Analysis

Lab Reference			347339	347340
Client Sample ID			-	-
Client Sample Location			TP202	TP203
Client Sample Type			D	D
Client Sample Number			-	-
Depth - Top (m)			0.90	0.60
Depth - Bottom (m)			1.00	0.70
Date of Sampling			14/03/2024	14/03/2024
Time of Sampling			-	-
Sample Matrix			Sand	Sand
Determinant	Units	Accreditation		
Water soluble sulphate (as SO ₄)	(mg/l)	u	27	49
pH Value	pH Units	MCERTS	6.2	7.0



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L24/02331/GRM - 24-42959

Project Reference - Stanton Lane, Stanton under Bardon

P8079

Analytical Test Results - VPH / EPH

Lab Reference			347335	347336	347337	347338
Client Sample ID			-	-	-	-
Client Sample Location			TP201	TP202	TP203	TP204
Client Sample Type			ES	ES	ES	ES
Client Sample Number			-	-	-	-
Depth - Top (m)			0.10	0.00	0.50	0.10
Depth - Bottom (m)			0.20	0.10	0.60	0.20
Date of Sampling			14/03/2024	14/03/2024	14/03/2024	14/03/2024
Time of Sampling			-	-	-	-
Sample Matrix			Clay	Sand	Sand	Sand
Determinant	Units	Accreditation				
Aliphatic >C ₅ to C ₆ [HS_MS_1D_AL]	(mg/kg)	MCERTS	< 0.06	< 0.06	< 0.06	< 0.06
Aliphatic >C ₆ to C ₈ [HS_MS_1D_AL]	(mg/kg)	MCERTS	< 0.06	< 0.06	0.14	< 0.06
Aliphatic >C ₈ to C ₁₀ [HS_MS_1D_AL]	(mg/kg)	MCERTS	< 0.06	< 0.06	< 0.06	< 0.06
Aliphatic >C ₁₀ to C ₁₂ [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10	< 10
Aliphatic >C ₁₂ to C ₁₆ [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10	< 10
Aliphatic >C ₁₆ to C ₂₁ [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10	< 10
Aliphatic >C ₂₁ to C ₃₅ [EH_CU_1D_AL]	(mg/kg)	u	< 20	< 20	< 20	32
Aromatic >C ₅ to C ₇ [HS_MS_1D_AR]	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C ₇ to C ₈ [HS_MS_1D_AR]	(mg/kg)	MCERTS	0.06	0.01	< 0.01	< 0.01
Aromatic >C ₈ to C ₁₀ [HS_MS_1D_AR]	(mg/kg)	MCERTS	< 0.06	< 0.06	< 0.06	< 0.06
Aromatic >C ₁₀ to C ₁₂ [EH_CU_1D_AR]	(mg/kg)	u	< 10	< 10	< 10	< 10
Aromatic >C ₁₂ to C ₁₆ [EH_CU_1D_AR]	(mg/kg)	u	< 10	< 10	< 10	< 10
Aromatic >C ₁₆ to C ₂₁ [EH_CU_1D_AR]	(mg/kg)	u	< 10	< 10	< 10	< 10
Aromatic >C ₂₁ to C ₃₅ [EH_CU_1D_AR]	(mg/kg)	u	33	40	59	31
Total >C ₅ to C ₄₀ [EH_CU+HS_1D_Total]	(mg/kg)	u	< 50	< 50	60	64



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L24/02331/GRM - 24-42959

Project Reference - Stanton Lane, Stanton under Bardon P8079

Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
347335	-	TP201	ES	-	Greyish brown slightly gravelly sandy silty clay	11	31	70
347336	-	TP202	ES	-	Dark brown silty sand	41	5.3	75
347337	-	TP203	ES	-	Dark brown slightly gravelly silty sand	60	< 0.1	90
347338	-	TP204	ES	-	Dark brown slightly gravelly silty sand	24	8.1	89
347339	-	TP202	D	-	Orangish brown slightly gravelly silty sand	-	-	87
347340	-	TP203	D	-	Orangish brown slightly gravelly silty sand	-	-	76



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L24/02331/GRM - 24-42959

Project Reference - Stanton Lane, Stanton under Bardon P8079

Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
347335	-	TP201	ES	-	VPH/BTEX - Sample taken from container with headspace.
347336	-	TP202	ES	-	VPH/BTEX - Sample taken from container with headspace. PAHAR 1:10 dilution
347337	-	TP203	ES	-	
347338	-	TP204	ES	-	
347339	-	TP202	D	-	
347340	-	TP203	D	-	



L24/02331/GRM - 24-42959

Project Reference - Stanton Lane, Stanton under Bardon P8079

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
EPHS	MS - CL - EPH in Soil	As received	Passing 10mm test sieve	Determination of Extractable Petroleum Hydrocarbons in soils via GC-MS
PAHASRDS	MS - CL - PAH (As Received)	As received	Passing 10mm test sieve	Determination of Polyaromatic hydrocarbons in soil via GC-MS
CWGS	MS - CL - VPH & MS - CL - EPH	As received	Passing 10mm test sieve	Determination of TPH CWG (Volatile Petroleum Hydrocarbons and Extractable Petroleum Hydrocarbons) in soils via Headspace-GC-MS and GC-MS respectively
TOCS	MS - CL - TOC Eltra	Air Dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soils
VPHS	MS - CL - VPH	As received	Passing 10mm test sieve	Determination of VPH in soils via Headspace-GC-MS
SKALARCNS	MS - CL - Cyanide by Skalar	As received	Passing 10mm test sieve	Determination of cyanide (total / free / complex) in soil using a Skalar segmented flow analyser
SKALARHCS	MS - CL - Hexavalent Chromium by Skalar	As received	Passing 10mm test sieve	Determination of hexavalent chromium in soil using Skalar segmented flow analyser
ICPMETS	MS - CL - ICP Metals	Air dried	Passing 10mm test sieve	Determination of metals in soils via ICP
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
SKALARPHS	MS - CL - Phenols by Skalar	As received	Passing 10mm test sieve	Determination of total phenols in soil using Skalar segmented flow analyser
ASB	MS - AS - Asbestos	-	-	Fibre identification is in accordance with in house documented methods which are based on the procedure documented in the HSE Document HSG 248 "Asbestos: The analysts guide for sampling, analysis and clearance procedures"
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis



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L24/02331/GRM - 24-42959

Project Reference - Stanton Lane, Stanton under Bardon P8079

HWOL TPH Acronym Index

Acronym	Description
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics and Aromatics
AL	Aliphatics Only
AR	Aromatics Only
2D	GC-GC - Double Coil Gas Chromatography
#1	EH_Total but with humics mathmatically subtracted
#2	EH_Total but with fatty acids mathmatically subtracted
_	Operator - underscore to separate acronyms (except for +)
+	Operator to indicate cumlative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry



A P P E N D I X I

Land Appraisal | Environmental | Geotechnical | Design | Mining | Inspections

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Nicholls Colton Group
7-11 Harding Street
Leicester
LE1 4DH

Analytical Test Report: G21159-01 - 21-21483

Your Project Reference:	CJU Land Project Markfield		
Your Order Number:	G21159-01	Samples Received / Instructed:	18/10/2021 / 18/10/2021
Report Issue Number:	1	Sample Tested:	18/10 to 27/10/2021
Samples Analysed:	8 soil samples	Report issued:	27/10/2021

Signed



Laura Watts
Manager - Organic Chemistry
Nicholls Colton Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report with the exception of the asbestos test portion which is held for 6 months unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2.

Stone Content was determined in accordance with NC method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Asbestos

Please note: Where further analysis is required samples identified as containing asbestos are screened and tested on an as received basis. No correction is made for moisture content and these results are not covered by our accreditation.

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

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present).

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of Issue 10/12/2020

Owned by Emily Blissett - Customer Services Supervisor

Authorized by James Gane - Commercial Manager

L:\DATA\REPORTS\NC\G\G21159-01 - 21-21483.XLSX\TPH Codes

G21159-01 - 21-21483

Project Reference - CIU Land Project Markfield

Analytical Test Results - Soil

NC Reference		194254	194255	194257	194258	194260
Client Sample ID		-	-	-	-	-
Client Sample Location		WS01	WS01	WS02	WS02	WS04
Client Sample Type		ES	ES	ES	ES	ES
Client Sample Number		1	2	1	2	1
Depth - Top (m)		0.10	0.45	0.10	0.50	0.10
Depth - Bottom (m)		0.10	0.45	0.10	0.50	0.10
Date of Sampling		12/10/2021	12/10/2021	12/10/2021	12/10/2021	12/10/2021
Time of Sampling		-	-	-	-	-
Sample Matrix		Clay	Sand	Clay	Clay	Clay
Determinant	Units	Accreditation				
Arsenic	(mg/kg)	MCERTS	< 10	-	< 10	< 10
Cadmium	(mg/kg)	MCERTS	0.5	-	0.5	0.6
Chromium (Total)	(mg/kg)	UKAS	9.4	-	7.0	10
Copper	(mg/kg)	MCERTS	18	-	21	31
Lead	(mg/kg)	MCERTS	54	-	61	110
Mercury	(mg/kg)	UKAS	< 2.5	-	< 2.5	< 2.5
Nickel	(mg/kg)	MCERTS	9.3	-	11	21
Zinc	(mg/kg)	MCERTS	120	-	130	210
Total Phenols	(mg/kg)	MCERTS	< 1.0	-	< 1.0	< 1.0
pH	pH Units	MCERTS	6.3	-	6.2	7.1
Acenaphthene	(mg/kg)	MCERTS	< 0.02	-	0.57	< 0.02
Acenaphthylene	(mg/kg)	UKAS	0.03	-	< 0.20	< 0.02
Anthracene	(mg/kg)	UKAS	0.07	-	1.3	< 0.02
Benzo (a) anthracene	(mg/kg)	MCERTS	0.26	-	2.5	0.06
Benzo (a) pyrene	(mg/kg)	MCERTS	0.28	-	2.1	0.05
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.44	-	3.6	0.07
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.18	-	1.3	0.03
Benzo (k) fluoranthene	(mg/kg)	MCERTS	0.16	-	1.2	0.03
Chrysene	(mg/kg)	MCERTS	0.36	-	3.0	0.07
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	0.04	-	0.30	< 0.02
Fluoranthene	(mg/kg)	MCERTS	0.63	-	5.4	0.15
Fluorene	(mg/kg)	MCERTS	< 0.02	-	0.43	< 0.02
Indeno (1, 2, 3-cd) pyrene	(mg/kg)	MCERTS	0.20	-	1.4	0.04
Naphthalene	(mg/kg)	MCERTS	< 0.02	-	1.6	< 0.02
Phenanthrene	(mg/kg)	MCERTS	0.35	-	4.2	0.07
Pyrene	(mg/kg)	MCERTS	0.56	-	5.2	0.13
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	3.6	-	34	0.84
TOC	(%)	MCERTS	-	< 1.0	-	-
Asbestos	-	UKAS	-	-	No asbestos detected	-
						No asbestos detected

G21159-01 - 21-21483

Project Reference - CJU Land Project Markfield

Analytical Test Results - TPH CWG

NC Reference			194256	194257	194259	194261
Client Sample ID			-	-	-	-
Client Sample Location			WS01	WS02	WS03	WS04
Client Sample Type			ES	ES	ES	ES
Client Sample Number			3	1	1	2
Depth - Top (m)			1.00	0.10	0.15	0.40
Depth - Bottom (m)			1.00	0.10	0.15	0.40
Date of Sampling			12/10/2021	12/10/2021	12/10/2021	12/10/2021
Time of Sampling			-	-	-	-
Sample Matrix			Sand	Clay	Clay	Clay
Determinant	Units	Accreditation				
Aliphatics						
>C ₅ to C ₆ [HS_MS_1D_AI]	(mg/kg)	u	< 0.03	< 0.04	< 0.04	< 0.03
>C ₆ to C ₈ [HS_MS_1D_AI]	(mg/kg)	u	< 0.03	0.07	< 0.04	< 0.03
>C ₈ to C ₁₀ [HS_MS_1D_AI]	(mg/kg)	u	0.04	< 0.04	< 0.04	< 0.03
>C ₁₀ to C ₁₂ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10
>C ₁₂ to C ₁₆ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10
>C ₁₆ to C ₂₁ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10
>C ₂₁ to C ₃₅ [EH_CU_1D_AI]	(mg/kg)	u	< 10	16	17	< 10
Aromatics						
>C ₅ to C ₇ [HS_MS_1D_AI]	(mg/kg)	u	< 0.03	< 0.04	< 0.04	< 0.03
>C ₇ to C ₈ [HS_MS_1D_AI]	(mg/kg)	u	< 0.03	< 0.04	< 0.04	< 0.03
>C ₈ to C ₁₀ [HS_MS_1D_AI]	(mg/kg)	u	0.03	< 0.04	< 0.04	< 0.03
>C ₁₀ to C ₁₂ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10
>C ₁₂ to C ₁₆ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10
>C ₁₆ to C ₂₁ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10
>C ₂₁ to C ₃₅ [EH_CU_1D_AI]	(mg/kg)	u	< 10	23	27	< 10
Total						
>C ₅ to C ₃₅ [EH_CU+HS_1D_Total]	(mg/kg)	u	< 50	< 50	< 50	< 50

G21159-01 - 21-21483

Project Reference - CJU Land Project Markfield

Sample Descriptions

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)
194254	-	WS01	ES	1	Dark brown clayey very gravelly silt with occasional organic matter rootlets	22	28
194255	-	WS01	ES	2	Orangish brown clayey slightly gravelly sand	11	17
194256	-	WS01	ES	3	Orangish brown clayey slightly gravelly sand	11	37
194257	-	WS02	ES	1	Dark greyish brown clayey slightly gravelly silt with occasional organic matter rootlets	18	27
194258	-	WS02	ES	2	Light greyish brown slightly silty very gravelly sandy clay	12	23
194259	-	WS03	ES	1	Dark brown very sandy slightly gravelly silty clay with rare organic matter rootlets	20	47
194260	-	WS04	ES	1	Dark greyish brown clayey slightly gravelly silt with rare organic matter	25	7.3
194261	-	WS04	ES	2	Brown slightly sandy slightly gravelly silty clay	15	26

G21159-01 - 21-21483

Project Reference - CJU Land Project Markfield

Sample Comments

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
194254	-	WS01	ES	1	
194255	-	WS01	ES	2	
194256	-	WS01	ES	3	VPH - Sample taken from container with headspace.
194257	-	WS02	ES	1	VPH - Sample taken from container with headspace.
194258	-	WS02	ES	2	
194259	-	WS03	ES	1	VPH - Sample taken from container with headspace.
194260	-	WS04	ES	1	
194261	-	WS04	ES	2	VPH - Sample taken from container with headspace.

G21159-01 - 21-21483

Project Reference - CJU Land Project Markfield

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
EPHS	MS - CL - EPH in Soil	As received	Passing 10mm test sieve	Determination of Extractable Petroleum Hydrocarbons in soils via GC-MS
PAHASRDS	MS - CL - PAH (As Received)	As received	Passing 10mm test sieve	Determination of Polyaromatic hydrocarbons in soil via GC-MS
CWGS	MS - CL - VPH & MS - CL - EPH	As received	Passing 10mm test sieve	Determination of TPH CWG (Volatile Petroleum Hydrocarbons and Extractable Petroleum Hydrocarbons) in soils via Headspace-GC-MS and GC-MS respectively
TOCS	MS - CL - TOC Eltra	Air Dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soils
VPHS	MS - CL - VPH	As received	Passing 10mm test sieve	Determination of VPH in soils via Headspace-GC-MS
ICPMETS	MS - CL - ICP Metals	Air dried	Passing 10mm test sieve	Determination of metals in soils via ICP
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
SKALARPHS	MS - CL - Phenols by Skalar	As received	Passing 10mm test sieve	Determination of total phenols in soil using Skalar segmented flow analyser
ASB	MS - AS - Asbestos	-	-	Fibre identification is in accordance with in house documented methods which are based on the procedure documented in the HSE Document HSG 248 "Asbestos: The analysts guide for sampling, analysis and clearance procedures"
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis

G21159-01 - 21-21483

Project Reference - CJU Land Project Markfield

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

KEY: A - No Date of Sampling Provided, C - Samples received in inappropriate containers, H - Samples contain headspace, R - Date of sampling to receipt was outside ideal timescales for analysis to be completed, Please note this is only a deviation if 'X' is also recorded against the sample, X - Exceeds sampling to extraction or analysis timescales, T - Temperature of samples on receipt exceeds storage temperature.

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
194254	-	WS01	ES	1	MS - CL - pH in Soils	RX
194257	-	WS02	ES	1	MS - CL - EPH in Soil	RX
194257	-	WS02	ES	1	MS - CL - VPH	RX
194257	-	WS02	ES	1	MS - CL - pH in Soils	RX
194258	-	WS02	ES	2	MS - CL - pH in Soils	RX
194260	-	WS04	ES	1	MS - CL - pH in Soils	RX

G21159-01 - 21-21483

Project Reference - CJU Land Project Markfield

HWOL TPH Acronym Index

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



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Analytical Test Report: G21159-03 - 21-21541A

Your Project Reference: CJU Land Project Markfield

Your Order Number: G21159-03 Samples Received / Instructed: 20/10/2021 / 26/11/2021

Report Issue Number: 2 Sample Tested: 26/11 to 28/10/2021

Samples Analysed: 7 soil samples, 1 water sample Report issued: 03/12/2021

Signed

James Gane
Data Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report with the exception of the asbestos test portion which is held for 6 months unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with NC method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Asbestos

Please note: Where further analysis is required samples identified as containing asbestos are screened and tested on an as received basis. No correction is made for moisture content and these results are not covered by our accreditation

Opinions and Interpretations expressed herein are outside the scope of UKAS accreditation

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of Issue 10/12/2020

Owned by Emily Blissett - Customer Services Supervisor

Authorised by James Gane - Commercial Manager

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G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Analytical Test Results - Soil

NC Reference			195284	195286	195287
Client Sample ID			-	-	-
Client Sample Location			WS12	WS16	WS16
Client Sample Type			ES	ES	ES
Client Sample Number			1	1	2
Depth - Top (m)			0.35	0.30	1.00
Depth - Bottom (m)			0.35	0.30	1.00
Date of Sampling			18/10/2021	18/10/2021	18/10/2021
Time of Sampling			-	-	-
Sample Matrix			Sand	Sand	Clay
Determinant	Units	Accreditation			
Arsenic	(mg/kg)	MCERTS	< 10	-	< 10
Cadmium	(mg/kg)	MCERTS	0.9	-	0.7
Chromium (Total)	(mg/kg)	UKAS	5.7	-	19
Copper	(mg/kg)	MCERTS	160	-	13
Lead	(mg/kg)	MCERTS	31	-	26
Mercury	(mg/kg)	UKAS	< 2.5	-	< 2.5
Nickel	(mg/kg)	MCERTS	10	-	13
Zinc	(mg/kg)	MCERTS	71	-	26
Total Phenols	(mg/kg)	MCERTS	< 1.0	-	< 1.0
pH	pH Units	MCERTS	9.0	-	6.8
Acenaphthene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Acenaphthylene	(mg/kg)	UKAS	< 0.02	-	< 0.02
Anthracene	(mg/kg)	UKAS	< 0.02	-	< 0.02
Benzo (a) anthracene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Benzo (a) pyrene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Benzo (b) fluoranthene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Benzo (k) fluoranthene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Chrysene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Fluoranthene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Fluorene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Naphthalene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Phenanthrene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Pyrene	(mg/kg)	MCERTS	< 0.02	-	< 0.02
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	< 0.32	-	< 0.32
TOC	(%)	MCERTS	-	-	< 1.0
Asbestos	-	UKAS	No asbestos detected	No asbestos detected	-

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Analytical Test Results - TPH CWG

NC Reference			195282	195283	195285	195287	195288
Client Sample ID			-	-	-	-	-
Client Sample Location			WS11	WS11	WS12	WS16	WS16
Client Sample Type			ES	ES	ES	ES	ES
Client Sample Number			1	4	2	2	5
Depth - Top (m)			0.30	2.50	1.50	1.00	4.50
Depth - Bottom (m)			0.30	2.50	1.50	1.00	4.50
Date of Sampling			18/10/2021	18/10/2021	18/10/2021	18/10/2021	18/10/2021
Time of Sampling			-	-	-	-	-
Sample Matrix			Sand	Clay	Clay	Clay	Clay
Determinant	Units	Accreditation					
Aliphatics							
>C ₅ to C ₆ [HS_MS_1D_AI]	(mg/kg)	u	< 0.05	< 0.04	< 0.03	< 0.03	< 0.04
>C ₆ to C ₈ [HS_MS_1D_AI]	(mg/kg)	u	0.45	< 0.04	< 0.03	< 0.03	< 0.04
>C ₈ to C ₁₀ [HS_MS_1D_AI]	(mg/kg)	u	0.06	< 0.04	< 0.03	< 0.03	< 0.04
>C ₁₀ to C ₁₂ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₁₂ to C ₁₆ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₁₆ to C ₂₁ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₂₁ to C ₃₅ [EH_CU_1D_AI]	(mg/kg)	u	< 10	13	15	< 10	< 10
Aromatics							
>C ₅ to C ₇ [HS_MS_1D_AI]	(mg/kg)	u	< 0.05	< 0.04	< 0.03	< 0.03	< 0.04
>C ₇ to C ₈ [HS_MS_1D_AI]	(mg/kg)	u	< 0.05	< 0.04	< 0.03	< 0.03	< 0.04
>C ₈ to C ₁₀ [HS_MS_1D_AI]	(mg/kg)	u	< 0.05	< 0.04	< 0.03	< 0.03	< 0.04
>C ₁₀ to C ₁₂ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₁₂ to C ₁₆ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₁₆ to C ₂₁ [EH_CU_1D_AI]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₂₁ to C ₃₅ [EH_CU_1D_AI]	(mg/kg)	u	< 10	12	< 10	< 10	< 10
Total							
>C ₅ to C ₃₅ [EH_CU+HS_1D_TotAI]	(mg/kg)	u	< 50	< 50	< 50	< 50	< 50

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Analytical Test Results - VOC

NC Reference	195287
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Client Sample ID	-
Client Sample Location	WS16
Client Sample Type	ES
Client Sample Number	2
Depth - Top (m)	1.00
Depth - Bottom (m)	1.00
Date of Sampling	18/10/2021
Time of Sampling	-
Sample Matrix	Clay

Determinant	Units	Accreditation	
Benzene	(mg/kg)	MCERTS	< 0.05
Toluene	(mg/kg)	MCERTS	< 0.05
Ethylbenzene	(mg/kg)	MCERTS	< 0.05
m&p Xylene	(mg/kg)	MCERTS	< 0.10
o-Xylene	(mg/kg)	MCERTS	< 0.05
MTBE	(mg/kg)	MCERTS	< 0.05

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Analytical Test Results - Water

NC Reference	195289
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Client Sample ID	-
Client Sample Location	WC1
Client Sample Type	W
Client Sample Number	1
Depth (m)	0.10
Date of Sampling	18/10/2021
Time of Sampling	-
Sample Matrix	Water

Determinant	Units	Accreditation	
Arsenic	(µg/l)	u	< 3
Cadmium	(µg/l)	u	< 3
Chromium (Total)	(µg/l)	u	< 3
Copper	(µg/l)	u	< 1
Lead	(µg/l)	u	< 5
Mercury	(µg/l)	u	< 1
Nickel	(µg/l)	u	< 3
Selenium	(µg/l)	u	< 1
Zinc	(µg/l)	u	160
pH	pH Units	u	7.1
Phenol (Total)	(mg/l)	u	< 0.1
Acenaphthene	(µg/l)	u	< 0.01
Acenaphthylene	(µg/l)	u	< 0.01
Anthracene	(µg/l)	u	< 0.01
Benzo (a) anthracene	(µg/l)	u	< 0.01
Benzo (a) pyrene	(µg/l)	u	< 0.01
Benzo (b) fluoranthene	(µg/l)	u	< 0.01
Benzo (g, h, i) perylene	(µg/l)	u	< 0.01
Benzo (k) fluoranthene	(µg/l)	u	< 0.01
Chrysene	(µg/l)	u	< 0.01
Dibenzo (a,h) anthracene	(µg/l)	u	< 0.01
Fluoranthene	(µg/l)	u	< 0.01
Fluorene	(µg/l)	u	< 0.01
Indeno (1, 2, 3-cd) pyrene	(µg/l)	u	< 0.01
Naphthalene	(µg/l)	u	< 0.01
Phenanthrene	(µg/l)	u	< 0.01
Pyrene	(µg/l)	u	< 0.01
Total PAH (Sum of USEPA 16)	(µg/l)	u	< 0.16

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Analytical Test Results - TPH CWG Water

NC Reference	195289
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Client Sample ID	-
Client Sample Location	WC1
Client Sample Type	W
Client Sample Number	1
Depth (m)	0.10
Date of Sampling	18/10/2021
Time of Sampling	-
Sample Matrix	Water

Determinant	Units	Accreditation	
Aliphatics			
>C ₅ to C ₆	(µg/l)	u	8.01
>C ₆ to C ₈	(µg/l)	u	7.66
>C ₈ to C ₁₀	(µg/l)	u	< 1.00
>C ₁₀ to C ₁₂	(µg/l)	u	< 5.00
>C ₁₂ to C ₁₆	(µg/l)	u	< 10.00
>C ₁₆ to C ₂₁	(µg/l)	u	< 10.00
>C ₂₁ to C ₃₅	(µg/l)	u	< 15.00
Aromatics			
>C ₅ to C ₇	(µg/l)	u	< 1.00
>C ₇ to C ₈	(µg/l)	u	< 1.00
>C ₈ to C ₁₀	(µg/l)	u	< 1.00
>C ₁₀ to C ₁₂	(µg/l)	u	< 5.00
>C ₁₂ to C ₁₆	(µg/l)	u	< 10.00
>C ₁₆ to C ₂₁	(µg/l)	u	< 10.00
>C ₂₁ to C ₃₅	(µg/l)	u	< 15.00
Total			
>C ₅ to C ₃₅	(µg/l)	u	< 30

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Analytical Test Results - VOC

NC Reference	195289
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Client Sample ID

-

Client Sample Location

WC1

Client Sample Type

W

Client Sample Number

1

Depth (m)

0.10

Date of Sampling

18/10/2021

Time of Sampling

-

Sample Matrix

Water

Determinant	Units	Accreditation	
Benzene	(µg/l)	u	< 6.00
Toluene	(µg/l)	u	< 6.00
Ethylbenzene	(µg/l)	u	< 6.00
m&p Xylene	(µg/l)	u	< 12.00
o-Xylene	(µg/l)	u	< 6.00
MTBE	(µg/l)	u	< 6.00

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Sample Descriptions

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)
195282	-	WS11	ES	1	Greyish brown slightly clayey very gravelly sand	28	0.0
195283	-	WS11	ES	4	Light orangish brown slightly sandy slightly gravelly silty clay	24	19
195284	-	WS12	ES	1	Greyish brown slightly clayey very gravelly sand	7.0	56
195285	-	WS12	ES	2	Mottled brown grey slightly silty slightly gravelly sandy clay	13	30
195287	-	WS16	ES	2	Light orangish brown slightly sandy slightly gravelly silty clay	18	0.8
195288	-	WS16	ES	5	Light orangish brown slightly sandy slightly gravelly silty clay	22	18

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Sample Comments

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
195282	-	WS11	ES	1	
195283	-	WS11	ES	4	VPH - Sample taken from container with headspace.
195284	-	WS12	ES	1	
195285	-	WS12	ES	2	VPH - Sample taken from container with headspace.
195287	-	WS16	ES	2	VPH - Sample taken from container with headspace.
195288	-	WS16	ES	5	VPH - Sample taken from container with headspace.

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
BTEXS	MS - CL - VOC and MBTEX	As received	Passing 10mm test sieve	Determination of BTEX in soils via Headspace-GC-MS
BTEXW	MS - CL - VOC and MBTEX	As received	-	Determination of BTEX in waters via Headspace-GC-MS
EPHS	MS - CL - EPH in Soil	As received	Passing 10mm test sieve	Determination of Extractable Petroleum Hydrocarbons in soils via GC-MS
EPHW	MS - CL - TPH EPH Waters	As received	-	Determination of Extractable Petroleum Hydrocarbons in waters via GC-MS
PAHASRDS	MS - CL - PAH (As Received)	As received	Passing 10mm test sieve	Determination of Polyaromatic hydrocarbons in soil via GC-MS
PAHSPMEW	MS - CL - PAH SPME	As received	-	Determination of Polyaromatic hydrocarbons in water via GC-MS
CWGL	MS - CL - VPH & MS - CL - EPH (Leachate)		BSEN:12457 Leaching	Determination of TPH CWG (Volatile Petroleum Hydrocarbons and Extractable Petroleum Hydrocarbons) in leachates via Headspace-GC-MS and GC-MS respectively
CWGS	MS - CL - VPH & MS - CL - EPH	As received	Passing 10mm test sieve	Determination of TPH CWG (Volatile Petroleum Hydrocarbons and Extractable Petroleum Hydrocarbons) in soils via Headspace-GC-MS and GC-MS respectively
TOCS	MS - CL - TOC Eltra	Air Dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soils
VPHS	MS - CL - VPH	As received	Passing 10mm test sieve	Determination of VPH in soils via Headspace-GC-MS
VPHW	MS - CL - VPH	As received	-	Determination of VPH in waters via Headspace-GC-MS
ICPMETWD	MS - CL - ICP -Metals in Waters	As received	-	Determination of dissolved metals in water via ICP
ICPMETS	MS - CL - ICP Metals	Air dried	Passing 10mm test sieve	Determination of metals in soils via ICP
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
PHW	MS - CL - pH & Conductivity in Waters	As received	-	Determination of pH in waters using a pH probe
SKALARPHS	MS - CL - Phenols by Skalar	As received	Passing 10mm test sieve	Determination of total phenols in soil using Skalar segmented flow analyser
SKALARPHW	MS - CL - Phenols by Skalar	As received	-	Determination of total phenols in water using Skalar segmented flow analyser
ASB	MS - AS - Asbestos	-	-	Fibre identification is in accordance with in house documented methods which are based on the procedure documented in the HSE Document HSG 248 "Asbestos: The analysts guide for sampling, analysis and clearance procedures"
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis

G21159-03 - 21-21541A

Project Reference - CJU Land Project Markfield

HWOL TPH Acronym Index

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

Nicholls Colton Group
7-11 Harding Street
Leicester
LE1 4DH

Analytical Test Report: G21159-04 - 21-21627

Your Project Reference: CIU Land Project Markfield

Your Order Number: G21159-04 Samples Received / Instructed: 25/10/2021 / 25/10/2021

Report Issue Number: 1 Sample Tested: 25/10 to 02/11/2021

Samples Analysed: 10 soil samples Report issued: 02/11/2021

Signed



James Gane
Group Data Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report with the exception of the asbestos test portion which is held for 6 months unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with NC method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were taken by NC

Asbestos

Please note: Where further analysis is required samples identified as containing asbestos are screened and tested on an as received basis. No correction is made for moisture content and these results are not covered by our accreditation

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

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of issue 10/12/2020

Owned by Emily Blissett - Customer Services Supervisor

Authorised by James Gane - Commercial Manager

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G21159-04 - 21-21627

Project Reference - CJU Land Project Markfield

Analytical Test Results - Soil

NC Reference			196200	196201	196203	196205	196206	196207
Client Sample ID			-	-	-	-	-	-
Client Sample Location			WS13	WS14	WS15	WS15	WS17	WS17-A
Client Sample Type			ES	ES	ES	ES	ES	ES
Client Sample Number			4	1	1	6	1	1
Depth - Top (m)			2.50	0.40	0.40	4.50	0.40	0.30
Depth - Bottom (m)			2.50	0.40	0.40	4.50	0.40	0.30
Date of Sampling			21/10/2021	21/10/2021	21/10/2021	21/10/2021	21/10/2021	21/10/2021
Time of Sampling			-	-	-	-	-	-
Sample Matrix			Clay	Sand	Sand	Clay	Clay	Sand
Determinant	Units	Accreditation						
Arsenic	(mg/kg)	MCERTS	< 10	< 10	-	< 10	< 10	-
Cadmium	(mg/kg)	MCERTS	0.6	0.9	-	0.8	0.4	-
Chromium (Total)	(mg/kg)	UKAS	15	7.5	-	40	8.5	-
Copper	(mg/kg)	MCERTS	14	180	-	22	11	-
Lead	(mg/kg)	MCERTS	23	27	-	35	27	-
Mercury	(mg/kg)	UKAS	< 2.5	< 2.5	-	< 2.5	< 2.5	-
Nickel	(mg/kg)	MCERTS	16	13	-	23	9.6	-
Zinc	(mg/kg)	MCERTS	31	84	-	32	56	-
Total Phenols	(mg/kg)	MCERTS	< 1.0	< 1.0	-	< 1.0	< 1.0	-
pH	pH Units	MCERTS	6.4	8.7	-	7.6	7.3	-
Acenaphthene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	< 0.02	-
Acenaphthylene	(mg/kg)	UKAS	< 0.02	< 0.02	-	< 0.02	0.04	-
Anthracene	(mg/kg)	UKAS	< 0.02	< 0.02	-	< 0.02	0.10	-
Benzo (a) anthracene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.46	-
Benzo (a) pyrene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.78	-
Benzo (b) fluoranthene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.78	-
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.59	-
Benzo (k) fluoranthene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.30	-
Chrysene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.54	-
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.08	-
Fluoranthene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.88	-
Fluorene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	< 0.02	-
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.60	-
Naphthalene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	< 0.02	-
Phenanthrene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.25	-
Pyrene	(mg/kg)	MCERTS	< 0.02	< 0.02	-	< 0.02	0.87	-
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	< 0.32	< 0.32	-	< 0.32	6.4	-
TOC	(%)	MCERTS	< 1.0	-	-	-	-	-
Asbestos	-	UKAS	-	-	No asbestos detected	-	-	No asbestos detected

G21159-04 - 21-21627

Project Reference - CJU Land Project Markfield

Analytical Test Results - Soil

NC Reference	196208
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Client Sample ID				-
Client Sample Location				WS17-A
Client Sample Type				ES
Client Sample Number				2
Depth - Top (m)				0.70
Depth - Bottom (m)				0.70
Date of Sampling				21/10/2021
Time of Sampling				-
Sample Matrix				Clay
Determinant	Units	Accreditation		
Arsenic	(mg/kg)	MCERTS	< 10	
Cadmium	(mg/kg)	MCERTS	0.5	
Chromium (Total)	(mg/kg)	UKAS	15	
Copper	(mg/kg)	MCERTS	14	
Lead	(mg/kg)	MCERTS	20	
Mercury	(mg/kg)	UKAS	< 2.5	
Nickel	(mg/kg)	MCERTS	19	
Zinc	(mg/kg)	MCERTS	39	
Total Phenols	(mg/kg)	MCERTS	< 1.0	
pH	pH Units	MCERTS	7.5	
Acenaphthene	(mg/kg)	MCERTS	< 0.02	
Acenaphthylene	(mg/kg)	UKAS	< 0.02	
Anthracene	(mg/kg)	UKAS	< 0.02	
Benzo (a) anthracene	(mg/kg)	MCERTS	< 0.02	
Benzo (a) pyrene	(mg/kg)	MCERTS	< 0.02	
Benzo (b) fluoranthene	(mg/kg)	MCERTS	< 0.02	
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	< 0.02	
Benzo (k) fluoranthene	(mg/kg)	MCERTS	< 0.02	
Chrysene	(mg/kg)	MCERTS	< 0.02	
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	< 0.02	
Fluoranthene	(mg/kg)	MCERTS	< 0.02	
Fluorene	(mg/kg)	MCERTS	< 0.02	
Indeno (1, 2, 3-cd) pyrene	(mg/kg)	MCERTS	< 0.02	
Naphthalene	(mg/kg)	MCERTS	< 0.02	
Phenanthrene	(mg/kg)	MCERTS	< 0.02	
Pyrene	(mg/kg)	MCERTS	< 0.02	
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	< 0.32	
TOC	(%)	MCERTS	-	
Asbestos	-	UKAS	-	

G21159-04 - 21-21627

Project Reference - CJU Land Project Markfield

Analytical Test Results - TPH CWG

NC Reference			196199	196202	196204	196206	196207
Client Sample ID			-	-	-	-	-
Client Sample Location			WS13	WS14	WS15	WS17	WS17-A
Client Sample Type			ES	ES	ES	ES	ES
Client Sample Number			2	3	5	1	1
Depth - Top (m)			0.60	1.60	3.50	0.40	0.30
Depth - Bottom (m)			0.60	1.60	3.50	0.40	0.30
Date of Sampling			21/10/2021	21/10/2021	21/10/2021	21/10/2021	21/10/2021
Time of Sampling			-	-	-	-	-
Sample Matrix			Clay	Clay	Clay	Clay	Sand
Determinant	Units	Accreditation					
Aliphatics							
>C ₅ to C ₆ [HS_MS_1D_AL]	(mg/kg)	u	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
>C ₆ to C ₈ [HS_MS_1D_AL]	(mg/kg)	u	< 0.04	< 0.04	< 0.04	< 0.04	0.10
>C ₈ to C ₁₀ [HS_MS_1D_AL]	(mg/kg)	u	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
>C ₁₀ to C ₁₂ [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₁₂ to C ₁₆ [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₁₆ to C ₂₁ [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10	< 10	17
>C ₂₁ to C ₃₅ [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10	19	230
Aromatics							
>C ₅ to C ₇ [HS_MS_1D_AR]	(mg/kg)	u	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
>C ₇ to C ₈ [HS_MS_1D_AR]	(mg/kg)	u	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
>C ₈ to C ₁₀ [HS_MS_1D_AR]	(mg/kg)	u	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
>C ₁₀ to C ₁₂ [EH_CU_1D_AR]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₁₂ to C ₁₆ [EH_CU_1D_AR]	(mg/kg)	u	< 10	< 10	< 10	< 10	< 10
>C ₁₆ to C ₂₁ [EH_CU_1D_AR]	(mg/kg)	u	< 10	< 10	< 10	< 10	17
>C ₂₁ to C ₃₅ [EH_CU_1D_AR]	(mg/kg)	u	< 10	< 10	< 10	14	460
Total							
>C ₅ to C ₃₅ [EH_CU+HS_1D_Total]	(mg/kg)	u	< 50	< 50	< 50	< 50	720

G21159-04 - 21-21627

Project Reference - CJU Land Project Markfield

Analytical Test Results - VOC

NC Reference			196199	196206
Client Sample ID			-	-
Client Sample Location			WS13	WS17
Client Sample Type			ES	ES
Client Sample Number			2	1
Depth - Top (m)			0.60	0.40
Depth - Bottom (m)			0.60	0.40
Date of Sampling			21/10/2021	21/10/2021
Time of Sampling			-	-
Sample Matrix			Clay	Clay
Determinant	Units	Accreditation		
Benzene	(mg/kg)	MCERTS	< 0.05	< 0.05
Toluene	(mg/kg)	MCERTS	< 0.05	< 0.05
Ethylbenzene	(mg/kg)	MCERTS	< 0.05	< 0.05
m&p Xylene	(mg/kg)	MCERTS	< 0.10	< 0.10
o-Xylene	(mg/kg)	MCERTS	< 0.05	< 0.05
MTBE	(mg/kg)	MCERTS	< 0.05	< 0.05

G21159-04 - 21-21627

Project Reference - CJU Land Project Markfield

Sample Descriptions

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)
196199	-	WS13	ES	2	Dark orangish brown slightly silty slightly gravelly sandy clay	17	14
196200	-	WS13	ES	4	Orangish greyish brown slightly silty slightly gravelly sandy clay	15	19
196201	-	WS14	ES	1	Dark brown slightly clayey very gravelly sand	8.1	53
196202	-	WS14	ES	3	Orangish greyish brown slightly silty slightly gravelly sandy clay	20	10
196204	-	WS15	ES	5	Yellowish greyish brown slightly sandy slightly gravelly silty clay	22	12
196205	-	WS15	ES	6	Orangish brown slightly gravelly silty clay	18	0.0
196206	-	WS17	ES	1	Black slightly sandy very gravelly silty clay with occasional organic matter	18	42
196207	-	WS17-A	ES	1	Dark brown clayey gravelly silty sand	15	45
196208	-	WS17-A	ES	2	Orangish brown slightly silty slightly gravelly sandy clay	11	13

G21159-04 - 21-21627

Project Reference - CJU Land Project Markfield

Sample Comments

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
196199	-	WS13	ES	2	VPH - Sample taken from container with headspace. VOC/BTEX - Sample taken from container with headspace.
196200	-	WS13	ES	4	
196201	-	WS14	ES	1	
196202	-	WS14	ES	3	
196204	-	WS15	ES	5	VPH - Sample taken from container with headspace.
196205	-	WS15	ES	6	
196206	-	WS17	ES	1	VPH - Sample taken from container with headspace. VOC/BTEX - Sample taken from container with headspace.
196207	-	WS17-A	ES	1	VPH - Sample taken from container with headspace.
196208	-	WS17-A	ES	2	

G21159-04 - 21-21627

Project Reference - CJU Land Project Markfield

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
BTEXS	MS - CL - VOC and MBTEX	As received	Passing 10mm test sieve	Determination of BTEX in soils via Headspace-GC-MS
EPHS	MS - CL - EPH in Soil	As received	Passing 10mm test sieve	Determination of Extractable Petroleum Hydrocarbons in soils via GC-MS
PAHASRDS	MS - CL - PAH (As Received)	As received	Passing 10mm test sieve	Determination of Polyaromatic hydrocarbons in soil via GC-MS
CWGS	MS - CL - VPH & MS - CL - EPH	As received	Passing 10mm test sieve	Determination of TPH CWG (Volatile Petroleum Hydrocarbons and Extractable Petroleum Hydrocarbons) in soils via Headspace-GC-MS and GC-MS respectively
TOCS	MS - CL - TOC Eltra	Air Dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soils
VPHS	MS - CL - VPH	As received	Passing 10mm test sieve	Determination of VPH in soils via Headspace-GC-MS
ICPMETS	MS - CL - ICP Metals	Air dried	Passing 10mm test sieve	Determination of metals in soils via ICP
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
SKALARPHS	MS - CL - Phenols by Skalar	As received	Passing 10mm test sieve	Determination of total phenols in soil using Skalar segmented flow analyser
ASB	MS - AS - Asbestos	-	-	Fibre identification is in accordance with in house documented methods which are based on the procedure documented in the HSE Document HSG 248 "Asbestos: The analysts guide for sampling, analysis and clearance procedures"
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis

G21159-04 - 21-21627

Project Reference - CJU Land Project Markfield

HWOL TPH Acronym Index

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



A P P E N D I X J

Land Appraisal | Environmental | Geotechnical | Design | Mining | Inspections

GRM Development Solutions Limited, Laurus House, First Avenue, Centrum 100, Burton upon Trent, Staffs DE14 2WH
www.grm-uk.com | info@grm-uk.com | 01283 551249 Company No. 3099018 (England), VAT Reg. No. 658 1005 48

	GRM TIER 1 ASSESSMENT CRITERIA		
LAND USE	Commercial Industrial		
CONTAMINANT	Metals and Inorganic Compounds		
a Arsenic	640		
a Cadmium	410		
b Chromium III	8600		
a Chromium VI	49		
a Lead	2330		
b/c Mercury	11		
b Selenium	12000		
b Nickel	980		
b Phenols	690		
b Copper	68000		
b Zinc	730000		
d Cyanide	280		
	Organic Compounds		
BTEX	1% SOM	2.5% SOM	6% SOM
a Benzene	27	50	98
b Toluene	56000	110000	180000
b Ethylbenzene	5700	13000	27000
b o - xylene	6600	15000	33000
b m - xylene	6200	14000	31000
b p - xylene	5900	14000	30000
Non Genotoxic PAHs			
b Acenaphthene	84000	97000	100000
b Acenaphthylene	83000	97000	100000
b Anthracene	520000	540000	540000
b Fluoranthene	23000	23000	23000
b Fluorene	63000	68000	71000
b Naphthalene	190	460	1100
b Phenanthrene	22000	22000	23000
b Pyrene	54000	54000	54000
Genotoxic PAHs			
a/e Benzo(a)pyrene	76	76	76
ALIPHATIC HYDROCARBONS			
b C5-C6	3200	5900	12000
b C6-C8	7800	17000	40000
b C8-C10	2000	4800	11000
b C10-C12	9700	23000	47000
b C12-C16	59000	82000	90000
b C16-35	1600000	1700000	1800000
AROMATIC HYDROCARBONS			
b C5-7 (benzene)	26000	46000	86000
b C7-8 (toluene)	56000	110000	180000
b C8-C10	3500	8100	17000
b C10-C12	16000	28000	34000
b C12-C16	36000	37000	38000
b C16-C21	28000	28000	28000
b C21-C35			

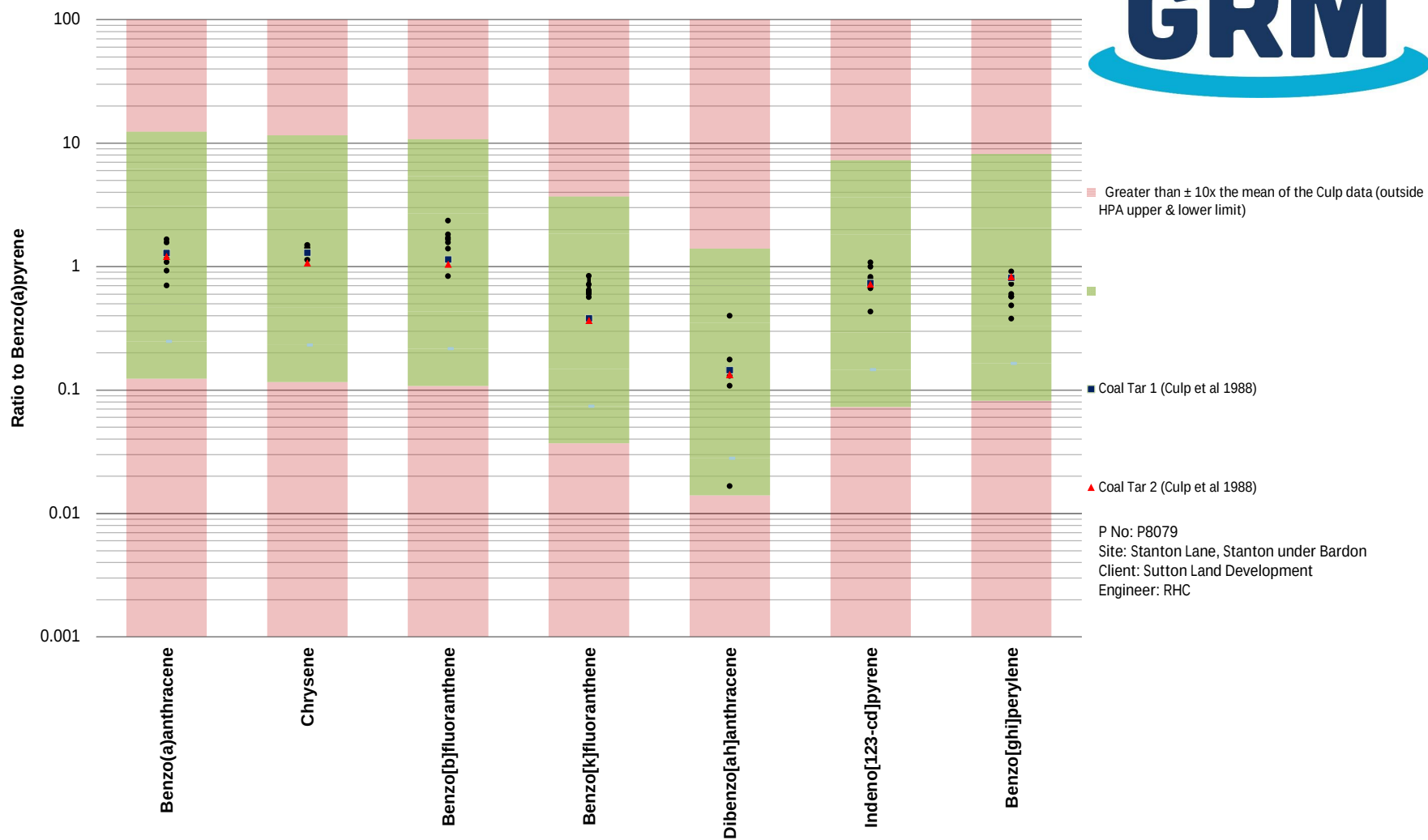
Notes

- a C4SL - SP1010 (2014) - Benzene (2.5% SOM) and Benzo(a)pyrene values (1% and 2.5% SOM) have been calculated using default C4SL parameters in CLEA v1.071
- b LQM/CIEH S4UL values (2015). Publication number S4UL3066.
- c S4UL for inorganic Hg used.
- d Atkins ATRISKsoil Value
- e Benzo(a)pyrene is a surrogate marker for the 8 genotoxic PAHs (Benzo(a)pyrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(ah)anthracene, Ideno(1,2,3-cd)pyrene)

All values in mg/kg unless otherwise stated

GRM TAC 02-2024

PAH Mixture Analysis



Contaminant Thresholds for Subsurface Water Pipes

Contaminant	Thresholds (mg/kg)
Corrosion	
Wrapped Steel	pH<7 Cond >400µS/cm
Wrapped Ductile Iron	pH<5 Cond >400µS/cm, he not neutral
Copper	pH<5 >8 and Eh +ve
Toxic Substances	
Chromium (total) (Cr)	Applies to above pipe materials
Organic Contaminants	
VOC's	0.5 PE/0.125 PVC
BTEX & MTBE	0.1 PE/0.03 PVC
SVOC	2 PE/1.4 PVC
Phenols	2 PE/0.4 PVC
Cresols & Chlorinated Phenols	2 PE/0.04 PVC
Mineral Oil C11-C20	10 PE
Mineral Oil C21 - C40	500
Ether/Ketone/Amines, Nitrobenzene/Aldehydes	0.5 PE/0.02-1 PVC

Notes.

It is not recommended that water pipes should be laid in sites where these substances are identified or suspected

Local Utility Companies should be consulted prior to pipe specifications being finalised.

Ref: Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites. UKWIR Ref. No. 10/WM/03/21. 2010.



A P P E N D I X K

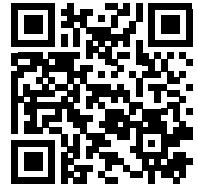
Land Appraisal | Environmental | Geotechnical | Design | Mining | Inspections

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www.grm-uk.com | info@grm-uk.com | 01283 551249 Company No. 3099018 (England), VAT Reg. No. 658 1005 48

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



0F9RT-CC7ZZ-YRR5O

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

P8079 Stanton Lane, Stanton under Bardon - Made Ground

Description/Comments

Project

P8079

Site

Stanton Lane, Stanton under Bardon

Classified by

Name: **George Salloway**
Date: **11 Apr 2024 14:59 GMT**
Telephone: **01283 551 249**

Company: **GRM Development Solutions Ltd**
Laurus House
First Avenue
Burton on Trent
DE14 2WH

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification
Most recent 3 year Refresher

Date

06 Dec 2018
07 Dec 2021

Next 3 year Refresher due by Dec 2024

Purpose of classification

2 - Material Characterisation

Address of the waste

Upton Steel, Stanton Lane, Markfield, LE67 9TT

Post Code LE67 9TT

SIC for the process giving rise to the waste

41201 Construction of commercial buildings

Description of industry/producer giving rise to the waste

New warehouses.

Description of the specific process, sub-process and/or activity that created the waste

Excavation of soils, in preparation for new building.

Description of the waste

Made Ground.



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP201	0.1-0.2	Non Hazardous		3
2	TP202	0.0-0.1	Non Hazardous		5
3	TP203	0.5-0.6	Non Hazardous		7
4	TP204	0.1-0.2	Non Hazardous		9
5	WS01	0.1	Non Hazardous		11
6	WS02	0.1	Non Hazardous		13
7	WS04	0.1	Non Hazardous		15
8	WS12	0.35	Non Hazardous		17
9	WS14	0.4	Non Hazardous		19
10	WS17	0.4	Non Hazardous		21
11	WS02[2]	0.1	Non Hazardous		23
12	WS03	0.15	Non Hazardous		24
13	WS04[2]	0.4	Non Hazardous		25
14	WS11	0.30.2	Non Hazardous		26
15	WS17[2]	0.4	Non Hazardous		27
16	WS17A	0.3	Non Hazardous		28

Related documents

#	Name	Description
1	GRM Validation Suite - WM3 V1.2.GB	waste stream template used to create this Job

Report

Created by: George Salloway

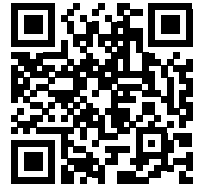
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Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	29
Appendix B: Rationale for selection of metal species	30
Appendix C: Version	31

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

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- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



BP1U7-HE9QR-M3EVF

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

P8079 - Stanton Lane, Stanton under Bardon - Natural Strata

Description/Comments

Project

P8079

Site

Stanton Lane, Stanton under Bardon

Classified by

Name: **George Salloway**
Date: **11 Apr 2024 15:05 GMT**
Telephone: **01283 551 249**
Company: **GRM Development Solutions Ltd**
Laurus House
First Avenue
Burton on Trent
DE14 2WH

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

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Purpose of classification

2 - Material Characterisation

Address of the waste

Upton Steel, Stanton Lane, Markfield, LE67 9TT

Post Code **LE67 9TT**

SIC for the process giving rise to the waste

41201 Construction of commercial buildings

Description of industry/producer giving rise to the waste

New warehouses.

Description of the specific process, sub-process and/or activity that created the waste

Excavation of soils, in preparation for new building.

Description of the waste

Natural Strata



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS02	0.5	Non Hazardous		3
2	WS16	1	Non Hazardous		5
3	WS13	2.5	Non Hazardous		7
4	WS15	4.5	Non Hazardous		9
5	WS17A	0.4	Non Hazardous		11
6	WS01	1.0	Non Hazardous		13
7	WS11	2.5	Non Hazardous		14
8	WS12	1.5	Non Hazardous		15
9	WS16[2]	1	Non Hazardous		16
10	WS16[3]	4.5	Non Hazardous		17
11	WS13[2]	0.6	Non Hazardous		18
12	WS14	1.6	Non Hazardous		19

Related documents

#	Name	Description
1	GRM Validation Suite - WM3 V1.2.GB	waste stream template used to create this Job

Report

Created by: George Salloway

Created date: 11 Apr 2024 15:05 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	20
Appendix B: Rationale for selection of metal species	21
Appendix C: Version	21