D. 2024 GRM Ground Investigation Factual Report

Report type:	Factual Ground Investigation Report
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Client:	Integrated Health Projects (VINCI)
GRM Ref:	GRM/P10525/FAC.1
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Date:	May 2024

CASICD - THE CHRISTIE RADIOLOGY VILLAGE,

FACTUAL GROUND INVESTIGATION REPORT
Naming Convention reference: CASICD-GRM-XX-ZZ-RP-C-000001-P01
FOR
INTEGRATED HEALTH PROJECTS (VINCI)

GRM Project Ref:
P10525

Date:
May 2024

Prepared for:
VINCI Construction UK Limited
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This report has been prepared in accordance with GRM's Accredited Quality Procedures

If you have any queries regarding this report please contact the project manager in the first instance.

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When required in-house geological, geotechnical, environmental, structural and civil staff helped to produce this document.		
Issue	**Description of Revision**	**Signature**
P01	Draft for comment	[redacted]

Constructionline Silver Member

AGS

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1 INTRODUCTION

1.1 PREAMBLE

GRM Development Solutions Limited (GRM) has been appointed by Integrated Health Projects - VINCI (Client) to undertake a Phase II Site Investigation to determine the ground conditions for the proposed Christie Radiology Village development. The projects Investigation Supervising Engineer is Mott MacDonald. The works reported within this document comprise the intrusive ground investigation, geotechnical testing and chemical analysis, and the post fieldwork gas and groundwater monitoring.

Client supplied information:

- Ground Investigation Specification by Mott MacDonald ref: 10014293 | P01 | CASCID-MMD-XX-ZZ-SP-C-000001, dated December 2023.
- The Christie Advanced Scanning and Imaging Centre Development Borehole Location and Constraints Plan ref: CASICD-MMD-XX-ZZ-DR-C-000002-P02.
- The Christie CT Development Bill of Quantities ref: CASICD-MMD-XX-ZZ-BQ-C-00001, dated December 2023.
- Designers' Hazard Elimination and Management Record ref: CASICD-MMD-XX-XX-HS-C-000001.
- UXO Desk Study and Risk Assessment by Zetica – The Christie NHS Foundation Trust, dated December 2023.

GRM Standard Limitations of Reporting are provided in Appendix A of this report.

A Site Location and Boundary Plan is presented in Appendix B.

The site is proposed to be re-developed, with the existing hospital buildings being decommissioned and demolished, and a new multi-storey hospital building constructed within a similar footprint.

An outline development footprint plan, on which this report is based, is presented in Appendix C.

2 PHASE II GROUND INVESTIGATION

2.1 FIELDWORK

The ground investigation fieldwork was conducted in several phases due to the logistical challenges of operating in a live hospital site;

- The rotary boreholes BH101, BH102, BH103, BH103A and BH104 and Trial pits TP101, TP102, TP104, TP106 and TP107 were undertaken between the 15th February and 18th March 2024.
- TP103 and TP105 undertaken in the small courtyard, and accessed through a waiting room were undertaken on Sunday 17th March 2024 due to the potential noise disturbance from breaking out hardstanding.
- WS101, WS02 and WS103 were undertaken on Sunday 28th April 2024, due to the logistics of working inside the hospital.

The groundwater/gas monitoring visits continued after the fieldwork.

A total of 14no. exploratory holes (7no. hand dug trial pits and 3no. windowless sample boreholes, and 4no. rotary boreholes) were progressed, to depths ranging between 0.60m (WS103) and 18.30m (BH101) below existing ground level (begl).

During the drilling of BH103, the rock strata encountered below 11.50m begl, was found to be locally softer and highly fractured, and is believed to represent a fault zone. Below this depth, no sample recovery for logging was possible, as recirculating water flush was used, with all the flush lost down the fractures. The issues encountered, resulted in the core barrel and casing being lost down the hole, with the location abandoned at 14.0m begl depth, as no further progress could be made.

The Exploratory Hole Location Plan (Specification document from Mott MacDonald) and Exploratory Hole Logs are presented in Appendix D and Appendix E respectively.

The Foundation Pit Diagrams and Photographs are presented in Appendix F.

The positioning and target depth of the exploratory holes was specified by the Investigation Supervisor.

Two monitoring standpipes were installed during the site works within BH101 and BH104, with the response zones specified by Mott MacDonald, upon completion of each location.

A PAS128 compliant survey was undertaken simultaneously with the investigation works, and provided buried services clearance at each investigation location. Where possible, the locations were also surveyed with GPS to provide coordinates. Locally in

the small courtyard where TP103, TP104 and TP105 were undertaken the GPS was not possible due to the enclosed setting, and no line of sight back to a known station.

The PAS128 survey, is presented in Appendix G.

2.1.1 Logging and Sampling

During the fieldwork, the recovered rock cores were placed in core boxes, and transported back to the GRM main office for logging and storage. During logging, the plastic core liner was split to enable detailed logging and sub-sampling for laboratory testing and core photographs to be taken.

A selection of rock core photographs is presented in Appendix H.

The cores will be held at the GRM office and available for inspection, for a minimum of 30 days after the issuing of the final factual report.

The soils generated by the trial pits and boreholes were logged on site in accordance with BS EN 1997-2 Eurocode 7: Geotechnical Design – Part 2: Ground Investigation and Testing.

Soil samples were delivered to the laboratory, with the scheduling of the testing by the project consultant (Mott MacDonald).

2.2 PROVEN GROUND

The following ground conditions were encountered during the investigation fieldwork:

- Made Ground
- Wilmslow Sandstone Formation

2.2.1 Made Ground

Made ground was encountered in all exploratory holes, to depths of between 0.2m and 4m begl.

The made ground was not fully penetrated in 4no. exploratory holes (TP102, TP104, TP105 and TP107), which all terminated at the specified target depth of 1.20m begl.

Types of made ground observed were;

- Hardstanding materials of concrete, tarmac/asphalt and brick pavers.
- Aggregates e.g. bedding sand, type 1 MOT and other gravel products.

- reworked natural soils, with gravels of chert, brick, tarmac, sandstone, mudstone, limestone and quartzite.

2.2.2 Wilmslow Sandstone Formation

Strata of the Wilmslow Sandstone Formation were encountered in some exploratory holes but were not fully penetrated.

These strata initially comprised of a more weathered zone, comprising; medium dense and dense orangish brown slightly clayey slightly gravelly SAND. Gravel comprises fine to coarse subangular sandstone.

The weathered zone was underlain by more competent rock quality strata, which generally comprised; extremely weak to weak orangish brown medium to coarse grained SANDSTONE.

Fractures within these strata were observed to fall into the following categories:

- Sub-horizontal closely spaced, planar smooth.
- Sub-horizontal widely spaced, planar rough, with some clayey gravelly infill.
- Sub-vertical, widely spaced, open rough with no infill.

Where encountered, zones of core loss and poor recovery within these strata are considered to be the result of both locally heavily fractured strata, and the anticipated location of a geological fault.

2.3 CONTAMINATION OBSERVATIONS

A mild to moderate organic odour was noted while advancing the service inspection pit in WS102 (inside the existing hospital), within the made ground soils.

2.4 GROUNDWATER

The exploratory techniques used were rapid and may have masked smaller water seepages.

During the investigation works, standing groundwater was encountered in the rotary boreholes at between 2.60 and 3.80m begl.

To date, two groundwater monitoring visits have been conducted and the results of the monitoring are reported in Appendix I.

2.5 SCHEDULING OF LABORATORY TESTING

GRM issued draft exploratory holes logs and blank chain of custody forms to Mott MacDonald following the completion of each exploratory hole location. The completed forms were returned to GRM, specifying the required laboratory testing.

Any sample deviations due to holding time exceedances, are outside of GRMs control.

3 LABORATORY ANALYSES

All AGS data for the laboratory testing results will be provided separately, and issued electronically to the Client for distribution.

3.1 CHEMICAL LABORATORY ANALYSIS

Chemical laboratory analyses were specified by Mott MacDonald and was undertaken by Construction Testing Services Ltd.

The chemical analysis results are presented in Appendix J.

Samples not used for testing will be stored for 30 days after issue of this report and then disposed of, unless the Client requests in writing that they be kept.

3.2 GEOTECHNICAL LABORATORY TESTING

Geotechnical testing on both soil and rock samples was specified by Mott MacDonald and was undertaken by Simtec and Geolabs Ltd.

The deformability of rock core testing could not be undertaken due to the nature of the samples recovered, i.e. the fracture state resulting in variability of the cylinder sidewalls, and reduced width to length ratio available.

The geotechnical test results are presented in Appendix K.

4 CONCLUSIONS

The investigation works have been undertaken in accordance with the specification, and supervising engineers instructions.

We trust this is sufficient for your current requirements.

If you have any queries, please contact the project manager in the first instance.

APPENDIX A

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

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.

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.

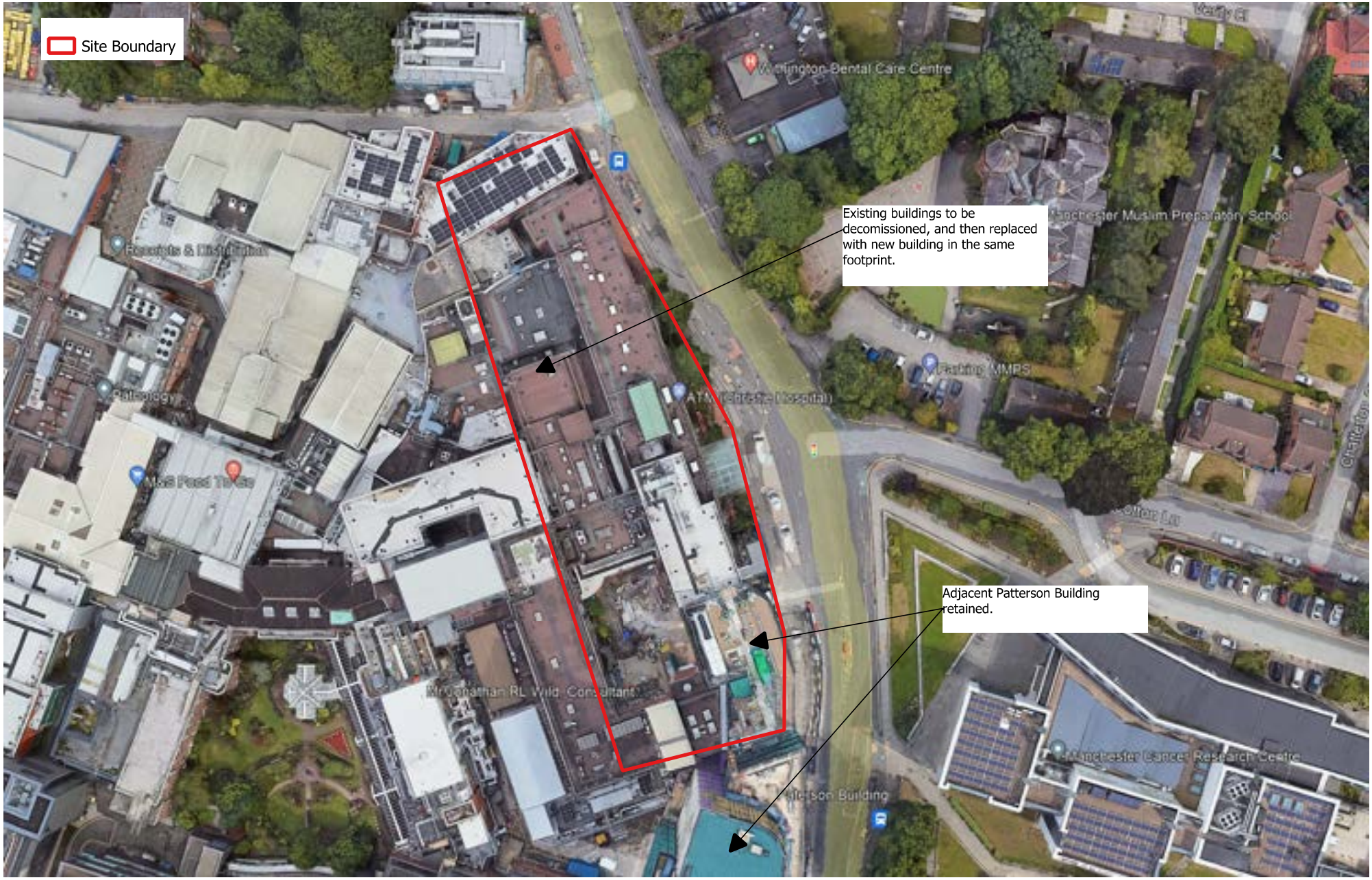
APPENDIX B



NOTES: Notes	CLIENT: IHP VINCI	PROJECT No: P10525	DATE: MAY 2024	DESIGN/DRAWN: RJH
	PROJECT: CASICD - THE RADIOLOGY VILLAGE	DRAWING NUMBER: 001	ISSUE: A	
	TITLE: SITE LOCATION PLAN	© GRM Development Solutions Ltd © Crown Copyright. AL 100014100		

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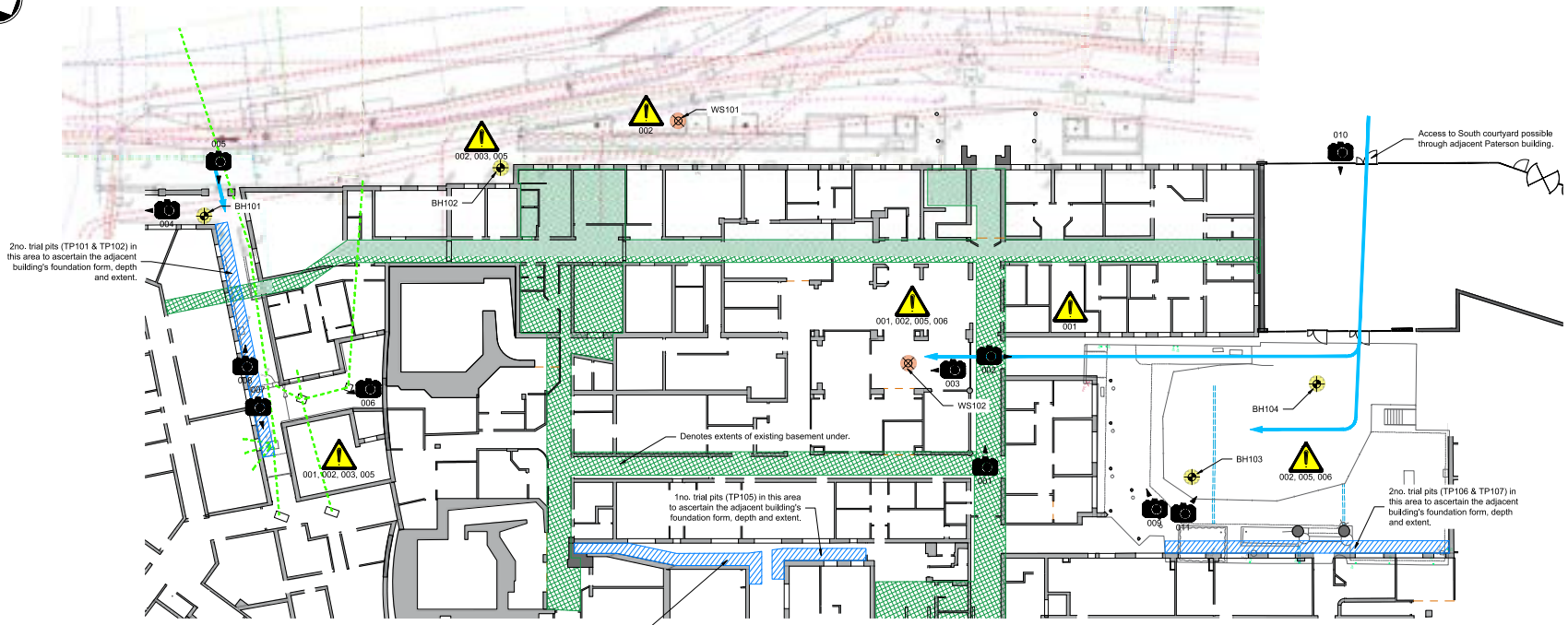
APPENDIX C



NOTES: Notes	CLIENT: IHP VINCI	PROJECT No: P10525	DATE: MAY 2024	DESIGN/DRAWN: RJH
	PROJECT: CASICD - THE RADIOLOGY VILLAGE	DRAWING NUMBER: 002	ISSUE: A	
	TITLE: DEVELOPMENT PROPOSAL	© GRM Development Solutions Ltd © Crown Copyright. AL 100014100		

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APPENDIX D



Ground Floor Constraints Plan

1:200

Exploratory Hole Schedule

Borehole ID	Type	Depth (m)	Groundwater monitoring required?	Easting	Northing
BH101	DS + RC	18	Yes	E384907	N392636
BH102	DS + RC	18	No	E384919	N392615
BH103	DS + RC	18	Yes	E384914	N392553
BH104	DS + RC	18	No	E384925	N392547
WS101	WS	5	No	E384927	N392603
WS102	WS	5	No	E384915	N392579
WS103	WS	5	No	E384909	N392608
TP101	HDTP	1.2	No	-	-
TP102	HDTP	1.2	No	-	-
TP103	HDTP	1.2	No	-	-
TP104	HDTP	1.2	No	-	-
TP105	HDTP	1.2	No	-	-
TP106	HDTP	1.2	No	-	-
TP107	HDTP	1.2	No	-	-

Health, Safety & Environment Information

XXX

Notes below are additional to hazards/risks normally associated with this type of work.

Ref.	Hazard	Activity / Process
001	Collapse of existing basement under external areas.	Temporary works Contractor to verify that existing basement is not overloaded when transporting Ground Investigation equipment.
002	Clash with existing services.	Sub-contractor to take full responsibility for utility plans and verify position of additional drainage prior to commencement of works.
003	UXO.	Pre-Desk Study showed site to be moderate risk, detailed desk study to be undertaken prior to GI to inform risk.
004	Working adjacent to the public highway.	Appropriate segregation to be used and agreed with Trust/council.
005	Contaminated ground.	Asbestos known to be present in the basement. Contractor to be vigilant on site for potential asbestos or other contaminants in ground.
006	Working in a live hospital.	Noise/vibration and general disruption to be kept to a minimum and agreed with the NHS Trust prior to commencing work. Appropriate segregation to be used around investigations.

Photo 001



Photo 002



Photo 003



Photo 004



Photo 005



Photo 006



Photo 007



Photo 008



Photo 009

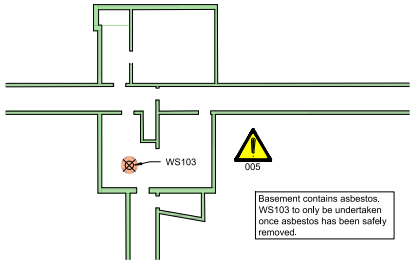


Photo 010



Photo 011





Basement Level Plan Extract

1:200

Ground Investigation Requirements

Requirements for the ground investigation are outlined below. Note that a full specification for the works will be produced prior to undertaking the investigation.
This drawing should be read in conjunction with the Geotechnical and Geoenvironmental Desk Study CASIDC-MMD-XX-XX-RP-C-000001.
An indicative ground model has been produced based on the adjacent Paterson Development Ground Investigation:

Stratum	Depth to top of stratum (mBGL)	Elevation at top of stratum (mAOD)	Thickness (m)
Made ground	0	34.72-35.26	0.70-2.20
Devensian till	0.70-2.20	32.52-34.22	0.50-2.20
Weathered sandstone	2.20-2.70	31.43-33.06	1.30-2.80
Very weak to weak sandstone (Wilmslow Formation)	3.50-5.00	29.92-31.76	Not proven

- Made ground samples required from all exploratory hole locations for contamination testing.
- Exploratory holes required to a depth of 18m below ground level. DS + RC refers to Dynamic Sampling borehole with Rotary Coring follow-on, WS refers to Window Sample and HDTP refers to Hand-Dug Trial Pit.
- GI Sub-Contractor to advise whether there is scope for other suitable borehole locations within the footprint of the building. GI Sub-Contractor to agree methodology and date/time of exploratory holes with NHS Trust prior to undertaking the works.
- CAT Scan and hand dug trial pits required to a depth of 1.2m at all exploratory hole locations to identify any buried services and/or foundations of adjacent buildings.
- Trial pits to be undertaken in the locations highlighted to determine the extent of existing foundations. Dimensioned sketches to be provided to Structural Engineer.
- If invasive species are seen on site the Contractor is to make the Principal Designer and Investigation Supervisor aware. Risk of invasive species is low due to the site being located in an urban area.

1:200 0 10m 20m

Notes

1. Do not scale from this drawing
2. All utilities shown are taken from "59603 Utility Survey (23-03-23)", with the exception of the lined indicating "Indicative combined sewer location" as shown in the below key, which is only shown in the approximate position based on recieved CCTV information.
3. Boreholes are shown in approximate required position only, the sub-contractor shall be responsible for ensuring that the proposed borehole locations are suitable and do not disrupt any live services or other ground obstructions below.
4. Temporary works contractor to verify that the existing basement is not overloaded when transporting ground investigation equipment.
5. Proposed access routes are to be agreed with the Trust prior to commencement of works. No consideration has been made to storage or site compound areas.

Key to symbols

- British Telecom
- Vodafone
- Virgin Media
- GTT Fibre Optic
- ZAYO
- Empty Ducting
- Earth Cable
- Electricity Cables
- Gas Pipes
- Sewer Combined
- Sewer Foul
- Sewer Surface Water
- Traffic Light Cables
- Unidentified GPR or electro location trace
- Water Pipe
- End of trace
- Mutliple Electric Ducts
- Red line boundary
- Extents of basement below
- Trial pits location plan
- Proposed indicative borehole location
- Proposed window sample location
- Indicative combined sewer location
- Proposed access route to South courtyard

Reference drawings

Existing ground floor and basement level plans taken from 1282-21-DAY-XX-00-DR-A-03-0001 and 1282-21-DAY-XX-BA-DR-A-03-0000 respectively.

Paterson Building ground floor general arrangement plan taken from BDP architectural Revit model PRP-BDP-Z01-XX-M3-A-0002.

Utility survey taken from 59603 Utility Survey (23-03-23).dwg

Indicative combined sewer locations shown by a lime green dashed line and associated manholes are taken from NRCWWS CCTV Drain survey dated Oct 2023.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P02	04.12.2023	M Ufton	Updated following subcontractor comment	CS	AS
P01	14.11.2023	M Ufton	Issued for sub-contractor comment	CS	AS

Status Stamp

PRELIMINARY

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Client

The Christie NHS Foundation Trust

Title

The Christie Advanced Scanning & Imaging Centre Development Borehole Location & Constraints Plan

Designed	I Sonara	IS	Eng check	M Wild	MW
Drawn	M Ufton	MU	Coordination	C Smith	CS
Dwg check	C Smith	CS	Approved	A Simpson	AS

MMD Project Number	Scale at A1	Security
100114293	1:200	STD

Suitability Description	Suit. Code
Suitable for Review and Comment	S3

Drawing Number	Revision
CASICD-MMD-XX-ZZ-DR-C-000002	P02

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APPENDIX E

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Cable-Percussion Borehole

Borehole No. **BH101**

Sheet 1 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD) 35.15

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384906 E, 392641 N

Install	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	SPT Value	Depth (m)	Level (m)	Legend	Stratum Description
					0.10	35.05		Tarmacadam/asphalt.
					0.20	34.95		MADE GROUND
		0.30 - 0.40	ES					Medium dense, light brown, slightly sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular limestone and quartzite.
		0.40 - 0.50	B					MADE GROUND
		1.00 - 1.10	ES					Soft, dark brown, slightly sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded brick, tarmacadam/ asphalt, limestone and brick.
		1.40	C	N=10 (2,3/2,3,2,3)	1.40	33.75		MADE GROUND
		1.50 - 1.60	ES					Firm, light grey and orangish-brown, sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular and subangular mudstone, sandstone, chert and brick.
		1.90 - 2.00	D		1.90	33.25		MADE GROUND
		2.00	C	N=35 (6,8/7,8,9,11)				Medium dense to dense, orangish-brown SAND. Sand is fine to coarse.
		2.30 - 2.40	D					WEATHERED WILMSLOW SANDSTONE FORMATION
		~~2.60~~	~~C~~	~~40 (11,13/40 for 185mm)~~				
		2.60 - 3.30	42	0	0			*... No recovery 2.60-3.10m.*
		3.30 - 4.80	85	10	0	3.30	31.85	Extremely weak reddish brown medium to coarse grained SANDSTONE, locally recovered as sand. Discontinuities; No.1 - sub-horizontal closely spaced, planar rough and open. No.2 - sub-vertical up to 60 degrees, planar rough, very widely spaced. No.3 - sub-horizonal, widely spaced, planar rough, with clayey fine to coarse gravel infill. WILMSLOW SANDSTONE FORMATION
		4.80 - 6.30	100	86	73			
		6.30 - 7.80	100	80	37			

Crew: MACKLIN GEOTECH **Logger:** AM / AW

Equipment: Comacchio 205

Groundwater Remarks:
Groundwater standing at 2.60m.

General Remarks:

Chiselling Details

Depth Top	Duration	Remarks

Casing Diameter by Depth

Depth Base	Diameter	Remarks
3.50	150	

Hole Started: 11/03/2024 **Hole Complete:** 13/03/2024 **Version:** FINAL **Scale:** 1:45

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Rotary Core Log

Borehole No.
BH101
Sheet 2 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
35.15

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384906 E
392641 N

Install	Water Strikes	Depth (m)	Coring TCR	Coring SCR	Coring RQD	FI	Depth (m)	Level (m)	Legend	Stratum Description
		7.80 - 9.30	87	63	30					Extremely weak reddish brown medium to coarse grained SANDSTONE, locally recovered as sand. Discontinuities; No.1 - sub-horizontal closely spaced, planar rough and open. No.2 - sub-vertical up to 60 degrees, planar rough, very widely spaced. No.3 - sub-horizonal, widely spaced, planar rough, with clayey fine to coarse gravel infill. WILMSLOW SANDSTONE FORMATION
		9.30 - 10.80	84	67	22					*... Locally recovered as sand.* *... moderately strong and light brown.*
		10.80 - 12.30	67	53	28					
		12.30 - 13.80	49	29	0					*... Locally grading to a mudstone* *... No recovery 13.50-13.80m.*
		13.80 - 15.30	60	53	33					*... Locally greyish yellow.* *... No recovery 15.0-15.40m.*

9 10 11 12 13 14 15 16

Crew: MACKLIN GEOTECH | **Equipment:** Comacchio 205 | **Logger:** AM / AW

General Remarks:

Groundwater Remarks:
Groundwater standing at 2.60m.

Hole Started: 11/03/2024 | **Hole Complete:** 13/03/2024 | **Version:** FINAL | **Scale:** 1:45

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Rotary Core Log

Borehole No.
BH101
Sheet 3 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
35.15

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384906 E
392641 N

Install	Water Strikes	Depth (m)	Coring TCR	Coring SCR	Coring RQD	FI	Depth (m)	Level (m)	Legend	Stratum Description
		15.30 - 16.80	33	27	18					Extremely weak reddish brown medium to coarse grained SANDSTONE, locally recovered as sand. Discontinuities; No.1 - sub-horizontal closely spaced, planar rough and open. No.2 - sub-vertical up to 60 degrees, planar rough, very widely spaced. No.3 - sub-horizonal, widely spaced, planar rough, with clayey fine to coarse gravel infill. WILMSLOW SANDSTONE FORMATION
		16.80 - 18.30	55	35	13					*... No recovery 16.50-16.80m.* *... No recovery 16.80-17.25m.*
							18.30	16.85		End of Borehole at 18.300m

17
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Crew: MACKLIN GEOTECH | **Equipment:** Comacchio 205 | **Logger:** AM / AW

General Remarks:

Groundwater Remarks:
Groundwater standing at 2.60m.

Hole Started: 11/03/2024 | **Hole Complete:** 13/03/2024 | **Version:** FINAL | **Scale:** 1:45

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Cable-Percussion Borehole

Borehole No. **BH102**

Sheet 1 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD) 35.32

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384918 E, 392617 N

Install	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	SPT Value		Depth (m)	Level (m)	Legend	Stratum Description
						0.10	35.22		Brick paving.
		0.30 - 0.40	ES			0.20	35.12		MADE GROUND
		0.50 - 0.60	B						Medium dense, light brown, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular limestone, tarmacadam/asphalt and brick. MADE GROUND
		1.20	C	N=26 (3,3/4,7,7,8)					Medium dense, dark brown, slightly gravelly, clayey SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded limestone, sandstone and brick. MADE GROUND
						1.50	33.82		Medium dense to dense, reddish-brown SAND. Sand is fine to coarse. WEATHERED WILMSLOW SANDSTONE FORMATION
		1.90 - 2.00	D						
		2.00	C	N=41 (5,7/9,10,10,12)					
		2.50 - 2.60	D						
		2.70	C	50 (11,13/50 for 225mm)		2.70	32.62		Extremely weak to weak, orangish brown medium to coarse grained SANDSTONE, locally recovered as sand. Discontinuities; No.1 - sub-horizontal up to 15 degrees, closely spaced, planar smooth to rough, locally some soft clay infill. No.2 - sub-horizontal 20-60 degrees, widely spaced, planar rough open and no infill. WILMSLOW SANDSTONE FORMATION
		2.70 - 3.30	80	20	0				
		3.30 - 4.80	93	90	87				
		4.80 - 6.30	90	83	29				
		6.30 - 7.80	93	83	37				*... Becomes weak to medium strong.*
									... colour locally becomes light brown.

Crew: MACKLIN GEOTECH **Logger:** AM / AW

Equipment: Comacchio 205

Groundwater Remarks:
Groundwater standing at 2.80m.

General Remarks:

Chiselling Details

Depth Top	Duration	Remarks

Casing Diameter by Depth

Depth Base	Diameter	Remarks
3.50	150	

Hole Started: 07/03/2024 **Hole Complete:** 11/03/2024 **Version:** FINAL **Scale:** 1:45

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Rotary Core Log

Borehole No.
BH102
Sheet 2 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
35.32

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384918 E
392617 N

Install	Water Strikes	Depth (m)	Coring TCR	Coring SCR	Coring RQD	FI	Depth (m)	Level (m)	Legend	Stratum Description
		7.80 - 9.30	96	86	47					Extremely weak to weak, orangish brown medium to coarse grained SANDSTONE, locally recovered as sand. Discontinuities; No.1 - sub-horizontal up to 15 degrees, closely spaced, planar smooth to rough, locally some soft clay infill. No.2 - sub-horizontal 20-60 degrees, widely spaced, planar rough open and no infill. WILMSLOW SANDSTONE FORMATION
		9.30 - 10.80	87	73	17					
		10.80 - 12.30	97	89	43					
		12.30 - 13.80	93	77	62					*... Becomes medium strong light brown sandstone.*
		13.80 - 15.30	97	70	32					
										... Locally grading to mudstone.

9 10 11 12 13 14 15 16

Crew: MACKLIN GEOTECH | **Equipment:** Comacchio 205 | **Logger:** AM / AW

General Remarks:

Groundwater Remarks:
Groundwater standing at 2.80m.

Hole Started: 07/03/2024 | **Hole Complete:** 11/03/2024 | **Version:** FINAL | **Scale:** 1:45

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Rotary Core Log

Borehole No.
BH102
Sheet 3 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
35.32

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384918 E
392617 N

Install	Water Strikes	Depth (m)	Coring TCR	Coring SCR	Coring RQD	FI	Depth (m)	Level (m)	Legend	Stratum Description
		15.30 - 16.80	93	73	64					Extremely weak to weak, orangish brown medium to coarse grained SANDSTONE, locally recovered as sand. Discontinuities; No.1 - sub-horizontal up to 15 degrees, closely spaced, planar smooth to rough, locally some soft clay infill. No.2 - sub-horizontal 20-60 degrees, widely spaced, planar rough open and no infill. WILMSLOW SANDSTONE FORMATION
		16.80 - 18.30	47	27	0					... *No recovery 16.80-17.60m.*
							18.30	17.02		End of Borehole at 18.200m

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Crew: MACKLIN GEOTECH | **Equipment:** Comacchio 205 | **Logger:** AM / AW

General Remarks:

Groundwater Remarks:
Groundwater standing at 2.80m.

Hole Started: 07/03/2024 | **Hole Complete:** 11/03/2024 | **Version:** FINAL | **Scale:** 1:45

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Cable-Percussion Borehole

Borehole No. **BH103**

Sheet 1 of 2

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD) 35.28

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384916 E, 392556 N

Install	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	SPT Value	Depth (m)	Level (m)	Legend	Stratum Description
					0.10	35.18		TARMACADAM
		0.20 - 0.30	ES		0.15	35.13		MADE GROUND
								Dense grey brown sandy fine to coarse GRAVEL of limestone and sandstone - Type 1 MOT.
					0.60	34.68		MADE GROUND
		0.70 - 0.80	ES					Medium dense dark brown gravelly fine to coarse SAND. Gravel is angular to coarse concrete fragments, quartzite, with brick and tile fragments.
								MADE GROUND
		1.30	S	N=12 (3,3/3,3,3,3)	1.30	33.98		Medium dense orange brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse angular to subangular brick fragments and quartzite.
		1.40 - 1.50	ES		1.40	33.88		MADE GROUND
		1.90 - 2.00	D		1.90	33.38		weak CONCRETE.
		2.00	S	N=39 (4,6/8,8,11,12)				MADE GROUND
								Medium dense brown and red brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse angular to subangular brick and concrete fragments, and occasional sandstone.
		2.50 - 2.60	D					MADE GROUND
								Medium dense brownish red fine to coarse SAND. WEATHERED WILMSLOW SANDSTONE FORMATION
		3.00	C	50 (25 for 140mm/50 for 175mm)	3.00	32.28		*... Becomes dense from 2.0m*
		3.00 - 4.00	75	55 32				Extremely weak to weak, reddish brown silty fine to coarse grained SANDSTONE, locally poorly cemented and friable, with thin interbeds of very silty partings. Discontinuities: no.1 - generally horizontal to sub-horizontal, very closely and closely spaced, planar rough, locally with soft silt infill, generally open. No. 2 - sub-vertical 70-80 degrees, widely spaced, open rough and undulating, no infill.
		4.00 - 5.50	62	43 8				WILMSLOW SANDSTONE FORMATION
								... window sample barrel and SPT refusal at 3.0m
								... No recovery 3.0-3.20m.
								... Non-intact - recovered as a coarse angular gravel.
								... Locally and silty sand.
								... No recovery 4.0-4.60m.
								... Non-intact, recovered as gravel.
		5.50 - 7.00	77	70 24				*... No recovery 5.5-5.90m.*
								... locally interbeds of pale brown coarse sandstone.
								... No recovery 7.0-7.10m.
		7.00 - 8.50	93	53 33				

Crew: MACKLIN GEOTECH **Logger:** AM / RJH

Equipment: Comacchio 205

Groundwater Remarks:
Groundwater standing at 3.80-4.0m begl.

General Remarks:
Location moved circa 2m from BH103A (original location), due to obstruction encountered.

Chiselling Details

Depth Top	Duration	Remarks

Casing Diameter by Depth

Depth Base	Diameter	Remarks
3.50	150	

Hole Started: 27/02/2024 **Hole Complete:** 04/03/2024 **Version:** FINAL **Scale:** 1:45

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Rotary Core Log

Borehole No.
BH103
Sheet 2 of 2

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
35.28

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384916 E
392556 N

Install	Water Strikes	Depth (m)	Coring TCR	Coring SCR	Coring RQD	FI	Depth (m)	Level (m)	Legend	Stratum Description
										Extremely weak to weak, reddish brown silty fine to coarse grained SANDSTONE, locally poorly cemented and friable, with thin interbeds of very silty partings. Discontinuities: no.1 - generally horizontal to sub-horizontal, very closely and closely spaced, planar rough, locally with soft silt infill, generally open. No. 2 - sub-vertical 70-80 degrees, widely spaced, open rough and undulating, no infill. WILMSLOW SANDSTONE FORMATION
		8.50 - 10.00	80	73	23					*... No recovery 8.50-8.70m.*
		10.00 - 11.50	87	30	8					*... No recovery 10.0-10.20m.* *... becomes pale reddish brown.* *... one joint with polished internal surface and grey gleying with some soft clay.*
		11.50 - 12.50	0	0	0		11.50	23.78		No core recovery - heavily weathered sandstone, possible fault zone. WILMSLOW SANDSTONE FORMATION
		12.50 - 14.00	0	0	0					
							14.00	21.28		End of Borehole at 14.000m

Crew: MACKLIN GEOTECH | **Equipment:** Comacchio 205 | **Logger:** AM / RJH

General Remarks:
Location moved circa 2m from BH103A (original location), due to obstruction encountered.

Groundwater Remarks:
Groundwater standing at 3.80-4.0m begl.

Hole Started:	27/02/2024	Hole Complete:	04/03/2024	Version:	FINAL	Scale:	1:45

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Cable-Percussion Borehole

Borehole No.
BH103A
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD) 35.26

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384915 E 392554 N

Install	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	SPT Value	Depth (m)	Level (m)	Legend	Stratum Description
		0.10 - 0.20	ES		0.10	35.16		TARMACADAM
								MADE GROUND
					0.30	34.96		Loose dark grey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subangular brick fragments, tarmac, sandstone, quartzite, and concrete fragments.
								MADE GROUND
								Medium dense reddish brown silty SAND. Sand is fine to coarse.
					1.20	34.06		MADE GROUND
								End of Borehole at 1.200m

1 2 3 4 5 6 7 8

Crew: MACKLIN GEOTECH **Logger:** AM

Equipment: Comacchio 205

Groundwater Remarks:
No Groundwater encountered.

General Remarks:
Obstruction encountered at 1.20m within inspection pit, therefore abandoned.

Chiselling Details

Depth Top	Duration	Remarks

Casing Diameter by Depth

Depth Base	Diameter	Remarks

Hole Started: 26/02/2024 **Hole Complete:** 26/02/2024 **Version:** FINAL **Scale:** 1:45

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Cable-Percussion Borehole

Borehole No. **BH104**

Sheet 1 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD) 35.33

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384922 E, 392547 N

Install	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	SPT Value	Depth (m)	Level (m)	Legend	Stratum Description
		0.30 - 0.40	ES		0.15	35.18		Tarmacadam/asphalt. MADE GROUND
		0.50 - 0.60	B					Medium dense, brown, slightly clayey ,gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse angular to subangular brick, concrete and tarmacadam/asphalt. Occasional clay clods. MADE GROUND
		1.20	C	N=4 (1,0/1,1,1,1)				
		1.60 - 1.70	ES		1.50	33.83		Firm to stiff, dark brown, slightly gravelly, sandy CLAY. Sand is fine to coarse. Gravel is fine to medium, subangular to subrounded chert, mudstone, sandstone and rare brick. MADE GROUND
		2.10 - 2.20	D		2.00	33.33		Medium dense to dense, reddish-brown SAND. Sand is fine to coarse. WEATHERED WILMSLOW SANDSTONE FORMATION
		2.20	C	N=35 (2,3/5,8,9,13)				*Becoming orangish-brown from 2.60m.*
		2.80 - 2.90	D					
		2.90	C	50 (5,14/50 for 220mm)				
		3.00 - 4.00	42	24 / 18	3.00	32.33		Extremely weak to weak, becomes weak to medium strong with depth, orangish brown, medium to coarse grained SANDSTONE. Joint set 1 is sub-horizontal, widely spaced, planar rough with no infill. Joint set 2 is sub-vertical up to 65 degrees, very widely spaced with clay infill. Joint set 3 is sub-horizontal up to 10 degrees, moderately widely spaced, planar rough with sandy, clayey, mica rich infill. WILMSLOW SANDSTONE FORMATION
		4.00 - 4.50	86	84 / 68				*... No recovery 3.00-3.56m.*
		4.50 - 5.50	81	74 / 55				*... No recovery 3.80-4.25m.*
		5.50 - 6.20	100	81 / 21				*... No recovery 4.50-4.85m.*
		6.20 - 7.70	100	93 / 53				*Becoming weak to locally medium strong at 7.00m.*

Crew: MACKLIN GEOTECH **Logger:** AW

Equipment: Comacchio 205

Groundwater Remarks:
Groundwater standing at 3.80m.

General Remarks:

Chiselling Details

Depth Top	Duration	Remarks

Casing Diameter by Depth

Depth Base	Diameter	Remarks
3.50	150	

Hole Started: 05/03/2024 **Hole Complete:** 07/03/2024 **Version:** FINAL **Scale:** 1:45

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Rotary Core Log

Borehole No.
BH104
Sheet 2 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
35.33

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384922 E
392547 N

Install	Water Strikes	Depth (m)	Coring TCR	Coring SCR	Coring RQD	FI	Depth (m)	Level (m)	Legend	Stratum Description
		7.70 - 9.20	100	93	47					Extremely weak to weak, becomes weak to medium strong with depth, orangish brown, medium to coarse grained SANDSTONE. Joint set 1 is sub-horizontal, widely spaced, planar rough with no infill. Joint set 2 is sub-vertical up to 65 degrees, very widely spaced with clay infill. Joint set 3 is sub-horizontal up to 10 degrees, moderately widely spaced, planar rough with sandy, clayey, mica rich infill. WILMSLOW SANDSTONE FORMATION
		9.20 - 10.70	100	90	47					
		10.70 - 12.20	95	91	65					
		12.20 - 13.70	100	97	53					
		13.70 - 15.20	93	89	13					
		15.20 - 16.70	92	81	49					

9 10 11 12 13 14 15 16

Crew: MACKLIN GEOTECH | **Equipment:** Comacchio 205 | **Logger:** AW

General Remarks:

Groundwater Remarks:
Groundwater standing at 3.80m.

Hole Started: 05/03/2024 | **Hole Complete:** 07/03/2024 | **Version:** FINAL | **Scale:** 1:45

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Rotary Core Log

Borehole No.
BH104
Sheet 3 of 3

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
35.33

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384922 E
392547 N

Install	Water Strikes	Depth (m)	Coring TCR	Coring SCR	Coring RQD	FI	Depth (m)	Level (m)	Legend	Stratum Description
										Extremely weak to weak, becomes weak to medium strong with depth, orangish brown, medium to coarse grained SANDSTONE. Joint set 1 is sub-horizontal, widely spaced, planar rough with no infill. Joint set 2 is sub-vertical up to 65 degrees, very widely spaced with clay infill. Joint set 3 is sub-horizontal up to 10 degrees, moderately widely spaced, planar rough with sandy, clayey, mica rich infill. WILMSLOW SANDSTONE FORMATION
		16.70 - 18.20	100	89	41					*Becomes light brown in colour 16.60-16.65m.* *Becomes light brown in colour 17.20-17.25m.*
							18.20	17.13		End of Borehole at 18.200m

17 18 19 20 21 22 23 24

Crew: MACKLIN GEOTECH | **Equipment:** Comacchio 205 | **Logger:** AW

General Remarks:

Groundwater Remarks:
Groundwater standing at 3.80m.

Hole Started:	05/03/2024	Hole Complete:	07/03/2024	Version:	FINAL	Scale:	1:45

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Windowless Sample Borehole

Borehole No WS101
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD) 35.30

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384927 E, 392604 N

Installation/ Backfill	Water Strike	Samples/Tests: Depth	Type	SPT Result	Depth (m)	Level (m)	Legend	Stratum Description
		0.30	ES		0.25	35.05		Brick pavers laid on sharp sand. MADE GROUND
		0.80	ES					Medium dense dark brown slightly clayey gravelly fine to coarse SAND with low cobble content. Gravel and cobbles are sandstone, brick fragments, concrete and quartzite. MADE GROUND
		1.20 - 1.65 1.20	D C	N=17 (3,3/3,4,5,5)	1.00	34.30		Dense dark red slightly clayey gravelly SAND, grading to very weak poorly cemented sandstone. WEATHERED WILMSLOW SANDSTONE FORMATION
		2.00 - 2.45 2.00	D C	N=50 (7,7/50 for 245mm)				
					2.45	32.85		End of Borehole at 2.450m

1 2 3 4 5

Crew: Macklin Geotechnical | **Logger:** RJH | **Weather:**

Equipment: Archway

Reason for termination of borehole: Refusal on very dense sand.

Groundwater Remarks:
No groundwater encountered.

General Remarks:

Hole Started: 28/04/2024 | **Hole Complete:** 28/04/2024 | **Version:** FINAL | **Scale:** 1:31

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Windowless Sample Borehole

Borehole No WS102
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD) 35.56

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384915 E, 392577 N

Installation/ Backfill	Water Strike	Samples/Tests: Depth	Type	SPT Result	Depth (m)	Level (m)	Legend	Stratum Description
					0.05	35.51		Heavy duty lino and adhesive. MADE GROUND
					0.30	35.26		Floor screen over reinforced gravelly concrete and membrane. One layer of 8mm mesh at 0.20m begl. MADE GROUND
		0.45	ES		0.40	35.16		Type 1 MOT sub-base. MADE GROUND
		0.80	ES					Medium dense very dark brown slightly gravelly fine to coarse SAND. Gravel is angular coarse brick fragments and concrete. Organic odour below 0.70m begl. MADE GROUND
		1.20 - 1.65 1.20	D C	N=12 (3,3/2,3,4,3)				
					1.50	34.06		Medium dense brownish red and grey slightly gravelly fine to coarse SAND. Gravel is coarse angular sandstone. WEATHERED WILMSLOW SANDSTONE FORMATION
		2.00 - 2.45 2.00	D C	50 (10,13/50 for 195mm)				
					2.45	33.11		End of Borehole at 2.450m

1 2 3 4 5

Crew: Macklin Geotechnical | **Logger:** RJH | **Weather:**

Equipment: Archway

Reason for termination of borehole: Refusal on very dense sand.

Groundwater Remarks:
No groundwater encountered.

General Remarks:
Undertaken inside in small waiting room.

Hole Started:	28/04/2024	**Hole Complete:**	28/04/2024	**Version:**	FINAL	**Scale:**	1:31

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Windowless Sample Borehole

Borehole No WS103
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates E N

Installation/ Backfill	Water Strike	Samples/Tests: Depth	Samples/Tests: Type	Samples/Tests: SPT Result	Depth (m)	Level (m)	Legend	Stratum Description
					0.15			Wooden floor. MADE GROUND
								Concrete MADE GROUND
					0.45			Extremely weak reddish brown fine to coarse SANDSTONE. WILMSLOW SANDSTONE FORMATION
					0.60			End of Borehole at 0.600m

Crew: GRM / DSUK **Logger:** RJH **Weather:**

Equipment: Concrete coring and hand digging tools.

Reason for termination of borehole: Refusal on rock.

Groundwater Remarks:
No groundwater encountered.

General Remarks:
Undertaken in basement. Unable to survey X,Y,Z coordinates.

Hole Started:	Hole Complete:	Version:	Scale:
28/04/2024	28/04/2024	FINAL	1:31

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Trial Pit Log

Trial Pit No TP101
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

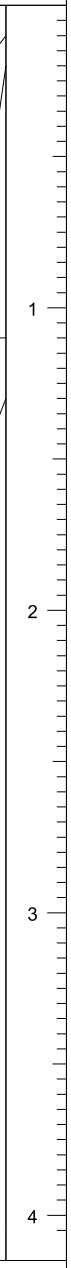
Ground Level (mAOD) 35.00

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384900 E 392631 N

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	34.90		Tarmacadam/asphalt. MADE GROUND
				0.20	34.80		Medium dense, yellowish-brown, slightly sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular limestone, quartzite and concrete. MADE GROUND
	0.40 - 0.50	ES					
	0.60 - 0.70	B					Northern end of the pit: Medium dense, orangish-brown, slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded quartzite and limestone. MADE GROUND
							Southern end of pit: Medium dense, dark brown, slightly clayey, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular sandstone, brick, quartzite, limestone and tarmacadam/asphalt between 0.20m and 1.10m.
				1.10	33.90		
	1.20 - 1.30	D					Medium dense, light brown, slightly gravelly, clayey SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded sandstone. WEATHERED WILMSLOW SANDSTONE FORMATION
				1.30	33.70		End of Pit at 1.300m



Date Excavated: 05/03/2024
Date Backfilled: 05/03/2024
Shoring: None.
Stability: Stable during excavation.
Plant Used: Hand tools.
Logged by: AW

Groundwater Observations:
No groundwater encountered.

Trial Pit Dimensions (m):
0.50 × 0.60

Reason for termination of Trial Pit:
Target depth reached.

General Remarks:

Relative density is approximate and determined by observation only.

Version: FINAL

Scale: 1:25

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Trial Pit Log

Trial Pit No
TP102
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
34.89

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384897 E
392629 N

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	34.79		Tarmacadam/asphalt. MADE GROUND
				0.20	34.69		Medium dense, light yellowish-brown, slightly sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular limestone, quartzite and concrete. MADE GROUND
	0.30 - 0.40	ES					Northern side of pit: Medium dense, light orangish-brown, slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded tarmacadam/asphalt and limestone. MADE GROUND
							Southern side of pit: Medium dense, dark brown, slightly gravelly, clayey SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded brick, limestone, tarmacadam/asphalt between 0.20m and 1.00m.
	1.00 - 1.10	D		1.00	33.89		
				1.20	33.69		Soft, light brownish-grey, slightly sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded limestone and tarmacadam/ asphalt. MADE GROUND
							End of Pit at 1.200m

1
2
3
4

Date Excavated: 04/03/2024
Date Backfilled: 04/03/2024
Shoring: None.
Stability: Stable during excavation.
Plant Used: Hand tools.
Logged by: AW

Groundwater Observations:
Recovered damp between 0.70m and 0.80m.

Trial Pit Dimensions (m):
0.60 × 0.60

Reason for termination of Trial Pit:
Target depth reached.

General Remarks:

Relative density is approximate and determined by observation only.

Version: FINAL

Scale: 1:25

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Trial Pit Log

Trial Pit No TP103
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates E N

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.05			Pale grey coarse angular GRAVEL of limestone. MADE GROUND
				0.10			Concrete slab. MADE GROUND
	0.30 - 0.40	ES					Medium dense orange brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded brick fragments, tarmac, quartzite and large quartz crystals. MADE GROUND
				0.60			Medium dense orange brown slightly gravelly fine to coarse SAND. Gravel is coarse rounded quartzite. WEATHERED WILMSLOW SANDSTONE FORMATION
	0.80	B					
				1.20			End of Pit at 1.200m

1
2
3
4

Date Excavated: 17/03/2024
Date Backfilled:
Shoring: None.
Stability: Stable during excavation.
Plant Used: Hand tools.
Logged by: RJH

Groundwater Observations:
No groundwater encountered.

Trial Pit Dimensions (m):
0.50
0.60

Reason for termination of Trial Pit:
Target depth reached.

General Remarks: Enclosed courtyard, enable to survey X,Y,Z coordinates.

Relative density is approximate and determined by observation only.

Version: FINAL

Scale: 1:25

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Trial Pit Log

Trial Pit No TP104
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates E N

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10			Loose, light grey and brown GRAVEL. Gravel is fine to medium, subangular to subrounded limestone and quartzite. MADE GROUND
	0.30 - 0.40	ES		0.20			Paving slab. MADE GROUND
	0.50 - 0.60	B					Loose to medium dense, dark brown, slightly gravelly, clayey SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular brick, concrete, limestone and quartzite. Rare concrete cobbles. MADE GROUND
	0.70 - 0.80	D		0.60			Medium dense, light brown, slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded quartzite, concrete and sandstone. MADE GROUND
				1.20			End of Pit at 1.200m

1
2
3
4

Date Excavated: 08/03/2024
Date Backfilled: 08/03/2024
Shoring: None.
Stability: Stable during excavation.
Plant Used: Hand tools.
Logged by: AW

Groundwater Observations:
No groundwater encountered.

Trial Pit Dimensions (m):
0.40 × 0.50

Reason for termination of Trial Pit:
Target depth reached.

General Remarks: Enclosed courtyard, enable to survey X,Y,Z coordinates.

Relative density is approximate and determined by observation only.

Version: FINAL

Scale: 1:25

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Trial Pit Log

Trial Pit No TP105
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates E N

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15			2x slabs of concrete. MADE GROUND
				0.30			broken concrete gravel and COBBLES. MADE GROUND
	0.50	ES					Medium dense brown slightly clayey gravelly fine to coarse SAND with low cobble content. Cobbles are whole bricks and fragments. MADE GROUND
	0.80	B					
				1.20			End of Pit at 1.200m

1
2
3
4

Date Excavated: 17/03/2024
Date Backfilled:
Shoring: None.
Stability: Stable during excavation.
Plant Used: Hand tools.
Logged by: RJH

Groundwater Observations:
No groundwater encountered.

Trial Pit Dimensions (m):
0.50 × 0.60

Reason for termination of Trial Pit:
Target depth reached.

General Remarks: Enclosed courtyard, enable to survey X,Y,Z coordinates.

Relative density is approximate and determined by observation only.

Version: FINAL

Scale: 1:25

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Trial Pit Log

Trial Pit No TP106
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD) 35.19

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates 384915 E, 392532 N

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	35.09		Paving slab. MADE GROUND
				0.30	34.89		Medium dense, grey and light yellow, sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular brick, tarmacadam/asphalt, limestone and ceramic. MADE GROUND
	0.40	ES					
	0.50 - 0.60	B		0.50	34.69		Medium dense, reddish-brown and dark grey, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular, brick, limestone, ceramic and plastic. MADE GROUND
							Dense, reddish-brown SAND. Sand is fine to coarse. WEATHERED WILMSLOW SANDSTONE FORMATION
				1.20	33.99		End of Pit at 1.200m

1
2
3
4

Date Excavated: 27/02/2024
Date Backfilled: 27/02/2024
Shoring: None.
Stability: Stable during excavation.
Plant Used: Hand tools.
Logged by: AW

Groundwater Observations:
No groundwater encountered.

Trial Pit Dimensions (m):
0.50 × 0.60

Reason for termination of Trial Pit:
Target depth reached.

General Remarks:

Relative density is approximate and determined by observation only.

Version: FINAL

Scale: 1:25

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Trial Pit Log

Trial Pit No
TP107
Sheet 1 of 1

Site Name: CASICD - Christie Hospital, Wilmslow, Manchester

Ground Level (mAOD)
35.14

Client: IHP Projects (VINCI)

GRM Project Ref: P10525

Coordinates
384909 E
392548 N

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	35.04		Brick paving. MADE GROUND
				0.30	34.84		Medium dense, light yellowish-brown, slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded quartzite and limestone.
	0.40	ES		0.35	34.79		MADE GROUND
							Brick. MADE GROUND
	0.70	B					Medium dense, dark brown, clayey, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular brick, limestone, quartzite and concrete. MADE GROUND
				1.20	33.94		End of Pit at 1.200m

1
2
3
4

Date Excavated: 27/02/2024
Date Backfilled: 28/02/2024
Shoring: None.
Stability: Stable during excavation.
Plant Used: Hand tools.
Logged by: AW

Groundwater Observations:
No groundwater encountered.

Trial Pit Dimensions (m):
0.40
0.50

Reason for termination of Trial Pit:
Target depth reached.

General Remarks:

Relative density is approximate and determined by observation only.

Version: FINAL

Scale: 1:25

APPENDIX F

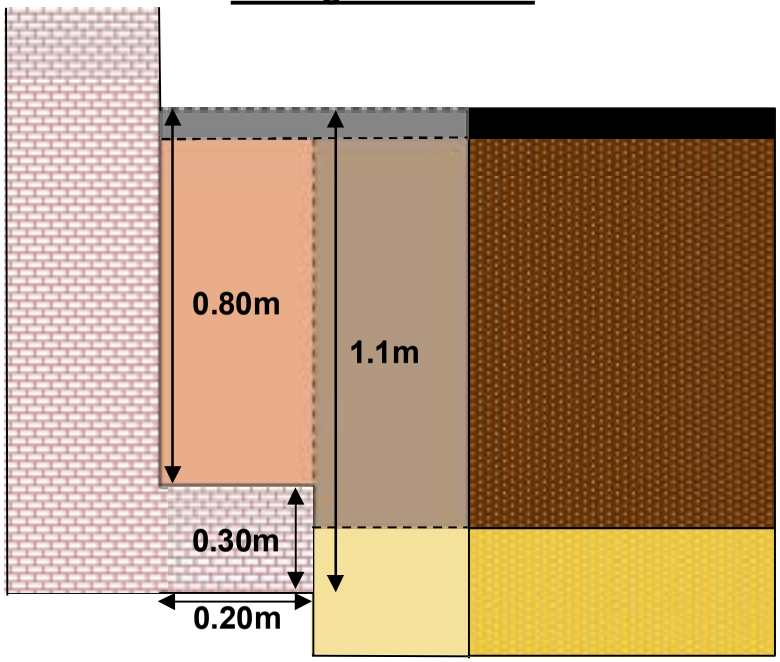
Facing Westwards

Tarmac/Asphalt. GL-0.10m

0.10-0.20m Medium dense yellowish Brown sligthly sandy GRAVEL.
MADE GROUND

0.20-1.10m Medium dense, dark brown, slightly clayey, gravelly SAND.
MADE GROUND.

1.10-1.30m Medium dense, light brown, slightly gravelly, clayey SAND.
WEATHERED WILMSLOW SANDSTONE FORMATION



Foundations observed:
Foundation slab encountered at 0.80m depth begl with a thickness of 0.30m extending 0.20m outwards from beneath the building.





DO NOT SCALE

NOTES:

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CLIENT:
Integrated Health Projects - VINCI

PROJECT:
Christie Hospital CASICD (Manchester)

TITLE:
Foundation Inspection Pit TP101

SCALE@SIZE :	ISSUE:
NTS	FINAL
DESIGN/DRAWN by :	DATE:
AW	15/3/24
PROJECT No:	DRAWING No:
P10525	001

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Facing Westwards

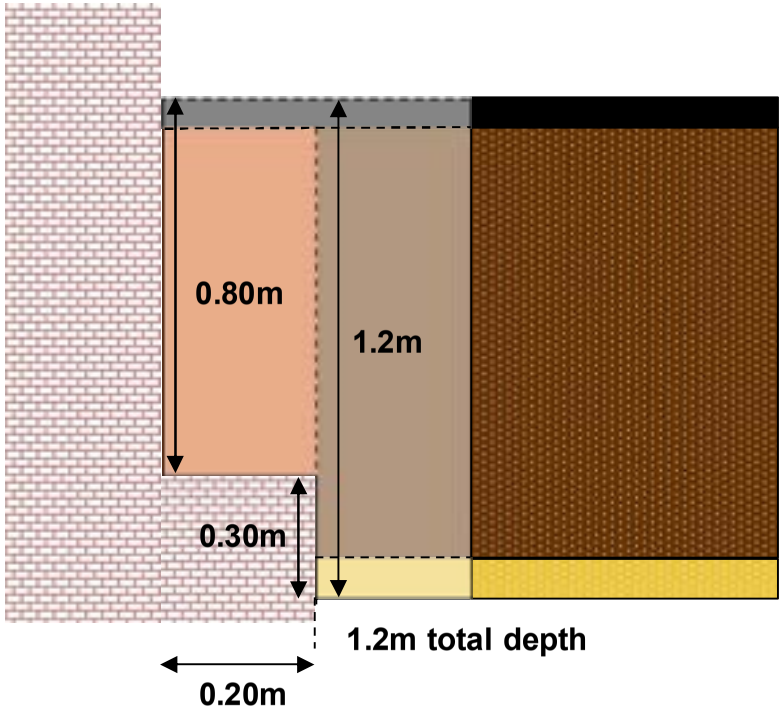
GL-0.10m Tarmac/Asphalt.

0.10-0.20m Medium dense yellowish brown slightly sandy GRAVEL.
MADE GROUND

Medium dense, orangish-brown, slightly gravelly SAND.
MADE GROUND.

0.20-1.0m Medium dense, dark brown, slightly clayey, gravelly SAND.
MADE GROUND.

1.0-1.20m Soft, light brownish-grey, slightly sandy, gravelly CLAY.
MADE GROUND



Foundations observed:
Foundation slab encountered at 0.80m depth begl base of the is slab not seen, slab extending 0.20m outwards from beneath the building.





DO NOT SCALE

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CLIENT:
Integrated Health Projects - VINCI

PROJECT:
Christie Hospital CASICD (Manchester)

TITLE:
Foundation Inspection Pit TP102

SCALE@SIZE :	ISSUE:
NTS	FINAL
DESIGN/DRAWN by :	DATE:
AW	15/3/24
PROJECT No:	DRAWING No:
P10525	002

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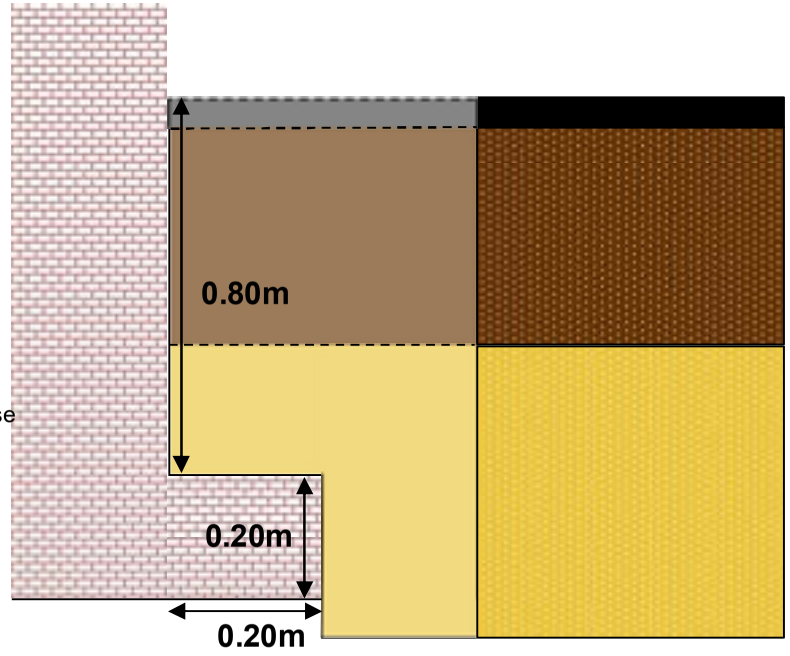
Facing Westwards

GL-0.10m Limestone gravel and concrete slab. MADEGROUND

0.05-0.10m Concrete Slab MADE GROUND.

0.10-0.60m Medium dense orange brown gravelly SAND. MADEGROUND

0.60-1.20m Medium dense orange brown slightly gravelly fine to coarse SAND. WEATHERED WILMSLOW SANDSTONE FORMATION



Ground Level

1.2m total depth begl

Foundations observed:
Foundation slab encountered at 0.80m depth begl the slab is 0.20m thick extending 0.20m outwards from beneath the building.





DO NOT SCALE

NOTES:

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PROJECT:
Christie Hospital CASICD (Manchester)

TITLE:
Foundation Inspection Pit TP103

SCALE@SIZE :	ISSUE:
NTS	FINAL
DESIGN/DRAWN by :	DATE:
AW	15/3/24
PROJECT No:	DRAWING No:
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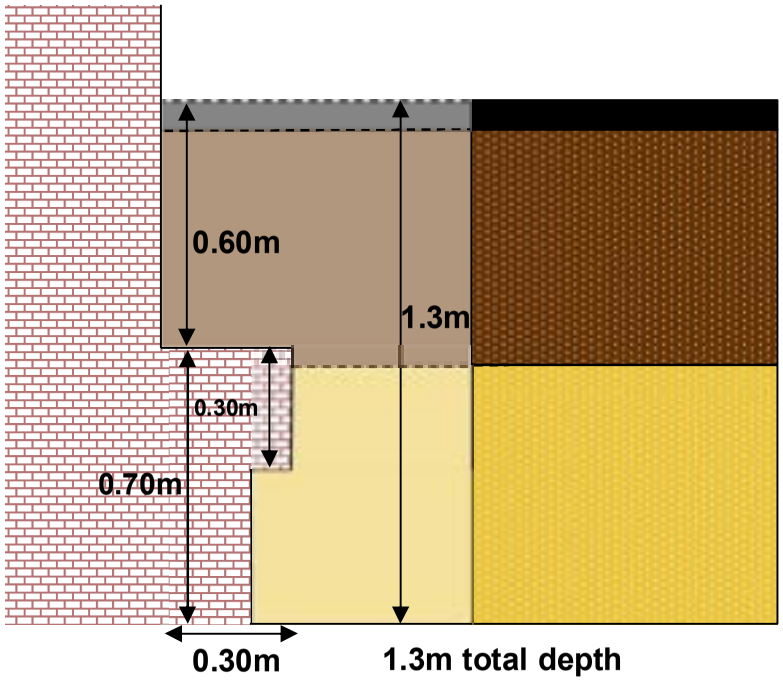
Facing Westwards

GL – 0.10m Loose light grey GRAVEL of limestone. MADE GROUND

0.10-0.20m Paving slabs. MADE GROUND

0.20-0.60m Loose to medium dense, dark brown, slightly gravelly, clayey SAND. MADE GROUND

0.60-1.20m Medium dense, light brown, slightly gravelly SAND. MADE GROUND



Foundations observed:
Foundation slab encountered at 0.60m depth begl with a thickness of 0.30m and extends 0.30m outwards from beneath the building above. Cement foundations continue sloping away towards the building base not seen.





DO NOT SCALE

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PROJECT:
Christie Hospital CASICD (Manchester)

TITLE:
Foundation Inspection Pit TP104

SCALE@SIZE :	ISSUE:
NTS	FINAL
DESIGN/DRAWN by :	DATE:
AW	15/3/24
PROJECT No:	DRAWING No:
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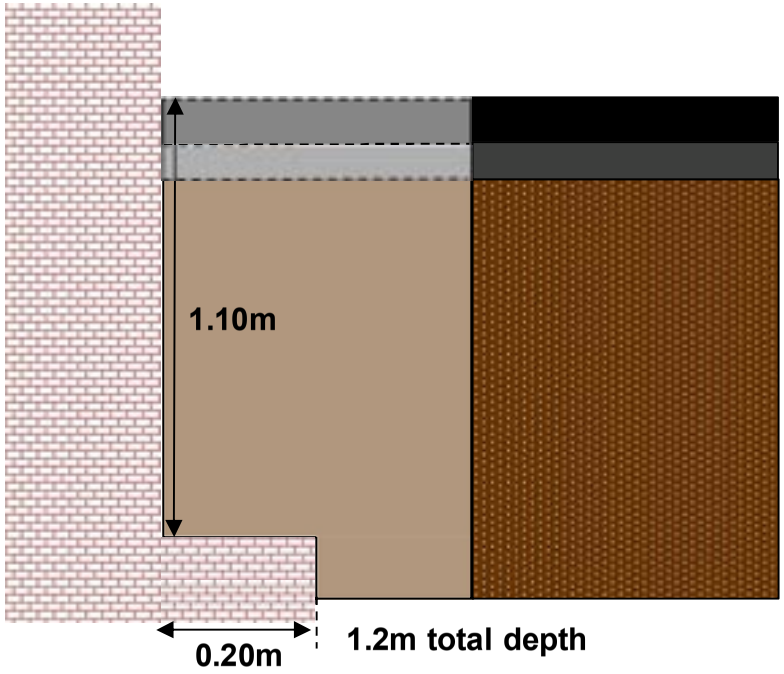
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Facing Westwards

GL-0.15m 2x concrete slabs.
MADE GROUND

0.15-0.30 Broken concrete gravel and COBBLES.
MADE GROUND

0.30-1.20m Medium dense brown slightly clayey gravelly fine to coarse SAND with low cobble content. Cobbles are whole bricks and fragments.
MADE GROUND



Ground Level

1.2m total depth

Foundations observed:
Foundation slab encountered at 1.10m depth begl base of the is slab not seen, slab extending 0.20m outwards from beneath the building.





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PROJECT:
Christie Hospital CASICD (Manchester)

TITLE:
Foundation Inspection Pit TP105

SCALE@SIZE :	ISSUE:
NTS	FINAL
DESIGN/DRAWN by :	DATE:
AW	15/3/24
PROJECT No:	DRAWING No:
P10525	005

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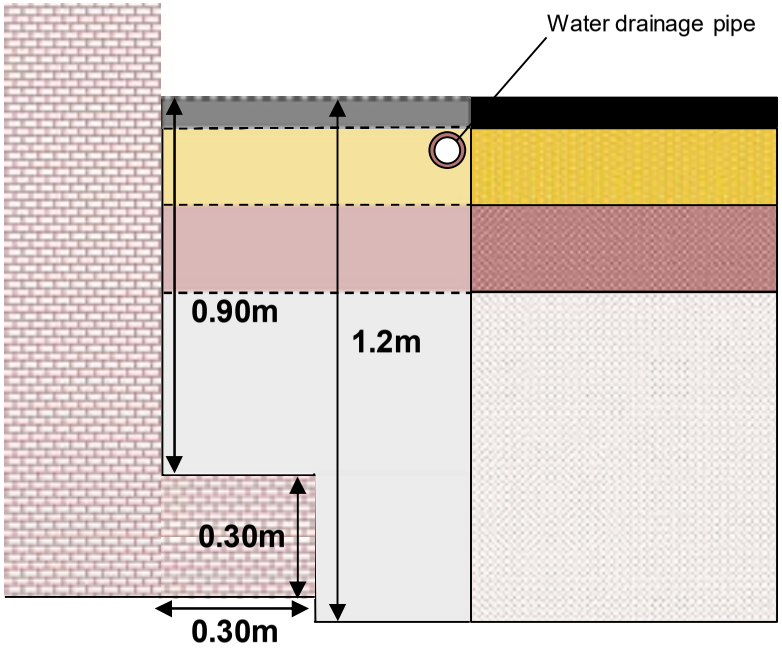
Facing Westwards

GL-0.10m Paving slab.
MADE GROUND

0.10-0.30 Medium dense, grey and light yellow, sandy GRAVEL.
MADE GROUND.

0.30-0.50m Medium dense, reddish-brown and dark grey, gravelly SAND.
MADE GROUND.

0.50-1.20 Dense, reddish-brown SAND. Sand is fine to coarse.
WEATHERED WILMSLOW SANDSTONE FORMATION



Foundations observed:
Foundation slab encountered at 0.90m depth begl with a thickness of 0.30m extending 0.30cm outwards from beneath the building.





DO NOT SCALE

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CLIENT:
Integrated Health Projects - VINCI

PROJECT:
Christie Hospital CASICD (Manchester)

TITLE:
Foundation Inspection Pit TP106

SCALE@SIZE :	ISSUE:
NTS	FINAL
DESIGN/DRAWN by :	DATE:
AW	15/3/24
PROJECT No:	DRAWING No:
P10525	006

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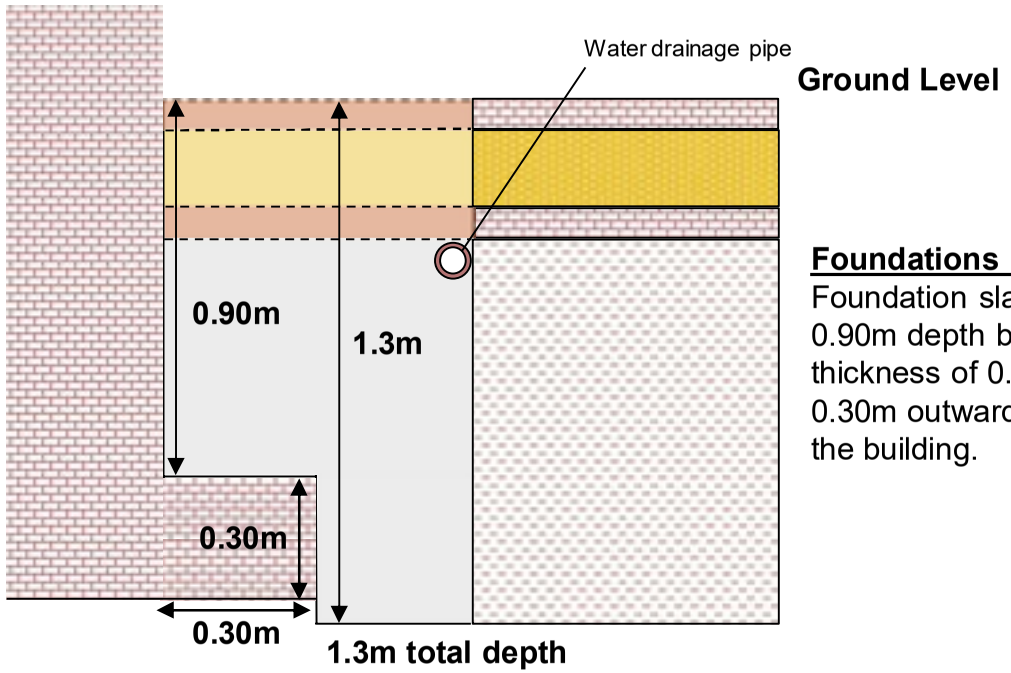
Facing Westwards

GL-0.10m Brick paving.
MADE GROUND

0.10-0.30m Medium dense, light yellowish-brown, slightly gravelly SAND.
MADE GROUND.

0.30-0.35m Crushed brick fragments.
MADE GROUND

0.35-1.20m Medium dense, dark brown, clayey, gravelly SAND.
MADE GROUND.



Foundations observed:
Foundation slab encountered at 0.90m depth begl with a thickness of 0.30m extending 0.30m outwards from beneath the building.





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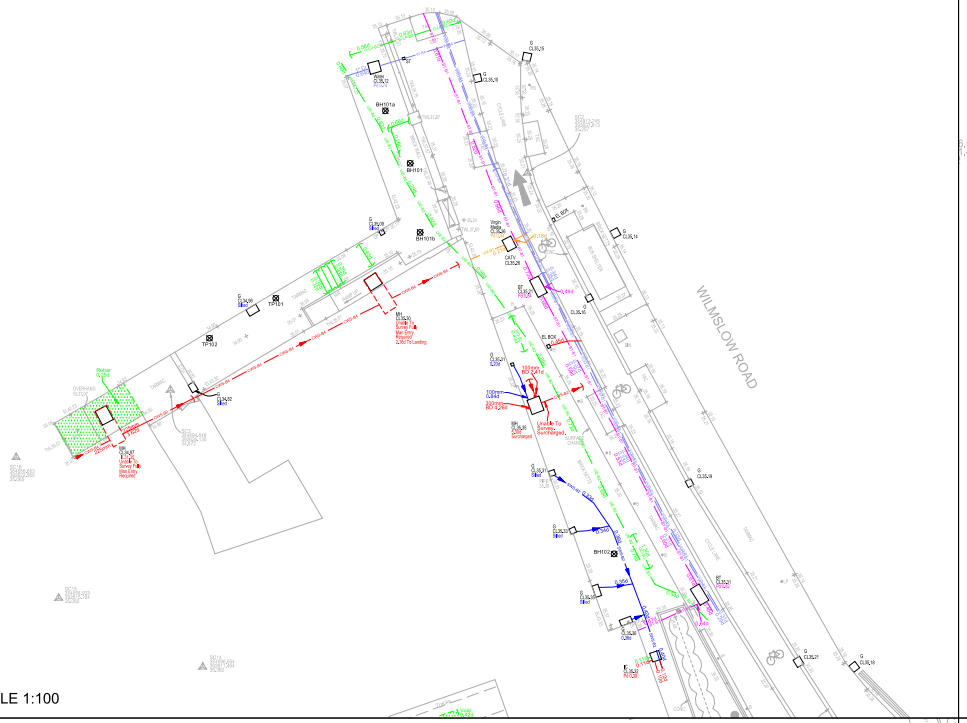
PROJECT:
Christie Hospital CASICD (Manchester)

TITLE:
Foundation Inspection Pit TP107

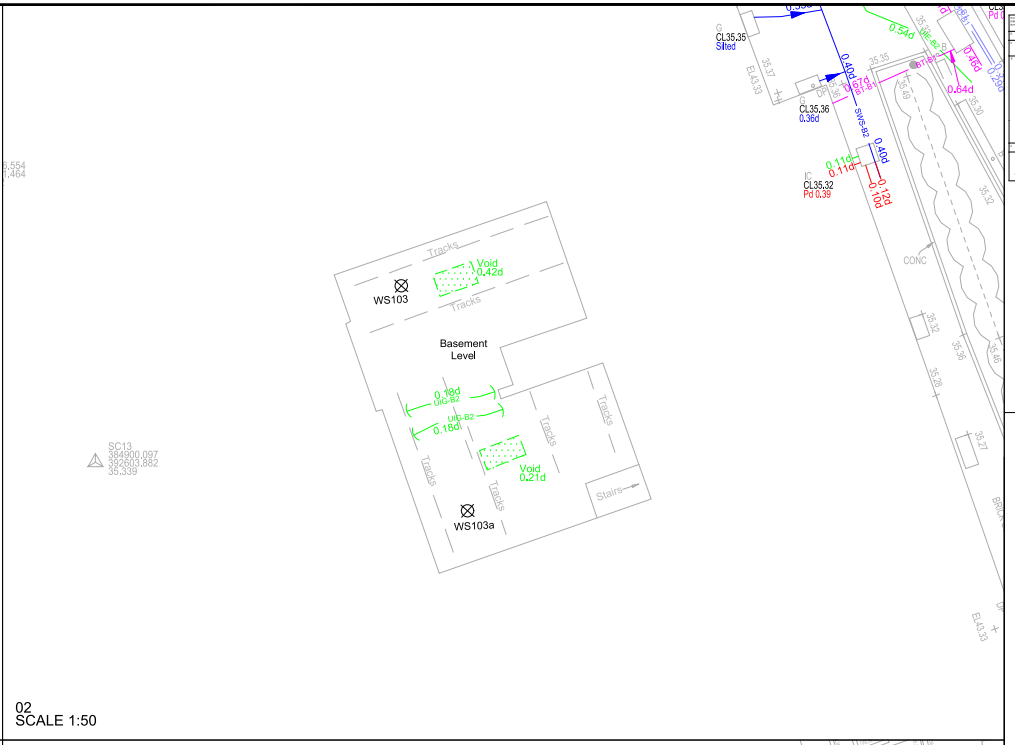
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DESIGN/DRAWN by :	DATE:
AW	15/3/24
PROJECT No:	DRAWING No:
P10525	007

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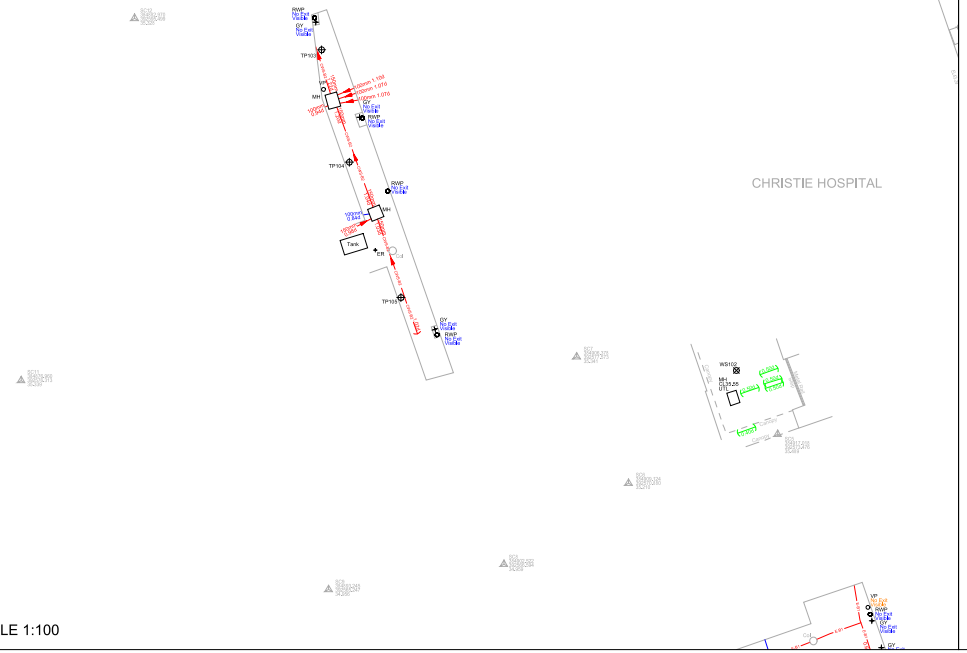
APPENDIX G



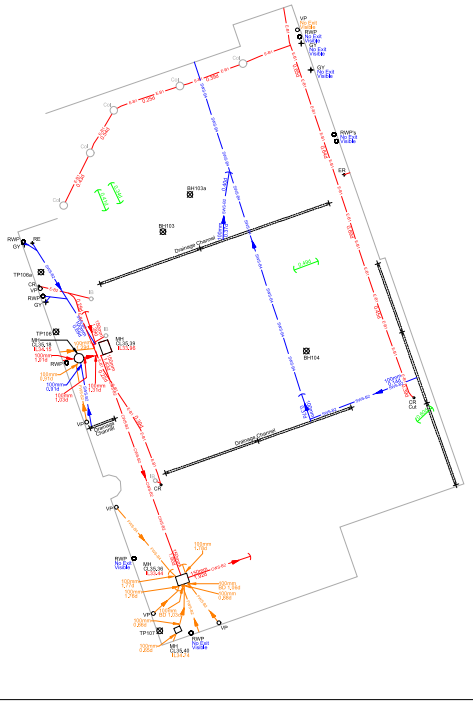
01
SCALE 1:100



02
SCALE 1:50



03
SCALE 1:100



04
SCALE 1:100

PAS 128:2022 Quality & Confidence Levels

QUALITY LEVEL	DESCRIPTION		CONFIDENCE LEVEL	DESCRIPTION	
A	Highest	Data obtained from trial excavation and/or detailed survey	1	Highest	Multiple sources of data
B	Medium	Data obtained from detailed survey	2	Medium	Single source of data
C	Low	Data obtained from record	3	Low	Unverified data
D	Lowest	Data obtained from verbal account	4	Lowest	Unverified data

GENERAL NOTES

1. THIS DRAWING PLAN [WITHIN THE LIMITS] IS BASED ON TOPOGRAPHIC SURVEY DATA WHICH MAY HAVE BEEN CREATED BY OTHERS AND SUPPLIED TO US FOR THE PURPOSES OF PRESENTING OUR SURVEY OUTPUT, WE CANNOT BE HELD RESPONSIBLE FOR THE CONTENT, COMPLETENESS AND ACCURACY OF DATA SUPPLIED BY OTHERS.

2. THIS DRAWING IS TO BE VIEWED IN CONJUNCTION WITH THE SURVEY REPORT AND METHODOLOGY.

ALSO ANY OTHER RELEVANT DRAWINGS/DOCUMENTS AND WITH RELEVANT STATUTORY RECORDS

3. DO NOT SCALE FROM THIS DRAWING.

4. NO ALLOWANCE HAS BEEN MADE FOR SUB SURFACE ENTRY INTO MANHOLES OR CHAMBERS. ALL MANHOLE COVERS AND CHAMBERS ARE TAKEN FROM GROUND LEVEL AND ARE TO BE TAKEN AS APPROXIMATE ONLY. ALL DRAIN ROUTES ARE PLOTTED USING SURFACE LABELS UNLESS OTHERWISE STATED.

5. IT IS THE CONTRACTOR'S TO CHECK AND VERIFY ALL DIMENSIONS AND LEVELS BEFORE COMMENCING ANY WORKS.

6. SOME SERVICES SHOWN ON THIS DRAWING MAY BE ASSUMED ROUTES (CLAIM AND ALL NORMALLY TIP OF UNKNOWN CONDITION, CONTRACTORS SHOULD THEREFORE ALLOW FOR HAND EXCAVATION WORKS AND TAKE PARTICULAR CARE DURING EXCAVATION WORKS.

7. EXACT THREE DIMENSIONAL CONNECTIVITY BETWEEN THE DETAIL AND DETAIL ON THE DRAWING CANNOT BE GUARANTEED AND SHOULD BE CONFIRMED PRIOR TO CONSTRUCTION WORKS.

8. IT IS IMPORTANT TO NOTE THAT THE SAME ACCURACY APPLIED BY THE PLOTTING SCALE ARE EQUALLY APPLICABLE TO DIGITAL DATA SUPPLIED FOR CAD.

9. EVERY EFFORT IS MADE TO IDENTIFY ALL VISIBLE ABOVE GROUND FEATURES, HOWEVER, IT IS NOT ALWAYS POSSIBLE TO DO SO. THE ACCURACY OF THE LOCATION OF SURFACE FEATURES IS THE EXTENT OF THE EQUIPMENT AS SHOWN ON THIS SURVEY MAY NOT REPRESENT THE EXTENT OF LEGALLY ENFORCEABLE RIGHTS.

10. THIS SURVEY HAS BEEN BASED BUT TARGET MEASURED IN BOREHOLES UNDERGROUND SERVICES MAY BE PRESENT.

11. EVERY EFFORT HAS BEEN MADE TO AVOID TEXT OVERWRITING WHEN PLOTTING THIS UTILITY SURVEY, NO LEVEL INFORMATION SHOULD BE TAKEN FROM THIS DRAWING AS SOME TEXT MAY HAVE BEEN MOVED OR OMITTED.

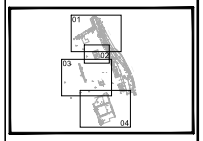
UTILITY & DRAINAGE LEGEND

ADDITIONAL SERVICE INFORMATION

UTILITIES ABBREVIATIONS

SERVICE LOCATION

TO BE USED IN CONJUNCTION WITH UKUG_UTILITIES .CBT FILE



CLIENT
GRM DEVELOPMENT SOLUTIONS

PROJECT TITLE
CHRISTIE HOSPITAL, WILMSLOW
MANCHESTER, M20 4BX

DRAWING DETAIL
UTILITY CLEARANCE SURVEY

DRAWING STATUS
INFORMATION

UK LAND & UNDERGROUND SURVEYS LTD
Unit 1 Bridge Mill, Bridge Street, Congleton, Cheshire, CW12 1AY
Tel: 01260 298 298 Email: info@ukgroundsurveys.co.uk

DRAWN	JP	DATE	28/04/2024
PROJECT ENGINEER	JP	SCALE	SEE INSET
CHECKED	MAJ		(WHEN PLOTTED @ A0)
APPROVED	MAJ		

DESCRIPTION	REV	DATE	DRWN	CHKD	APPR

DRAWING NUMBER: UKUG_2428_01_UTILITY
SHEET NUMBER: 1 OF 1

AVAILABILITY OF RECORD DRAWINGS
(RIGHT HAND SIDE OF SURVEY)
(N/A = NOT AFFECTED)

TYPE	AVAILABLE	TYPE	AVAILABLE	TYPE	AVAILABLE	TYPE	AVAILABLE
BT/JCN	NO	CATV	NO	SW	NO	ATC	NO
ELEC	NO	GAS	NO	TEL	NO	ELEC	NO
WATER	NO	FOUL	NO	TRAFFIC	NO	WATER	NO

ALWAYS USE SAFE DIGGING PRACTICES. ALWAYS CONSULT A TRAINED AND COMPETENT PERSON TO CHECK YOUR EXCAVATION AREA BEFORE BREAKING GROUND

APPENDIX H


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PROJECT NAME
CASCID - Chrome Hop
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH101
DEPTH FROM
2.60
M
DEPTH TO
4.80
M
2.60
3.30
4.80


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Centrum 100, Burton on Trent
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info@grm-uk.com
www.grm-uk.com
PROJECT NAME
CASCID - christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH101
DEPTH FROM
4·80
M
DEPTH TO
7·80
M


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www.grm-uk.com
PROJECT NAME
CASCID - Chrstie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH101
DEPTH FROM
7.80
M
DEPTH TO
10.80
M
0.0m
0.1m
0.2m
0.3m
0.4m
0.5m
0.6m
0.7m
0.8m
0.9m
1.0m
9.30


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CASCID - Christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH101
DEPTH FROM
10·80
M
DEPTH TO
13·80
M
12.30
13·80


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CASCID - christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH101
DEPTH FROM
13.80
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DEPTH TO
16.80
M
15.30
16.80


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CASCID - christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH101
DEPTH FROM
16.80
M
DEPTH TO
18.30
M
0.0m
0.1m
0.2m
0.3m
0.4m
0.5m
0.6m
0.7m
0.8m
0.9m
1.0m
18.30


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BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH102
DEPTH FROM
2.70
M
DEPTH TO
4.80
M
1.70
3.30
4.80


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CASCIO - Christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH102
DEPTH FROM
4.80
M
DEPTH TO
7.80
M
4.80
4.80
6.30
7.80


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BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH102
DEPTH FROM
7.80
M
DEPTH TO
10.80
M
9.30
10.80


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CASCID - Chrysler Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH102
DEPTH FROM
10.80
M
DEPTH TO
13.80
M
9.30
12.30
13.80


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BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH102
DEPTH FROM
13.80
M
DEPTH TO
16.80
M
15.30
16.90


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BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH102
DEPTH FROM
16.80
M
DEPTH TO
18.30
M
0.0m
0.1m
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1.0m
15.30

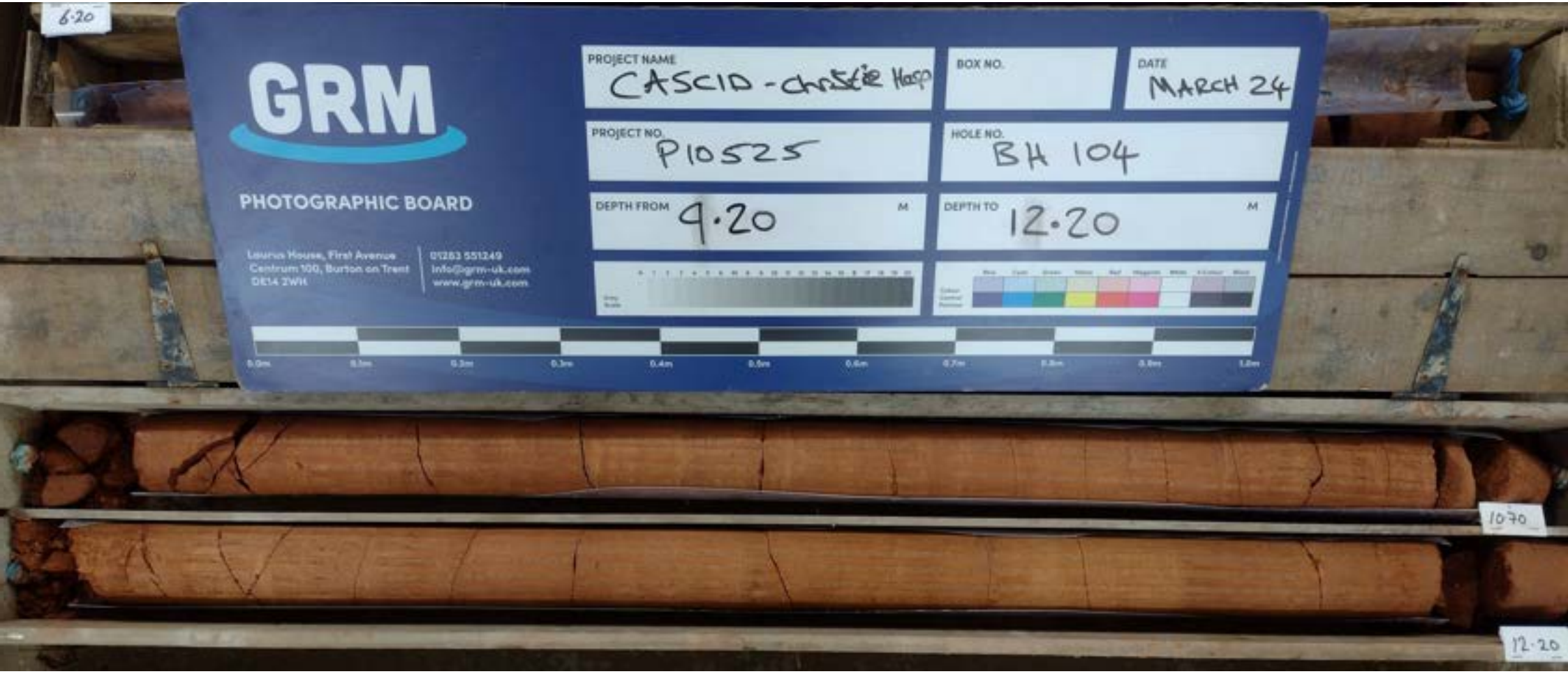

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Laurus House, First Avenue
Centrum 100, Burton on Trent
DE14 2WH
01283 551249
info@grm-uk.com
www.grm-uk.com
PROJECT NAME
CASCID - chester
PROJECT NO.
P10525
ENGINEER
Matt M
CLIENT
IHP VINCI
LOCATION ID
BH103
DATE
06.03.24
DEPTH FROM
3.00
M TO
5.50
M
3.00
AZCL
4.00
AZCL
5.50


GRM
Laurus House, First Avenue
Centrum 100, Burton on Trent
DE14 2WH
01283 551249
info@grm-uk.com
www.grm-uk.com
PROJECT NAME CASCID - chaistle
PROJECT NO. P10525
ENGINEER Matt M
CLIENT IHP VINCI
LOCATION I.D. BH103
DATE 06.03.24
DEPTH FROM 5.50 M TO 8.50 M
5.50
AZCL
7.00
AZCL
8.5


GRM
Laurus House, First Avenue
Centrum 100, Burton on Trent
DE14 2WH
01283 551249
info@grm-uk.com
www.grm-uk.com
CASCID - Cheshire
P10525
IHP VINCI
BH103
06.03.24
8.50
11.50
8.50
AZCL
AZCL


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www.grm-uk.com
PROJECT NAME
CASCID - Christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH 104
DEPTH FROM
3.00
M
DEPTH TO
6.20
M
3.00
5.50
6.20


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CASCID - Christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH 104
DEPTH FROM
6.20
M
DEPTH TO
9.20
M
7.70
9.20


6.20
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www.grm-uk.com
PROJECT NAME
CASCID - christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH 104
DEPTH FROM
9.20
M
DEPTH TO
12.20
M
1070
12.20


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PROJECT NAME
CASCID - Chrislie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH 104
DEPTH FROM
12·20
M
DEPTH TO
15·20
M
13·70


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CASCID - christie Hosp
BOX NO.
DATE
MARCH 24
PROJECT NO.
P10525
HOLE NO.
BH 104
DEPTH FROM
15.20
M
DEPTH TO
18.20
M
16.70
18.20

APPENDIX I

In-Situ Gas Monitoring Results

Project Name:	CASICD Christie Hospital
Project Number:	P10525
Client:	IHP
Date:	05.04.2024
Weather:	Dry
Atmospheric Pressure (mb):	*Number
Pressure Trend:	
Equipment:	
Operator:	Liam Press

Ground Gases														Groundwater	
Well ID	Response Zone (mbegl)			Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Gas Flow (l/h)		PID Reading (ppm)		Depth to Groundwater (mbegl)	Total Well Depth (mbegl)
	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady		
BH101	3.0	8.0	NAT											4.10	7.80
BH104	3.0	8.0	NAT											4.25	8.01

Comments: Both locations bailed; with BH101 having very slow recharge, BH104 recharging at 1cm every 4 seconds.

Notes

L.E.L.	Lower Explosive Limit (100% L.E.L.'= 5% Flammable Gas)	Highlighted cell for following conditions:	
N.D.	Not Detected	a.	Methane ≥1% v/v
N.R.	Not Recorded	b.	Carbon Dioxide ≥5% v/v
PID	Photo-Ionising Detector	MG	Made Ground
%	By volume	NS	Natural Strata

In-Situ Gas Monitoring Results

Project Name:	CASICD Christie Hospital
Project Number:	P10525
Client:	IHP
Date:	08.05.2024
Weather:	
Atmospheric Pressure (mb):	*Number
Pressure Trend:	
Equipment:	
Operator:	

Ground Gases														Groundwater	
Well ID	Response Zone (mbegl)			Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Gas Flow (l/h)		PID Reading (ppm)		Depth to Groundwater (mbegl)	Total Well Depth (mbegl)
	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady		
BH101	3.0	8.0	NAT											4.13	7.63
BH104	3.0	8.0	NAT											4.39	8.04

Comments:

Notes

L.E.L.	Lower Explosive Limit (100% L.E.L.'= 5% Flammable Gas)	Highlighted cell for following conditions:	
N.D.	Not Detected	a.	Methane ≥1% v/v
N.R.	Not Recorded	b.	Carbon Dioxide ≥5% v/v
PID	Photo-Ionising Detector	MG	Made Ground
%	By volume	NS	Natural Strata

APPENDIX J

7 - 11 Harding Street
Leicester
LE1 4DH

GRM Development Solutions
Laurus House
First Avenue
Centrum 100
Burton Upon Trent
DE14 2WH

Analytical Test Report: L24/01949/GRM - 24-42528-A

Your Project Reference:	**CASCID-Christie Hospital, Manchester P10525**		
Your Order Number:	P10525	Samples Received / Instructed:	07/03/2024 / 07/03/2024
Report Issue Number:	1	Sample Tested:	07/03 to 26/03/2024
Samples Analysed:	4 soil samples	Report issued:	26/03/2024

Signed

James Gane
Analytical Services Manager
CTS Group

Notes:

General
26/03/2024 report amended to show extra testing
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 futher analaysis is required samples identified as containing asbestos are screened and tested on an as recevied basis. No correction is made for moisture content and these results are not covered by our accrediation

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

WAC Testing

Samples were leached in accordance with BS EN 12457-2: 2002.

Eluate Results are reported as L/S 10. These results have been calculated in accordance with BS EN 12457-2:2002.

Comparative values are taken from the Council Decision Annex - CRITERIA AND PROCEDURES FOR THE ACCEPTANCE OF WASTE AT LANDFILLS, (2003/33/EC).

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

CTS Group
7 - 11 Harding Street
Leicester
LE1 4DH

L24/01949/GRM - 24-42528-A

Project Reference - CASCID-Christie Hospital, Manchester P10525

Analytical Test Results - Solid

Lab Reference			345250	345251	345252
Client Sample ID			-	-	-
Client Sample Location			BH104	BH103A	BH103
Client Sample Type			ES	ES	ES
Client Sample Number			-	-	-
Depth - Top (m)			0.30	0.10	0.70
Depth - Bottom (m)			0.40	0.20	0.80
Date of Sampling			27/02/2024	27/02/2024	27/02/2024
Time of Sampling			-	-	-
Sample Matrix			Sand	Sand	Sand
Determinant	**Units**	**Accreditation**			
Antimony	(mg/kg)	u	< 3.5	< 3.5	< 3.5
Arsenic	(mg/kg)	MCERTS	28	11	10
Barium	(mg/kg)	MCERTS	560	290	110
Beryllium	(mg/kg)	MCERTS	1.3	1.1	0.6
Boron (w/s)	(mg/kg)	u	< 2.5	< 2.5	< 2.5
Cadmium	(mg/kg)	MCERTS	1.1	0.7	0.5
Chromium (III)	(mg/kg)	u	6.5	11	6.4
Chromium (Total)	(mg/kg)	UKAS	7.5	12	7.4
Copper	(mg/kg)	MCERTS	120	46	29
Iron	(mg/kg)	u	39000	28000	16000
Lead	(mg/kg)	MCERTS	2100	56	110
Manganese	(mg/kg)	MCERTS	650	490	300
Mercury	(mg/kg)	UKAS	< 2.5	< 2.5	< 2.5
Mercury (Total, Low Level)	(mg/kg)	u	1.1	0.1	< 0.1
Molybdenum	(mg/kg)	u	3.1	2.4	< 2.0
Nickel	(mg/kg)	MCERTS	24	33	14
Selenium	(mg/kg)	u	< 8.0	< 8.0	< 8.0
Vanadium	(mg/kg)	UKAS	31	35	19
Zinc	(mg/kg)	MCERTS	250	55	50
Phenol	(mg/kg)	MCERTS	< 0.20	< 0.20	< 0.20
Cresols	(mg/kg)	MCERTS	< 0.20	< 0.20	< 0.20
Xylenols	(mg/kg)	MCERTS	< 0.20	< 0.20	< 0.20
Trimethyl Phenols	(mg/kg)	UKAS	< 0.20	< 0.20	< 0.20
Total Phenols (via HPLC)	(mg/kg)	UKAS	< 0.80	< 0.80	< 0.80
Cyanide (Free)	(mg/kg)	u	< 1.0	< 1.0	< 1.0
Chromium (Hexavalent)	(mg/kg)	u	< 1.0	< 1.0	< 1.0
pH	pH Units	MCERTS	8.5	9.0	8.3
Sulphate (Water soluble as SO_4)	(mg/l)	u	34	61	14
Sulphur (Total)	(%)	UKAS	0.06	0.20	0.02
Acenaphthene	(mg/kg)	MCERTS	< 0.02	< 0.20	0.03
Acenaphthylene	(mg/kg)	UKAS	< 0.02	0.96	0.11
Anthracene	(mg/kg)	UKAS	0.05	1.1	0.33
Benzo (a) anthracene	(mg/kg)	MCERTS	0.04	2.7	0.95
Benzo (a) pyrene	(mg/kg)	MCERTS	0.05	4.4	0.88
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.07	5.2	1.1
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.06	4.9	0.49
Benzo (k) fluoranthene	(mg/kg)	MCERTS	0.03	1.9	0.43
Chrysene	(mg/kg)	MCERTS	0.05	2.9	1.0
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	< 0.02	0.63	0.10
Fluoranthene	(mg/kg)	MCERTS	0.07	4.7	2.2
Fluorene	(mg/kg)	MCERTS	< 0.02	< 0.20	0.04
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	0.06	4.5	0.52
Naphthalene	(mg/kg)	MCERTS	< 0.02	< 0.20	0.02

CTS Group
7 - 11 Harding Street
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L24/01949/GRM - 24-42528-A

Project Reference - CASCID-Christie Hospital, Manchester P10525

Analytical Test Results - Solid

Lab Reference			345250	345251	345252
Client Sample ID			-	-	-
Client Sample Location			BH104	BH103A	BH103
Client Sample Type			ES	ES	ES
Client Sample Number			-	-	-
Depth - Top (m)			0.30	0.10	0.70
Depth - Bottom (m)			0.40	0.20	0.80
Date of Sampling			27/02/2024	27/02/2024	27/02/2024
Time of Sampling			-	-	-
Sample Matrix			Sand	Sand	Sand
Determinant	**Units**	**Accreditation**			
Phenanthrene	(mg/kg)	MCERTS	0.05	1.2	1.2
Pyrene	(mg/kg)	MCERTS	0.07	4.7	2.2
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	0.71	40	12
FOC	-	UKAS	0.051	0.070	0.022
Asbestos	-	UKAS	No asbestos detected	No asbestos detected	No asbestos detected

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L24/01949/GRM - 24-42528-A

Project Reference - CASCID-Christie Hospital, Manchester P10525

Analytical Test Results - Chemical Analysis

Lab Reference			345251	345252
Client Sample ID			-	-
Client Sample Location			BH103A	BH103
Client Sample Type			ES	ES
Client Sample Number			-	-
Depth - Top (m)			0.10	0.70
Depth - Bottom (m)			0.20	0.80
Date of Sampling			27/02/2024	27/02/2024
Time of Sampling			-	-
Sample Matrix			Sand	Sand
Determinant	**Units**	**Accreditation**		
Water soluble sulphate (as SO_4)	(mg/l)	u	61	14
Acid Soluble Sulphate	(%)	u	0.06	< 0.01
Total Sulphur	(%)	UKAS	0.20	0.02
pH Value	pH Units	MCERTS	9.0	8.3

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L24/01949/GRM - 24-42528-A

Project Reference - CASCID-Christie Hospital, Manchester P10525

Analytical Test Results - VPH / EPH

Lab Reference			345250	345251	345252
Client Sample ID			-	-	-
Client Sample Location			BH104	BH103A	BH103
Client Sample Type			ES	ES	ES
Client Sample Number			-	-	-
Depth - Top (m)			0.30	0.10	0.70
Depth - Bottom (m)			0.40	0.20	0.80
Date of Sampling			27/02/2024	27/02/2024	27/02/2024
Time of Sampling			-	-	-
Sample Matrix			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
Aliphatic >C_6 to C_8 [HS_MS_1D_AL]	(mg/kg)	MCERTS	< 0.06	< 0.06	< 0.06
Aliphatic >C_8 to C_{10} [HS_MS_1D_AL]	(mg/kg)	MCERTS	< 0.06	< 0.06	< 0.06
Aliphatic >C_{10} to C_{12} [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10
Aliphatic >C_{12} to C_{16} [EH_CU_1D_AL]	(mg/kg)	u	< 10	< 10	< 10
Aliphatic >C_{16} to C_{21} [EH_CU_1D_AL]	(mg/kg)	u	< 10	41	< 10
Aliphatic >C_{21} to C_{35} [EH_CU_1D_AL]	(mg/kg)	u	< 20	610	38
Aliphatic >C_{35} to C_{44} [EH_CU_1D_AL]	(mg/kg)	u	< 15	320	68
Aromatic >C_5 to C_7 [HS_MS_1D_AR]	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Aromatic >C_7 to C_8 [HS_MS_1D_AR]	(mg/kg)	MCERTS	< 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
Aromatic >C_{10} to C_{12} [EH_CU_1D_AR]	(mg/kg)	u	< 10	< 10	< 10
Aromatic >C_{12} to C_{16} [EH_CU_1D_AR]	(mg/kg)	u	< 10	12	< 10
Aromatic >C_{16} to C_{21} [EH_CU_1D_AR]	(mg/kg)	u	< 10	81	< 10
Aromatic >C_{21} to C_{35} [EH_CU_1D_AR]	(mg/kg)	u	31	1200	64
Aromatic >C_{35} to C_{44} [EH_CU_1D_AR]	(mg/kg)	u	< 15	930	100
Total >C_5 to C_{35} [EH_CU+HS_1D_Total]	(mg/kg)	u	< 50	1900	100
Benzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Toluene	(mg/kg)	MCERTS	< 0.01	0.01	< 0.01
Ethylbenzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
m&p Xylene	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
o-Xylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
MTBE	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01

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L24/01949/GRM - 24-42528-A

Project Reference - CASCID-Christie Hospital, M

Analytical Test Results - VOC

Lab Reference			345250	345251	345252
Client Sample ID			-	-	-
Client Sample Location			BH104	BH103A	BH103
Client Sample Type			ES	ES	ES
Client Sample Number			-	-	-
Depth - Top (m)			0.30	0.10	0.70
Depth - Bottom (m)			0.40	0.20	0.80
Date of Sampling			27/02/2024	27/02/2024	27/02/2024
Time of Sampling			-	-	-
Sample Matrix			Sand	Sand	Sand
Determinant	**Units**	**Accreditation**			
Benzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Toluene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Ethylbenzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
m&p Xylene	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
o-Xylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Dichlorodifluoromethane	(mg/kg)	UKAS	< 0.05	< 0.05	< 0.05
Chloromethane	(mg/kg)	UKAS	< 0.02	< 0.02	< 0.02
Vinyl Chloride	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
Bromomethane	(mg/kg)	u	< 0.05	< 0.05	< 0.05
Chloroethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Trichlorofluoromethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,1-Dichloroethylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Dichloromethane	(mg/kg)	u	< 0.10	< 0.10	< 0.10
MTBE	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
trans-1,2,-dichloroethylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,1-Dichloroethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
2,2-Dichloropropane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
cis--1,2,-dichloroethylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Bromochloromethane	(mg/kg)	MCERTS	< 0.05	< 0.05	< 0.05
Chloroform	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,1,1-Trichloroethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,1-Dichloropropene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Carbon Tetrachloride	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
Trichloroethylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,2-Dichloropropane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Dibromomethane	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
Bromodichloromethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
cis-1,2-dichloropropylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,1,2-Trichloroethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,3-Dichloropropane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Chlorodibromomethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,2-Dibromoethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Chlorobenzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Styrene	(mg/kg)	UKAS	< 0.01	< 0.01	< 0.01
Isopropylbenzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Bromoform	(mg/kg)	MCERTS	< 0.05	< 0.05	< 0.05
1,1,2,2-Tetrachloroethane	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,2,3-Trichloropropane	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
n-Propylbenzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
Bromobenzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,3,5-Trimethylbenzene	(mg/kg)	UKAS	< 0.01	< 0.01	< 0.01
2-chlorotoluene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
4-chlorotoluene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
tert-butylbenzene	(mg/kg)	UKAS	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	(mg/kg)	UKAS	< 0.01	< 0.01	< 0.01
sec-Butylbenzene	(mg/kg)	UKAS	< 0.01	< 0.01	< 0.01
4-Isopropyltoluene (P-Cymene)	(mg/kg)	UKAS	< 0.01	< 0.01	< 0.01
1,3-Dichlorobenzene	(mg/kg)	u	< 0.01	< 0.01	< 0.01
1,4-Dichlorobenzene	(mg/kg)	u	< 0.01	< 0.01	< 0.01
n-Butylbenzene	(mg/kg)	UKAS	< 0.01	< 0.01	< 0.01
1,2-Dichlorobenzene	(mg/kg)	MCERTS	< 0.01	< 0.01	< 0.01
1,2-Dibromo-3-chloropropane	(mg/kg)	u	< 0.05	< 0.05	< 0.05
1,2,4-Trichlorobenzene	(mg/kg)	u	< 0.05	< 0.05	< 0.05
Hexachlorobutadiene	(mg/kg)	u	< 0.05	< 0.05	< 0.05
Naphthalene	(mg/kg)	u	< 0.05	< 0.05	< 0.05
1,2,3-Trichlorobenzene	(mg/kg)	u	< 0.05	< 0.05	< 0.05

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L24/01949/GRM - 24-42528-A

Project Reference - CASCID-Christie Hospital, Manchester P10525

Certificate Of Analysis - WAC Suite

Lab Reference	345250
Client Sample ID	-
Client Sample Location	BH104
Client Sample Type	ES
Client Sample Number	-
Depth - Top (m)	0.3
Depth - Bottom (m)	0.4
Date of Sampling	27/02/2024
Time of Sampling	-
Sample Description	Made Ground- dark greyish brown slightly clayey gravelly silty sand with occasional brick fragments slag bituminous material
Sample Matrix	Sand
Moisture Content (%)	16
Stone content (%)	16

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	5.1	3.0	5.0	6.0
Loss on Ignition	%	UKAS	3.0	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.06	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C_{10} to C_{40}) [EH_1D_Total]	mg/kg	MCERTS	91	500	-	-
PAH	mg/kg	u	0.7	100	-	-
pH	units	MCERTS	8.5	-	> 6	-
Eluate Analysis						
Arsenic	mg/kg	u	0.10	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	0.04	0.5	10	70
Copper	mg/kg	u	< 0.01	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	0.05	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	< 0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.05	4	50	200
Chloride	mg/kg	u	200	800	15000	25000
Fluoride	mg/kg	u	2	10	150	500
Sulphate (as SO_4)	mg/kg	u	48	1000	20000	50000
Total Dissolved Solids	mg/kg	u	1100	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	23.0	500	800	1000

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L24/01949/GRM - 24-42528-A

Project Reference - CASCID-Christie Hospital, Manchester P10525

Certificate Of Analysis - WAC Suite

Lab Reference	345252
Client Sample ID	-
Client Sample Location	BH103
Client Sample Type	ES
Client Sample Number	-
Depth - Top (m)	0.7
Depth - Bottom (m)	0.8
Date of Sampling	27/02/2024
Time of Sampling	-
Sample Description	Made Ground- dark brown clayey slightly gravelly silty sand with occasional slag
Sample Matrix	Sand
Moisture Content (%)	12
Stone content (%)	< 0.1

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	2.2	3.0	5.0	6.0
Loss on Ignition	%	UKAS	2.2	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.06	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C_{10} to C_{40}) [EH_1D_Total]	mg/kg	MCERTS	56	500	-	-
PAH	mg/kg	u	12	100	-	-
pH	units	MCERTS	8.3	-	> 6	-
Eluate Analysis						
Arsenic	mg/kg	u	0.07	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.01	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.05	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	< 0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.05	4	50	200
Chloride	mg/kg	u	< 1	800	15000	25000
Fluoride	mg/kg	u	4	10	150	500
Sulphate (as SO_4)	mg/kg	u	< 10	1000	20000	50000
Total Dissolved Solids	mg/kg	u	440	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	32.0	500	800	1000

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S **L24/01949/GRM - 24-42528-A**

\# **Project Reference - CASCID-Christie Hospital, Manchester P10525**

Analytical Test Results - 2:1 Leachate Suite

DE	Lab Reference			345253
	Client Sample ID			-
	Client Sample Location			BH103
	Client Sample Type			ES
	Client Sample Number			-
	Depth - Top (m)			1.40
	Depth - Bottom (m)			1.50
	Date of Sampling			27/02/2024
	Time of Sampling			-
	Sample Matrix			Leachate
	Determinant	**Units**	**Accreditation**	
EN	Boron	(mg/l)	u	0.029
EN	Calcium	(mg/l)	u	48
EN	Iron	(mg/l)	u	< 0.010
EN	Antimony	(µg/l)	u	< 2.5
EN	Arsenic	(µg/l)	u	3
EN	Barium	(µg/l)	u	< 5
EN	Beryllium	(µg/l)	u	< 1
EN	Boron	(µg/l)	u	29
SU	Cadmium (LL)	(µg/l)	u	< 0.25
EN	Chromium	(µg/l)	u	< 3
EN	Chromium (III)	(µg/l)	u	< 20
EN	Copper	(µg/l)	u	< 1
EN	Lead	(µg/l)	u	< 5
EN	Magnesium	(µg/l)	u	68
EN	Manganese	(µg/l)	u	< 5
EN	Mercury	(µg/l)	u	< 0.20
EN	Molydenum	(µg/l)	u	5.7
EN	Nickel	(µg/l)	u	< 3
EN	Selenium	(µg/l)	u	< 1
EN	Vanadium	(µg/l)	u	30.5
EN	Zinc	(µg/l)	u	< 5
EN	pH	pH Units	u	11
EN	Cyanide (Free)	(mg/l)	u	< 0.5
EN	Cyanide (Complex)	(mg/l)	u	< 0.5
EN	Cyanide (Total)	(mg/l)	u	< 0.5
EN	Chromium (Hexavalent)	(mg/l)	u	< 0.02
EN	Chloride	(mg/l)	u	30
EN	Fluoride	(mg/l)	u	0.50
EN	Sulphate (As SO_4)	(mg/l)	u	39
EN	Ammonium (As N)	(mg/l)	u	< 0.02
EN	Phenol	(µg/l)	u	17.0
EN	Cresols	(µg/l)	u	0.81
EN	Xylenols	(µg/l)	u	< 0.20
EN	Trimethyl Phenols	(µg/l)	u	< 0.50
EN	Phenols (Total)	(µg/l)	u	18.0

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Project Reference - CASCID-Christie Hospital, Manchester P10525

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 (%)
345250	-	BH104	ES	-	Made Ground- dark greyish brown slightly clayey gravelly silty sand with occasional brick fragments slag bituminous material	16	16	82
345251	-	BH103A	ES	-	Made Ground- black very gravelly silty sand with frequent slag bituminous material brick fragments	5.3	55	20
345252	-	BH103	ES	-	Made Ground- dark brown clayey slightly gravelly silty sand with occasional slag	12	< 0.1	83

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Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
345250	-	BH104	ES	-	VPH/BTEX - Sample taken from container with headspace.
345251	-	BH103A	ES	-	PAHAR 1:10 Dilution VPH/BTEX - Sample taken from container with headspace. VOC - Sample taken from container with headspace.
345252	-	BH103	ES	-	VPH/BTEX - Sample taken from container with headspace. VOC - Sample taken from container with headspace.

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Project Reference - CASCID-Christie Hospital, Manchester P10525

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preperation	Test Details
ANIONSL	MS - CL - Anions by Aquakem	As received	-	Determination of Anions (inc Sulphate, chloride etc.) in leachate samples by Aquakem
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
PCB7S	MS - CL - PCB Soils	As received	Passing 10mm test sieve	Determination of PCB's (7 congeners) 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
WACTOCS	MS - CL - TOC Eltra (WAC)	Air dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soil as part of a WAC test
TOCS	MS - CL - TOC Eltra	Air Dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soils
TPHS	MS - CL - TPH (GC-FID)	As received	Passing 10mm test sieve	Determination of Total Petroleum Hydrocarbons in soil using GC-FID
WACSKALAR	MS - CL - Phenols by Skalar (WAC)	As received	BSEN:12457 Leaching	Determination of Total Phenols within leachate as part of a WAC test using a Skalar Segmented flow analyser
VOCS	MS - CL - VOC and MBTEX	As received	Passing 10mm test sieve	Determination of VOCs (inc BTEX) in soils via Headspace-GC-MS
VPHS	MS - CL - VPH	As received	Passing 10mm test sieve	Determination of VPH in soils via Headspace-GC-MS
WSBORONS	MS - CL - WS Boron	Air dried	Passing 10mm test sieve	Determination of Water soluble Boron in soils via ICP
SKALARCNL	MS - CL - Cyanide by Skalar - Leachate	As received	BSEN:12457 Leaching	Determination of cyanide (total / free / complex) in leachates using a Skalar segmented flow analyser
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
WACDOC	MS - CL - DOC (WAC)	As received	BSEN:12457 Leaching	Determination of dissolved organic carbon in a leachate as part of a WAC test
SKALARHCL	MS - CL - Hexavalent Cr by Skalar - L	As received	BSEN:12457 Leaching	Determination of hexavalent chromium in leachate using 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
WACMETALS	MS - CL - ICP - Metals in Waters (WAC)	As received	BSEN:12457 Leaching	Determination of metals in a leachate as part of a WAC test via ICP
ICPMETL	MS - CL - ICP Metals in Waters	As received	BSEN:12457 Leaching	Determination of metals in leachates via ICP
ICPMETS	MS - CL - ICP Metals	Air dried	Passing 10mm test sieve	Determination of metals in soils via ICP
PHL	MS - CL - pH in Waters	As received	BSEN:12457 Leaching	Determination of pH in leachates using a pH probe

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Project Reference - CASCID-Christie Hospital, Manchester P10525

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preperation	Test Details
WACPHS	MS - CL - pH in Soils (WAC)	As received	BSEN:12457 Leaching	Determination of pH in soils as part of a WAC test via pH probe
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)
PHOHHPLCL	MS - CL - Phenol Waters by HPLC	As received	BSEN:12457 Leaching	Determination of speciated phenols in leachates using HPLC
PHOHHPLCS	MS - CL - Phenols by HPLC (soil)	As received	Passing 10mm test sieve	Determination of speciated phenols in soil using HPLC
WACANIONS	MS - CL - Anions by Aquakem (WAC)	As received	BSEN:12457 Leaching	Determination of sulphate, chloride and fluoride in a leachate as part of a WAC test using a Aquakem analyser
TDSL	MS-CL-Conductivity in Water(TDS by Calc)	As received	BSEN:12457 Leaching	Determination of total dissolved solids in leachates (by calculation)
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
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"
ENLEACHP	BS EN 12457-2	As Received	-	Leaching in accordance with BSEN 12457-2 (10:1 Ratio)
ENLEACHP2	BS EN 12457-3	As Received	-	Leaching in accordance with BSEN 12457-3
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
SUBCON-ENV	Subcontract - ENV Lab	-	-	Subcontract testing
1377LOI	BS1377 LoI	Oven dried	Passing 2mm test sieve	Testing was in accordance with BS 1377: Part 3: 2018 + A1 :2021 Clause 6. Determination of the mass loss on ignition. Some information required by BS1377: 2016: Part 1 has not been reported. This information is available on request.
1377TS-ELT	BS1377 Total Sulphur Content by HTC	Oven dried	BS1377 : Part 1 : 2016	Total Sulphur Content testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 7.10 (using Eltra CS-800 Analyser)

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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.

Observations on receipt

A - No date of sampling provided
C - Received in inappropriate container
H - Contains headspace
T - Temperature on receipt exceeds storage temperature
R - Sample(s) received with less than 96 hours for testing to commence/complete, any result formally classed as deviating will be marked with an X against the applicable test (i.e. RX)

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
345250	-	BH104	ES	-	MS - CL - Cyanide by Skalar	RX
345250	-	BH104	ES	-	MS - CL - EPH in Soil	RX
345250	-	BH104	ES	-	MS - CL - PAH (As Received)	RX
345250	-	BH104	ES	-	MS - CL - Phenols by HPLC (soil)	RX
345250	-	BH104	ES	-	MS - CL - TPH (GC-FID)	RX
345250	-	BH104	ES	-	MS - CL - VOC and MBTEX	RX
345250	-	BH104	ES	-	MS - CL - VPH	RX
345250	-	BH104	ES	-	MS - CL - pH in Soils	RX
345250	-	BH104	ES	-	MS - CL - pH in Soils (WAC)	RX
345251	-	BH103A	ES	-	MS - CL - Cyanide by Skalar	RX
345251	-	BH103A	ES	-	MS - CL - EPH in Soil	RX
345251	-	BH103A	ES	-	MS - CL - PAH (As Received)	RX
345251	-	BH103A	ES	-	MS - CL - Phenols by HPLC (soil)	RX
345251	-	BH103A	ES	-	MS - CL - VOC and MBTEX	RX
345251	-	BH103A	ES	-	MS - CL - VPH	RX
345251	-	BH103A	ES	-	MS - CL - pH in Soils	RX
345252	-	BH103	ES	-	MS - CL - Cyanide by Skalar	RX
345252	-	BH103	ES	-	MS - CL - EPH in Soil	RX
345252	-	BH103	ES	-	MS - CL - PAH (As Received)	RX
345252	-	BH103	ES	-	MS - CL - Phenols by HPLC (soil)	RX
345252	-	BH103	ES	-	MS - CL - TPH (GC-FID)	RX
345252	-	BH103	ES	-	MS - CL - VOC and MBTEX	RX
345252	-	BH103	ES	-	MS - CL - VPH	RX
345252	-	BH103	ES	-	MS - CL - pH in Soils	RX
345252	-	BH103	ES	-	MS - CL - pH in Soils (WAC)	RX

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Project Reference - CASCID-Christie Hospital, Manchester P10525

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

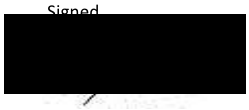
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GRM Development Solutions
Laurus House
First Avenue
Centrum 100
Burton Upon Trent
DE14 2WH

Analytical Test Report: L24/01949/GRM - 24-42792

Your Project Reference:	**P10525 CASCID - Christie Hospital, Manchester**		
Your Order Number:	P10525	Samples Received / Instructed:	12/03/2024 / 12/03/2024
Report Issue Number:	1	Sample Tested:	12/03 to 26/03/2024
Samples Analysed:	5 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 futher analaysis is required samples identified as containing asbestos are screened and tested on an as recevied basis. No correction is made for moisture content and these results are not covered by our accrediation

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

WAC Testing

Samples were leached in accordance with BS EN 12457-2: 2002.

Eluate Results are reported as L/S 10. These results have been calculated in accordance with BS EN 12457-2:2002.

Comparative values are taken from the Council Decision Annex - CRITERIA AND PROCEDURES FOR THE ACCEPTANCE OF WASTE AT LANDFILLS, (2003/33/EC).

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

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L24/01949/GRM - 24-42792

Project Reference - P10525 CASCID - Christie Hospital, Manchester

Analytical Test Results - Solid

Lab Reference			346673	346674	346676
Client Sample ID			-	-	-
Client Sample Location			TP106	TP107	TP101
Client Sample Type			ES	ES	ES
Client Sample Number			-	-	-
Depth - Top (m)			0.40	0.40	0.40
Depth - Bottom (m)			0.40	0.40	0.50
Date of Sampling			27/02/2024	27/02/2024	27/02/2024
Time of Sampling			-	-	-
Sample Matrix			Sand	Clay	Sand
Determinant	**Units**	**Accreditation**			
Antimony	(mg/kg)	u	< 3.5	< 3.5	< 3.5
Arsenic	(mg/kg)	MCERTS	< 10	78	14
Barium	(mg/kg)	MCERTS	100	280	110
Beryllium	(mg/kg)	MCERTS	0.5	1.2	0.8
Boron (w/s)	(mg/kg)	u	< 2.5	< 2.5	< 2.5
Cadmium	(mg/kg)	MCERTS	0.5	1.2	0.7
Chromium (III)	(mg/kg)	u	5.0	8.2	6.9
Chromium (Total)	(mg/kg)	UKAS	6.0	9.2	7.9
Copper	(mg/kg)	MCERTS	32	210	49
Iron	(mg/kg)	u	17000	33000	21000
Lead	(mg/kg)	MCERTS	330	590	92
Manganese	(mg/kg)	MCERTS	240	880	380
Mercury	(mg/kg)	UKAS	< 2.5	< 2.5	< 2.5
Mercury Total (Low Level)	(mg/kg)	u	< 0.1	0.5	< 0.1
Molybdenum	(mg/kg)	u	< 2.0	< 2.0	< 2.0
Nickel	(mg/kg)	MCERTS	13	27	14
Selenium	(mg/kg)	u	< 8.0	< 8.0	< 8.0
Vanadium	(mg/kg)	UKAS	21	31	26
Zinc	(mg/kg)	MCERTS	66	360	52
Phenol	(mg/kg)	MCERTS	< 0.20	< 0.20	< 0.20
Cresols	(mg/kg)	MCERTS	< 0.20	< 0.20	< 0.20
Xylenols	(mg/kg)	MCERTS	< 0.20	< 0.20	< 0.20
Trimethyl Phenols	(mg/kg)	UKAS	< 0.20	< 0.20	< 0.20
Total Phenols (via HPLC)	(mg/kg)	UKAS	< 0.80	< 0.80	< 0.80
Cyanide (Free)	(mg/kg)	u	< 1.0	< 1.0	< 1.0
Chromium (Hexavalent)	(mg/kg)	u	< 1.0	< 1.0	< 1.0
pH	pH Units	MCERTS	8.5	7.9	7.3
Sulphate (Water soluble as SO_4)	(mg/l)	u	< 10	< 10	< 10
Sulphur (Total)	(%)	UKAS	0.02	0.01	0.02
Acenaphthene	(mg/kg)	MCERTS	0.02	0.04	< 0.02
Acenaphthylene	(mg/kg)	UKAS	< 0.02	< 0.02	< 0.02
Anthracene	(mg/kg)	UKAS	0.06	0.06	< 0.02
Benzo (a) anthracene	(mg/kg)	MCERTS	0.28	0.24	0.07
Benzo (a) pyrene	(mg/kg)	MCERTS	0.30	0.25	0.07
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.34	0.30	0.12
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.20	0.17	0.06
Benzo (k) fluoranthene	(mg/kg)	MCERTS	0.12	0.10	0.03
Chrysene	(mg/kg)	MCERTS	0.38	0.37	0.10
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
Fluoranthene	(mg/kg)	MCERTS	0.62	0.58	0.14
Fluorene	(mg/kg)	MCERTS	< 0.02	0.03	< 0.02
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	0.17	0.15	0.07
Naphthalene	(mg/kg)	MCERTS	0.04	0.11	< 0.02