

NATURAL HISTORY MUSEUM ACCESS ROAD, SHINFIELD

CONDITION 11 – DRAINAGE SYSTEM

UNIVERSITY OF READING

11 OCTOBER 2024



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Date:	11 October 2024
Document Reference:	HD065-R006

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1.0 Planning Condition 11 – Drainage

1. Introduction

- 1.1 This Report relates to the drainage proposals for the construction of a new Access Road to the north-east of Cutbush Lane which will provide access to a new building for the Natural History Museum at Thames Valley Science Park. The proposed access road benefits from planning consent which was determined at Wokingham Borough Council's March 2024 planning committee (Wokingham Borough Council Planning Application Ref : 232995).

2. Planning condition

- 2.1 Planning Condition No. 11 as listed within the Decision Notice states:

No development shall take place until full details of the drainage system for the site have been submitted to and approved in writing by the LPA. The details shall include:

- *Calculations indicating the Greenfield runoff rate from the site.*
- *Full calculations demonstrating the capacity of attenuation features to cater for 1 in 100 year flood event with a 40% allowance for climate change and runoff controlled at Greenfield rates, or preferably better.*
- *Separate drainage systems for any proposed adopted highways and residential dwellings.*
- *A drainage strategy plan indicating the location and sizing of SuDS features, with the base of any SuDS features located at least 1m above the seasonal high water table level.*
- *Details demonstrating how any SuDS for this development would be managed throughout the lifespan of the development and who will be responsible for maintenance.*

The approved scheme shall be implemented prior to first public use of the road and shall be maintained in the approved form for as long as the development remains on the site.

3. Response to Planning Condition 11

- 3.1. The Greenfield runoff rates have been calculated using the online HR Wallingford tool and can be found in **Appendix A**.
- 3.2 Full calculations demonstrating the capacity of the proposed attenuation features to cater for the 1 in 100 year flood event with a 40% allowance for climate change and runoff controlled at Greenfield rates (QBAR) can be found in Appendix B.
- 3.3 Drawings HD065-501 NHM Access Road Drainage Layout Sheet 1, HD065-502 NHM Access Road Drainage Layout Sheet 2 and HD065-503 NHM Access Road Drainage Layout Sheet 3 reflecting the Infodrainage calculations can also be found in Appendix B.



- 3.4 The proposed drainage network is designed to collect and manage surface water flows from the proposed highway only, which will be offered for adoption. It is envisaged that adjacent development will convey surface water directly to nearby watercourses.
- 3.5 The seasonal groundwater table for the site varies between 0.4 and 1.4m below ground level. More information can be found in the Ground Investigation in Appendix C. The proposed road design would need to be artificially raised more than 1.0m above existing ground in order to achieve this requirement.
- 3.6 However, the Ground Investigation data confirms that infiltration to ground is not a viable option due to the lack of permeability, therefore it is not proposed. Impermeable membranes or puddle clay will be used if required for the construction of the swales, basins, filter drains or any other drainage feature to avoid groundwater entering the proposed surface water network.
- 3.7 For the water treatment effects of SuDS features to remain effective, a comprehensive maintenance strategy should be implemented.
- 3.8 During construction, maintenance of SuDS features should be undertaken by the Contractor. Upon completion, the assets should be passed over to the Management Company or Highway Authority to maintain the features in perpetuity.
- 3.9 The drainage system has been designed to the appropriate standards including the new Sewerage Sector Guidance (SSG), the Building Regulations and the requirement of the National Planning Policy Framework.
- 3.10 The intention of adoption and ownership of drainage and SuDS is as follows:
- Surface water highway drains, gullies and leads within adopted roads to be maintained by the Highway Authority.
 - Above ground attenuation (i.e. swales and basins) to be maintained by a NAV or University of Reading.
 - Foul sewers under the proposed highway to be offered for adoption to Thames Water under a Section 104 Agreement.
- 3.11 Regular maintenance regimes for each of the proposed drainage features have been created, which consist of several primary measures required to ensure the longevity of the systems and they can be found in Appendix D.



Appendices



Appendix A - Greenfield Runoff Rates

Calculated by:	GEORGIOS ROINAS
Site name:	A392 Hall Farm, Loddon Valley SDL
Site location:	Cutbush Lane, Shinfield

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.41637° N
Longitude:	0.93434° W
Reference:	1772736302
Date:	Sep 21 2023 14:16

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1

Methodology

Q _{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	644	644
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

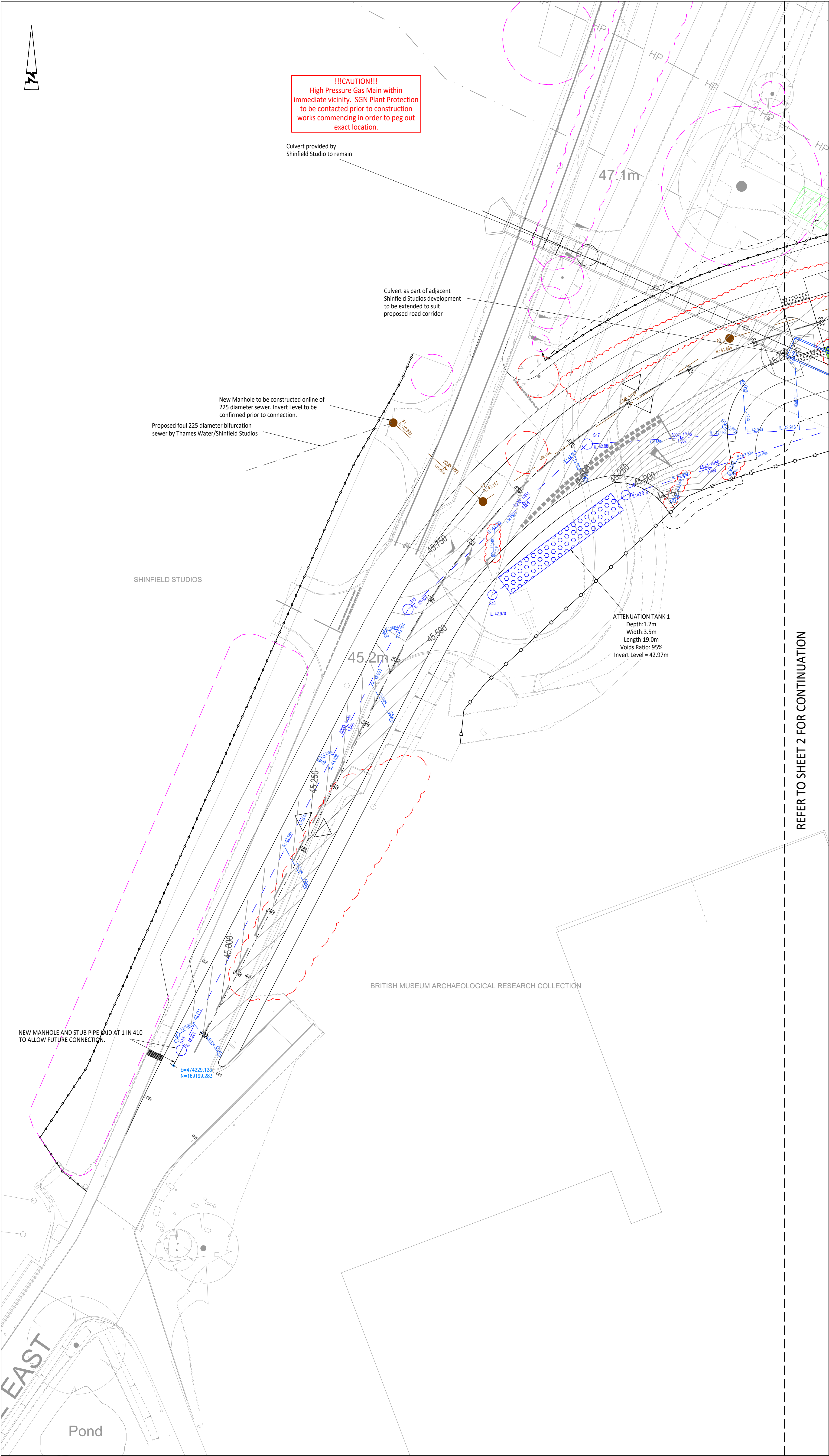
Greenfield runoff rates

	Default	Edited
Q _{BAR} (l/s):	4.38	4.38
1 in 1 year (l/s):	3.72	3.72
1 in 30 years (l/s):	10.07	10.07
1 in 100 year (l/s):	13.97	13.97
1 in 200 years (l/s):	16.38	16.38

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.



Appendix B – Proposed Drainage Strategy Layout & Infodrainage Calculations



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DRAINAGE NOTES:

- Do not scale.
- This drawing is to be read in conjunction with and checked against all other drawings, Engineering details, Specification and any structural, Geotechnical or other specialist document provided.
- Site layout shown for context only, refer to other project drawings for details.
- All adoptable drainage works to be constructed as detailed in design and construction guidance or as stipulated in the water authorities addendum.
- All public sewers are to be the subject of a section 104 agreement of the water industry act 1991.
- Invert levels of existing manholes and sewers are to be checked on site before construction commences and results reported to engineers.
- The contractor is responsible for maintaining continuity of flow for all existing sewers within the site boundary and limit of works for the duration of the project.
- All drainage ironworks to comply with BS EN124, and be stamped with BSI Kitemark. Covers to suit loading as below:
-Carriageways and Roads - E600/D400
-Driveways and Verges - C250
-Footways and Pedestrian areas - B125
-Gardens/Landscaping - A15
- All sewer pipes, up to, and including 225mm are to be vitrified clay to BS EN295. All sewer pipes 300mm diameter and above to be concrete pipes to BS EN1916. Where agreed with adopting authority pipes up to and including 600mm diameter can be PVC-U to BS EN1404.
- All drainage shall be installed and tested strictly in accordance with the manufacturers' printed instructions, BS EN 752, BS EN 1501, local water authority requirements and the building regulations.
- All bedding shall be class s unless noted otherwise.
- All trenches under existing and proposed public highways are to be backfilled with thoroughly compacted type 1 granular sub-base material.
- Drainage laid beneath roads and areas of vehicular access (car parking etc) with less than 1200mm of cover shall be encased in concrete bed and surround with associated movement joints. drainage laid beneath paths, footways and pedestrian areas with less than 900mm of cover shall be similarly treated.
- Chambers with outgoing pipes greater than 600mm diameter shall be fitted with guard bars, safety chains or other approved safety devices.
- The use of precast concrete products made with sulphate resisting cement is mandatory, unless a laboratory report proves such precautions are not necessary.
- All sewers to be abandoned must be surveyed to identify any lateral connections that are still live with any found to be reported to the engineer.
- All foul and storm water drains which are not to be adopted as public sewers shall be in accordance with document h of the building regulations, together with nbc standards chapter 5.3 and BS8301.
- Geocellular storage tanks to have 2 manholes either side, as per manufacturer's specifications.

ALL STUB PIPES TO BE SECURELY SEALED AGAINST INGRESS OF GROUNDWATER. STUB PIPES LOCATION/DEPTH TO BE SURVEYED AS PART OF AS BUILT RECORDS BY CONTRACTOR.

KEY:

- Proposed Surface Water Network
- Proposed Foul Water Network
- Proposed section of pipe with concrete protection (where cover less than 1.2m)
- Proposed Road gully and connection
- Proposed ACO Kerb Drain HB405 (or similar) with silt traps/access units every 20m.
- Proposed ACO Kerb Drain HB405 flush drainable unit (or similar) with associated drop kerb units as required.
- Proposed Road side Filter drain
- Proposed Pre-cast concrete Headwall
- Proposed stone pitched headwall
- Attenuation Basin
- Existing Foul Sewer
- Foul Water sewer by others
- Existing ditch to be regraded
- Surface water lateral to be sealed and capped with plastic capping unit
- Foul water lateral to be sealed and capped with plastic capping unit
- Proposed Road crossfall
- Attenuation Tank
- Tree Root Protection Zones
- Trees to be removed to facilitate development
- Swale (Depth: 0.3m)

0 2 4 6 8 10m

Scale 1:250

P6	08/24	Updated following WBC comments; crossfall adjusted around bend with kerbs and swale amended to suit, cycle lane to join carriageway removed. Gully references and lengths added, pipe lengths added and lateral connections updated with key updated to suit.	LC	SM
P5	07/24	Fence line adjusted west side of Calbush Lane	SM	SM
P4	07/24	BM access updated with drainage amended to suit. Gullies & MH moved accordingly.	LC	SM
P3	05/24	Amended following design team review	AS	SM
P2	04/24	Amended following review	LC	SM
P1	04/24	First issue	AS	SM

Rev	Date	Description	Drawn	Checked

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Client

UNIVERSITY OF READING

Project

THAMES VALLEY
SCIENCE PARK
PRIMARY INFRASTRUCTURE

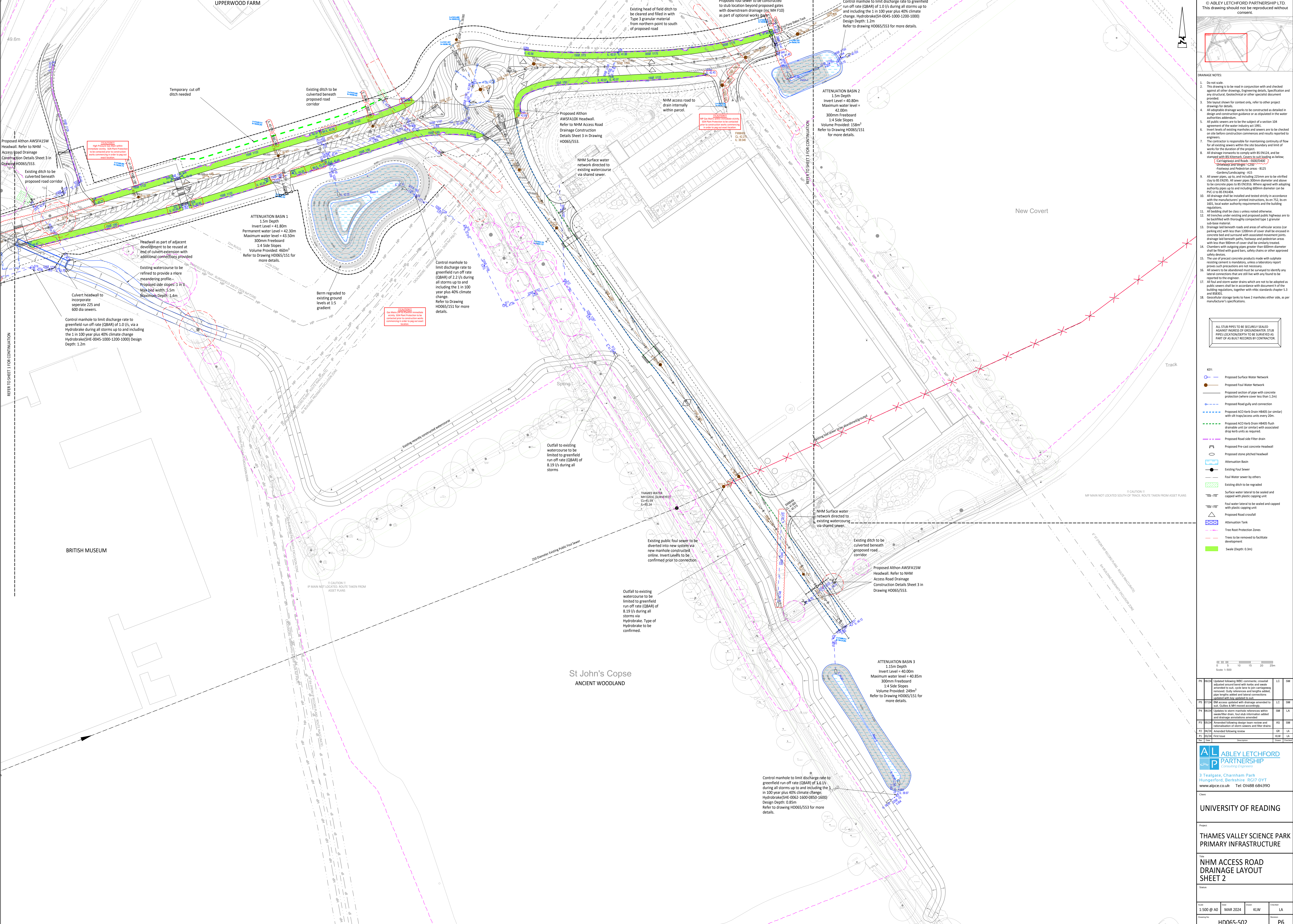
Title

NHM ACCESS ROAD
DRAINAGE LAYOUT
SHEET 1

Status

Scale	Date	Drawn	Checked
1:250 @ A1	APRIL 2024	AS	SM

Drawing No	Revision
HD065-501	P6



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 5. All public sewers are to be the subject of a section 104 agreement of the water industry act 1991.
 6. Invert levels of existing manholes and sewers are to be checked on site before construction commences and results reported to engineers.
 7. The contractor is responsible for maintaining continuity of flow for existing sewers within the site boundary and limit of works for the duration of the project.
 8. All drainage networks to comply with BS EN124, and be stamped with BS1382. Covers to suit loading as below:
 - Carriageway and Roads - E600(D402)
 - Driveways and Verges - C250
 - Footways and Pedestrian areas - B125
 - Gardens/Landscaping - A15
 9. All sewer pipes, up to and including 225mm are to be vitrified clay to BS EN295. All sewer pipes 300mm diameter and above to be concrete pipes to BS EN335. Where agreed with adopting authority pipes up to and including 600mm diameter can be PVC-U to BS EN1404.
 10. All drainage shall be installed and tested strictly in accordance with the manufacturers' printed instructions, to BS EN124, BS EN1404, local water authority requirements and the building regulations.
 11. All bedding shall be class 5 unless noted otherwise.
 12. All trenches under existing and proposed public highways are to be bedded with thoroughly compacted type 1 granular sub-base material.
 13. Drainage bed beneath roads and areas of vehicular access (or parking etc) with less than 1200mm of cover shall be encased in concrete bed and surround with associated movement joints. drainage bed beneath paths, footways and pedestrian areas with less than 900mm of cover shall be similarly treated.
 14. Chambers with outgoing pipes greater than 600mm diameter shall be fitted with guard bars, safety chains or other approved safety devices.
 15. The use of precast concrete products made with sulphate resisting cement is mandatory, unless a laboratory report proves such precautions are not necessary.
 16. All sewers to be abandoned must be surveyed to identify any lateral connections that are still in use or found to be reported to the engineer.
 17. All foul and storm water drains which are not to be adopted as public sewers shall be in accordance with document h of the building regulations, together with minor standards chapters 5.3 and BS8301.
 18. Geocellular storage tanks to have 2 manholes either side, as per manufacturer's specifications.

ALL STUB PIPES TO BE SECURELY SEALED AGAINST INGRESS OF GROUNDWATER. STUB PIPES LOCATION/DEPTH TO BE SURVEYED AS PART OF A BUILD RECORD BY CONTRACTOR.

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 - Proposed ACO Kurb Drain HB405 flush drainable unit (or similar) with associated drop lock units as required.
 - Proposed Road side filter drain
 - Proposed Pre-cast concrete Headwall
 - Proposed stone pitched headwall
 - Attenuation Basin
 - Existing Foul Sewer
 - Foul Water sewer by others
 - Existing ditch to be upgraded
 - Surface water lateral to be sealed and capped with plastic capping unit
 - Foul water lateral to be sealed and capped with plastic capping unit
 - Proposed Road crossfall
 - Attenuation Tank
 - Tree Root Protection Zones
 - Trees to be removed to facilitate development
 - Swale (Depth: 0.3m)

Scale 1:500

PK 06+00	Updated following WBC comments, crossfall amended around bend with kerbs and swale amended to suit, storm line to join carriageway removed. Carry overflows and lengths added, pipe lengths added and lateral connections detailed.	LC	SM
PK 07+00	BM access updated with drainage amended to suit. Gullies & M1 revised accordingly.	LC	SM
PK 08+00	Update to storm mainline reference within swale/filter drain, but stub information added and drainage annotations amended.	SM	LA
PK 09+00	Amended following design team review and calculation of storm sewers and filter drains.	AS	SM
PK 10+00	Amended following review.	CH	LA
PK 11+00	First issue.	KLW	LA

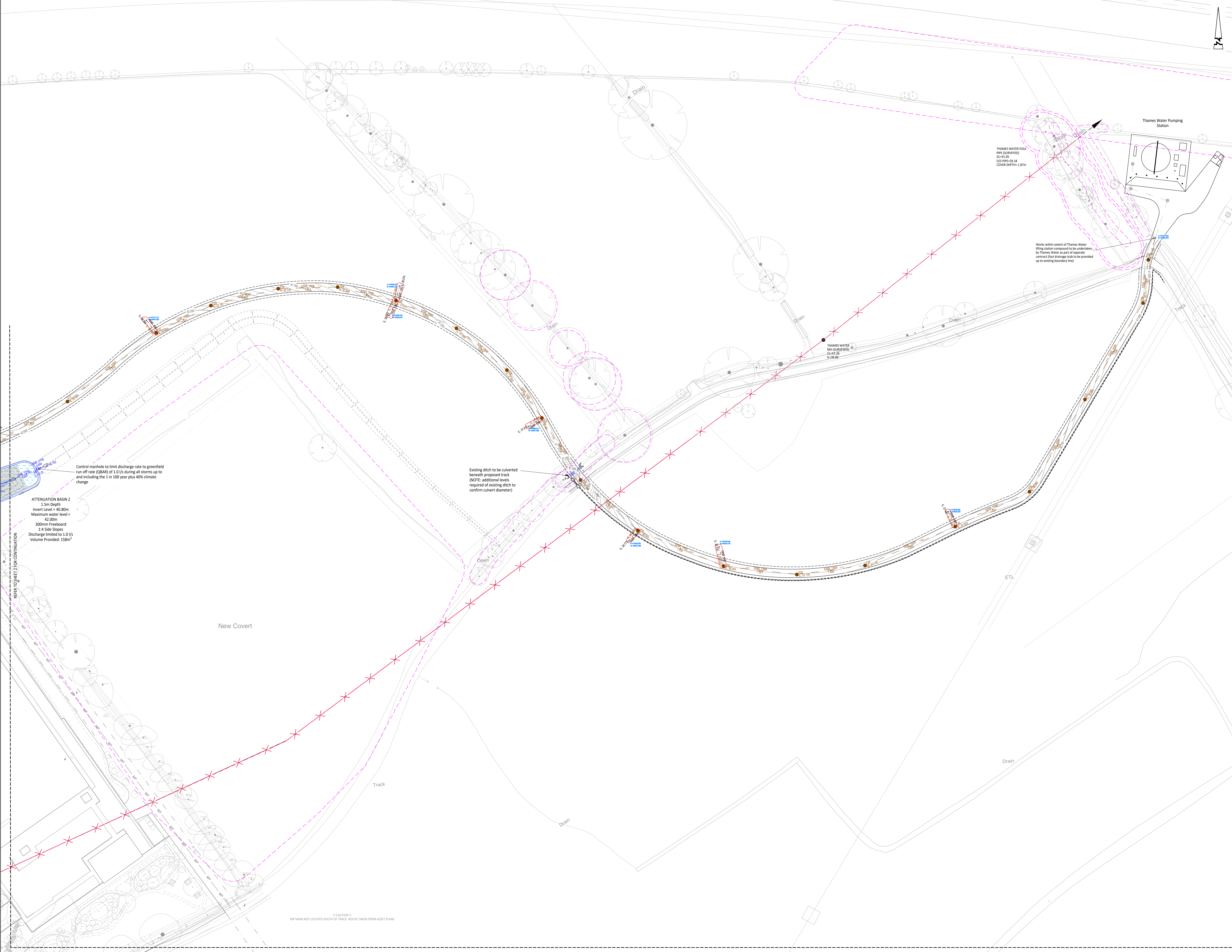
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Client
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Project
**THAMES VALLEY SCIENCE PARK
PRIMARY INFRASTRUCTURE**

Title
**NHM ACCESS ROAD
DRAINAGE LAYOUT
SHEET 2**

Scale	Date	Drawn	Checked
1:500 @ A0	MAR 2024	KLW	LA
Drawn by	Checked by	Drawn by	Checked by
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- Carriageways and Roads - F600 (D40)
- Driveways and Verges - F250
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- Foul water lateral to be sealed and capped with plastic capping unit
- Proposed Road crossfall
- Attenuation Tank
- Tree Root Protection Zones
- Trees to be removed to facilitate development
- Swale (Depth: 0.3m)

0 5 10 15 20 25m
Scale 1:500

P5	18/24	Lateral information updated & notes updated	L.C.	SM
P4	17/24	Pumping station layout updated	L.C.	SM
P3	16/24	Amended following design team review	A.S.	SM
P2	14/24	Amended following review	CH	LA
P1	13/24	First issue	K.W.	LA

Client: UNIVERSITY OF READING

Project: THAMES VALLEY SCIENCE PARK PRIMARY INFRASTRUCTURE

Title: NHM ACCESS ROAD DRAINAGE LAYOUT SHEET 3

Status:

Scale	Date	Drawn	Checked
1:500 @ A0	MAR 2024	K.W.	LA

Overseer: HD065-503

Sheet: P5



Appendix C – Geo-technical Investigation

FACTUAL AND INTERPRETATIVE GROUND INVESTIGATION REPORT

University of Reading Access Roads

794-ENV-GDE-20318

1

1

19 April 2024

Document status					
Version	Revision	Authored by	Reviewed by	Approved by	Review date
1	0	Ben Walder/Gary Riches	Gary Riches/Paul Jeffery	Phil Thomas	18 April 2024

Approval for issue			
Phil Thomas	Technical Director	[Signature]	18 April 2024

File Name
240419 R 794-ENV-GDE-20318_GR_Factual and Interpretative Ground Investigation Report_v1 r0 .docx

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Drawing 2	A392-IV1-501 P8 NHM Access Road Drainage Layout

Appendices

Appendix A	Photographs
Appendix B	Exploratory Hole Records (RPS)
Appendix C	DCP Results
Appendix D	Chemical Laboratory Results
Appendix E	Geotechnical Laboratory Results
Appendix F	Proposed Layout Plans and Section

1 INTRODUCTION

1.1 Preamble

1.1.1 RPS Consulting Services Ltd (RPS) was commissioned by the University of Reading (UoR) to undertake an intrusive ground investigation works. The intrusive investigation is required to provide additional information pertaining to the ground conditions at the site to inform the design of two new access roads for the proposed Collections and Research Centre for the Natural History Museum (NHM). The access roads are defined as being located as follows:

- NHM Access Road – Located from Cutbush Lane East to a roundabout providing access to the proposed NHM Centre; and
- Innovation Valley Access Road - from the roundabout to a proposed pumping station to the east.

1.2 Objectives

1.2.1 The key objectives of the Ground Investigation undertaken were as follows;

- To evaluate potential variability in shallow ground conditions across the proposed road routes.
- To provide an assessment of the ground conditions, together with recommended characteristic values of geotechnical properties for use in the design of the geotechnical elements of the proposed development.
- To provide comments on the ground conditions in relation to the design and construction of the geotechnical elements of the proposed development. and evaluation of waste disposal options for any surplus material generated.
- To provide monitoring information on groundwater levels over a three month period in areas of proposed attenuation basins.

1.2.2 This report sets out the factual results of the ground investigation, a review of existing ground investigation information for the site area and an interpretative assessment of the ground conditions encountered.

1.3 Limitations

1.3.1 Unless stated otherwise, information from the previous desk studies and ground investigation has not been included in this report and, where referenced, the reports presenting this information should be read in conjunction with this report.

1.3.2 The recommendations and conclusions presented herein are based on the information available at the time of writing and proposed end use. Where an alternate end use is proposed additional information and assessment will be required.

1.3.3 Guidance on the context of this report and any general limitations or constraints on its content and usage are given in Section 10, included after the text of this report.

2 THE SITE

2.1 Site Location

- 2.1.1 The NHM Access Road section is centred at approximate Ordnance Survey (OS) National Grid Reference (NGR) 474482, 169361 and at the time of investigation comprised fields to the south and east of Upperwood Farm and north of St John's Copse woodland.

2.2 Proposed Development

- 2.2.1 It is understood that the NHM road is to comprise single carriageway flanked by grass verge and footpath/cycle ways on each side. A four-exit roundabout is proposed approximately 260 m east of Cutbush Lane East, with The Thames Valley Science Park Foul Pumping Station Access Track running south-eastwards from the roundabout. The proposed pumping station access road comprises a road running approximately west to east, connecting the roundabout to a proposed pumping station location.
- 2.2.2 It is understood that the roadways are to be constructed circa 300 to 1,000 mm above existing ground levels, with banking from the back of the footway/margin at an angle of 1:3.
- 2.2.3 The NHM access road is to be built to adoptable standards although it is unconfirmed that road will be offered for adoption by the local highway authority at this stage. It is also understood that the pumping station will possibly be temporary in nature to facilitate construction only. A copy of the proposed road layouts (Refs A392-IV2-101 P4 Foul Pumping Station Access Track General Arrangement and HD065-101 P1 NHM Access Road General Arrangement), and typical cross section for the NHM Access Road (Ref HD065-SK01 P3 NHM Access Road Typical Section) are included in Appendix F.
- 2.2.4 The proposed development includes the construction of three attenuation basins of between 1.15 m and 1.50 m depth, located to the south of the proposed roadways and the spur road from the roundabout. The surface water drainage scheme also includes provision for culverting of an existing watercourse close to the junction with Cutbush Lane East. The basin slopes are proposed to be typically 1:4 internally with the crest berm at approximately 300 mm to 600 mm above existing ground levels and with 1:5 external side slopes to tie into existing levels. A copy of the proposed drainage plan is included as Drawing 2 - A392-IV1-501 P8 NHM Access Road Drainage Layout.

3 GROUND INVESTIGATION

3.1 Introduction

- 3.1.1 The extent and scope of the ground investigation works has been prepared by RPS in order to provide ground condition information to inform the preliminary design of the development, as provided by Abley Letchford Partnership Consulting Engineers (ALPCE).
- 3.1.2 The intrusive ground investigation works were undertaken between 27th February and 29th February 2024 and comprised six dynamic cone penetrometer (DCP) tests, five windowless dynamic sampling boreholes and six hand excavated pits. Representative soil samples collected during the ground investigation works were submitted for geotechnical and chemical laboratory analysis.
- 3.1.3 Boreholes formed in close proximity to proposed attenuation basins were fitted with groundwater level data loggers. Return visits to download the data are proposed on a monthly basis following completion of the ground investigation.

3.2 Ground Investigation Standards

- 3.2.1 The ground investigation was set in the context of relevant UK guidance and legislation relating to ground investigation and testing and the pollution of land and controlled waters including:
- British Standards BS5930 (BSI 2015 + A1:2020) and BS10175 (BSI 2011 + A2:2017);
 - Building Research Establishment: Concrete in aggressive ground. BRE Special Digest 1. Third Edition (BRE, 2005).
 - BS 1377 Parts 2-9: Methods of tests for soils for civil engineering purposes. (BSI, 1990).
 - EN 1997-1 (2004 + A1:2013): Eurocode 7: Geotechnical design – Part 1: General rules; and
 - EN 1997-2 (2007): Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing.

3.3 Site Constraints and Evidence of Hazards

- 3.3.1 The proposed distribution of investigation locations was constrained at the outset of the works by known constraints including High pressure (HP), intermediate pressure (IP) and medium pressure (MP) gas mains.
- 3.3.2 All exploratory locations were agreed prior to their commencement by representatives from RPS and UoR. Due to the known presence of High, Intermediate and Medium pressure gas mains in the area of work, site meetings were held with representatives of Southern Gas Network (SGN) on 23rd February and 28th February to identify gas utility locations and ensure a suitable stand-off distance was applied.
- 3.3.3 Constraints were also encountered following commencement of the ground investigation as a result of heavy rainfall which resulted in waterlogged ground and standing water which prevented access to six of the proposed borehole locations (WS06-WS11). These locations were substituted by hand dug inspection pits to permit assessment of ground profile and collection of samples for laboratory analysis.

3.4 Summary of Works Undertaken

- 3.4.1 The intrusive ground investigation works were undertaken between 27th February and 1st March 2024 and comprised the following:

- Provision of a detailed Health and Safety Plan (HASP) including risk assessments and method statements (RAMS);
- Drilling of five dynamic continuous sampling boreholes (WS01-WS05) to a maximum depth of 4.00 metres below ground level (m bgl);
- Excavation of six inspection pits (WS06-WS11) to depths of up to 0.75 m bgl at locations that were inaccessible with the drilling rig;
- Installation of groundwater monitoring well standpipes and data loggers within two boreholes;
- In situ geotechnical testing (Standard Penetration Tests – solid cone);
- Six CPT tests (DCP01-DCP06) to depths of between 0.60 and 1.00 m bgl;
- Soil sampling to assist in determining waste classification of shallow topsoil, compliance with BS3882 topsoil characteristics and to obtain samples for geotechnical laboratory analysis;
- Full time site supervision and logging of soils on site by Consultant from RPS; and
- Continuous groundwater level monitoring using data loggers following completion of works.

3.4.2 The locations of the exploratory holes were established using 'What 3 Words' and the locations are presented on Drawing 1 - 94-ENV-GDE-200318_01_EHLP_Rev1 Exploratory Hole Plan.

3.5 Permit To Dig System

- 3.5.1 Each exploratory hole location was undertaken in accordance with a Permit to Dig issued by the Client and on-site confirmation from SGN of the selected exploratory hole locations with respect to known gas utility locations.
- 3.5.2 Prior to breaking ground a review of available services information was undertaken and a CAT and signal generator was used at each location to check for the presence of buried service apparatus.

3.6 Dynamic Continuous Sampling Boreholes

- 3.6.1 Following completion of a hand excavated inspection pit to depths of circa 0.75 - 1.00 m bgl, five boreholes (WS01-WS05) were formed with an Archway Competitor Dart rig using dynamic continuous sampling techniques to a maximum depth of 4.00 m bgl. The samples were recovered in semi-rigid plastic liner. The samples were extracted horizontally from the sampler, split and logged/sub-sampled on site.
- 3.6.2 Standard penetration tests (SPT) were carried out at 1.00 m intervals in each borehole in general accordance with BS EN ISO 22476-3:2005+A1:2011. A solid cone was used for each test. The SPT N value was taken as the number of blows to penetrate the 300 mm test drive following a 150 mm seating drive. Where low penetration was recorded the seating drive was terminated at 25 blows and the test drive completed after a further 50 blows. SPT results, together with the energy ratio (Er), are presented as uncorrected N values on the borehole logs.
- 3.6.3 Disturbed samples were taken and retained in a combination of plastic tubs, bags and glass jars.
- 3.6.4 Upon completion, boreholes WS01 and WS03 located in close proximity to proposed attenuation basin locations were installed with 50 mm HDPE single groundwater monitoring wells set in a filter response zone of noncalcareous pea gravel in which groundwater level data loggers were fitted. The final depths of the boreholes and installation details were dictated by the ground conditions identified during drilling. The monitoring well installation details and depths are also shown on the exploratory logs in Appendix B.
- 3.6.5 Boreholes not selected for monitoring well installation were backfilled on completion with arisings.

3.7 Dynamic Cone Penetration Testing

- 3.7.1 Geotechnical Site and Testing Limited (GSTL) attended site on the 28th February 2024 and carried out 6 dynamic cone penetrometer tests (DCP) across the site (DCP01-06). The results are which are presented within Appendix C.

3.8 Inspection Pits

- 3.8.1 In locations that were inaccessible to the drilling rig inspection pits were excavated by hand to depths of up to 0.75 m bgl and disturbed samples were taken and retained in a combination of plastic tubs, bags and glass jars for laboratory analysis. Copies of the inspection pit logs are also included in Appendix B.

4 REVIEW OF EXISTING GROUND INVESTIGATIONS

4.1 Introduction

4.1.1 To assist with the assessment of the geological and hydrogeological ground conditions in the immediate vicinity of the proposed NHM Access Road, copies of the following documents were made available for review by the Client.

- CC Ground Investigations Ltd (October 2022). Natural History Museum Collections and Research, Interpretative Factual Ground Investigation Report. Report Number: C7638; and
- Ramboll (UK) Ltd. (September 2022). Natural History Museum Collections and Research, Interpretative Ground Investigation Report. Report Number: 1620012379/v1.

4.1.2 Both reports relate to ground investigations undertaken for the proposed construction of the NHM storage buildings to the south-east of the proposed roundabout and immediately east of the spur road leading south from the proposed roundabout. It is noted that a second interpretative report was prepared by Ramboll (UK) Ltd focused on interpretation of land contamination. This report has not been made available for review, The investigation area and distribution of exploratory holes are shown on Figure 1, below.



Figure 1 – Ramboll NHM Ground Investigation location

4.1.3 RPS cannot vouch for the accuracy or validity of the information provided within third party reports and the following opinion is based solely upon the reports. Legal reliance should be sought from the original authors of these reports where their content is considered material to the characterisation of the site. RPS comments are provided in *italics*.

4.2 Report Summary:

CC Ground Investigations Ltd (2022)

- 4.2.1 A Ground Investigation was undertaken by CC Ground Investigations Ltd (CCGI) on behalf of the Natural History Museum (NHM) under instruction from Ramboll (UK) Ltd (Design Engineer) between 28th June and 13th July 2022 to assist with the design of new facilities for the NHM's collection and research centre. The scope of the ground investigation comprised:
- 3 x cable percussion boreholes to a maximum depth of 30.00 m below ground level (bgl);
 - 8 x machine excavated trial pits to depths of up to 2.80 m bgl (including 3 x BRE365 soakaway tests);
 - 7 x Cone Penetration tests (CPT) to depths of up to 10.61 m bgl;
 - 4 x Dynamic Sampling Boreholes to depths of up to 6.00 m bgl;
 - 4 x Seismic Cone Penetration Tests (SCPT) to depths of up to 14.90 m bgl;
 - 7 x In-situ CBR tests;
 - Geotechnical laboratory testing;
 - Chemical laboratory testing of soils and groundwater; and
 - 3 x groundwater/ground gas monitoring phases.
- 4.2.2 The investigation was undertaken to provide information to inform on the design of the NHM buildings and was undertaken in accordance with the scope of works specified by Ramboll UK Ltd.
- 4.2.3 *The CC Ground Investigation includes exploratory hole and in-situ test locations in close proximity to the proposed access roads and/or attenuation basins, particularly:*
- *BH03/SCPT03 located on or in close proximity to Attenuation Basin 3;*
 - *BH01/ SCPT01 located in close proximity to the southern edge of the proposed roundabout;*
 - *WS02/WS02A located approximately 35 m west of Attenuation basin 2; and*
 - *TP06/6A/CPT05 located on the alignment of the southern spur road.*
- 4.2.4 *Both BH01 and BH03 were installed with groundwater monitoring wells and were subject to three rounds of groundwater level monitoring. This information is of benefit in the assessment of groundwater level variability in the areas of proposed attenuation basins through identification of possible seasonal variations.*

Ramboll (UK) Ltd Interpretative Geotechnical Report (2022)

- 4.2.5 The findings of the CC Ground Investigation were utilised in the preparation of an interpretative geotechnical ground investigation report by Ramboll (UK) Ltd. The reports presents an interpretation of the ground conditions identified by CCGI, including cross-sections, material properties for the strata/deposits proven, assessment of infiltration rates and a geotechnical risk assessment.
- 4.2.6 *The CCGI investigation recorded Topsoil, overlying Brickearth and River Terrace Deposits underlain by bedrock strata of London Clay Formation. This confirmed the anticipated geological sequence from published sources identified in the RPS DTS and PRA reports for both road sections.*
- 4.2.7 Topsoil is described as being between 0.30 m and 0.80 m thick and proven in all exploratory holes. It was described as comprising 'firm to stiff friable brown gravelly sandy silt with occasional rootlets. The gravel was identified as flint. The Topsoil was not subject to any laboratory testing on

the assumption that it would be removed prior to development. A single CBR test undertaken at 0.30 m bgl. Inspection of the log (TP08) indicates the test depth was within the Topsoil. A CBR Value of 19 % caveated within the report as a 'skewed result'. *It should be noted that CBR tests are not typically undertaken within Topsoil.*

- 4.2.8 *The deepest topsoil layer would appear to have been recorded in BH01, it is considered that 0.80 m is exceptionally thick for a topsoil layer and that the change in colour reported at 0.35 m to 'brown' is likely to be more representative of the boundary between the topsoil and underlying Brickearth deposits.*
- 4.2.9 *Chemical Laboratory test results were undertaken on six topsoil samples for a general range of determinants including metalloids, pH, Polycyclic Aromatic Hydrocarbons (PAHs), asbestos, cyanides, petroleum hydrocarbons and BTEX compounds (Benzene, Toluene and Xylenes). Review of the results show no detectable concentrations of petroleum hydrocarbons, BTEX, PAHs, cyanide, asbestos and concentrations of metalloids below the standard screening criteria for a commercial land use. Based upon the results obtained, the topsoil samples analysed do not represent a human health risk to future site users and would be suitable for reuse in areas of soft landscaping.*
- 4.2.10 Brickearth was proven in all exploratory holes with recorded thicknesses of between 0.10 m and 1.85 m. The deposit is described as 'stiff friable orangish brown slightly gravelly sandy clayey silt with occasional rootlets'. The following classification criteria were established through in-situ and laboratory testing:
- Atterberg tests of this material identified it as a low plasticity clay;
 - SPT tests indicated a characteristic value of $N=14$;
 - The Plasticity Index results indicated a suitable characteristic value for angle of shearing resistance, ϕ' , is 27° .
 - From the SPT results a characteristic value of drained stiffness, E' , of 20 Mn/m^2 was recommended; and
 - CBR tests undertaken in three trial pits in the Brickearth identified CBR values of between 2.4 and 10 %. In one pit there was insufficient penetration to prove a CBR value.
- 4.2.11 *Chemical Laboratory test results were undertaken on two samples of Brickearth, results were again below the laboratory limit of detection or below the standard screening criteria for a commercial land use.*
- 4.2.12 River Terrace Deposits (RTD) were again identified in all of the exploratory holes formed, with a proven thickness of between 0.20 m and 1.80 m. The RTD varied between 'very dense brown very gravelly silty sand' and locally 'loose' predominantly 'medium dense to dense brown sandy or very sandy angular to rounded fine to coarse flint gravel'. Classification testing on the RTD concluded the following:
- No Atterberg Limits or bulk density analyses were undertaken;
 - SPT tests ranged from 3 to 75 and a conservative characteristic value of $N_{60}=30$ was selected as representative by Ramboll. The average of all values for the RTD equates to $N_{60}=37$. A relative density of 20-80% was calculated using the SPT N value.
 - The internal angle of shearing resistance and the stiffness of the River Terrace Deposits was calculated from the SPT results. A peak recommended angle of shearing resistance of 37° was recommended based upon BS8002:2015 using grading, angularity and SPT results where: $\phi'_{\text{peak}} = 30 + A + B + C$ and A = subangular (2), B = moderately graded (2) and C = characteristic SPT value of 30 (3).
 - From the SPT results a characteristic value of drained stiffness, E' , of 35 Mn/m^2 was recommended.

- One completed CBR test was undertaken in the RTD with a recorded result of 14 %. At another location there was insufficient penetration to obtain a result.
- 4.2.13 *Chemical Laboratory test results were undertaken on two samples of Brickearth, results were again below the laboratory limit of detection or below the standard screening criteria for a commercial land use.*
- 4.2.14 Bedrock strata of the London Clay Formation were encountered in boreholes but not trial pits. The thickness of this material was not proven beyond the base of boreholes (max thickness of 27 m proven) and was described as a stiff bluish grey sandy silty clay becoming very stiff dark grey indistinctly thinly laminated clay with shell fragments with depth. The results of in-situ and laboratory testing of samples of the London Clay Formation identified the following parameters:
- The moisture content of the London Clay ranged from 19 % to 32 % with an average of 24 % comparable to the measured moisture content from quick undrained triaxial tests undertaken which averaged 24 %.
 - Bulk density varied between 18.9 kN/m³ and 21.6 kN/m³. A bulk density design value of 20 kN/m³ was recommended for design purposes. Dry density varied between 14.4 kN/m³ and 18.0 kN/m³, with an assumed design value of 17.0 kN/m³.
 - From Atterberg Limits analyses, liquid limits varied between 38 % and 65 % and the plastic limit between 19 % and 27 %. Plasticity Index ranged from 19 % to 38 % with an average of 28.7 %.
 - SPT N values ranged from 7 to 163 (extrapolated on refusal) with a general linear pattern of N value increasing with depth other than one borehole where the refusal was obtained.
 - The undrained shear strength of the London Clay at the site showed a general increasing trend with depth. It is noted that a number of Hand Shear Vane (HSV) tests completed at depth are uncharacteristically low. Remarks described on exploratory hole logs describe several of the HSV tests refusing at depths. The London Clay is generally described as a stiff to very stiff material, therefore it is anticipated that the undrained shear strength values of material at depth would be greater than 150 kPa.
 - Cone and Seismic Cone Penetration Tests indicated a Cu ranging from 60 kPa at the London Clay surface to 250 kPa at depth.
- 4.2.15 *Using the correlation by Stroud, whereby undrained shear strength $C_u = f_1 \times N$ and $f_1 = 4.5$ is considered appropriate based on the Plasticity Index results. This corresponds approximately to undrained shear strength values in the range of between 30kPa to in excess of 225kPa increasing with depth.*
- 4.2.16 Groundwater is described as comprising 'perched groundwater within the Brickearth and River Terrace Deposits' with one strike recorded in the London Clay Formation at 7.00 m bgl. No other groundwater strikes were recorded in drilling. Groundwater ingress was observed in five of the seven trial pits, the shallowest ingress being at 1.10 m bgl. Subsequent monitoring of borehole standpipes on three occasions in July and August 2022 identified a conservative groundwater depth below ground level of 0.50 m bgl (approx. 42.00 m AOD) assumed to allow for possible seasonal fluctuations.
- 4.2.17 *For borehole BH03 close to the proposed Attenuation Basin 3, the shallow installation with a response zone between 1.00 m and 3.50 m bgl the recorded groundwater levels ranged from 3.45 m to 1.90 m bgl. In borehole BH01 (response zone 1.00 – 3.00 m bgl) located close to the proposed roundabout, the recorded groundwater levels were from 0.47 m to 1.68 m bgl.*
- 4.2.18 Three BRE 365 equivalent soakaway infiltration tests were undertaken in the Brickearth and RTD. Two results were obtained indicating infiltration rates of 4.17×10^{-6} m/s and 1.22×10^{-5} m/s respectively.

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- 4.2.19 *It is apparent from these results that the infiltration rates are poor, it is stated in the report that the result attributed to the RTD is more likely to be representative of the Brickearth. It is evident that the high groundwater table encountered and the unstable nature of the trial pits prevented CCGI from being able to test adequately to get a representative infiltration rate for the RTD and had to rely on extrapolated data.*

5 LABORATORY ANALYSIS

5.1 Introduction

- 5.1.1 The following section summarises the laboratory chemical and geotechnical analyses undertaken on soil samples collected during the ground investigation. Full laboratory analysis reports are presented within Appendix D and Appendix E respectively.

5.2 Geo-environmental

- 5.2.1 Laboratory chemical analyses were undertaken on a selection of shallow soil samples taken across both proposed road routes. Five samples were despatched for contamination testing to Element under full chain of custody documentation. Chemical analyses were carried out for a general suite of contaminants on five samples in accordance with MCERTS accreditation standards as listed in Table 4.1 below;

Table 4-1 – Chemical Analyses

Determinands Analysed
Metals (As, Cd, Cr (total), Cr(VI), Hg, Pb, Cu, Ni, Zn, S)
Sulphide
Extractable Petroleum Hydrocarbons (EPH) (C10-C40)
Total Petroleum Hydrocarbons (TPH) Aliphatic/Aromatic split (CWG) (C5-C44)
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) & Methyl tert-butyl ether (MTBE)
Speciated Polycyclic Aromatic Hydrocarbons (PAHs)
Total Cyanide
Total phenols
pH
Asbestos Identification
Soil Organic Matter

- 5.2.2 In addition to the standard suite of testing, Waste Acceptance Criteria (WAC) testing was undertaken on another five samples, and a composite sample of topsoil material from Ws02 and WS04 scheduled for Topsoil testing in accordance with BS3882:2015 requirements. The topsoil test was subcontracted by Element to NRM Laboratories in Bracknell where the sample was analysed by in accordance with BS 3882 Specification for Topsoil (2015).
- 5.2.3 A summary and discussion of the results is given in Section 6.

5.3 Geotechnical

- 5.3.1 Soil samples considered to be representative of ground conditions encountered were scheduled by RPS and submitted to GSTL UKAS accredited laboratories for various geotechnical analyses, the following tests being carried out in accordance with BS1377:1990 (British Standards Institution, 1990), unless stated otherwise as detailed within Table 4.2 below.
- 5.3.2 Analyses included samples from the proposed attenuation basin locations to allow characterisation for potential earthworks usage. Further assessment on this is presented in Section 7 of this report.

Table 4-2 – Geotechnical Analyses

Scheduled Geotechnical Laboratory Tests	No of Tests
Moisture Content	10
Plasticity Index (4 point)	8
Particle Size Distribution (PSD) Wet Sieving	6
PSD sedimentation by pipette	4
Particle Density using gas jar method	5
MCV at received moisture content	1
Dry Density/Moisture Content Relationship Compaction (2.5 kg rammer)	2
Dry Density/Moisture Content Relationship Compaction (4.5 kg rammer)	1
BRE SD1 Suite D	5

5.3.3 The results of the geotechnical analyses are provided in Appendix D.

6 GROUND CONDITIONS

6.1 Introduction

- 6.1.1 The ground conditions revealed by the investigation generally confirm the anticipated shallow geological sequence and were broadly consistent with the published geology and the findings of the CCGI ground investigation undertaken for Ramboll (summarised in Section 3).
- 6.1.2 The following superficial deposit sequence was identified;
- Topsoil;
 - Brickearth; and
 - River Terrace Deposits;
- 6.1.3 Made Ground was not encountered in any of the exploratory holes. The depth to bedrock was not proven during this investigation.

6.2 Topsoil

- 6.2.1 A surface material identified as 'Topsoil' was recorded in all of the exploratory hole locations to depths of between 0.25 m and 0.30 m bgl. This was described as being similar in appearance throughout the investigation area and comprised dark brown clayey slightly gravelly fine to coarse sand, the gravel component consisting of flint. The observed maximum thicknesses were less than observed during the previous NHM ground investigation.
- 6.2.2 No in-situ testing was undertaken on this material.
- 6.2.3 It should be noted that the description of 'Topsoil' does not necessarily mean that the deposits would conform to the BS3882 (2025) definition of topsoil without further confirmatory testing.
- 6.2.4 The testing undertaken on the composite topsoil sample from boreholes WS02 and WS04 allows a comparison with the criteria set by BS3882. A comparison of the data with the criteria for the multi-purpose topsoil indicates that other than in respects of nitrogen, the topsoil is likely to be compliant. A deficit in nitrogen has the potential to impact on plant growth in certain circumstances, but would not necessarily preclude the reuse of the topsoil as part of the scheme and can be addressed through the addition of fertiliser where necessary. Where the topsoil are to be retained within the scheme, it is recommended that a specific assessment of the need to increase nitrogen contents is undertaken based on the specific use and proposed planting.
- 6.2.5 Comparison with the further use scenarios outlined in BS3882 (acid, calcareous, low fertility, low fertility acid and low fertility calcareous) identifies multiple non compliances with the criteria respects to pH, carbonate content, nitrogen and phosphorus content.

6.3 Brickearth

- 6.3.1 Encountered beneath the Topsoil in all exploratory hole locations bar WS03 was a superficial deposit identified as Brickearth. This correlates with the findings of the previous NHM Gground investigation, undertaken in 2022. In the RPS ground investigation the base of this material was not proven in the inspection pits undertaken at locations WS06 to WS11, however in boreholes WS01 to WS05, the base of the deposit was identified as between 1.30 m and 1.55 m bgl.
- 6.3.2 The material encountered is described as a cohesive deposit with a high granular content with typical descriptions of soft to firm light grey, mottled orangish brown slightly gravelly sandy clay, with occasional bands of slightly gravelly clayey sand, the gravel comprising mainly subangular to subrounded fine to medium, rarely coarse flint.

- 6.3.3 In WS04 a band of medium dense orangish brown mottled light grey fine to coarse sand with localised bands of sandy gravelly clay was proven between 0.90 m and 1.55 m bgl. This has tentatively been identified as Brickearth although may correspond to RTD.

6.4 River Terrace Deposits

- 6.4.1 In the dynamic sampling boreholes, deposits interpreted as being River Terrace were proven beneath the Topsoil (WS03) or Brickearth (WS01, WS02, WS04 and WS05) to the termination of the borehole on SPT refusal at depths varying from 1.00 m bgl (WS03) to 4.00 m bgl (WS01).
- 6.4.2 The SPT N_{60} values range between 25 and typically in excess of 50 (extrapolated results of 54.5 to 83) The RTD encountered comprised locally medium dense to more generally very dense, light brown, sandy or very sandy, slightly clayey to clayey, angular to subrounded fine to coarse flint gravel.

6.5 Groundwater

- 6.5.1 Groundwater strikes were encountered within all dynamic sampling boreholes during the ground investigation and are summarised in Table 5-1 below. The groundwater strikes are also shown on the exploratory hole logs included within Appendix B.

Table 5-1 – Groundwater Strikes

Borehole	Depth (m bgl)	Deposit
WS01	1.40	River Terrace Deposits
WS02	1.20	Brickearth
WS03	0.40	River Terrace Deposits
WS04	1.00	Brickearth
WS05	0.90	Brickearth

- 6.5.2 Groundwater strikes could not be clearly identified during excavation of the inspection pits due to ingress of standing water originating from the ground surface.
- 6.5.3 The results of the groundwater level monitoring recorded by the installed data loggers will be included in an addendum report on completion of the designated three monthly monitoring period. At the time of writing circa 6 weeks of groundwater level monitoring data have been downloaded from boreholes WS01 and WS03, in proximity to the proposed stream culvert and attenuation pond 1. The data is currently being processed however dip readings at the time of data download indicates groundwater levels of 1.16 m bgl and 'dry' within WS01 and WS03 respectively.
- 6.5.4 As previously set out BH03, advanced as part of CCGI investigation was advanced adjacent to proposed Attenuation Basin 3 and recorded groundwater levels between 3.45 m to 1.90 m bgl. In borehole BH01 (response zone 1.00 – 3.00 m bgl) located close to the proposed roundabout, the recorded groundwater levels were from 0.47 m to 1.68 m bgl indicating significant spatial variability in groundwater levels.

7 CONTAMINATION APPRAISAL

7.1 Introduction

- 7.1.1 A standard suite of chemical analyses were undertaken on soil samples taken from the areas and depths of proposed attenuation pond excavations to allow waste classification to be undertaken of potential arisings. Waste Acceptance criteria (WAC) testing was also undertaken to determine if the material would be suitable for disposal at an inert waste facility if required.

7.2 Waste Classification Assessment

- 7.2.1 Five Waste Acceptance Criteria (WAC) analyses were undertaken on Topsoil/Brickearth samples from WS01 0.00-0.30 m (representative of proposed culverted water course), WS03 0.00-0.25 m (representative of attenuation basin 1), WS06 at 0.50 m (representative of attenuation basin 3), WS07 0.00-0.30 m (representative of attenuation basin 2) and WS05 at 0.50 m.
- 7.2.2 The results of solid soils analysis undertaken on eight soil samples including the WAC scheduled samples where possible have been used for Waste Classification purposes in accordance with WM3 (2021). The results have been reviewed using the HazWaste Online reference tool to determine if the soils sampled would be classified as hazardous or non-hazardous. The results indicate that all eight samples are classified as non-hazardous. The data sheets generated by the HazWaste Online assessment are also presented in Appendix D together with the laboratory results.
- 7.2.3 The WAC results suggest that material will meet the criteria required for disposal as inert waste.
- 7.2.4 From the assessments undertaken it is apparent that surplus shallow soils generated as part of the construction process are likely to be non-hazardous and suitable for disposal at an inert waste.
- 7.2.5 It is recommended that the laboratory testing results are provided to a suitably competent and licensed waste broker for advice/guidance on how to proceed with off-site disposal.

8 GEOTECHNICAL APPRIASAL

8.1 Introduction

- 8.1.1 The following section provides an appraisal of the classification criteria established from in-situ and laboratory analysis of the shallow ground conditions identified during the RPS Ground Investigation.
- 8.1.2 Comments and the nature and extent of each stratum are presented in the following sections of this report. Where characteristic values of parameters for geotechnical design are suggested in the discussion on ground conditions below, reference should be made to terminology and definitions given in the BS EN 1997-1 (2004a) and BS EN 1997-2 (2007) as appropriate. Characteristic values of geotechnical properties and design values for use in geotechnical design should be reviewed and selected by the Geotechnical Designer taking into consideration the limit states and design methods being used, and the process should be documented in the Geotechnical Design Report.

8.2 Brickearth

- 8.2.1 The results of eight Atterberg tests on samples of the Brickearth confirm it to be a clay of low to intermediate plasticity. Based upon the modified plasticity indices, this material is considered to be of low to medium volume change potential in response to changes in moisture content (NHBC, 2022).
- 8.2.2 Moisture Content results for eleven Brickearth samples analysed recorded values of between 16 % and 29 %. The average moisture content of the samples tested is 22.5 %.
- 8.2.3 SPT tests undertaken during borehole formation proved a range of N_{60} Values from $N_{60}=9$ to $N_{60}=38$, Using the correlation by Stroud, whereby undrained shear strength $C_u = f_1 \times N$ and $f_1 = 5$ is considered appropriate based on the Plasticity Index results. This corresponds approximately to undrained shear strength values in the range of between 45 kPa to 190 kPa increasing with depth, corresponding to a firm to very stiff consistency, however it is apparent that the latter test bridged the change in strata to RTD and therefore may not be fully representative of the Brickearth unit.
- 8.2.4 Particle size distributions were determined for four samples by wet sieving. The fine fractions of these samples were further analysed by sedimentation using the pipette method. The results are presented as grading curves. The results indicate that the Brickearth analysed comprised (slightly) silty, clayey (slightly) gravelly fine to coarse sand/sandy clay.
- 8.2.5 In accordance with the Manual of Contract Documents for Highway Works (MCHW) specification for Highway Works Series 600 the material would be classified as being a Class 2A wet cohesive material based on grading and moisture content being greater than 4 % wet of Plastic Limit. The compaction characteristics of two selected Brickearth samples were investigated using a 2.5 kg rammer. The results are presented as a plot of dry density against moisture content. Particle Density by gas jar analyses were undertaken on three samples of the Brickearth. These provided similar results of 2.58-2.60.
- 8.2.6 The results of the compaction studies show that the optimum moisture content of the material is circa 9 % with a Maximum Dry Density (MDD) of 1.90 Mg/m³. Assuming a minimum dry density criterion of 95 % of 2.5kg Maximum Dry Density (1.80 Mg/m³) is adopted then an upper bound moisture content of circa 17 % would need to be achieved. Similarly setting a lower bound maximum air void content of 10 % would set a lower bound acceptable moisture content as being 9%. It is therefore apparent that the insitu moisture content of the material is typically in excess of this range and as such it would be anticipated that moisture conditioning or treatment of the material would be needed to achieve a suitable level of compaction as engineered fill.

- 8.2.7 The BRE SD1 (2005) reduced suite; water soluble sulphate, total sulphate and total sulphur, together with pH were determined for five samples by CTS Group using in-house methods. In accordance with the BRE Special Digest 1 (2005) the site is not regarded as brownfield and/or containing sulfides within the ground. The chemical analyses recorded in the investigation fall within the Design Sulfate Class DS-1, based upon the water-soluble sulphates. Taking into account potentially static groundwater conditions given the Ramboll infiltration test results and with typical neutral to alkaline pH values of 6.9 to 7.9, an ACEC site classification of AC-1s is proposed.

8.3 River Terrace Deposits

- 8.3.1 Moisture Content results for three RTD samples analysed recorded values of 7.5 %, 8.6% and 8.9 % respectively.
- 8.3.2 SPT tests undertaken within the RTD proved a range of N_{60} Values from $N=25$ to $N=>50$ (extrapolated results of $N_{60} = 54.5$ to 83) corresponding to medium dense to very dense.
- 8.3.3 Particle Density by gas jar analyses were undertaken on two samples of the RTD. These provided results of 2.59 and 2.65.
- 8.3.4 Particle size distributions were determined for two samples by wet sieving [Part 2:9.2]. The results are presented as grading curves and indicate the material to comprise (slightly) silty/clayey, fine to coarse sandy fine to coarse gravel.
- 8.3.5 The compaction characteristics of one RTD sample were investigated using a 4.5 kg rammer. The results are presented as a plot of dry density against moisture content. The result of the compaction study show that the optimum moisture content of this single test result (recognising that material was screened and 35 % of the material was retained on a 20 mm sieve before undertaking the test) is circa 9 % with a Maximum Dry Density (MDD) of 2.16 Mg/m^3 .
- 8.3.6 Assuming a minimum dry density criterion of 95 % of 4.5 kg Maximum Dry Density (2.05 Mg/m^3) is adopted then an upper bound moisture content of circa 11 % would be required. Similarly setting a lower bound maximum air void content of 10 % would set a lower bound acceptable moisture content as being 9 %. The limited in situ moisture content of the material is typically at or around the optimum moisture content and as such it would be anticipated that moisture conditioning or treatment of the material would not be needed to achieve a suitable level of compaction as engineered fill.
- 8.3.7 It should be noted that groundwater levels are shallow and reside in the RTD. The moisture contents of these deposits are likely to vary significantly in the depth range impacted by the water table, which will be seasonally and spatially variable.

8.4 DCP Results

- 8.4.1 Six Dynamic Cone Penetrometer tests (DCP01 to DCP06) were undertaken by GSTL on 28th February 2024, three on the route of the NHM Access Road (DCP01-DCP03) and three on the Innovation Valley Access Road (DCP04 – DCP06). The locations of these tests are also shown on Drawing 1 - 94-ENV-GDE-200318_01_EHLP_Rev1 Exploratory Hole Plan.
- 8.4.2 Probe depths were measured with respect to ground level and the number of blows for the penetration of the probe was recorded. Equivalent CBR values have been calculated and presented with the results in Appendix C.
- 8.4.3 The three tests undertaken across the NHM Access Road were able to achieve between 900 mm and 1000 mm penetration. Calculated California Bearing Ratio (CBR) values ranged from 8.7 % to 17.5 % for the shallow deposits assumed to comprise the slightly gravelly sandy clay Brickearth deposits. In comparison the CBR values undertaken in TP06 and TP08, recorded values of 6.2 % and 19 % respectively.

-
- 8.4.4 The three tests undertaken for the Innovation Valley Access Road identified a more variable range of CBR values with results ranging from 6.6 % in DCP05 to 31.4 % in DCP04 where only approximately 600 mm penetration was achieved.
- 8.4.5 The brickearth material has a typical Plasticity Index of between 17 and 24 %. In accordance with CD 225 Design for new pavement foundations, and with reference to TRRL Laboratory Report 1132 a Stiffness Modulus can be attributed to these materials. It is suggested that a characteristic Subgrade Stiffness Modulus of 50 MPa (equivalent to a CBR value of circa 5 %) be considered for preliminary road and pavement design for both the NHM Access Road and the Innovation Valley Access Road, should the formation be constructed in these materials. Should the formation be constructed on fill materials then a reappraisal of likely subgrade stiffness modulus would need to be undertaken and plate bearing /CBR tests undertaken on the emplaced fill to confirm the values used in design.
- 8.4.6 The mainly cohesive deposits encountered at shallow depth are unlikely to be frost-susceptible since the soils generally had a Plasticity Index greater than 15 %.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

- 9.1.1 The RPS ground investigation findings proved a similar geological sequence to that identified in the Ramboll NHM ground investigation undertaken in 2022, albeit with a thinner topsoil unit.

9.1.1 Attenuation Basins

- 9.1.1 The initial findings of the exploratory holes have indicated that the excavations for the attenuation basins, proposed to extend to 1.00 m or 1.50 m depth are likely to terminate within the River Terrace Deposits and require removal of overlying topsoil and Brickearth deposits. The topsoil and Brickearth materials have been assessed as being non-hazardous and suitable for disposal at an inert waste facility if unsuitable for reuse in road construction.
- 9.1.2 Water strikes were identified in the RTD in boreholes WS01 (culvert) and WS03 (attenuation basin 1) within the proposed depth of culvert/basin excavation, at depths of 0.40 m bgl and 1.40 m bgl (rising to 0.90 m bgl after 20 minutes) respectively. The preliminary groundwater level data indicate groundwater levels in the region of 1.16 m bgl although data processing and conversion is currently being completed. That from the CCGI investigation identified a high degree of variability in boreholes with results ranging from approximately 0.5 m bgl to 3.45 m bgl. This high water table may present a potential constraint to effective storage capacity during winter months and during excavation and requires consideration in the design of basins to manage potential uplift and slope stability. This will be reassessed on completion of the long-term monitoring exercise currently being undertaken.

9.1.2 NHM Access Road

- 9.1.1 The NHM Access Road, particularly the southern spur from the roundabout coincides with a number of the exploratory holes undertaken in the 2022 NHM ground investigation (BH01, TP06, TP06A, TP08). These identified topsoil and brickearth (described as a slightly gravelly sandy silt or silty clay) to depths up to 1.20 m bgl and RTD to 3.00 m bgl underlain by London Clay. The RPS investigation has identified similar deposits of a sandy topsoil and slightly gravelly sandy clay Brickearth material to up to 1.55 m bgl underlain by RTD, however no evidence of London Clay was identified indicating that there may be a high degree of variability in the interface between the superficial deposits and bedrock in the site locality.
- 9.1.2 DCP testing on the route of the NHM Access Road has indicated equivalent CBR values of between 8.7 % and 17.5 %. These are in general accordance with the CBR results obtained from trial pits in the Ramboll Ground Investigation where values of 6.2 % and 19 % were recorded. However, given the plasticity of the material and the relative high groundwater table a recommended Subgrade Stiffness modulus of 50 Mpa (equivalent 5 % CBR) is recommended as a characteristic value for preliminary road design. Should the road formation be placed on fill then an appropriate design value relative to the source of fill material should be selected by the road designer. Confirmation of such should be confirmed by insitu plate bearing or CBR testing on the emplaced materials.

9.1.3 Innovation Valley Access Road

- 9.1.1 The inspection pits excavated along the route of the Innovation Valley Access Road identified similar ground conditions of a topsoil material to between 0.25 m and 0.35 m bgl overlying Brickearth to the base of excavation comprising a cohesive material with a fine to coarse sand and flint gravel content.

-
- 9.1.2 DCP testing has indicated variable equivalent CBR values perhaps reflecting variations in sand and gravel composition with results of between 6.6 % and 31.4 %. However, given the plasticity of the material and the relative high groundwater table, a recommended Subgrade Stiffness modulus of 50 Mpa (equivalent 5% CBR) is recommended as a characteristic value for preliminary road design. Should the road formation be placed on fill then an appropriate design value relative to the source of fill material should be selected by the road designer. Confirmation of such should be confirmed by insitu plate bearing or CBR testing on the emplaced materials.

9.1.4 Topsoil

- 9.1.1 The assessment of topsoil with respects to BS3882, indicates that it is compliant with the Multi Purpose criteria, other than in respects of nitrogen. A deficit in nitrogen has the potential to impact on plant growth in certain circumstances, but would not necessarily preclude the reuse of the topsoil as part of the scheme and can be addressed through the addition of fertiliser where necessary. Where the topsoil are to be retained within the scheme, it is recommended that a specific assessment of the need to increase nitrogen contents is undertaken based on the specific use and proposed planting.

9.2 Recommendations

- 9.2.1 It is recommended that reliance is obtained on the NHM ground investigation is obtained, and the relevant data (as set in this report) is considered within the design of the roads and attenuation ponds. Where conditions allow we would recommend that specific groundwater monitoring is undertaken at the location of proposed attenuation pond 2, should this extend below existing ground levels.

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- 10.7 The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not considered the perceptions of, for example, banks, insurers, other funders, lay people, etc., unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.
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REFERENCES

Building Research Establishment (2005): Concrete in aggressive ground. BRE Special Digest 1. Third Edition.

British Standards Institution (2015): Code of practice for ground investigations. BS 5930:2015+A1:2020.

British Standards Institution (2022/1990): Methods of tests for soils for civil engineering purposes. BS 1377 Parts 2 & 9.

British Standards Institution (2012): Geotechnical investigation and testing. Field testing. Standard penetration test. BS EN ISO 22476-3:2005+A1:2011.

British Standards Institution (2015): Specification for topsoil. BS3882:2015.

CC Ground Investigations Ltd (October 2022). Natural History Museum Collections and Research, Interpretative Factual Ground Investigation Report. Report Number: C7638.

Environment Agency (2021): Guidance on the classification and assessment of waste (1st Edition v1.2.GB) Technical Guidance WM3

NHBC (2022): NHBC Standards 4.2 Building near trees

Ramboll. (September 2022). Natural History Museum Collections and Research, Interpretative Ground Investigation Report. Report Number: 1620012379/v1.

RPS (2023): Desktop Study and Preliminary Risk Assessment, University of Reading, The Natural History Museum Access Road, JER9482 v1 r0.

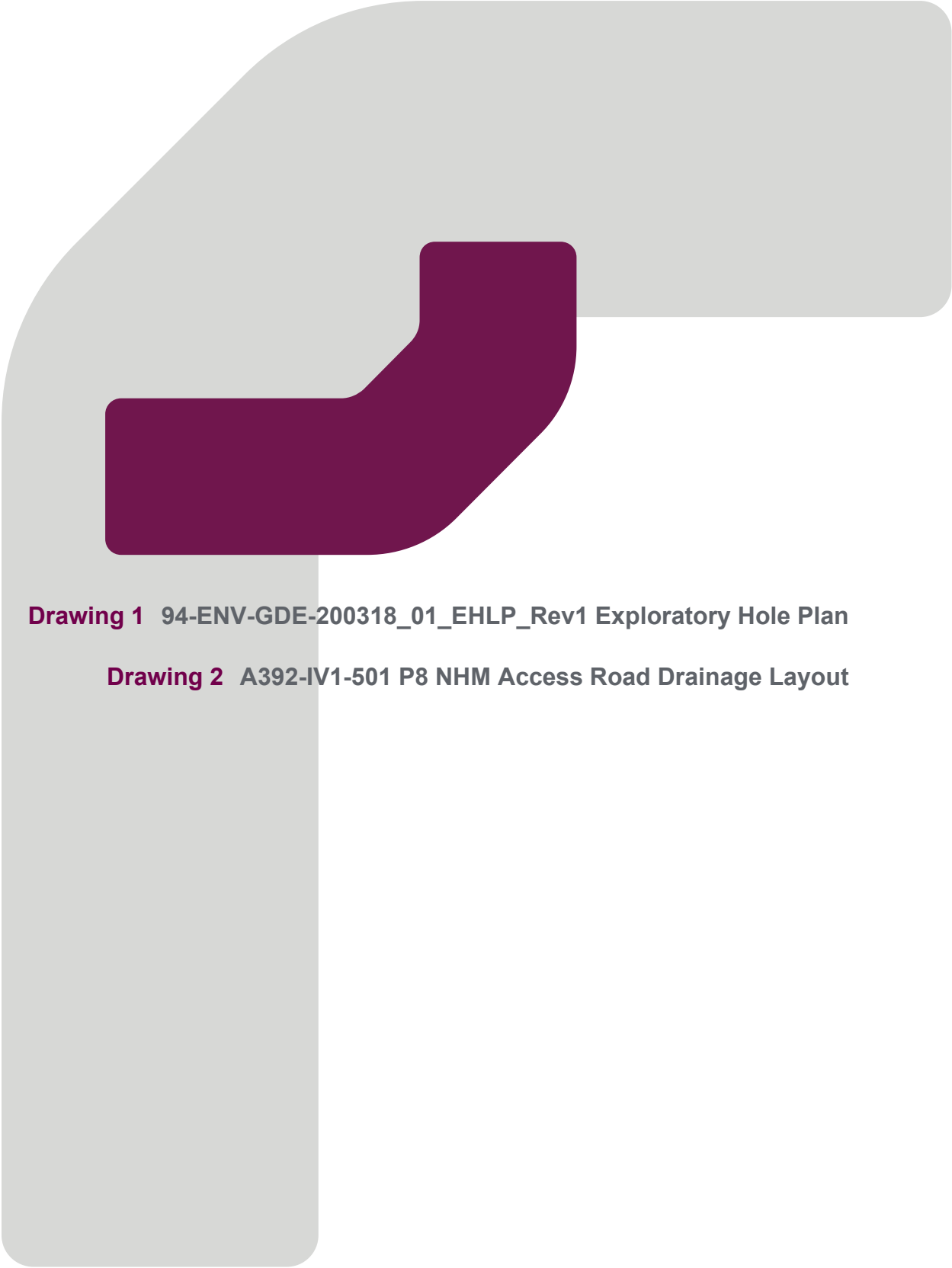
RPS (2023): Desktop Study and Preliminary Risk Assessment, University of Reading, The Natural History Museum Access Road, JER9482 v1 r0.

Highways England (2016) Manual of Contract Documents for Highway Works. Volume 1 Specification for Highway Works

Highways England (2009). CD 225 Design for new pavement foundations (formerly IAN 73/06 revision 1 Highways England, Birmingham.

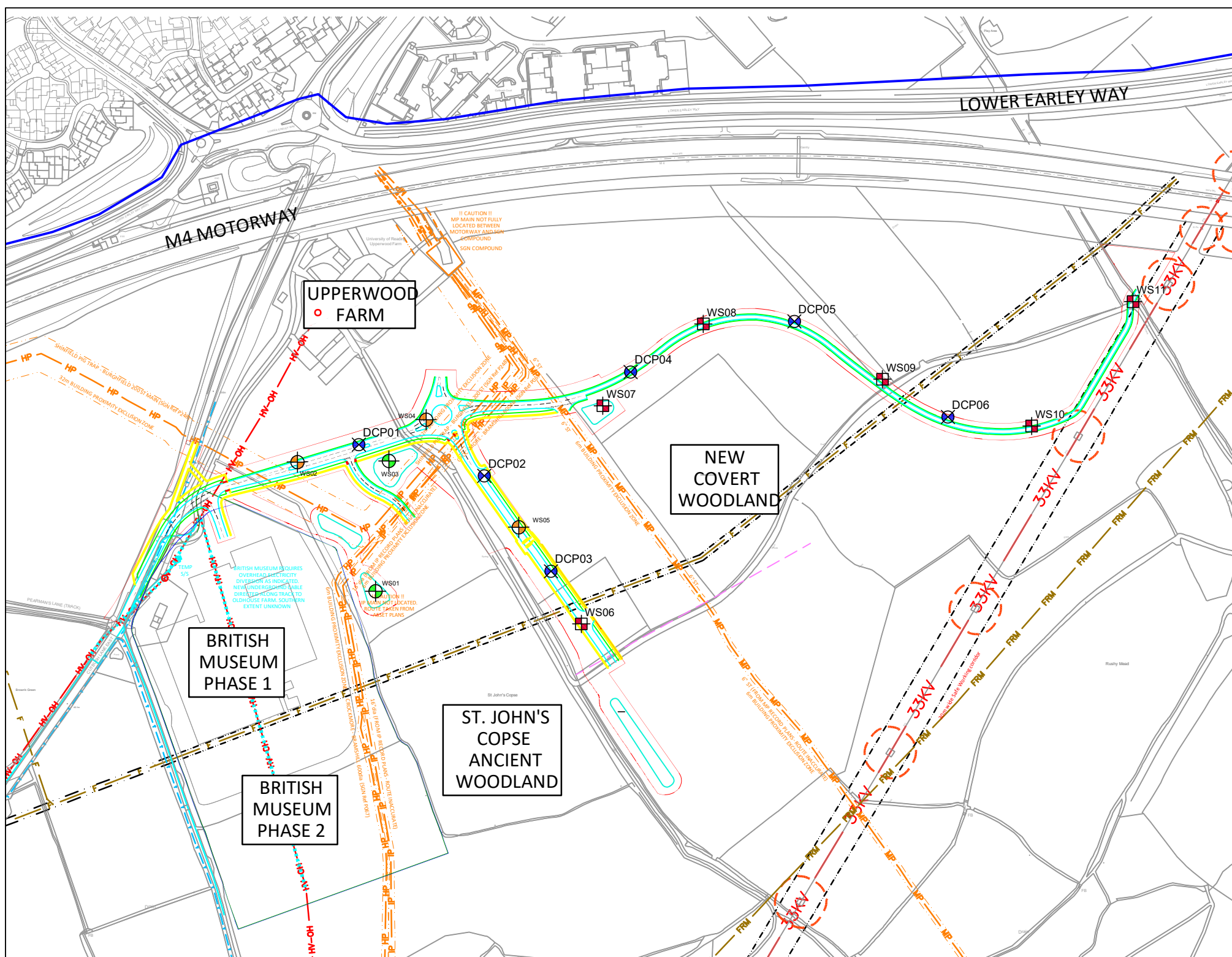
Stroud M A, 1989 The standard penetration test, its application and interpretation. ICE Conference on Penetration Testing in the UK, Birmingham, pp 29-50.

TRRL (1984) TRRL LABORATORY REPORT 1132. The structural design of bituminous roads. Transport and Road Research Laboratory Department of Transport.



Drawing 1 94-ENV-GDE-200318_01_EHLP_Rev1 Exploratory Hole Plan

Drawing 2 A392-IV1-501 P8 NHM Access Road Drainage Layout



Legend

- HAND_PTS_WITHOUT_INSTALLS
- WINDOW_SAMPLES_WITHOUT_INSTALLS
- WINDOW_SAMPLES_WITH_INSTALLS
- DYNAMIC_CONE_PENETROMETER

- EXISTING SERVICES LEGEND
- ELECTRIC - SEE POWER DISTRIBUTION
- HV 132KV OH
 - HV 33KV OH
 - HV 11KV MAINS
 - HV 11KV MAINS OH
- GAS - SOUTHERN GAS NETWORKS
- LP MAINS
 - HP MAINS
 - IP MAINS
 - HP MAINS
- WATER - THAMES WATER
- WATER MAINS
 - F W SEWER
 - F W RISING MAIN
- TELECOMS - BT / GIGACLEAR
- BT (CH)
 - BT (UG)
 - GIGACLEAR



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Client University Of Reading

Project University Of Reading Access Road GI

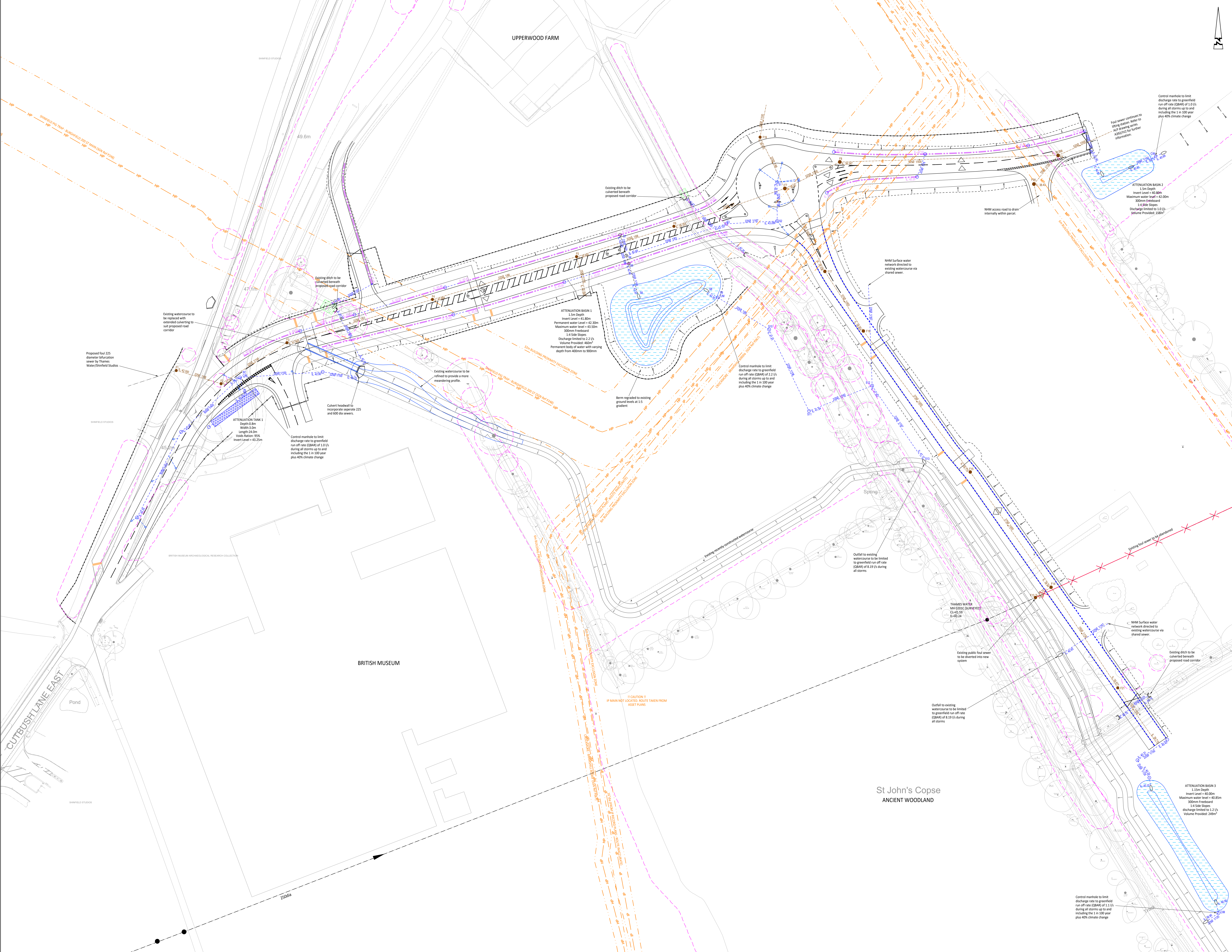
Title Exploratory Hole Location Plan

Status	Drawn By	PM/Checked by
DRAFT	JR	GR

Job Ref	Scale @ A0	Date Created
794-ENV-GDE-20318 NTS		15/04/2024

RPS Drawing / Figure Number	Rev
794-ENV-GDE-20318_001_EHLP	1

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DRAINAGE NOTES:

- Do not scale.
- This drawing is to be read in conjunction with and checked against all other drawings, Engineering details, Specification and any structural, Geotechnical or other specialist document provided.
- Site layout shown for context only, refer to other project drawings for details.
- All drainage works to be constructed as detailed in design and construction guidance or as stipulated in the water authorities addendum.
- All public sewers are to be the subject of a section 104 agreement of the water authority act 1991.
- Invert levels of existing manholes and sewers are to be checked on site before construction commences and results reported to engineers.
- The contractor is responsible for maintaining continuity of flow for all existing sewers within the site boundary and limit of works for the duration of the project.
- All drainage networks to comply with to en124, and be stamped with the kitemark, covers to suit loading as below:
 - carriageways and roads - d400
 - driveways and verges - c250
 - footways and protection areas - h125
 - gardens/landscaping - h15
- All sewer pipes, up to and including 225mm are to be verified clay to BS EN295. All sewer pipes 300mm diameter and above to be concrete pipes to BS EN1318. Where agreed with adopting authority pipes up to and including 600mm diameter can be PVC-U to BS EN1404.
- All drainage shall be installed and tested strictly in accordance with the manufacturers' printed instructions, to en 752, to en 1502, local water authority requirements and the building regulations.
- All bedding shall be class 4 unless noted otherwise.
- All trenches under existing and proposed public highways are to be bedded with thoroughly compacted and granular sub-base material.
- Drainage bed beneath roads and areas of vehicular access (or parking etc) with less than 1200mm of cover shall be enclosed in concrete bed and surround with associated movement joints, drainage bed beneath paths, footways and pedestrian areas with less than 900mm of cover shall be similarly treated.
- Chambers with outgoing pipes greater than 600mm diameter shall be fitted with guard bars, safety chains or other approved safety devices.
- The use of precast concrete products made with sulphate resisting cement is mandatory, unless a laboratory report proves such precautions are not necessary.
- All sewers to be abandoned must be surveyed to identify any lateral connections that are still live with any found to be reported to the engineer.
- All foul and storm water drains which are not to be adopted as public sewers shall be in accordance with document h of the building regulations, together with mhc standards chapter 5.3 and bs832.
- Where pipes pass through footings, retaining or screen walls, inlets to be provided over drains.
- Where inlets are less than 6.0m deep inspection chambers (min dia. 190mm) or access fittings (125 x 100mm) to be used, elsewhere proprietary plastic, brick or pcc to be used and sized in accordance with table 1.1 of document h of the building regulations (4.6m to invert min d1300, 4.6m to invert min d1075).
- Where required 1m deep root barrier of an approved type to be installed vertically along the back edge level of all areas of footway/ demarcation to protect from both proposed and future vegetation.
- Construction details subject to refinement through detailed design/technical approval process.
- Geotechnical storage tanks to have 2 manholes either side, as per manufacturer specifications.

KEY:

- Proposed Surface Water Network
- Proposed Foul Water Network
- Proposed Road gully and connection
- Proposed Beamy Blocks (or similar)
- Proposed Road side Filter drain
- Proposed Pre-cast concrete Headwall
- Proposed stone pitched headwall
- Attenuation Basin
- Existing Foul Sewer
- Foul Water sewer by others
- Existing ditch to be regraded
- Proposed Road crossfall

Scale 1:500

P8	REL 24	MINOR AMENDMENTS	KLW	LA
P7	REL 24	CORRECTION OF BASIN INVERT LEVELS	KLW	LA
P6	REL 24	MINOR AMENDMENTS	KLW	LA
P5	REL 24	POUL MAIN HOLE IS MOVED AND MAIN HOLE FRA 4000	AM	EY
P4	REL 24	MINOR UPDATES TO SW DRAINAGE IN LINE WITH LANDSCAPING PROPOSALS	KW	LA
P3	REL 24	ACCESS ROAD EXTENSION AND BASIN UPDATED	KLW	LA
P2	REL 24	DISCHARGE RATES UPDATED	GR	KLW
P1	REL 24	FIRST ISSUE	KLW	LA

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Project: THAMES VALLEY SCIENCE PARK PRIMARY INFRASTRUCTURE

Site: NHM ACCESS ROAD DRAINAGE LAYOUT

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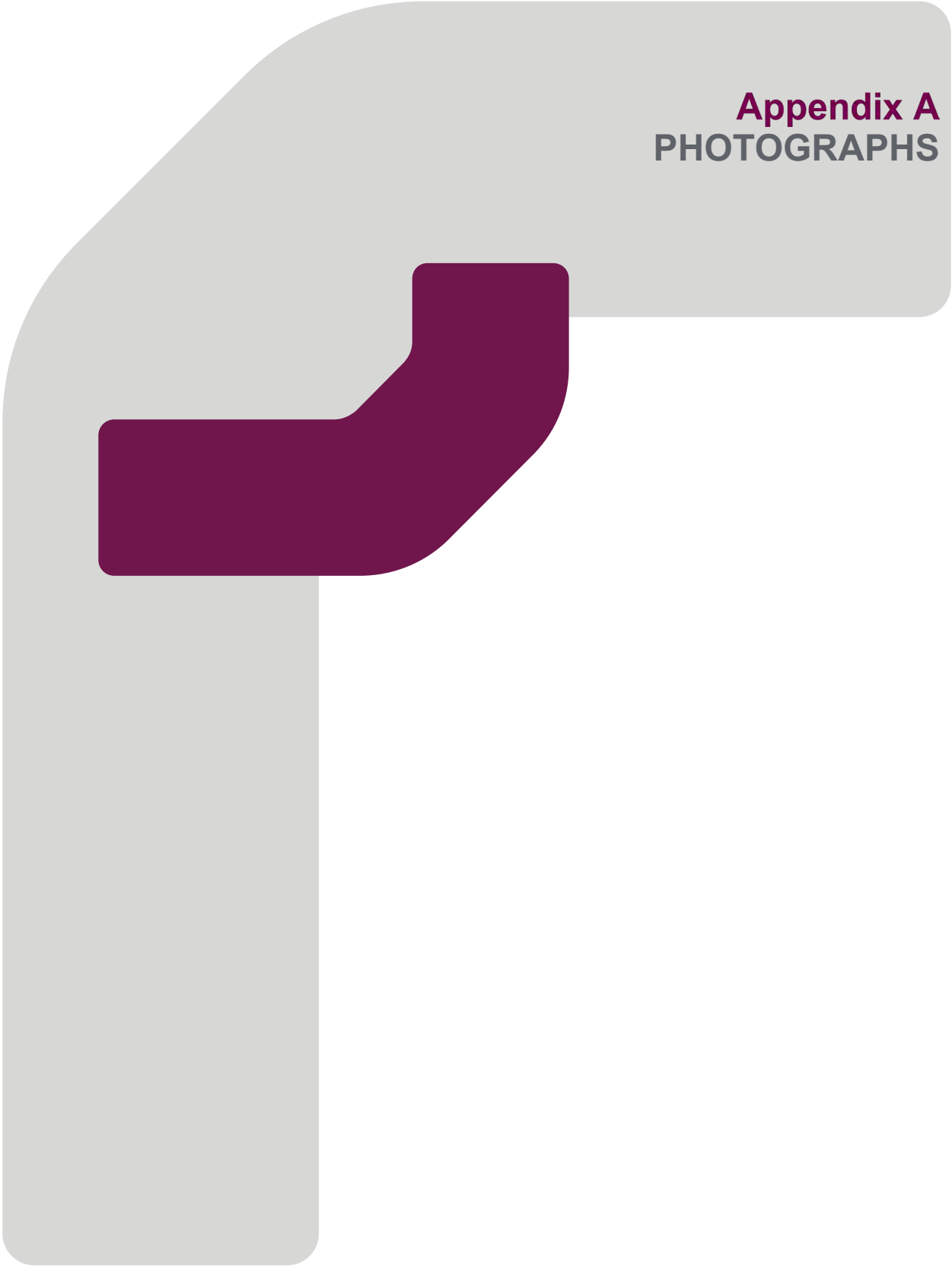
Date: SEPT 2023

Project: KLW

Checked: LA

Drawn by: A392-IV1-501

Project: P8



Appendix A PHOTOGRAPHS



Plate 01: WS01 1.00m to 2.00m



Plate 02: WS01 Preconstruction



Plate 03: WS01 Postconstruction



Plate 01: WS02 1.00m to 2.00m



Plate 02: WS02 Preconstruction



Plate 03: WS02 Postconstruction

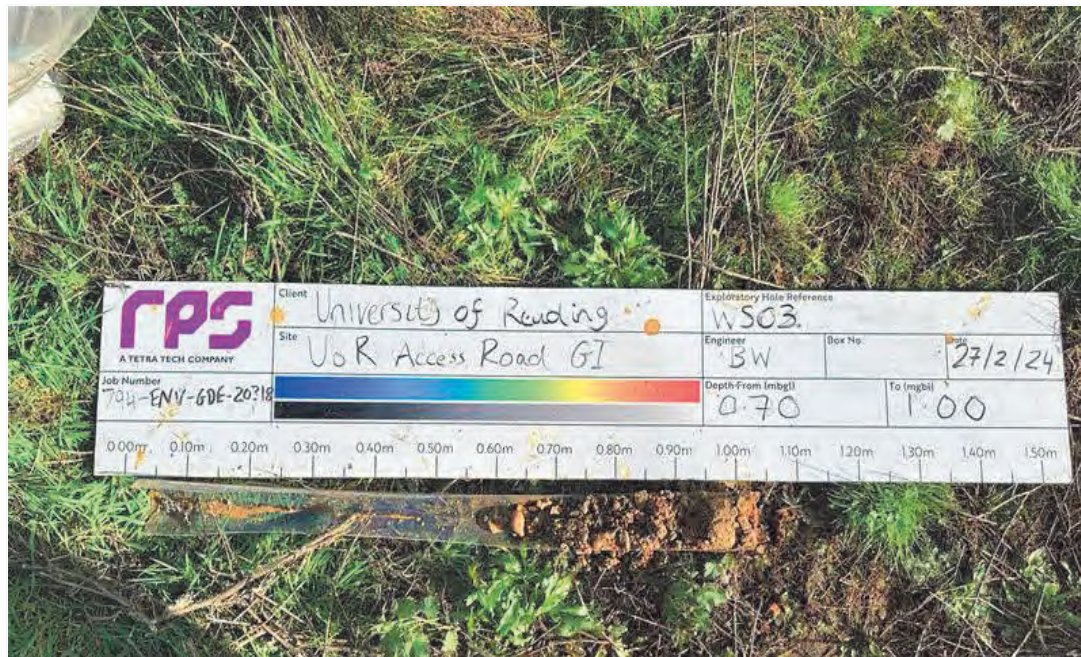


Plate 01: WS03 0.70m to 1.00m



Plate 02: WS03 Preconstruction



Plate 03: WS03 Postconstruction



Plate 01: WS04 1.00m to 2.00m



Plate 02: WS04 Preconstruction



Plate 03: WS04 Postconstruction



Plate 01: WS05 Pit



Plate 02: WS05 Postconstruction



Plate 01: WS06 Pit



Plate 01: WS07 Pit



Plate 01: WS08 Pit



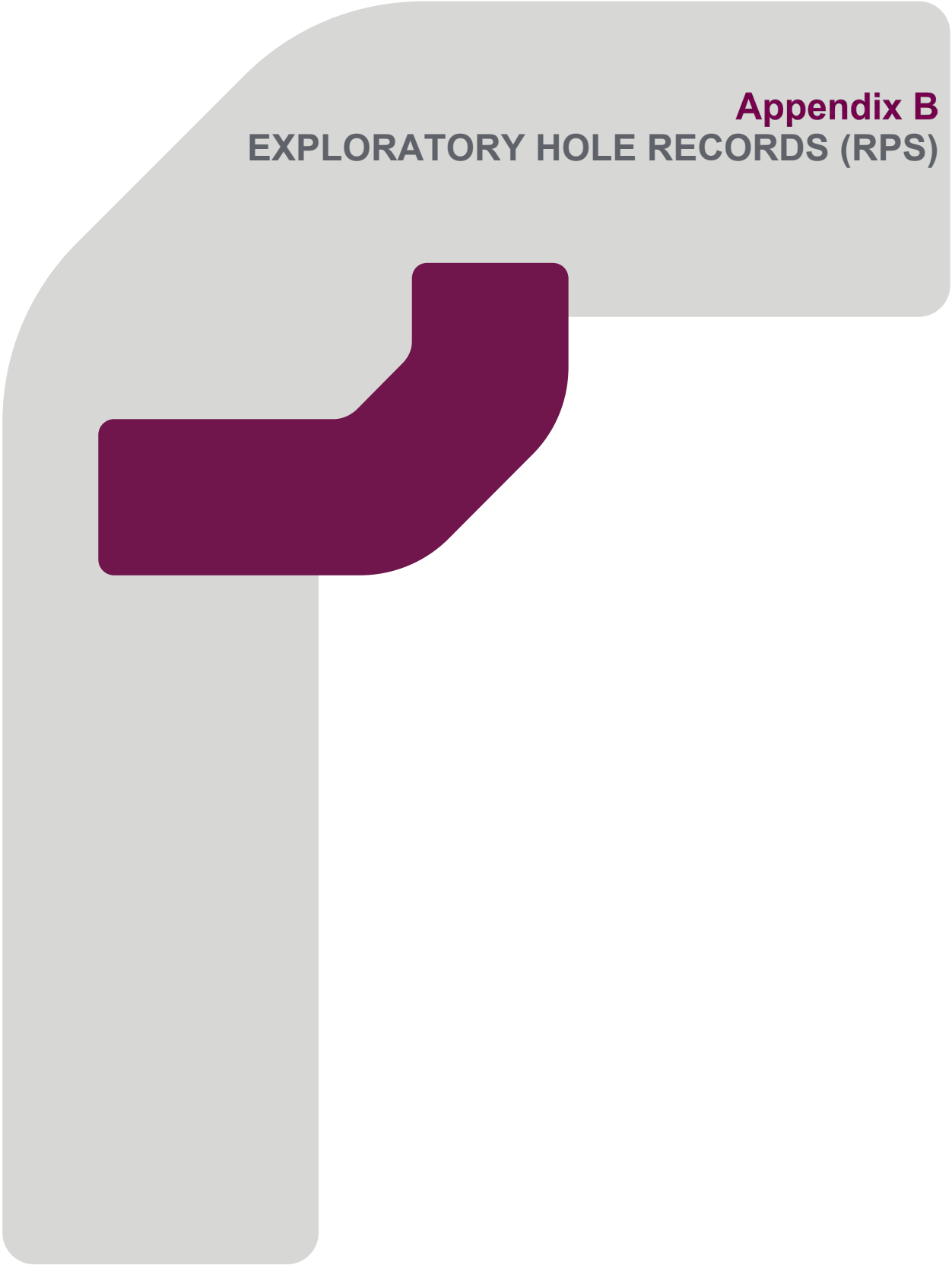
Plate 01: WS09 Pit



Plate 01: WS10 Pit



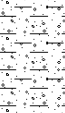
Plate 01: WS11 Pit



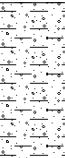
Appendix B

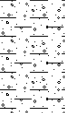
EXPLORATORY HOLE RECORDS (RPS)

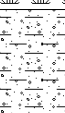
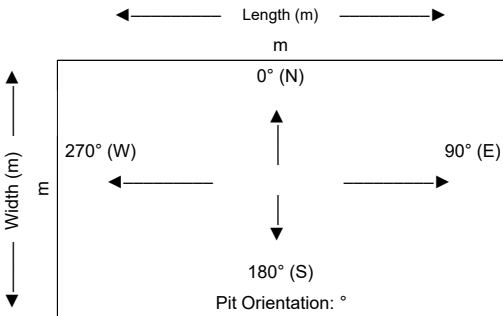
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	Contract Number: 794-ENV-GDE-20318	Start Date: 27/02/2024	End Date: 27/02/2024	Checked By: GR	Status: DRAFT	Sheet 1 of 1						
Windowless Borehole Log	Easting:		Northing:	Ground Level:	Plant Used: Archway Competitor Dart	Logged By: BW	Scale: 1:25					
Weather:			Termination: SPT refusal			SPT Hammer: Dart497 Energy Ratio: 82.88%						
Samples & In Situ Testing				Strata Details				Groundwater				
Depths	Type/Ref	SPT	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation			
0.00 - 0.30	ES1				(0.30)		Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.					
					0.30		[Topsoil] Soft light grey mottled orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine and medium flint.					
0.80 - 0.90	B				(1.00)		[Brickearth]	1				
1.10 - 1.20	D	SPT(C) 1.00m, N=38 (1,3/9,12,9,8)			1.30		Medium dense to dense light brown very sandy clayey angular to subrounded fine to coarse flint GRAVEL. Sand is fine to coarse					
1.50 - 1.70	B				(2.70)		[River Terrace Deposits] Between 1.50 and 1.70m bgl: Becoming sandy clayey gravel.	2				
		SPT(C) 2.00m, N=46 (5,10/10,12,1 2,12)			4.00		At 4.00m bgl: Becoming very dense End of Borehole at 4.00m	4				
		SPT(C) 3.00m, N=25 (4,8/7,7,5,6)						3				
		SPT(C) 4.00m, 50 (25 for 135mm/50 for 200mm)						5				
Start & End of Shift Observations				Installation				Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Ref	Top (m)	Base (m)	Type	Diameter (mm)	1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 1.00m bgl. Dynamic Sampling to 4.00m bgl. Borehole collapsing at 2.00m bgl. 3. Groundwater strike at 1.40m bgl. Groundwater level data logger installed on completion.		
					1	0.00	1.00	PLAIN	50			
Windowless Sample Run Details				Casing				Water Strikes				
Test Number	Diameter (mm)	Depth Top (m)	Depth Base (m)	Recovery (%)	Depth (m)	Diameter (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
							1.40	0.00	0.00	0		Rising to 0.90m bgl after 20 mins
RPS WLS Template Issue Number: 3 Issue Date: 01/01/2023												

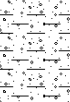
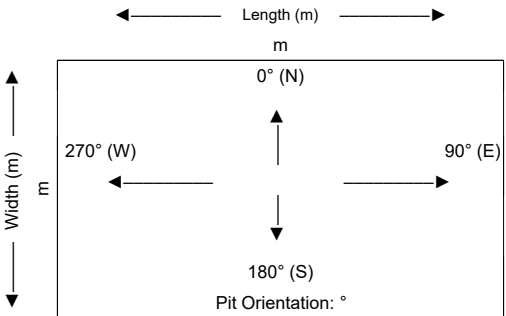
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	Contract Number: 794-ENV-GDE-20318	Start Date: 27/02/2024	End Date: 27/02/2024	Checked By: GR	Status: DRAFT							
Windowless Borehole Log	Easting:		Northing:		Ground Level:		Plant Used: Archway Competitor Dart	Logged By: BW	Sheet 1 of 1 Scale: 1:25			
	Weather:				Termination: SPT refusal				SPT Hammer: Dart497 Energy Ratio: 82.88%			
Samples & In Situ Testing				Strata Details					Groundwater			
Depths	Type/Ref	SPT	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation		
0.00 - 0.25	ES1				(0.30)		Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.					
0.40	B				0.30		[Topsoil] Soft to firm light grey mottled orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine and medium, rarely coarse subangular to subrounded flint.					
		SPT(C) 1.00m, N=9 (1,2/1,2,3,3)			(1.25)		[Brickearth] At 0.40m bgl: Locally gravelly clayey fine to coarse sand.		1			
1.45 - 1.55	D				1.55		Light brown very sandy slightly clayey angular to subrounded fine and medium flint GRAVEL. Sand is fine to coarse					
		SPT(C) 2.00m, 50 (25 for 135mm/50 for 190mm)			(0.45)		[River Terrace Deposits]					
					2.00		At 2.00m bgl: Becoming very dense. End of Borehole at 2.00m		2			
									3			
									4			
									5			
Start & End of Shift Observations				Installation				Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Ref	Top (m)	Base (m)	Type	Diameter (mm)			
										1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 1.00m bgl. Dynamic Sampling to 2.00m bgl. 3. Groundwater encountered at 1.20m bgl. 4. Borehole backfilled with arisings on completion.		
Windowless Sample Run Details				Casing				Water Strikes				
Test Number	Diameter (mm)	Depth Top (m)	Depth Base (m)	Recovery (%)	Depth (m)	Diameter (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
							1.20	0.00	0.00	0		
RPS WLS Template Issue Number: 3 Issue Date: 01/01/2023												

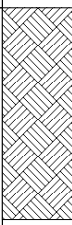
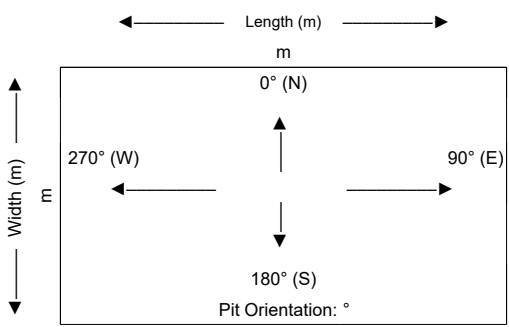
 A TETRA TECH COMPANY	Contract Name: University of Reading Access Road GI			Client: University of Reading			Borehole ID: WS03					
	Contract Number: 794-ENV-GDE-20318	Start Date: 27/02/2024	End Date: 27/02/2024	Checked By: GR	Status: DRAFT	Sheet 1 of 1						
Windowless Borehole Log	Easting:		Northing:	Ground Level:	Plant Used: Archway Competitor Dart	Logged By: BW	Scale: 1:25					
	Weather:			Termination: SPT refusal		SPT Hammer: Dart497 Energy Ratio: 82.88%						
Samples & In Situ Testing				Strata Details				Groundwater				
Depths	Type/Ref	SPT	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation			
0.00 - 0.25	ES1						Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.					
0.50	B				0.25		[Topsoil]					
					(0.75)		Light brown sandy slightly clayey angular to subrounded fine to coarse flint GRAVEL. Sand is fine to coarse					
					1.00		[River Terrace Deposits]					
		SPT(C) 1.00m, 50 (10,15/50 for 180mm)					At 1.00m bgl: Becoming very dense. End of Borehole at 1.00m	1				
								2				
								3				
								4				
								5				
Start & End of Shift Observations				Installation				Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Ref	Top (m)	Base (m)	Type	Diameter (mm)			
					1	0.00	0.40	PLAIN	50	1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 0.40m bgl. Dynamic Sampling to 1.00m bgl. 3. Groundwater strike at 0.40m bgl. Groundwater level data logger installed on completion.		
Windowless Sample Run Details				Casing				Water Strikes				
Test Number	Diameter (mm)	Depth Top (m)	Depth Base (m)	Recovery (%)	Depth (m)	Diameter (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
							0.40	0.00	0.00	0		
RPS WLS Template Issue Number: 3 Issue Date: 01/01/2023												

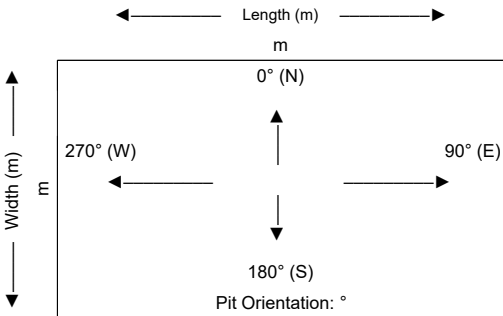
 A TETRA TECH COMPANY	Contract Name: University of Reading Access Road GI			Client: University of Reading			Borehole ID: WS04					
	Contract Number: 794-ENV-GDE-20318	Start Date: 27/02/2024	End Date: 27/02/2024	Checked By: GR	Status: DRAFT	Sheet 1 of 1						
Windowless Borehole Log	Easting:		Northing:	Ground Level:	Plant Used: Archway Competitor Dart	Logged By: BW	Scale: 1:25					
	Weather:			Termination: SPT refusal		SPT Hammer: Dart497 Energy Ratio: 82.88%						
Samples & In Situ Testing				Strata Details				Groundwater				
Depths	Type/Ref	SPT	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation			
0.00 - 0.30	ES1	SPT(C) 1.00m, N=26 (3,4/4,5,7,10)			(0.30)		Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.	1				
0.50 - 0.60	D				(0.60)		[Topsoil] Soft light grey mottled orangish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine and medium flint.					
0.60 - 0.80	B						[Brickearth] Between 0.60 and 0.80m bgl: Band of slightly gravelly clayey sand.					
1.30 - 1.40	D						(0.90)			Medium dense orangish brown mottled light grey fine to coarse SAND.		
							(0.65)			[Brickearth] From 1.30m bgl: Localised bands of sandy gravelly silty clay.		
		1.55	Light brown very sandy slightly clayey angular to subrounded fine to coarse flint GRAVEL. Sand is fine to coarse.									
				(0.45)	[River Terrace Deposits]	2						
				2.00	At 2.00m bgl: Becoming very dense.							
				End of Borehole at 2.00m								
		SPT(C) 2.00m, 50 (8,10/50 for 275mm)						3				
										4		
										5		
Start & End of Shift Observations				Installation				Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Ref	Top (m)	Base (m)	Type	Diameter (mm)	1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 1.00m bgl. Dynamic Sampling to 2.00m bgl. 3. Groundwater encountered at 1.00m bgl. 4. Borehole backfilled with arisings on completion.		
Windowless Sample Run Details					Casing					Water Strikes		
Test Number	Diameter (mm)	Depth Top (m)	Depth Base (m)	Recovery (%)	Depth (m)	Diameter (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
							1.00	0.00	0.00	0		
RPS WLS Template Issue Number: 3 Issue Date: 01/01/2023												

 A TETRA TECH COMPANY	Contract Name: University of Reading Access Road GI				Client: University of Reading				Borehole ID: WS05					
	Contract Number: 794-ENV-GDE-20318		Start Date: 29/02/2024		End Date: 29/02/2024		Checked By: GR		Status: DRAFT					
Windowless Borehole Log		Easting:		Northing:		Ground Level:		Plant Used: Archway Competitor Dart		Logged By: BW		Sheet 1 of 1 Scale: 1:25		
Weather:				Termination: SPT refusal				SPT Hammer: Dart497 Energy Ratio: 82.88%						
Samples & In Situ Testing					Strata Details							Groundwater		
Depths		Type/Ref	SPT	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/Installation	
0.00 - 0.30		ES1						Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.						
0.00 - 0.30		ES2				(0.30)								
						0.30								
0.50 - 0.60		D				(0.70)		[Topsoil] Soft light grey mottled orangish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine and medium flint.						
0.90 - 1.00		B				1.00		[Brickearth] At 1.00m bgl: <i>Becoming very dense.</i>				1		
			SPT(C) 1.00m, 50 (10,13/50 for 275mm)			(0.30)		Very dense light brown very sandy slightly clayey angular to subrounded fine to coarse flint GRAVEL. Sand is fine to coarse						
						1.30		[River Terrace Deposits] End of Borehole at 1.30m						
												2		
												3		
												4		
												5		
Start & End of Shift Observations					Installation					Remarks:				
Date		Time	Depth (m)	Casing (m)	Water (m)	Ref	Top (m)	Base (m)	Type	Diameter (mm)	1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 1.00m bgl. Dynamic Sampling to 1.33m bgl. 3. Groundwater encountered at 0.90m bgl. 4. Borehole backfilled with arisings on completion.			
Windowless Sample Run Details					Casing					Water Strikes				
Test Number		Diameter (mm)	Depth Top (m)	Depth Base (m)	Recovery (%)	Depth (m)	Diameter (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
								0.90	0.00	0.00	0			
RPS WLS Template Issue Number: 3 Issue Date: 01/01/2023														

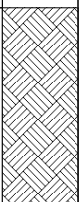
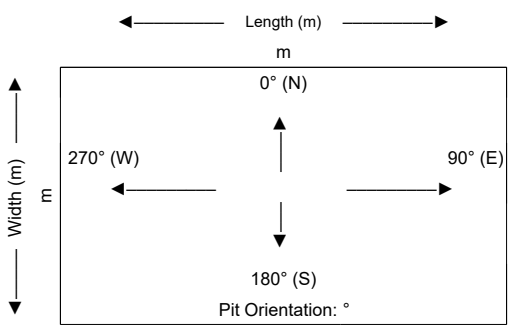
 A TETRA TECH COMPANY	Contract Name: University of Reading Access Road GI			Client: University of Reading		Trial Pit ID: WS06			
	Contract Number: 794-ENV-GDE-20318	Start Date: 29/02/2024	End Date: 29/02/2024	Checked By: GR	Status: DRAFT	Sheet 1 of 1			
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: Hand Tools	Logged By: BW	Scale: 1:25			
	Weather:			Hole Termination: target depth achieved		Stability:			
Samples & In Situ Testing						Strata Details		Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			
0.50 0.50 - 0.60 0.70	ES1 D B			(0.30) 0.30 (0.40) 0.70	  	Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint. [Topsoil] Soft light grey mottled orangish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine and medium flint. [Brickearth] End of Trial Pit at 0.70m			
								1	
								2	
								3	
Dimensions:						General Remarks:			
Final Depth: 0.70m						1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 0.70m bgl. 3. Due to standing water and unsuitable ground stability borehole substituted by hand excavated pit to obtain samples.			
									
						Water Strikes			
						Strike (m) Remarks			
						RPS TP Template Issue Number: 1 Issue Date: 13/09/2017			

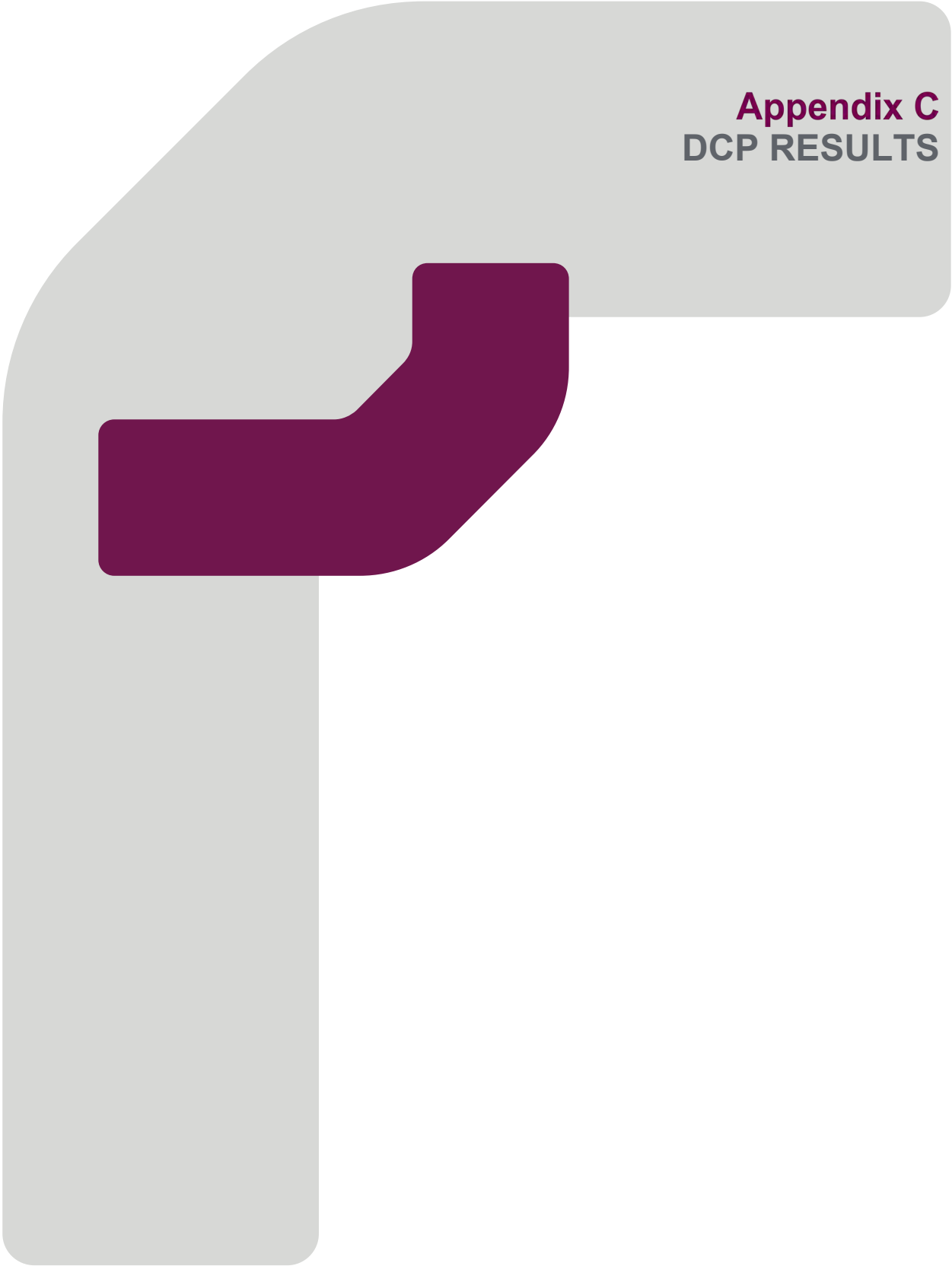
 A TETRA TECH COMPANY		Contract Name: University of Reading Access Road GI		Client: University of Reading		Trial Pit ID: WS07		
		Contract Number: 794-ENV-GDE-20318	Start Date: 29/02/2024	End Date: 29/02/2024	Checked By: GR	Status: DRAFT	Sheet 1 of 1	
Trial Pit Log		Easting:	Northing:	Ground Level:	Plant Used: Hand Tools	Logged By: BW	Scale: 1:25	
Weather:			Hole Termination: target depth achieved			Stability:		
Samples & In Situ Testing		Strata Details					Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
0.00 - 0.30	ES1			(0.30)		Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.		
0.40	B			0.30		[Topsoil] Soft light grey mottled orangish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint.		
0.60 - 0.70	D			(0.50)		[Brickearth]		
				0.80		End of Trial Pit at 0.80m		
							1	
							2	
							3	
Dimensions:		General Remarks:						
Final Depth: 0.80m		1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 0.80m bgl. 3. Due to standing water and unsuitable ground stability borehole substituted by hand excavated pit to obtain samples.						
								
		Water Strikes						
		Strike (m) Remarks						
RPS TP Template Issue Number: 1 Issue Date: 13/09/2017								

 A TETRA TECH COMPANY	Contract Name: University of Reading Access Road GI			Client: University of Reading		Trial Pit ID: WS08		
	Contract Number: 794-ENV-GDE-20318	Start Date: 29/02/2024	End Date: 29/02/2024	Checked By: GR	Status: DRAFT	Sheet 1 of 1		
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: Hand Tools	Logged By: BW	Scale: 1:25		
	Weather:		Hole Termination: target depth achieved		Stability:			
Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
				0.25		Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.		
				(0.45)		[Topsoil] Soft light grey mottled orangish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine and medium flint.		
				0.70		[Brickearth] End of Trial Pit at 0.70m		
							1	
							2	
							3	
Dimensions:						General Remarks:		
Final Depth: 0.70m						1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 0.70m bgl. 3. Due to standing water and unsuitable ground stability borehole substituted by hand excavated pit to obtain samples.		
								
						Water Strikes		
						Strike (m) Remarks		
						RPS TP Template Issue Number: 1 Issue Date: 13/09/2017		

 A TETRA TECH COMPANY	Contract Name: University of Reading Access Road GI			Client: University of Reading		Trial Pit ID: WS09		
	Contract Number: 794-ENV-GDE-20318	Start Date: 29/02/2024	End Date: 29/02/2024	Checked By: GR	Status: DRAFT	Sheet 1 of 1		
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: Hand Tools	Logged By: BW	Scale: 1:25		
Weather:		Hole Termination: target depth achieved			Stability:			
Samples & In Situ Testing				Strata Details			Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
				(0.35)		Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.		
				0.35		[Topsoil]		
				(0.45)		Soft light grey mottled orangish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine and medium flint.		
				0.80		[Brickearth]		
						End of Trial Pit at 0.80m	1	
							2	
							3	
Dimensions:				General Remarks:				
Final Depth: 0.80m				1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 0.80m bgl. 3. Due to standing water and unsuitable ground stability borehole substituted by hand excavated pit to obtain samples.				
								
				Water Strikes				
				Strike (m) Remarks				
				RPS TP Template Issue Number: 1 Issue Date: 13/09/2017				

[illegible]

 A TETRA TECH COMPANY	Contract Name: University of Reading Access Road GI			Client: University of Reading		Trial Pit ID: WS11		
	Contract Number: 794-ENV-GDE-20318	Start Date: 29/02/2024	End Date: 29/02/2024	Checked By: GR	Status: DRAFT	Sheet 1 of 1		
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: Hand Tools	Logged By: BW	Scale: 1:25		
	Weather:		Hole Termination: target depth achieved		Stability:			
Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Type/Ref	Testing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		
				(0.30)		Topsoil of dark brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine and medium flint.		
				0.30		[Topsoil]		
				(0.35)		Soft light grey mottled orangish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine and medium flint.		
				0.65		[Brickearth]		
						End of Trial Pit at 0.65m		
							1	
							2	
							3	
Dimensions:						General Remarks:		
Final Depth: 0.65m						1. Exploratory hole position CAT scanned and service plans inspected prior to excavation. 2. Inspection pit hand excavated from ground level to 0.65m bgl. 3. Due to standing water and unsuitable ground stability borehole substituted by hand excavated pit to obtain samples.		
								
						Water Strikes		
						Strike (m)	Remarks	
						RPS TP Template Issue Number: 1 Issue Date: 13/09/2017		



Appendix C

DCP RESULTS



Laboratory Report



Contract Number: 71315

Client Ref: **794-ENV-GDE-20318**

Client PO: **PO24-0118**

Date Received: **20-02-2024**

Date Completed: **29-02-2024**

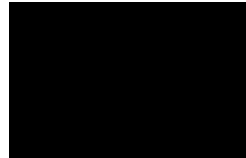
Report Date: **29-02-2024**

Client: **RPS Group**

This report has been checked and approved by:

Contract Title: **University of Reading**

For the attention of: **Patrick Roberts**



Shaun Thomas
Site Manager

Description	Qty
1 Man DCP testing Day rate, Mob included	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:

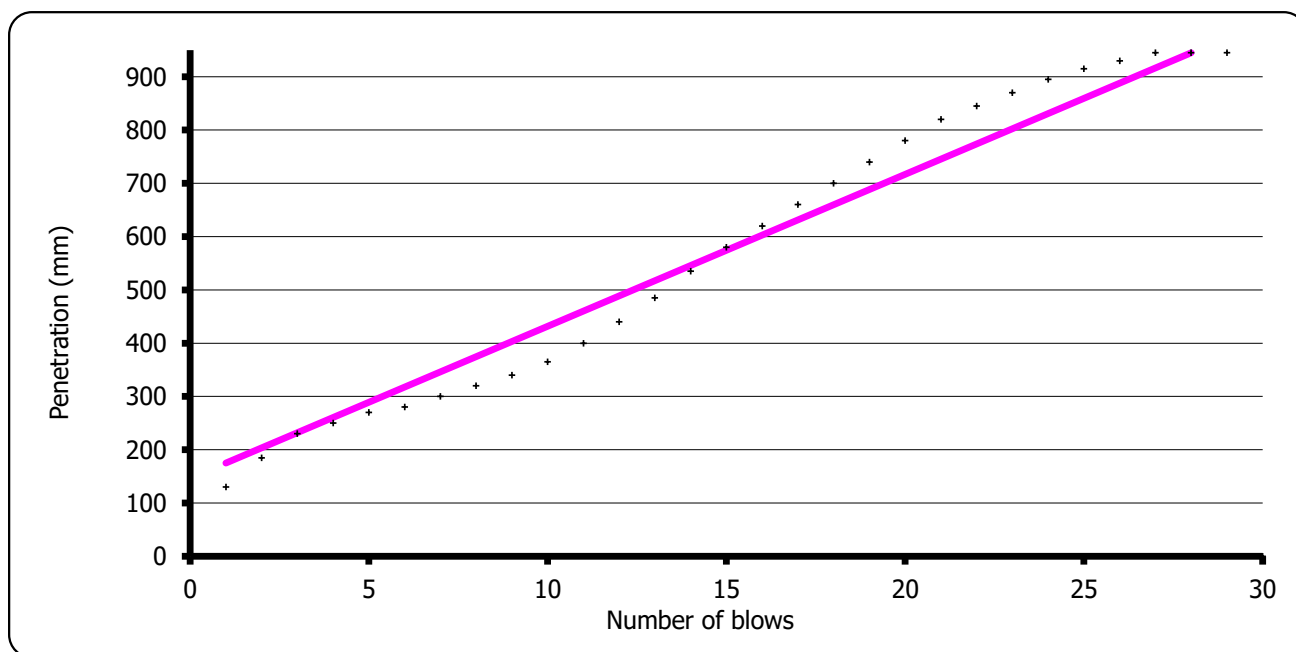
Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)

Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)

Wayne Honey (Human Resources/ Health and Safety Manager)

Test Report: **Determination of the Dynamic Cone Penetrometer Test**
CBR Value
in accordance with TRL Dynamic Cone Operating Instructions (2nd edition)

Client:	RPS Group
Client ref:	794-ENV-GDE-20318
Location:	University of Reading
Contract Number:	71315
Date tested:	28/02/2024
Test Position:	DCP01
Depth (m) :	GL
Equipment Used:	TRL - Dynamic Cone Penetrometer 1
DCP Cone Angle:	90°
Tested By:	Ashley Davies



Rate of Penetration **28.5185 mm/blow**

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \text{Log}_{10}(\text{Rate of Penetration})$$

CBR Value (%): **8.7**

Remarks:

For and behalf of GEO Site & Testing Services Ltd



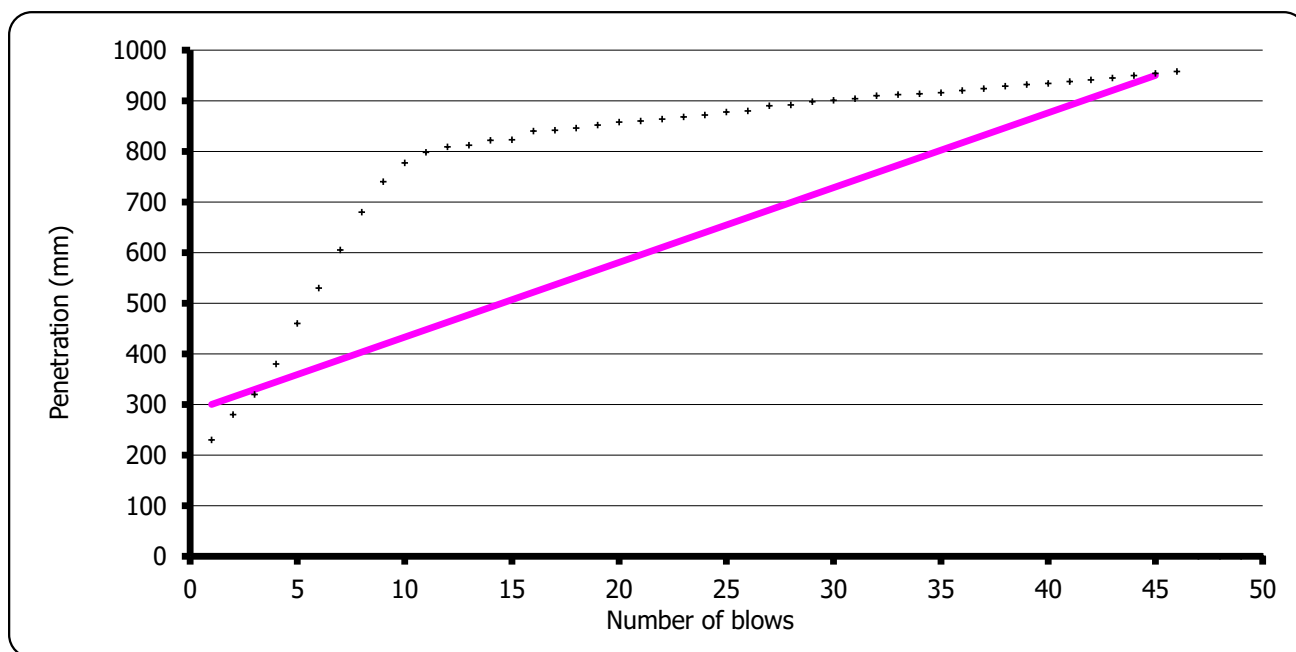
Authorised By:
Paul Evans (Quality/Technical Manager)

Date: **29.2.24**



Test Report: **Determination of the Dynamic Cone Penetrometer Test**
CBR Value
in accordance with TRL Dynamic Cone Operating Instructions (2nd edition)

Client:	RPS Group
Client ref:	794-ENV-GDE-20318
Location:	University of Reading
Contract Number:	71315
Date tested:	28/02/2024
Test Position:	DCP02
Depth (m) :	GL
Equipment Used:	TRL - Dynamic Cone Penetrometer 1
DCP Cone Angle:	90°
Tested By:	Ashley Davies



Rate of Penetration **14.7727 mm/blow**

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \text{Log}_{10}(\text{Rate of Penetration})$$

CBR Value (%): **17.5**

Remarks:

For and behalf of GEO Site & Testing Services Ltd



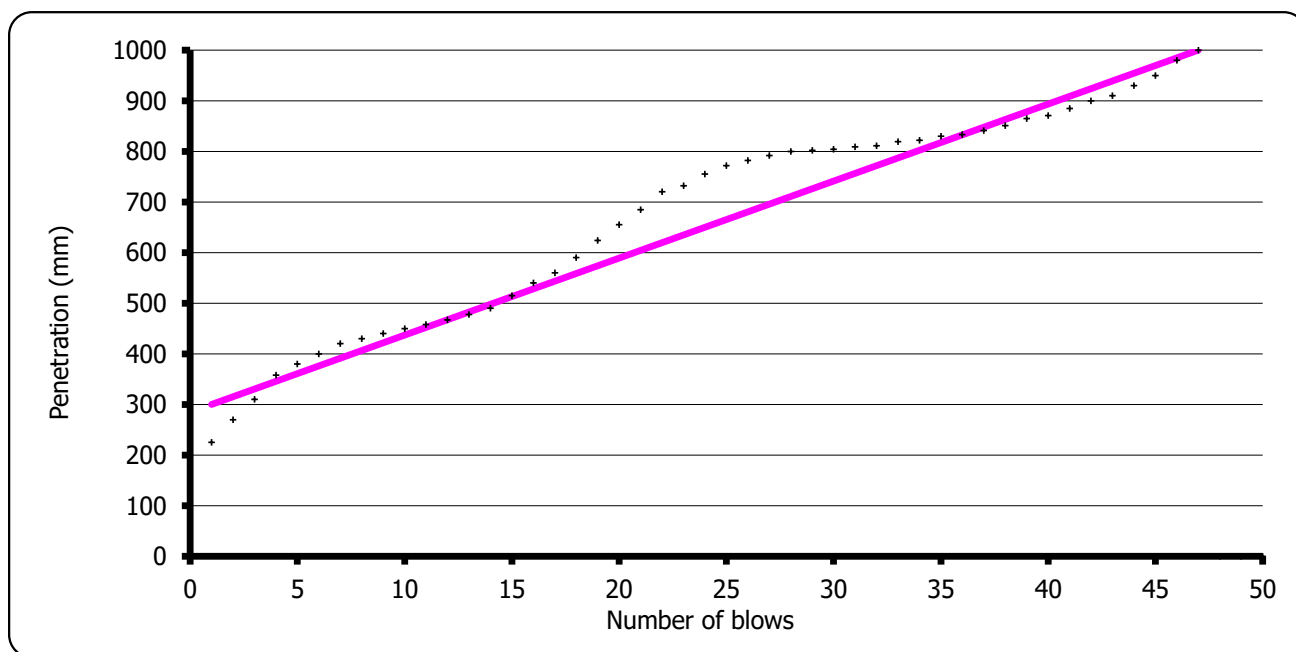
Authorised By:
Paul Evans (Quality/Technical Manager)



Date: **29.2.24**

Test Report: **Determination of the Dynamic Cone Penetrometer Test**
CBR Value
in accordance with TRL Dynamic Cone Operating Instructions (2nd edition)

Client: RPS Group
Client ref: 794-ENV-GDE-20318
Location: University of Reading
Contract Number: 71315
Date tested: 28/02/2024
Test Position: DCP03
Depth (m) : GL
Equipment Used: TRL - Dynamic Cone Penetrometer 1
DCP Cone Angle: 90°
Tested By: Ashley Davies



Rate of Penetration **15.2174 mm/blow**

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \text{Log}_{10}(\text{Rate of Penetration})$$

CBR Value (%): **17.0**

Remarks:

For and behalf of GEO Site & Testing Services Ltd



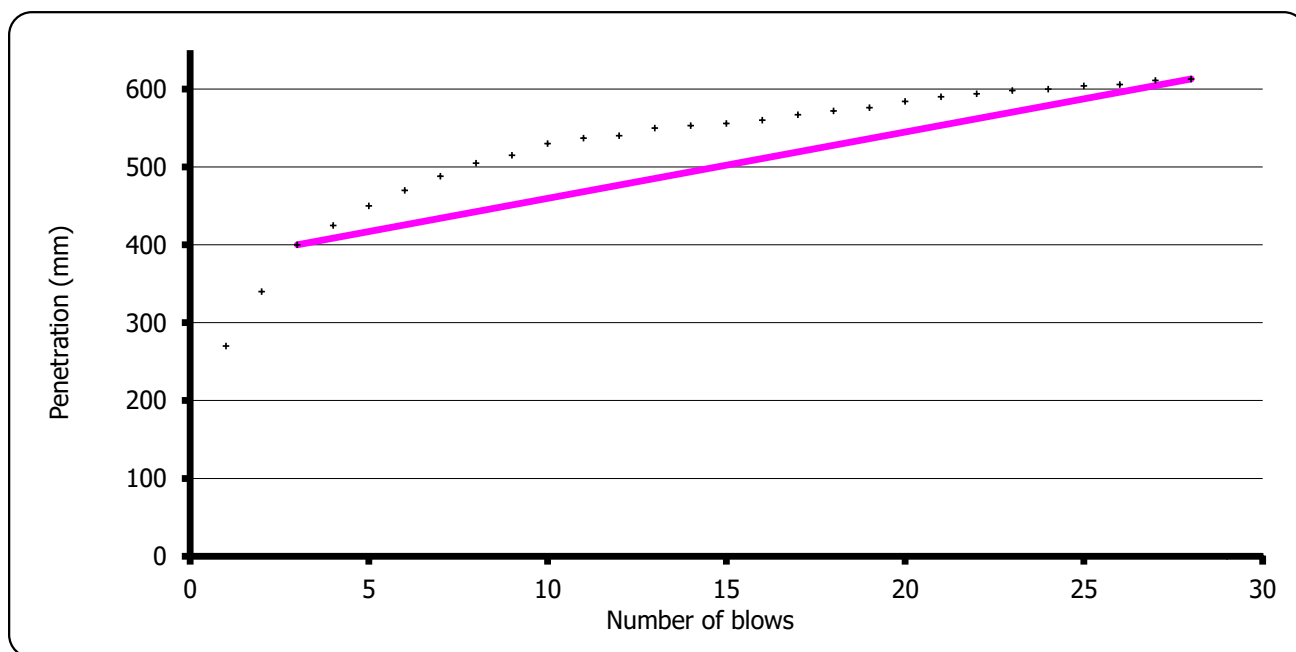
Authorised By:
Paul Evans (Quality/Technical Manager)

Date: 29.2.24



Test Report: **Determination of the Dynamic Cone Penetrometer Test**
CBR Value
in accordance with TRL Dynamic Cone Operating Instructions (2nd edition)

Client: RPS Group
Client ref: 794-ENV-GDE-20318
Location: University of Reading
Contract Number: 71315
Date tested: 28/02/2024
Test Position: DCP04
Depth (m) : GL
Equipment Used: TRL - Dynamic Cone Penetrometer 1
DCP Cone Angle: 90°
Tested By: Ashley Davies



Rate of Penetration **8.5200 mm/blow**

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \text{Log}_{10}(\text{Rate of Penetration})$$

CBR Value (%): **31.4**

Remarks:

For and behalf of GEO Site & Testing Services Ltd



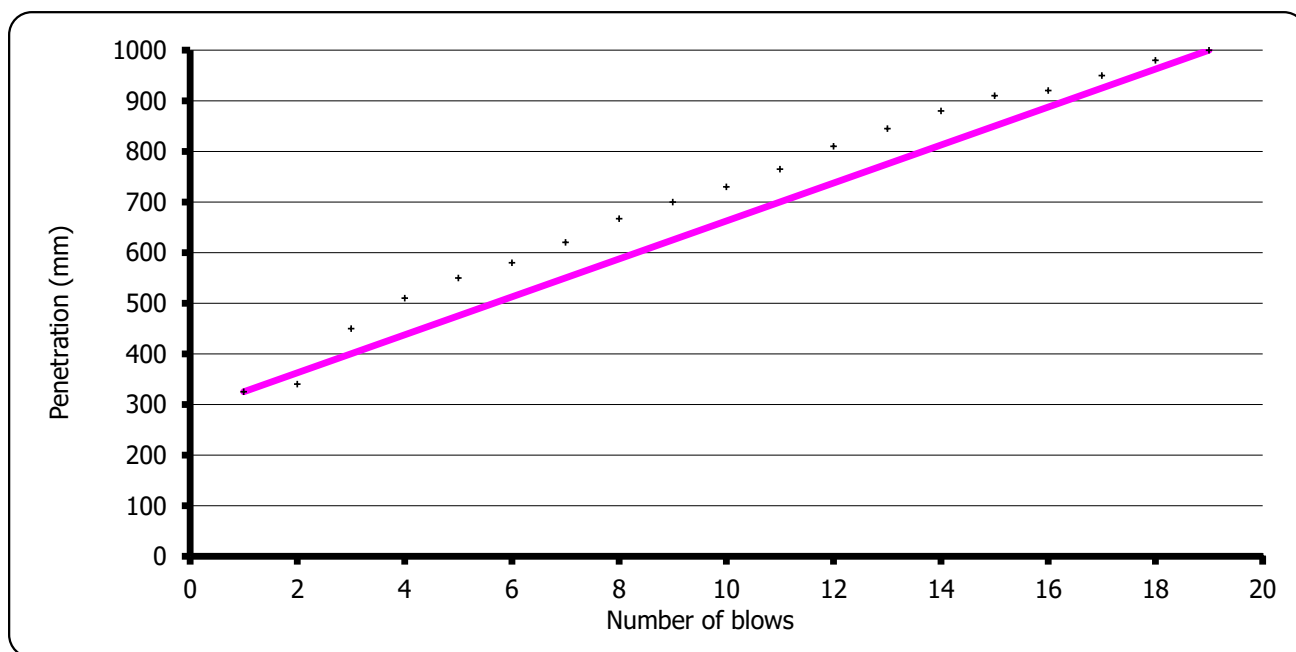
Authorised By:
Paul Evans (Quality/Technical Manager)

Date: 29.2.24



Test Report: **Determination of the Dynamic Cone Penetrometer Test**
CBR Value
in accordance with TRL Dynamic Cone Operating Instructions (2nd edition)

Client: RPS Group
Client ref: 794-ENV-GDE-20318
Location: University of Reading
Contract Number: 71315
Date tested: 28/02/2024
Test Position: DCP05
Depth (m) : GL
Equipment Used: TRL - Dynamic Cone Penetrometer 1
DCP Cone Angle: 90°
Tested By: Ashley Davies



Rate of Penetration **37.5000 mm/blow**

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \text{Log}_{10}(\text{Rate of Penetration})$$

CBR Value (%): **6.6**

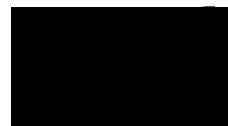
Remarks:

For and behalf of GEO Site & Testing Services Ltd



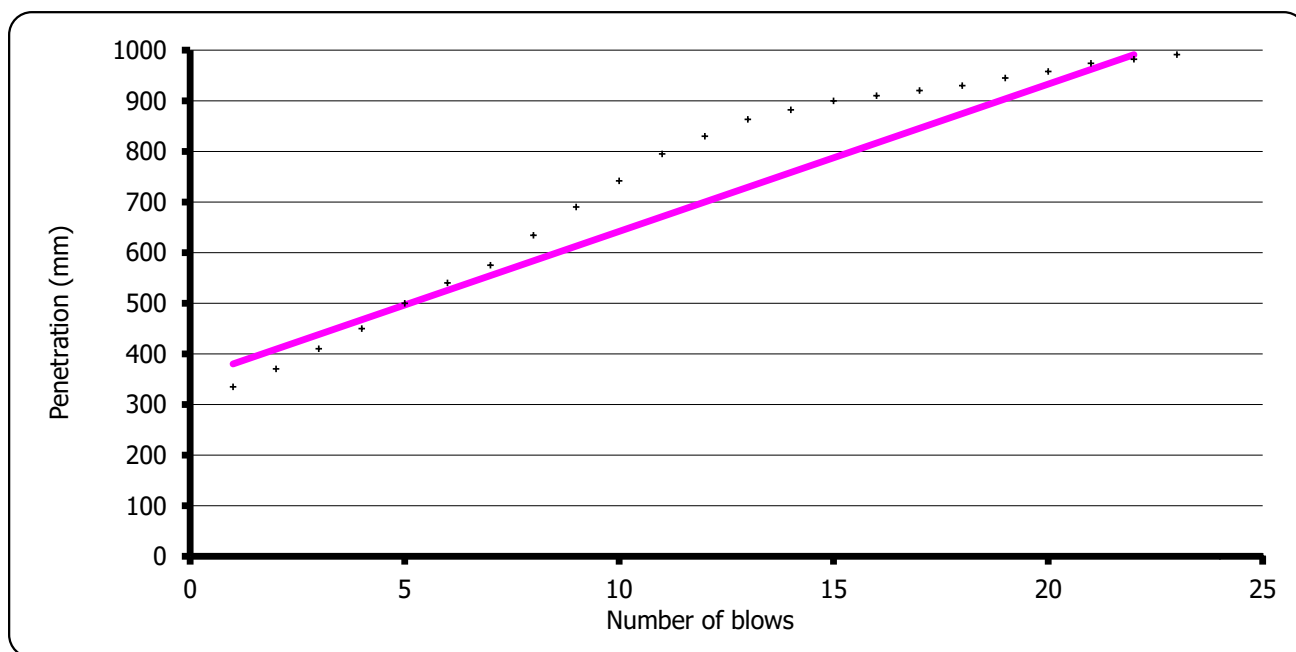
Authorised By:
Paul Evans (Quality/Technical Manager)

Date: 29.2.24



Test Report: **Determination of the Dynamic Cone Penetrometer Test**
CBR Value
in accordance with TRL Dynamic Cone Operating Instructions (2nd edition)

Client:	RPS Group
Client ref:	794-ENV-GDE-20318
Location:	University of Reading
Contract Number:	71315
Date tested:	28/02/2024
Test Position:	DCP06
Depth (m) :	GL
Equipment Used:	TRL - Dynamic Cone Penetrometer 1
DCP Cone Angle:	90°
Tested By:	Ashley Davies



Rate of Penetration **29.0952 mm/blow**

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \text{Log}_{10}(\text{Rate of Penetration})$$

CBR Value (%): **8.6**

Remarks:

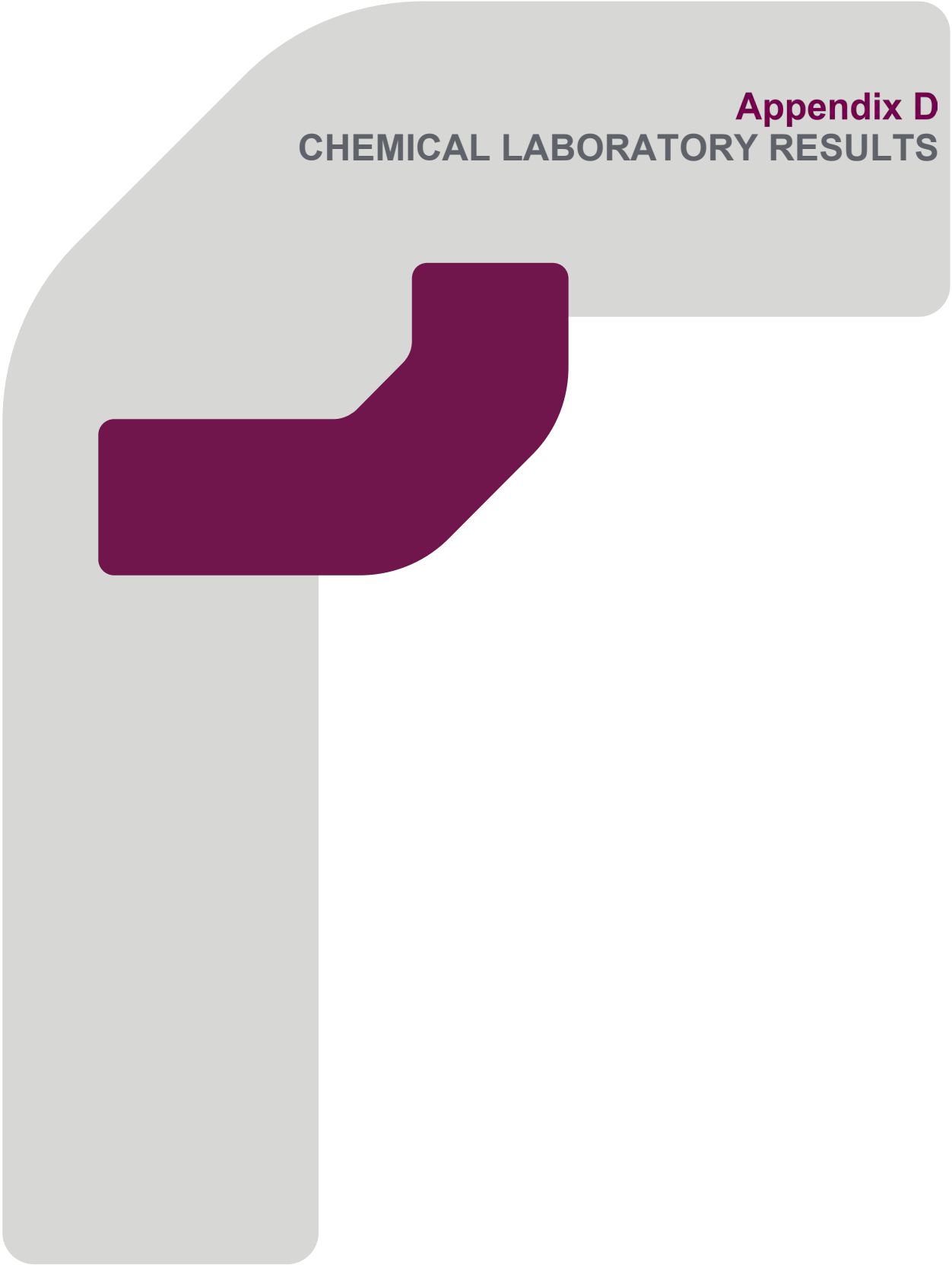
For and behalf of GEO Site & Testing Services Ltd



Authorised By:
Paul Evans (Quality/Technical Manager)

Date: **29.2.24**





Appendix D

CHEMICAL LABORATORY RESULTS

RPS Consulting Services Ltd
2nd Floor
90 Victoria Street
Bristol
United Kingdom
BS1 6DP



4225



Attention : Gary Riches
Date : 15th April, 2024
Your reference : 794-ENV-GDE-20318
Our reference : Test Report 24/3782 Batch 1
Location : University of Reading Access Road GI
Date samples received : 2nd March, 2024
Status : Final Report
Issue : 202404151343

Thirteen samples were received for analysis on 2nd March, 2024 of which nine were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

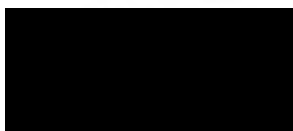
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 39.168 kg of CO2

Scope 1&2&3 emissions - 92.565 kg of CO2

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: RPS Consulting Services Ltd
Reference: 794-ENV-GDE-20318
Location: University of Reading Access Road GI
Contact: Gary Riches
EMT Job No: 24/3782

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	7-9	13,28	14-15	16-17	18-19	20-23	24-26	30		Please see attached notes for all abbreviations and acronyms		
Sample ID	WS01	WS03	WS06	WS06	WS07	WS10	WS05	WS05	WS02 & WS04				
Depth	0.00-0.30	0.00-0.25	0.00-0.30	0.50	0.00-0.30	0.00-0.30	0.00-0.30	0.50	COMPOSITE				
COC No / misc													
Containers	V J T	V J T	T J	J T	V T	V J	V J T	J T	B				
Sample Date	27/02/2024	27/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024	27/02/2024				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024		LOD/LOR	Units	Method No.
Arsenic #	9.0	8.0	6.7	-	-	5.9	6.8	-	-		<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-	-		<0.1	mg/kg	TM30/PM15
Chromium #	82.2	50.4	47.3	-	-	47.9	45.7	-	-		<0.5	mg/kg	TM30/PM15
Copper #	17	13	12	-	-	10	8	-	-		<1	mg/kg	TM30/PM15
Lead #	24	19	19	-	-	28	21	-	-		<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	-	-	0.1	<0.1	-	-		<0.1	mg/kg	TM30/PM15
Nickel #	9.3	7.8	9.1	-	-	8.3	9.6	-	-		<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	-	-	<1	<1	-	-		<1	mg/kg	TM30/PM15
Zinc #	48	43	48	-	-	42	34	-	-		<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-		<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-		<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-		<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-		<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-		<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-		<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-		<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-		<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	-		<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-		<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	-		<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-		<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-		<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-		<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-		<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	-	<0.04	<0.04	-	-	<0.04	-		<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	<0.6	-	-	<0.6	<0.6	-	-		<0.6	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	-	<0.64	<0.64	-	-	<0.64	-		<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-		<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-		<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	102	101	95	80	95	75	100	95	-		<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30	<30	-	<30	<30	-	-	<30	-		<30	mg/kg	TM5/PM8/PM16

Element Materials Technology

Client Name: RPS Consulting Services Ltd
Reference: 794-ENV-GDE-20318
Location: University of Reading Access Road GI
Contact: Gary Riches
EMT Job No: 24/3782

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	7-9	13,28	14-15	16-17	18-19	20-23	24-26	30		Please see attached notes for all abbreviations and acronyms		
Sample ID	WS01	WS03	WS06	WS06	WS07	WS10	WS05	WS05	WS02 & WS04				
Depth	0.00-0.30	0.00-0.25	0.00-0.30	0.50	0.00-0.30	0.00-0.30	0.00-0.30	0.50	COMPOSITE				
COC No / misc													
Containers	V J T	V J T	T J	J T	V T	V J	V J T	J T	B				
Sample Date	27/02/2024	27/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024	29/02/2024	27/02/2024				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024	02/03/2024		LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-	-		<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-	-		<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-	-		<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	-	-		<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4	<4	-	-	<4	<4	-	-		<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7	<7	-	-	<7	<7	-	-		<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	<7	<7	-	-	<7	<7	-	-		<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	<19	<19	<19	-	-	<19	<19	-	-		<19	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-	-		<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-	-		<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	-	-		<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	-	-		<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	<4	-	-	<4	<4	-	-		<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	<7	<7	-	-	<7	<7	-	-		<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	<7	<7	-	-	<7	<7	-	-		<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<19	<19	<19	-	-	<19	<19	-	-		<19	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	<38	<38	<38	-	-	<38	<38	-	-		<38	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5	<5	-		<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5	<5	-		<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	-		<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5	<5	-		<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	-		<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	-		<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	-	<5	<5	-	-	<5	-		<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	-	<5	<5	-	-	<5	-		<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	-	<5	<5	-	-	<5	-		<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	-	<5	<5	-	-	<5	-		<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	-	<5	<5	-	-	<5	-		<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	-	<5	<5	-	-	<5	-		<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	-	<5	<5	-	-	<5	-		<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	-	<35	<35	-	-	<35	-		<35	ug/kg	TM17/PM8
Total Phenols HPLC	<0.15	<0.15	<0.15	-	-	<0.15	<0.15	-	-		<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	21.7	19.5	3.0	18.4	33.7	26.1	20.7	35.8	-		<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	-	-	<0.3	<0.3	-	-		<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0020	0.0036	<0.0015	-	-	0.0019	0.0024	-	-		<0.0015	g/l	TM38/PM20

Element Materials Technology

Client Name: RPS Consulting Services Ltd
Reference: 794-ENV-GDE-20318
Location: University of Reading Access Road GI
Contact: Gary Riches
EMT Job No: 24/3782

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Element Materials Technology

Client Name: RPS Consulting Services Ltd
Reference: 794-ENV-GDE-20318
Location: University of Reading Access Road GI
Contact: Gary Riches
EMT Job No: 24/3782

Report : Solid (Duplicate results)

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Element Materials Technology

Client Name: RPS Consulting Services Ltd
Reference: 794-ENV-GDE-20318
Location: University of Reading Access Road GI
Contact: Gary Riches
EMT Job No: 24/3782

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Mass of sample taken (kg)	0.1087	Moisture Content Ratio (%) =	20.8
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	82.8
Particle Size <4mm =	>95%		
EMT Job No	24/3782	Landfill Waste Acceptance Criteria Limits	
Sample No	3		
Client Sample No	WS01		
Depth/Other	0.00-0.30		
Sample Date	27/02/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	1.69	3	5
Loss on Ignition (%)	5.5	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-
PAH Sum of 17(mg/kg)	<0.64	100	-
pH (pH Units)	7.33	-	>6
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated
ANC to pH 4 (mol/kg)	0.04	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	<0.0025	<0.025	0.5
Barium	0.003	<0.03	2
Cadmium	<0.0005	<0.005	100
Chromium	<0.0015	<0.015	0.04
Copper	<0.007	<0.07	1
Mercury	<0.001	<0.01	0.5
Molybdenum	<0.002	<0.02	10
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	10
Antimony	<0.002	<0.02	0.5
Selenium	<0.003	<0.03	0.06
Zinc	0.005	0.05	0.7
Chloride	0.4	4	5
Fluoride	<0.3	<3	0.1
Sulphate as SO ₄	<0.5	<5	0.5
Total Dissolved Solids	66	660	4
Phenol	<0.01	<0.1	50
Dissolved Organic Carbon	5	50	800

Mass of sample taken (kg)	0.1082	Moisture Content Ratio (%) =	20.3
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	83.1
Particle Size <4mm =	>95%		
EMT Job No	24/3782	Landfill Waste Acceptance Criteria Limits	
Sample No	9		
Client Sample No	WS03		
Depth/Other	0.00-0.25		
Sample Date	27/02/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	1.37	3	5
Loss on Ignition (%)	4.7	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-
PAH Sum of 17(mg/kg)	<0.64	100	-
pH (pH Units)	7.03	-	>6
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated
ANC to pH 4 (mol/kg)	0.04	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	0.0031	0.031	0.5
Barium	<0.003	<0.03	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	<0.002	<0.02	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.005	0.05	4
Chloride	<0.3	<3	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	<0.5	<5	1000
Total Dissolved Solids	<35	<350	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	4	40	500

Mass of sample taken (kg)	0.1054	Moisture Content Ratio (%) =	17.2
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	85.3
Particle Size <4mm =	>95%		
EMT Job No	24/3782	Landfill Waste Acceptance Criteria Limits	
Sample No	15		
Client Sample No	WS06		
Depth/Other	0.50		
Sample Date	29/02/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.11	3	5
Loss on Ignition (%)	2.9	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-
PAH Sum of 17(mg/kg)	<0.64	100	-
pH (pH Units)	8.11	-	>6
ANC to pH 7 (mol/kg)	<0.03	-	to be evaluated
ANC to pH 4 (mol/kg)	<0.03	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	<0.0025	<0.025	0.5
Barium	<0.003	<0.03	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	<0.002	<0.02	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.003	0.03	4
Chloride	0.4	4	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	1.1	11	1000
Total Dissolved Solids	62	620	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	3	30	500

Mass of sample taken (kg)	0.118	Moisture Content Ratio (%) =	31.2
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	76.2
Particle Size <4mm =	>95%		
EMT Job No	24/3782	Landfill Waste Acceptance Criteria Limits	
Sample No	17		
Client Sample No	WS07		
Depth/Other	0.00-0.30		
Sample Date	29/02/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	1.98	3	5
Loss on Ignition (%)	6.4	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-
PAH Sum of 17(mg/kg)	<0.64	100	-
pH (pH Units)	6.89	-	>6
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated
ANC to pH 4 (mol/kg)	0.04	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	<0.0025	<0.025	0.5
Barium	0.003	0.03	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	0.008	0.08	2
Mercury	<0.001	<0.01	0.01
Molybdenum	<0.002	<0.02	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.006	0.06	4
Chloride	3.1	31	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	11.2	112	1000
Total Dissolved Solids	48	480	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	8	80	500

Mass of sample taken (kg)	0.1085	Moisture Content Ratio (%) =	20.4
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	83.1
Particle Size <4mm =	>95%		
EMT Job No	24/3782	Landfill Waste Acceptance Criteria Limits	
Sample No	26		
Client Sample No	WS05		
Depth/Other	0.50		
Sample Date	29/02/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	2.02	3	5
Loss on Ignition (%)	6.4	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-
PAH Sum of 17(mg/kg)	<0.64	100	-
pH (pH Units)	6.91	-	>6
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated
ANC to pH 4 (mol/kg)	<0.03	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	<0.0025	<0.025	0.5
Barium	<0.003	<0.03	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	<0.002	<0.02	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.003	0.03	4
Chloride	<0.3	<3	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	<0.5	<5	1000
Total Dissolved Solids	<35	<350	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	5	50	500

Client Name: RPS Consulting Services Ltd
Reference: 794-ENV-GDE-20318
Location: University of Reading Access Road GI
Contact: Gary Riches

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
24/3782	1	WS01	0.00-0.30	2	Anthony Carman	22/03/2024	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	22/03/2024	Asbestos Fibres	NAD
					Anthony Carman	22/03/2024	Asbestos ACM	NAD
					Anthony Carman	22/03/2024	Asbestos Type	NAD
24/3782	1	WS03	0.00-0.25	8	Anthony Carman	22/03/2024	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	22/03/2024	Asbestos Fibres	NAD
					Anthony Carman	22/03/2024	Asbestos ACM	NAD
					Anthony Carman	22/03/2024	Asbestos Type	NAD
24/3782	1	WS06	0.00-0.30	13	Anthony Carman	22/03/2024	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	22/03/2024	Asbestos Fibres	NAD
					Anthony Carman	22/03/2024	Asbestos ACM	NAD
					Anthony Carman	22/03/2024	Asbestos Type	NAD
24/3782	1	WS06	0.50	15	Anthony Carman	22/03/2024	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	22/03/2024	Asbestos Fibres	NAD
					Anthony Carman	22/03/2024	Asbestos ACM	NAD
					Anthony Carman	22/03/2024	Asbestos Type	NAD
24/3782	1	WS07	0.00-0.30	17	Anthony Carman	22/03/2024	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	22/03/2024	Asbestos Fibres	NAD
					Anthony Carman	22/03/2024	Asbestos ACM	NAD
					Anthony Carman	22/03/2024	Asbestos Type	NAD
24/3782	1	WS10	0.00-0.30	19	Anthony Carman	22/03/2024	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	22/03/2024	Asbestos Fibres	NAD
					Anthony Carman	22/03/2024	Asbestos ACM	NAD
					Anthony Carman	22/03/2024	Asbestos Type	NAD
24/3782	1	WS05	0.00-0.30	21	Anthony Carman	22/03/2024	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	22/03/2024	Asbestos Fibres	NAD
					Anthony Carman	22/03/2024	Asbestos ACM	NAD
					Anthony Carman	22/03/2024	Asbestos Type	NAD
24/3782	1	WS05	0.50	25	Anthony Carman	22/03/2024	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	22/03/2024	Asbestos Fibres	NAD
					Anthony Carman	22/03/2024	Asbestos ACM	NAD
					Anthony Carman	22/03/2024	Asbestos Type	NAD

Matrix : Solid

[illegible]

Client Name:	RPS Consulting Services Ltd
Reference:	794-ENV-GDE-20318
Location:	University of Reading Access Road GI
Contact:	Gary Riches

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/3782

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitatively, with a matrix specific limit of detection.

Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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 & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/3782

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.			AD	Yes

EMT Job No: 24/3782

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH ₄ + 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH ₄ + 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH ₄ + 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes

EMT Job No: 24/3782

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM77	Modified DDCE/TS method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

EMT Job No: 24/3782

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
Subcontracted	See attached subcontractor report for accreditation status and provider.					AD	Yes



Certificate of Analysis

Page 1

Client: ELEMENT ENVIRONMENTAL
(K920) LABS DEESIDE UNIT 3
DEESIDE POINT ZONE 3
DEESIDE IND PK
FLINTSHIRE
CH5 2UA

Originator: 24 3782
24 3782

Lab ID: 26350 - 685158
Sample ID: 24/3782-30
Sample Weight: 1809g

Date Received: 08/03/2024
Date Reported: 15/04/2024

BS 3882 : 2015 SPECIFICATION FOR TOPSOIL Fails BS 3882

				Compliant with range (Y/N)					
				Multi-P	Acid	Calc	Low-F	Low-F Acid	Low-F Calc
Texture:	Clay	% w/w	14						
	Silt	% w/w	28						
	Sand	% w/w	58						
	Textural Class		Sandy Loam	Y	Y	Y	Y	Y	Y
				<i>See area of permitted soil textural classes in Fig. 1.</i>					
Organic Matter:		% w/w	3.2	Y	Y	Y	Y	Y	Y
Coarse	>2 mm	% w/w	7.2	Y	Y	Y	Y	Y	Y
Fragment	>20 mm	% w/w	4.1	Y	Y	Y	Y	Y	Y
Content:	>50 mm	% w/w	0.0	Y	Y	Y	Y	Y	Y
Soil pH:			6.7	Y	N	N	Y	N	N
Carbonate:		% w/w	<1			N			N
Available	Nitrogen	% w/w	0.140	N	N	N			
Plant	Phosphorus	mg/l	40.2 (3)*	Y	Y	Y	N	N	N
Nutrients:	Potassium	mg/l	147.1 (2-)*	Y	Y	Y			
	Magnesium	mg/l	90.5 (2)*	Y	Y	Y			
Carbon:Nitrogen Ratio:		:1	13.3	Y	Y	Y	Y	Y	Y
Exchangeable Sodium Percentage:		%	0.6						
Phytotoxic	Total Zinc	mg/kg	46.0	Y	Y	Y	Y	Y	Y
Contaminants:	Total Copper	mg/kg	14.9	Y	Y	Y	Y	Y	Y
	Total Nickel	mg/kg	11.9	Y	Y	Y	Y	Y	Y
Visible	> 2mm	% w/w	0.00	Y	Y	Y	Y	Y	Y
Contaminants:	Plastics	% w/w	0.00	Y	Y	Y	Y	Y	Y
	Number of Sharps		0	Y	Y	Y	Y	Y	Y
Additional	Available Sodium	mg/l	11.6						
Analysis:	Available Calcium	mg/l	1489.0						
	Conductivity	uS/cm	2083	Y					
Compliance:				N	N	N	N	N	N

Results are expressed on a dry matter basis.

* Soil indices from RB209

Released by:

Teresa Clyne

Date: 15/04/2024

DECLARATION:

I certify that this sample has been analysed by NRM in accordance with BS 3882 Specification for Topsoil (2015).

NRM Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS

Tel: +44 (0) 1344 886338 **Fax:** +44 (0) 1344 890972 **Email:** enquiries@nrm.uk.com **www:** nrm.uk.com

Analytical Report

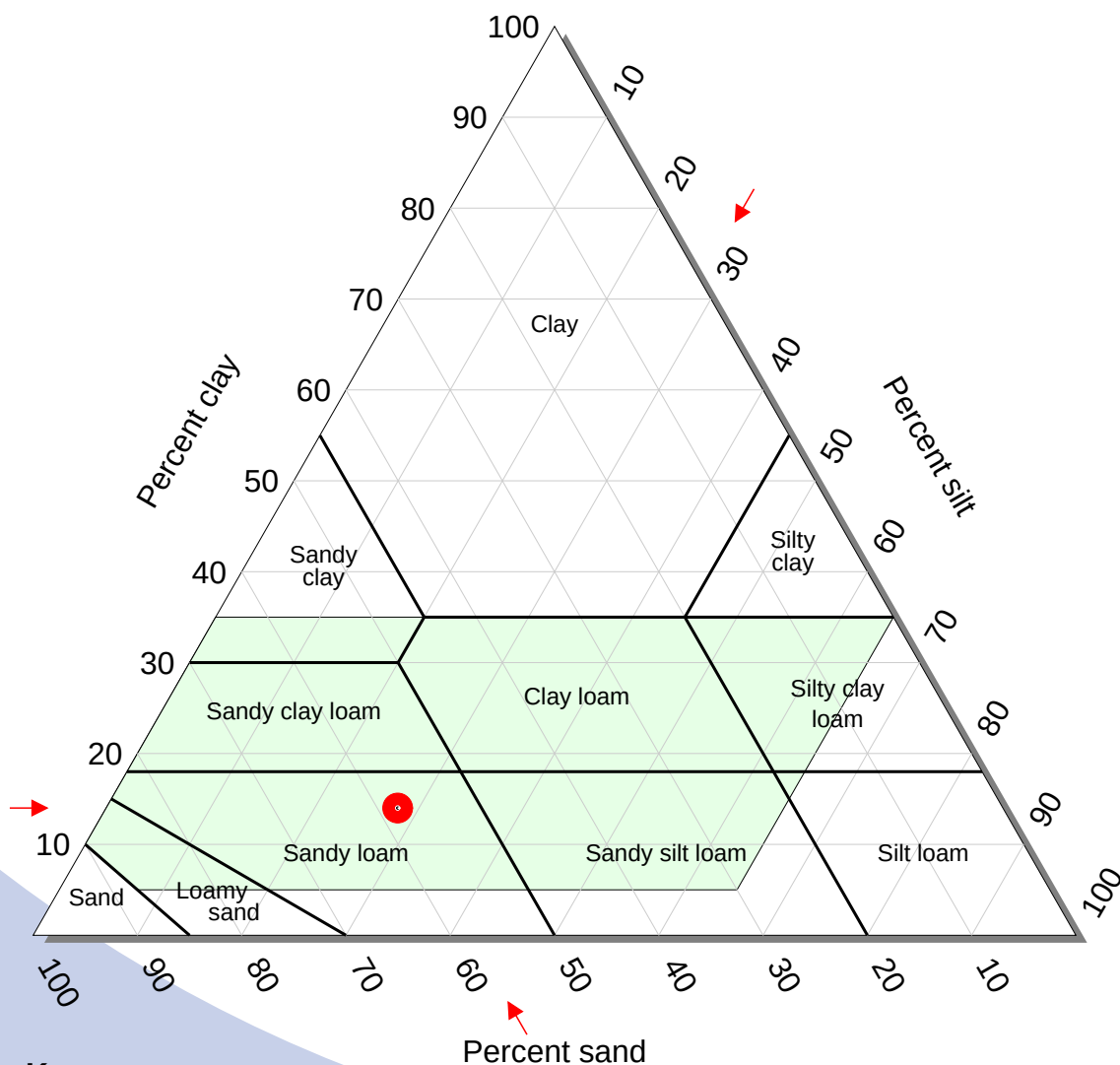
Client: ELEMENT ENVIRONMENTAL
(K920) LABS DEESIDE UNIT 3
 DEESIDE POINT ZONE 3
 DEESIDE IND PK
 FLINTSHIRE
 CH5 2UA

Originator: 24 3782
 24 3782

Lab ID: 26350 - 685158
Sample ID: 24/3782-30
Sample Weight: 1809g

Date Received: 08/03/2024
Date Reported: 15/04/2024

Fig. 1. Textural Class: Sandy Loam (compliant)



Key

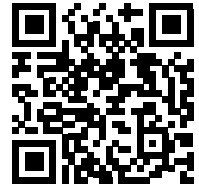


Area within which texture of topsoil is required to fall.

Waste Classification Report

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

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



PVRVA-D0FRD-J8X7E

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

Job name

UoR Access Roads[1]

Description/Comments

Project

794-ENV-GDE-20318

Site

Classified by

Name: Alice Thomas
Date: 16 Apr 2024 09:27 GMT
Telephone: 0121 622 8520
Company: RPS (Tetra Tech)
4th Floor
1 Newhall St
Birmingham
B3 3NH

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

HazWasteOnline™ Certification:

Course
Hazardous Waste Classification
3 year Refresher overdue

Date

03 Dec 2020

Purpose of classification

2 - Material Characterisation

Address of the waste

n/a

Post Code n/a

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

redevelopment

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

redevelopment

Description of the waste

soil and stones

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01-27/02/2024-0.00-0.30m		Non Hazardous		3
2	WS03-27/02/2024-0.00-0.25m		Non Hazardous		5
3	WS06-29/02/2024-0.00-0.30m		Non Hazardous		7
4	WS06-29/02/2024-0.50m		Non Hazardous		9
5	WS07-29/02/2024-0.00-0.30m		Non Hazardous		11
6	WS10-29/02/2024-0.00-0.30m		Non Hazardous		13
7	WS05-29/02/2024-0.00-0.30m		Non Hazardous		15
8	WS05-29/02/2024-0.50m		Non Hazardous		17

Related documents

#	Name	Description
1	EMT-24-3782-Batch-1-202404151343.HWOL	Element .hwol file used to populate the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Alice Thomas

Created date: 16 Apr 2024 09:27 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	19
Appendix B: Rationale for selection of metal species	20
Appendix C: Version	21

Classification of sample: WS01-27/02/2024-0.00-0.30m

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS01-27/02/2024-0.00-0.30m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
21.7%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }				9 mg/kg	1.32	9.764 mg/kg	0.000976 %	✓	
		033-003-00-0	215-481-4	1327-53-3							
2		cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				82.2 mg/kg	1.462	98.718 mg/kg	0.00987 %	✓	
			215-160-9	1308-38-9							
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
		024-017-00-8									
5		copper { dicopper oxide; copper (I) oxide }				17 mg/kg	1.126	15.727 mg/kg	0.00157 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
6		lead { lead chromate }			1	24 mg/kg	1.56	30.761 mg/kg	0.00197 %	✓	
		082-004-00-2	231-846-0	7758-97-6							
7		mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7							
8		nickel { nickel chromate }				9.3 mg/kg	2.976	22.744 mg/kg	0.00227 %	✓	
		028-035-00-7	238-766-5	14721-18-7							
9		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5							
10		zinc { zinc chromate }				48 mg/kg	2.774	109.416 mg/kg	0.0109 %	✓	
		024-007-00-3	236-878-9	13530-65-9							
11		TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %		<LOD
				TPH							
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
13		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
14		toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
15		ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
16	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
17	 cyanides {  salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %			<LOD
18	 pH		PH		7.33 pH		7.33 pH	7.33 pH			
19	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
20	 acenaphthylene	205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	 acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	 fluorene	201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
23	 phenanthrene	201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	 anthracene	204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
25	 fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	 pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
28	chrysene 601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
29	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
31	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
32	 indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
33	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
34	 benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
35	 polychlorobiphenyls; PCB 602-039-00-4	215-648-1	1336-36-3		<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
36	 coronene 205-881-7	191-07-1			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
Total:									0.0319 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS03-27/02/2024-0.00-0.25m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS03-27/02/2024-0.00-0.25m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19.5% (dry weight correction)	

Hazard properties

None identified

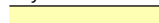
Determinands

Moisture content: 19.5% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				8 mg/kg	1.32	8.839 mg/kg	0.000884 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				50.4 mg/kg	1.462	61.642 mg/kg	0.00616 %	✓	
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
	024-017-00-8									
5	copper { dicopper oxide; copper (I) oxide }				13 mg/kg	1.126	12.248 mg/kg	0.00122 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	19 mg/kg	1.56	24.8 mg/kg	0.00159 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				7.8 mg/kg	2.976	19.427 mg/kg	0.00194 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
10	zinc { zinc chromate }				43 mg/kg	2.774	99.823 mg/kg	0.00998 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
11	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %		<LOD
			TPH							
12	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
13	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
14	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
15	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
16	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
17	cyanides {  salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %			<LOD
18	 pH PH				7.03 pH		7.03 pH	7.03 pH			
19	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
20	 acenaphthylene 205-917-1	208-96-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	 acenaphthene 201-469-6	83-32-9			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	 fluorene 201-695-5	86-73-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
23	 phenanthrene 201-581-5	85-01-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	 anthracene 204-371-1	120-12-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
25	 fluoranthene 205-912-4	206-44-0			0.06 mg/kg		0.0502 mg/kg	0.00000502 %	✓		
26	 pyrene 204-927-3	129-00-0			0.06 mg/kg		0.0502 mg/kg	0.00000502 %	✓		
27	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
28	chrysene 601-048-00-0	205-923-4	218-01-9		0.06 mg/kg		0.0502 mg/kg	0.00000502 %	✓		
29	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
31	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
32	 indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
33	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
34	 benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
35	 polychlorobiphenyls; PCB 602-039-00-4	215-648-1	1336-36-3		<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
36	 coronene 205-881-7	191-07-1			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
Total:									0.0261 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS06-29/02/2024-0.00-0.30m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS06-29/02/2024-0.00-0.30m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
3% (dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 3% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				6.7	mg/kg	1.32	8.589	mg/kg	0.000859 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				47.3	mg/kg	1.462	67.118	mg/kg	0.00671 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				12	mg/kg	1.126	13.117	mg/kg	0.00131 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	19	mg/kg	1.56	28.773	mg/kg	0.00184 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				9.1	mg/kg	2.976	26.295	mg/kg	0.00263 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				48	mg/kg	2.774	129.281	mg/kg	0.0129 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	TPH (C6 to C40) petroleum group				<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
			TPH									
12	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
13	benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
14	toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
15	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
16	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %			<LOD
18	pH		PH		7.45 pH		7.45 pH	7.45 pH			
19	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
20	acenaphthylene 205-917-1	208-96-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	acenaphthene 201-469-6	83-32-9			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	fluorene 201-695-5	86-73-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
23	phenanthrene 201-581-5	85-01-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	anthracene 204-371-1	120-12-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
25	fluoranthene 205-912-4	206-44-0			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	pyrene 204-927-3	129-00-0			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
28	chrysene 601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
29	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
31	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
32	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
33	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
34	benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
Total:									0.0306 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS06-29/02/2024-0.50m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS06-29/02/2024-0.50m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
18.4% (dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 18.4% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
2	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
3	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
4	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
5	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
6	pH				8.11 pH		8.11 pH	8.11 pH		
			PH							
7	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
8	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
9	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
10	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
11	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
12	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							
13	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
14	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
15	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
16	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
17	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
18	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
19	benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
20	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-893-2	193-39-5								
21	dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
22	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-883-8	191-24-2								
23	polychlorobiphenyls; PCB				<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
	602-039-00-4	215-648-1	1336-36-3								
24	coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-881-7	191-07-1								
Total:									0.00007 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: WS07-29/02/2024-0.00-0.30m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS07-29/02/2024-0.00-0.30m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
33.7%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 33.7% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
2	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
3	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
4	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
5	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
6	pH				6.89 pH		6.89 pH	6.89 pH		
			PH							
7	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
8	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
9	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
10	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
11	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
12	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							
13	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
14	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
15	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
16	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
17	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
19	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
20	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
21	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
22	benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
23	polychlorobiphenyls; PCB 602-039-00-4	215-648-1	1336-36-3		<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
24	coronene 205-881-7	191-07-1			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
Total:									0.00007 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: WS10-29/02/2024-0.00-0.30m

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS10-29/02/2024-0.00-0.30m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
26.1% (dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 26.1% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				5.9 mg/kg	1.32	6.178 mg/kg	0.000618 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				47.9 mg/kg	1.462	55.518 mg/kg	0.00555 %	✓	
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
	024-017-00-8									
5	copper { dicopper oxide; copper (I) oxide }				10 mg/kg	1.126	8.929 mg/kg	0.000893 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	28 mg/kg	1.56	34.635 mg/kg	0.00222 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				0.1 mg/kg	1.353	0.107 mg/kg	0.0000107 %	✓	
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				8.3 mg/kg	2.976	19.59 mg/kg	0.00196 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
10	zinc { zinc chromate }				42 mg/kg	2.774	92.398 mg/kg	0.00924 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
11	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %		<LOD
			TPH							
12	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
13	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
14	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
15	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
16	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %			<LOD
18	pH PH				6.98 pH		6.98 pH	6.98 pH			
19	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
20	acenaphthylene 205-917-1	208-96-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	acenaphthene 201-469-6	83-32-9			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	fluorene 201-695-5	86-73-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
23	phenanthrene 201-581-5	85-01-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	anthracene 204-371-1	120-12-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
25	fluoranthene 205-912-4	206-44-0			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	pyrene 204-927-3	129-00-0			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
28	chrysene 601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
29	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
31	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
32	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
33	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
34	benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
Total:									0.0248 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS05-29/02/2024-0.00-0.30m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS05-29/02/2024-0.00-0.30m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
20.7%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 20.7% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				6.8	mg/kg	1.32	7.438	mg/kg	0.000744 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				45.7	mg/kg	1.462	55.338	mg/kg	0.00553 %	✓	
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				8	mg/kg	1.126	7.462	mg/kg	0.000746 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	21	mg/kg	1.56	27.138	mg/kg	0.00174 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				9.6	mg/kg	2.976	23.672	mg/kg	0.00237 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				34	mg/kg	2.774	78.145	mg/kg	0.00781 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	TPH (C6 to C40) petroleum group				<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
			TPH									
12	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
13	benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
14	toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
15	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
16	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %			<LOD
18	pH		PH		6.66 pH		6.66 pH	6.66 pH			
19	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
20	acenaphthylene	205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	fluorene	201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
23	phenanthrene	201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
24	anthracene	204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
25	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
26	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
27	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
28	chrysene 601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
29	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
31	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
32	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
33	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
34	benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
Total:									0.0233 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS05-29/02/2024-0.50m

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS05-29/02/2024-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
35.8%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 35.8% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
2	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
3	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
4	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
5	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1]	95-47-6 [1]							
		203-396-5 [2]	106-42-3 [2]							
		203-576-3 [3]	108-38-3 [3]							
		215-535-7 [4]	1330-20-7 [4]							
6	pH				6.91 pH		6.91 pH	6.91 pH		
			PH							
7	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
8	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
9	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
10	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
11	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
12	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							
13	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
14	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
15	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
16	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
19	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
20	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
21	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
22	benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
23	polychlorobiphenyls; PCB 602-039-00-4	215-648-1	1336-36-3		<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
24	coronene 205-881-7	191-07-1			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
Total:								0.00007 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Appendix A: Classifier defined and non GB MCL determinands

• **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

• **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

• **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

• **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

• **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

• **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

• **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

• **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

GB MCL index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

■ **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: <http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en>
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2; H371

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worst case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide] (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2024.101.6003.11116 (10 Apr 2024)

HazWasteOnline Database: 2024.95.5999.11108 (04 Apr 2024)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

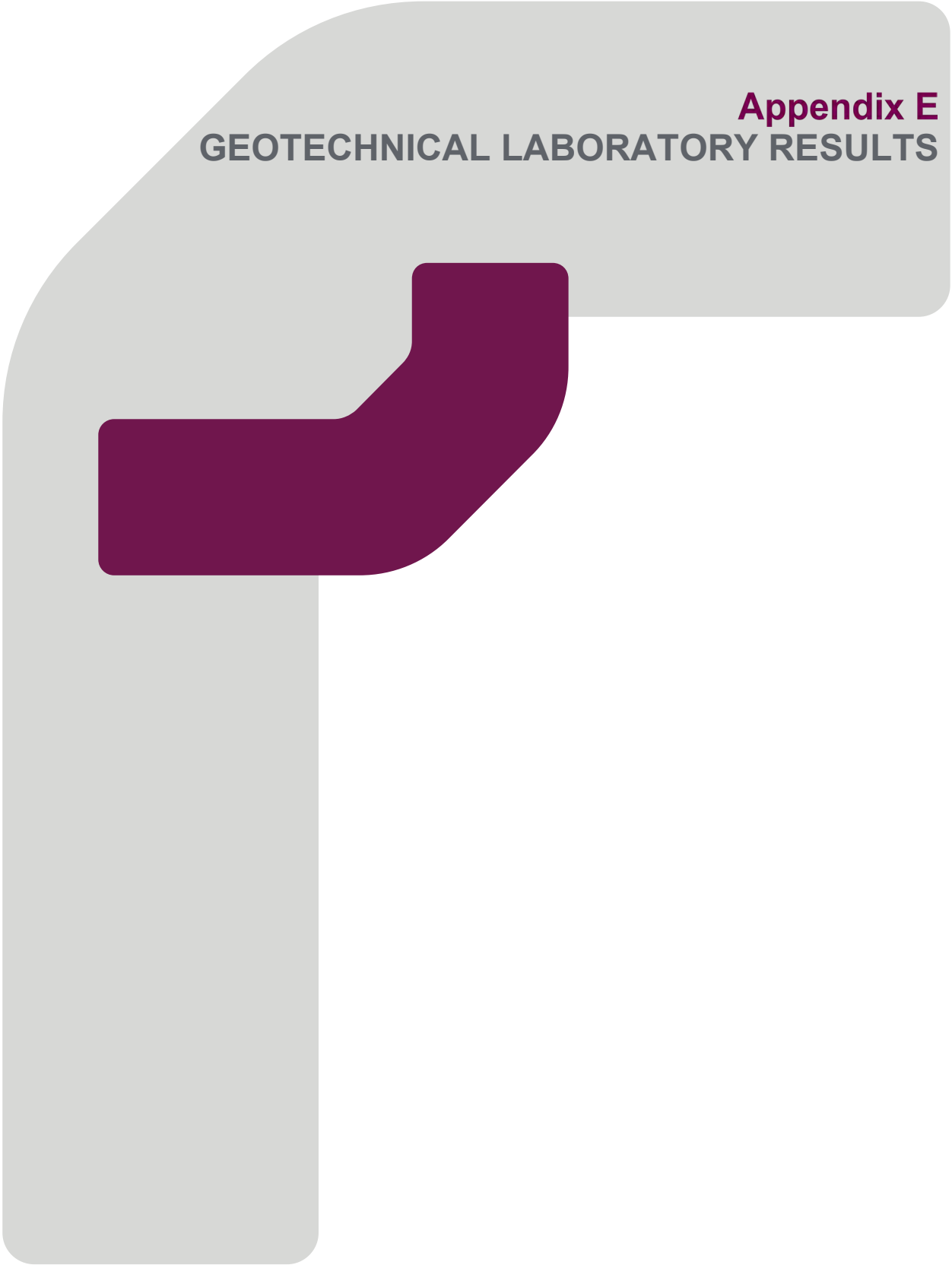
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

GB MCL List v2.0 - version 2.0 of 20th October 2023

GB MCL List v3.0 - version 3.0 of 11th January 2024

GB MCL List v4.0 - version 4.0 of 2nd March 2024



Appendix E

GEOTECHNICAL LABORATORY RESULTS



Laboratory Report



Contract Number: 71666

Client Ref: **794-ENV-GDE-20318**

Client PO: **PO24-0166**

Date Received: **08-03-2024**

Date Completed: **27-03-2024**

Report Date: **27-03-2024**

Client: **RPS Group**

This report has been checked and approved by:

Contract Title: **University of Reading Access Roads**

For the attention of: **Gary Riches**



Brendan Evans
Office Administrator

Description	Qty
MCV at received Moisture Content BS 1377:1990 - Part 4 : 5.4 - * UKAS	1
Dry Den/MC (4.5kg Rammer Method 1 litre mould/CBR Mould) BS 1377:1990 - Part 4 : 3.6 - * UKAS	1
Dry Den/MC (2.5kg Rammer Method 1 litre mould/CBR Mould) BS 1377:1990 - Part 4 : 3.4 - * UKAS	2
BRE Reduced Suite includes pH, water & acid soluble sulphate and total sulphur Sub-contracted Test	5
PSD: Sedimentation by pipette carried out with Wet Sieve (Wet Sieve must also be selected) BS 1377:1990 - Part 2 : 9.4 - * UKAS	4
PSD Wet Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	6
Particle Density (Gas Jar) BS 1377:1990 - Part 2 : 8.2 - * UKAS	5
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	8

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:

Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)

Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)

Wayne Honey (HR & HSE Manager)



Laboratory Report



Contract Number: 71666

Description	Qty
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	10
Disposal of samples for job	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

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Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)

Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)

Wayne Honey (HR & HSE Manager)

PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number 71666

Borehole/Pit No. WS01

Project Name University of Reading Access Roads

Sample No. G

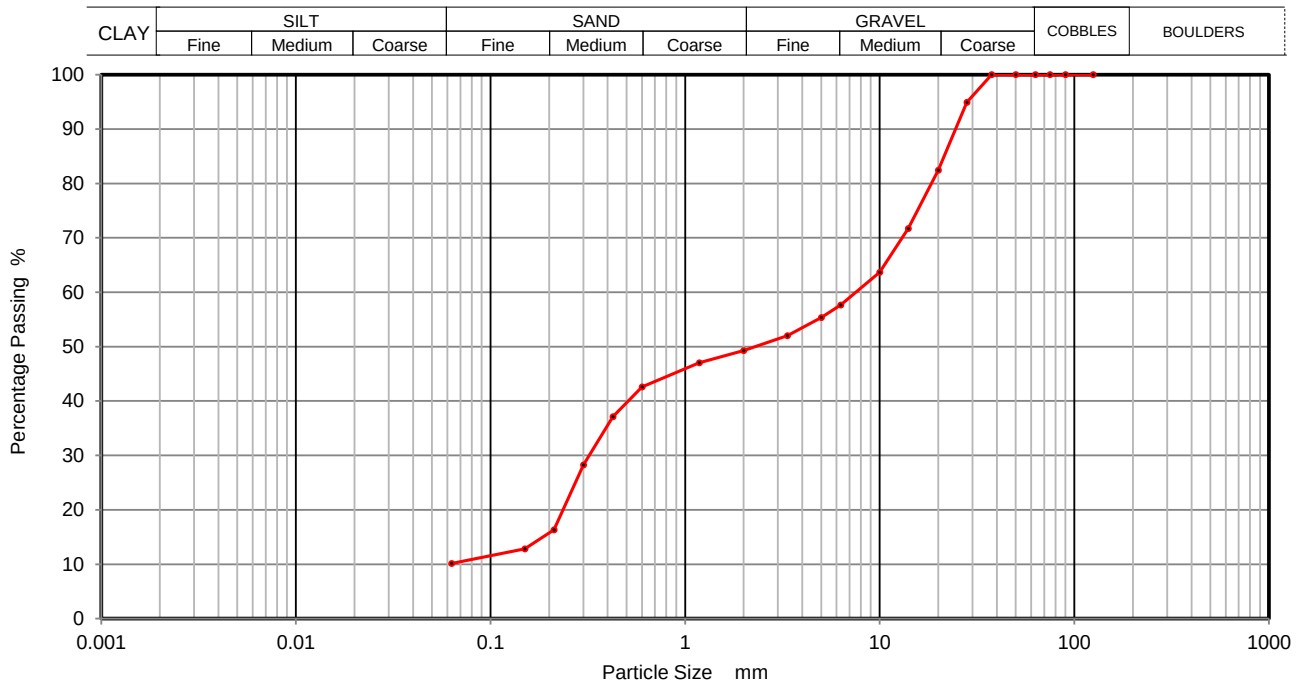
Soil Description Brown silty/ clayey fine to coarse sandy fine to coarse GRAVEL

Depth Top 1.50

Depth Base 1.70

Date Tested 21/03/2024

Sample Type B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	95		
20	82		
14	72		
10	64		
6.3	58		
5	55		
3.35	52		
2	49		
1.18	47		
0.6	43		
0.425	37		
0.3	28		
0.212	16		
0.15	13		
0.063	10		

Sample Proportions	% dry mass
Cobbles	0
Gravel	51
Sand	39
Silt and Clay	10

Remarks
Preparation and testing in accordance with BS1377 unless noted below

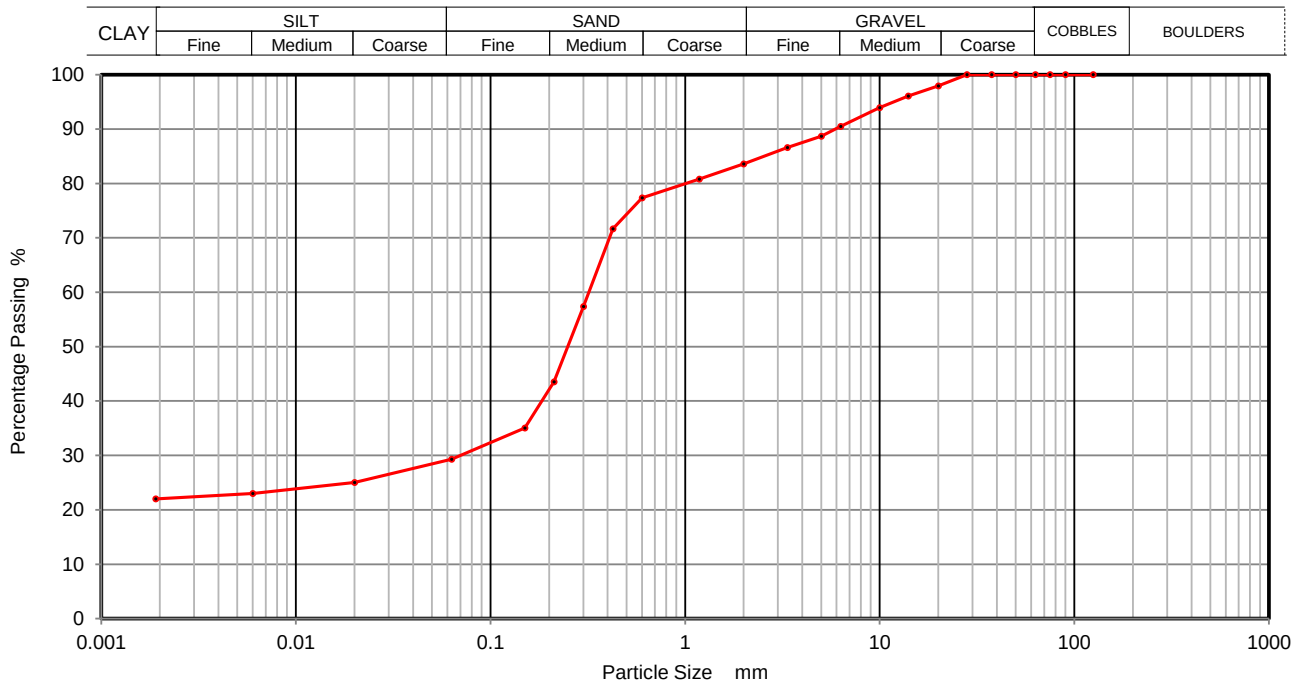
Operator

Cameron Thomas

PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	71666
Borehole/Pit No.	WS02
Sample No.	C
Depth Top	0.40
Depth Base	
Sample Type	B

Project Name	University of Reading Access Roads
Soil Description	Brown slightly silty fine to coarse gravelly clayey fine to coarse SAND
Date Tested	21/03/2024



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	25
90	100	0.0060	23
75	100	0.0020	22
63	100		
50	100		
37.5	100		
28	100		
20	98		
14	96		
10	94		
6.3	91		
5	89		
3.35	87		
2	84		
1.18	81		
0.6	77		
0.425	72		
0.3	57		
0.212	44		
0.15	35		
0.063	29		

Sample Proportions	% dry mass
Cobbles	0
Gravel	16
Sand	55
Silt	7
Clay	22

Remarks
Preparation and testing in accordance with BS1377 unless noted below

Operator
Cameron Thomas

PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number 71666

Borehole/Pit No. WS03

Project Name University of Reading Access Roads

Sample No. G

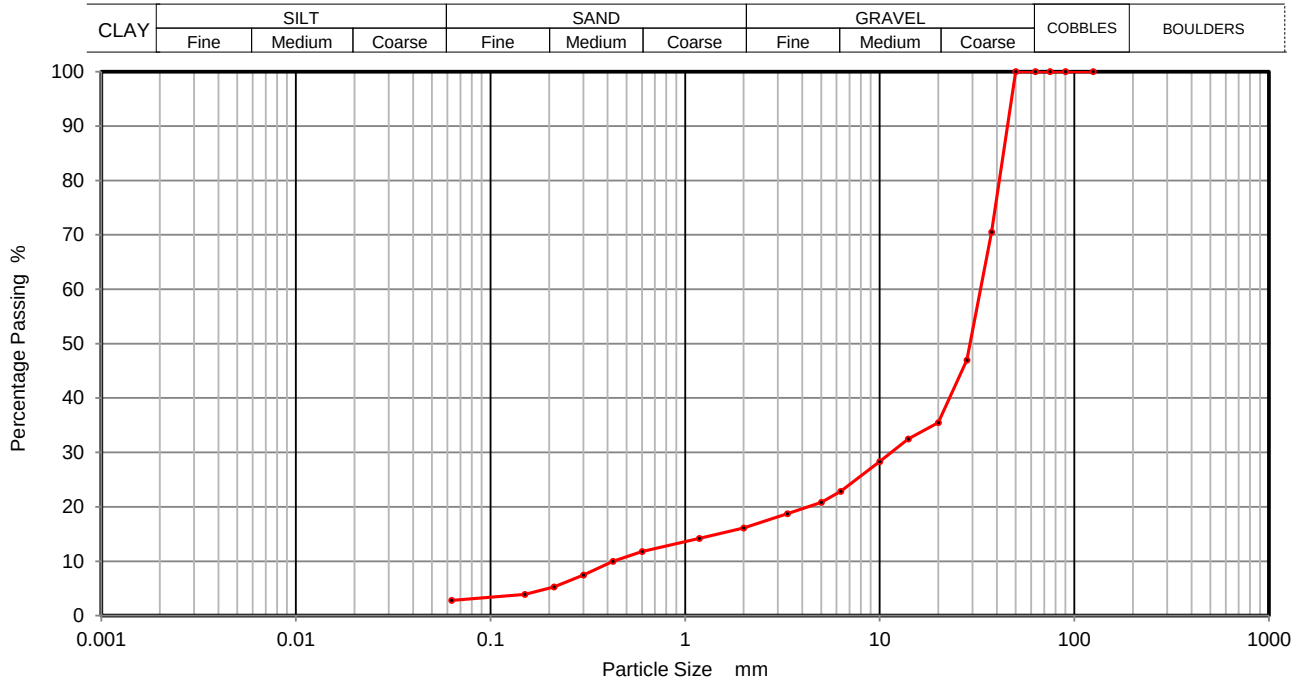
Soil Description Brown slightly silty/ clayey fine to coarse sandy fine to coarse GRAVEL

Depth Top 0.50

Depth Base

Date Tested 21/03/2024

Sample Type B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	71		
28	47		
20	36		
14	32		
10	28		
6.3	23		
5	21		
3.35	19		
2	16		
1.18	14		
0.6	12		
0.425	10		
0.3	7		
0.212	5		
0.15	4		
0.063	3		

Sample Proportions	% dry mass
Cobbles	0
Gravel	84
Sand	13
Silt and Clay	3

Remarks
Preparation and testing in accordance with BS1377 unless noted below

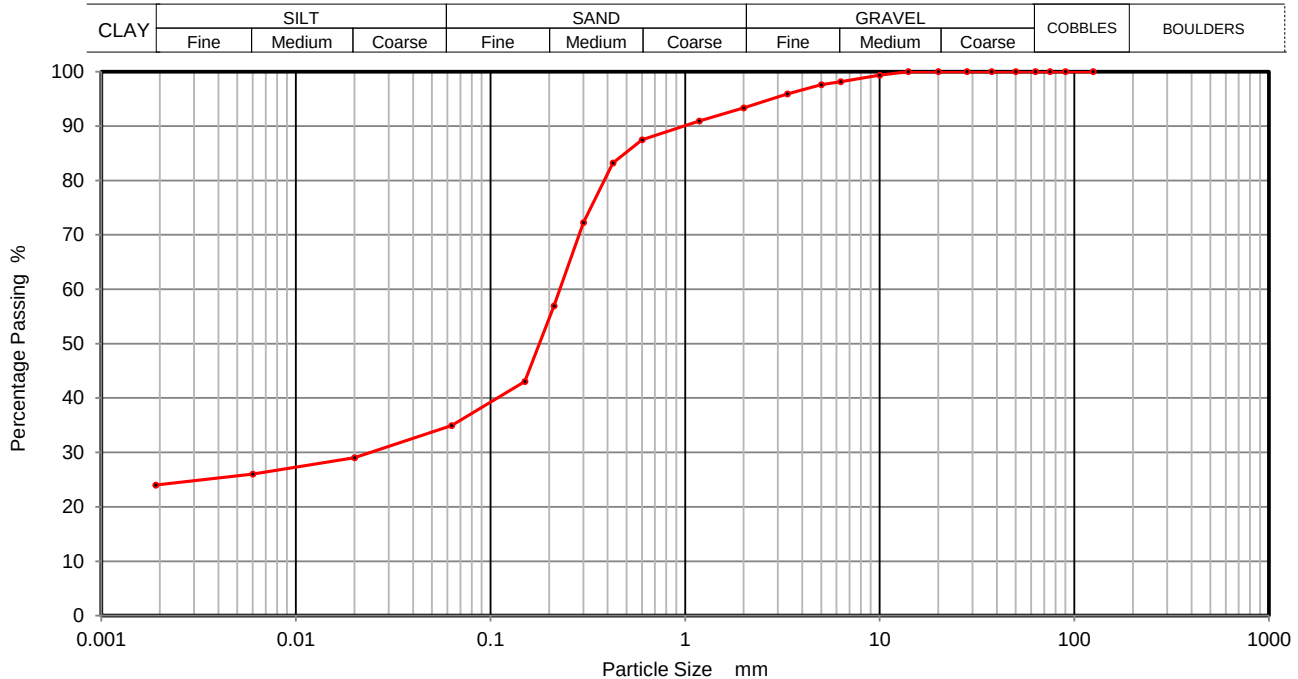
Operator

Cameron Thomas

PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	71666
Borehole/Pit No.	WS04
Sample No.	C
Depth Top	0.60
Depth Base	0.80
Sample Type	B

Project Name	University of Reading Access Roads
Soil Description	Brown slightly gravelly silty clayey fine to coarse SAND
Date Tested	21/03/2024



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	29
90	100	0.0060	26
75	100	0.0020	24
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	96		
2	93		
1.18	91		
0.6	88		
0.425	83		
0.3	72		
0.212	57		
0.15	43		
0.063	35		

Sample Proportions	% dry mass
Cobbles	0
Gravel	7
Sand	58
Silt	11
Clay	24

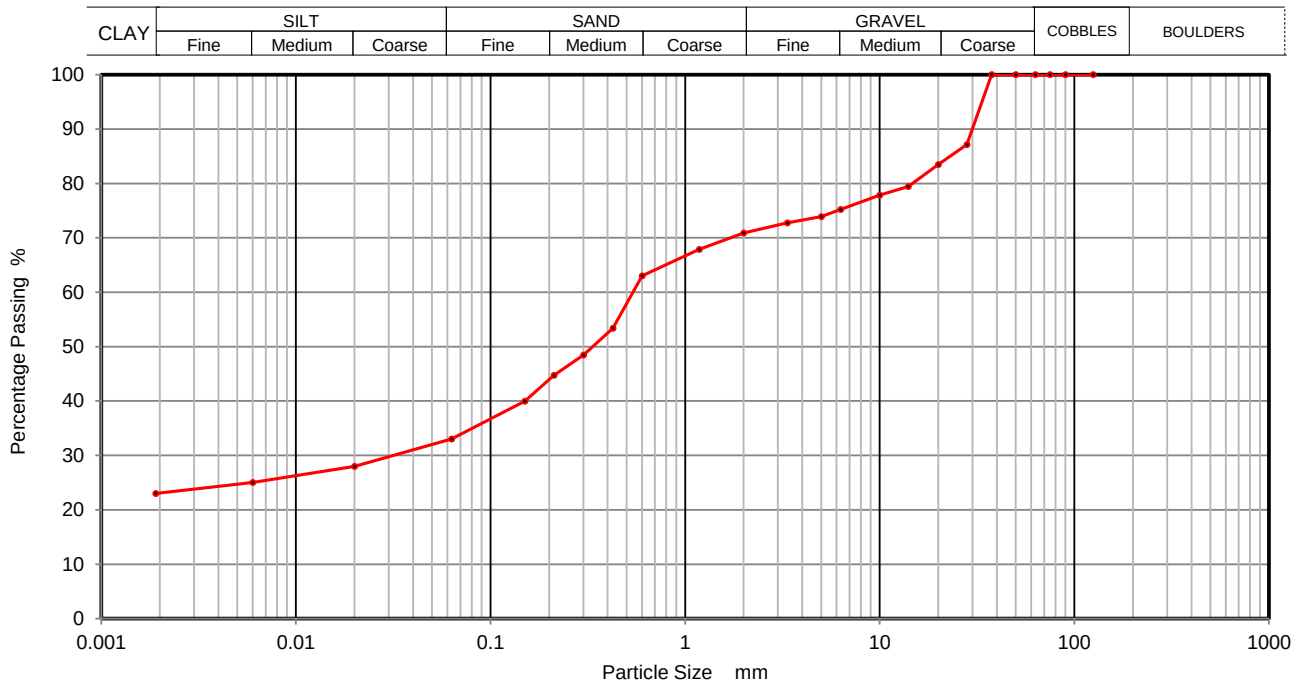
Remarks
Preparation and testing in accordance with BS1377 unless noted below

Operator
Cameron Thomas

PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	71666
Borehole/Pit No.	WS05
Sample No.	C
Depth Top	0.90
Depth Base	1.00
Sample Type	B

Project Name	University of Reading Access Roads
Soil Description	Brown silty clayey fine to coarse gravelly fine to coarse SAND
Date Tested	21/03/2024



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	28
90	100	0.0060	25
75	100	0.0020	23
63	100		
50	100		
37.5	100		
28	87		
20	84		
14	79		
10	78		
6.3	75		
5	74		
3.35	73		
2	71		
1.18	68		
0.6	63		
0.425	53		
0.3	48		
0.212	45		
0.15	40		
0.063	33		

Sample Proportions	% dry mass
Cobbles	0
Gravel	29
Sand	38
Silt	10
Clay	23

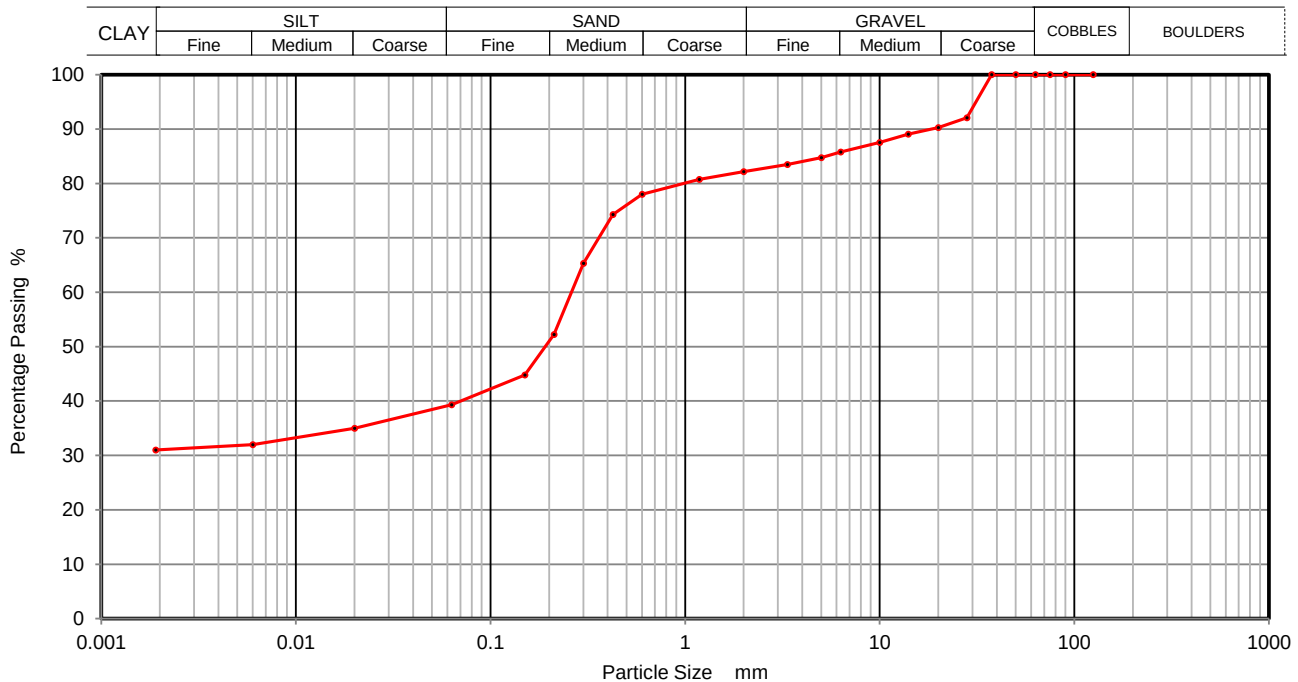
Remarks
Preparation and testing in accordance with BS1377 unless noted below

Operator
Cameron Thomas

PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	71666
Borehole/Pit No.	WS07
Sample No.	C
Depth Top	0.40
Depth Base	
Sample Type	B

Project Name	University of Reading Access Roads
Soil Description	Brown fine to coarse gravelly slightly silty clayey fine to coarse SAND
Date Tested	21/03/2024



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	35
90	100	0.0060	32
75	100	0.0020	31
63	100		
50	100		
37.5	100		
28	92		
20	90		
14	89		
10	88		
6.3	86		
5	85		
3.35	84		
2	82		
1.18	81		
0.6	78		
0.425	74		
0.3	65		
0.212	52		
0.15	45		
0.063	39		

Sample Proportions	% dry mass
Cobbles	0
Gravel	18
Sand	43
Silt	8
Clay	31

Remarks
Preparation and testing in accordance with BS1377 unless noted below

Operator
Cameron Thomas

[illegible]

<u>Key</u>	<u>Reported As</u>
Moisture Content	%
Bulk Density	Mg/m ³
Dry Density	Mg/m ³
Particle Density	Mg/m ³
Air Voids	%

Operator
Conal Aliffe

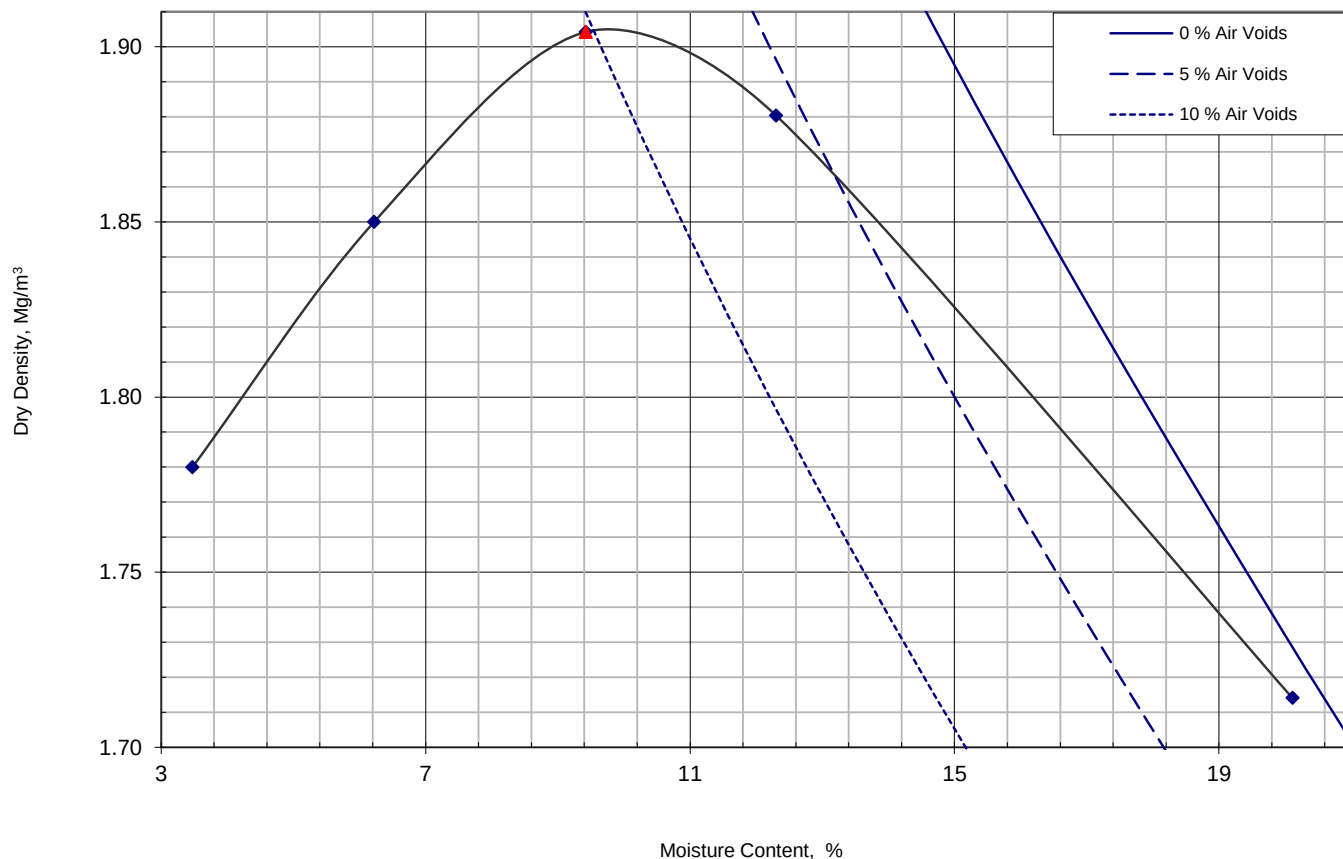


**Dry Density / Moisture Content Relationship
BS 1377:Part 4:1990**

Contract Number 71666

Borehole / Pit No WS01

Project Name	University of Reading Access Roads	Sample No	C
Date Tested	22/03/2024	Depth Top	0.80
Compaction Method	2.5 Kg Rammer	Depth Base	0.90
Compaction Clause	BS1377:Part 4:1990, Clause 3.3	Sample Type	B
Sample Description	Brown fine to medium gravelly sandy silty CLAY	Single or Separate Sample Used	Single



Compaction Point	1	2	3	4	5						
Moisture Content	3.5	6.2	9.4	12	20						
Bulk Density	1.84	1.97	2.08	2.11	2.06						
Dry Density	1.78	1.85	1.90	1.88	1.71						

Initial Moisture Content	20	%
Maximum Dry Density	1.90	Mg/m3
Optimum Moisture Content	9.4	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	0	%
Material Retained 20mm	0	%

Operator

Conor



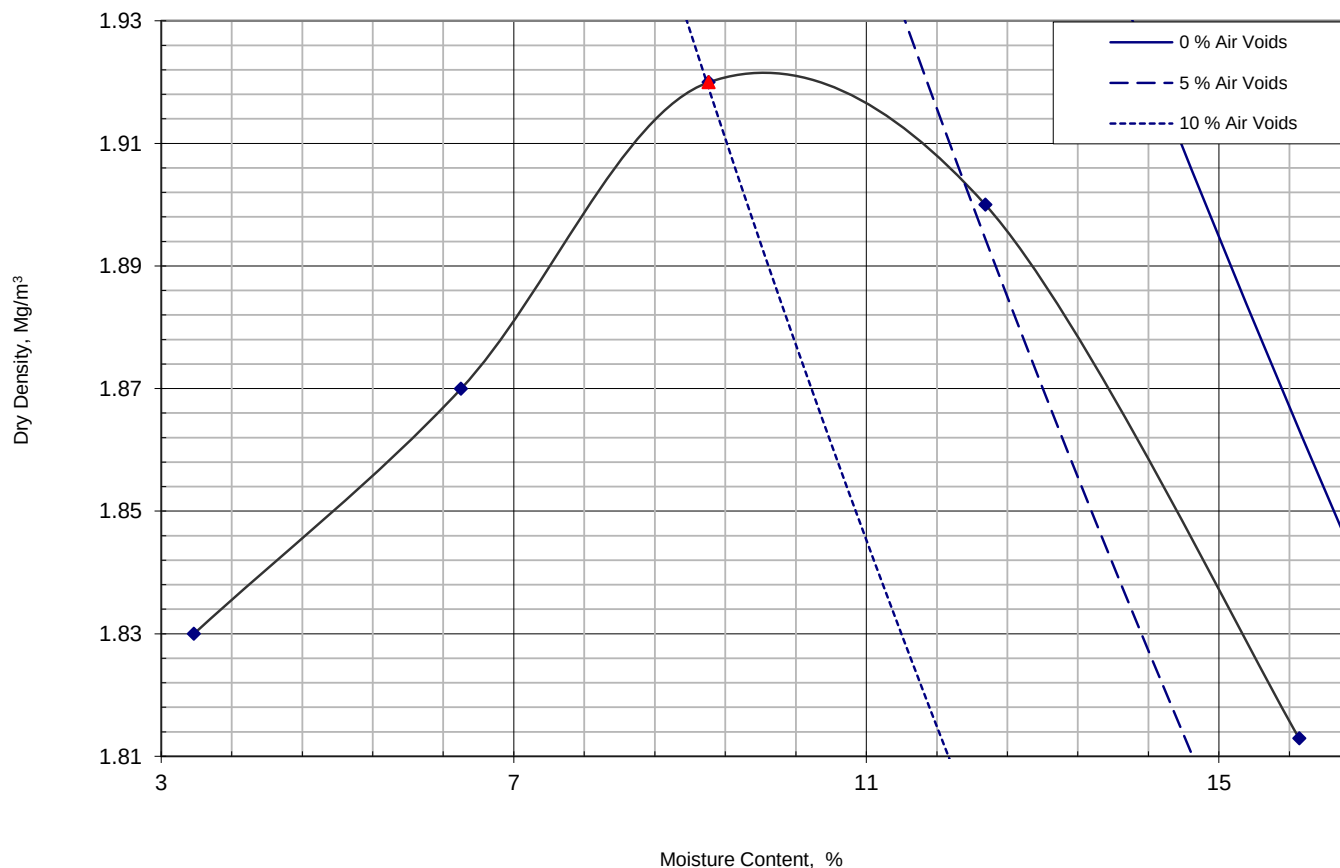
2788

**Dry Density / Moisture Content Relationship
BS 1377:Part 4:1990**

Contract Number 71666

Borehole / Pit No WS06

Project Name	University of Reading Access Roads	Sample No	C
Date Tested	22/03/2024	Depth Top	0.70
Compaction Method	2.5 Kg Rammer	Depth Base	
Compaction Clause	BS1377:Part 4:1990, Clause 3.3	Sample Type	B
Sample Description	Brown fine to coarse gravelly sandy CLAY	Single or Separate Sample Used	Single



Compaction Point	1	2	3	4	5							
Moisture Content	3.4	6.4	9.2	12	16							
Bulk Density	1.89	1.99	2.10	2.13	2.10							
Dry Density	1.83	1.87	1.92	1.90	1.81							

Initial Moisture Content	16	%
Maximum Dry Density	1.92	Mg/m3
Optimum Moisture Content	9.2	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	0	%
Material Retained 20mm	10	%

Operator

Conor



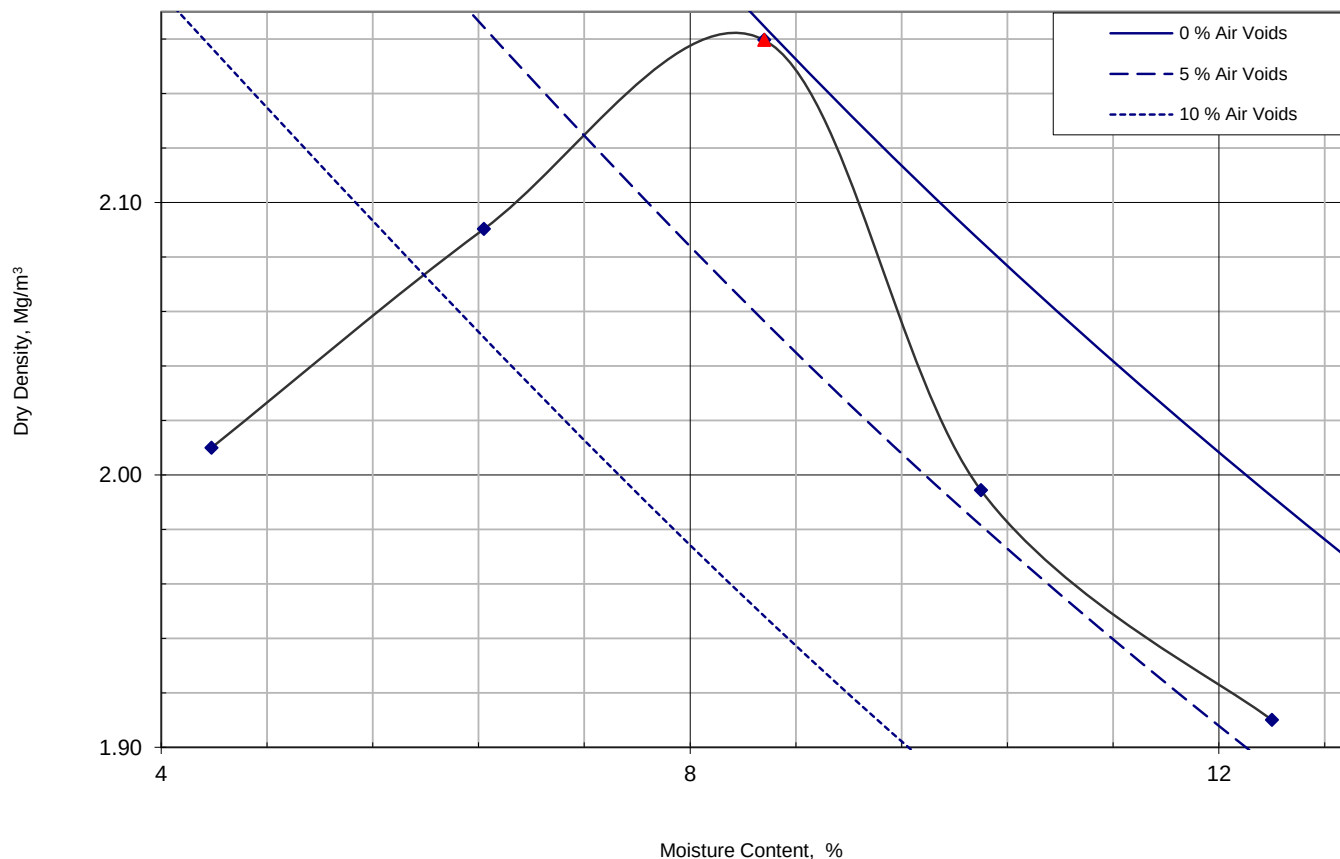
2788

**Dry Density / Moisture Content Relationship
BS 1377:Part 4:1990**

Contract Number 71666

Borehole / Pit No WS03

Project Name	University of Reading Access Roads	Sample No	G
Date Tested	22/03/2024	Depth Top	0.50
Compaction Method	4.5 Kg Rammer	Depth Base	
Compaction Clause	BS1377:Part 4:1990, Clause 3.5	Sample Type	B
Sample Description	Brown slightly silty/ clayey fine to coarse sandy fine to coarse GRAVEL	Single or Separate Sample Used	Single



Compaction Point	1	2	3	4	5							
Moisture Content	4.4	6.4	8.6	10	12							
Bulk Density	2.10	2.22	2.34	2.20	2.15							
Dry Density	2.01	2.09	2.16	1.99	1.91							

Initial Moisture Content	8.6	%
Maximum Dry Density	2.16	Mg/m ³
Optimum Moisture Content	8.6	%
Particle Density	2.65 Measured	Mg/m ³
Material Retained 37.5mm	29	%
Material Retained 20mm	35	%

Operator

Conal

Moisture Condition Value
BS1377:Part4:1990:Clause 5.4

Contract Number 71666

Borehole/Pit No. WS03

Project Name University of Reading Access Roads

Sample No.

Soil Description Brown slightly silty/ clayey fine to coarse sandy fine to coarse GRAVEL

Depth Top 0.50

Depth Base

Date Tested 22/03/2024

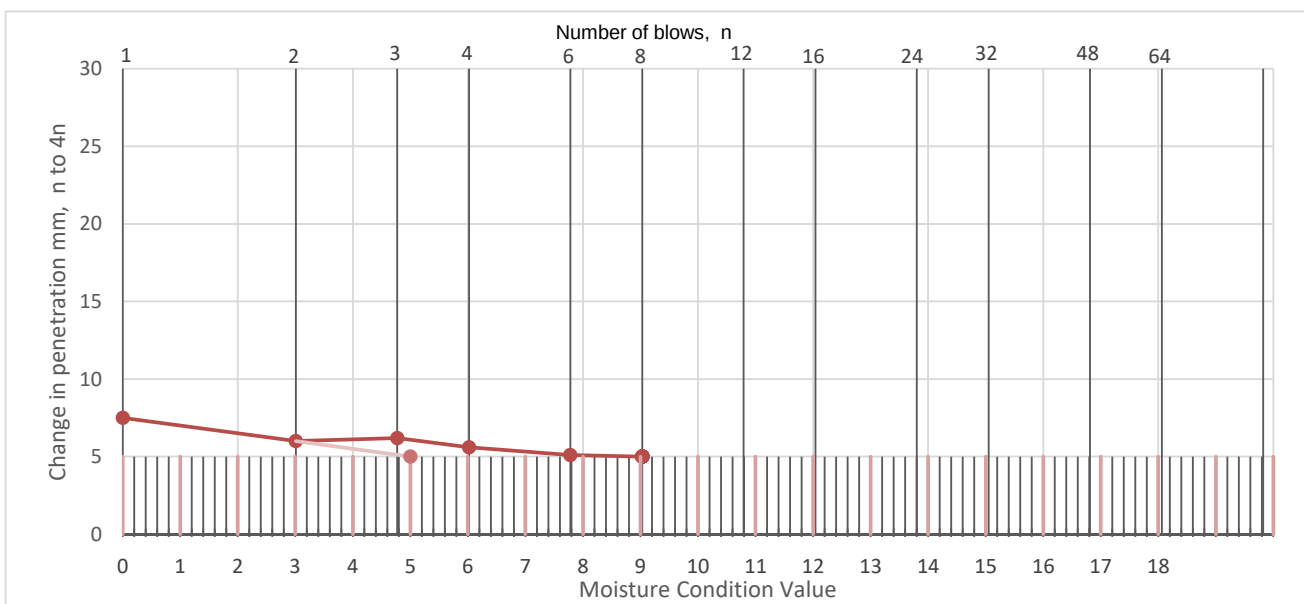
Sample Type B

Number of blows	Penetration mm	Change in Penetration n to 4n blows
1	44.9	7.5
2	40.8	6.0
3	38.6	6.2
4	37.4	5.6
6	35.5	5.1
8	34.8	5.0
12	32.4	
16	31.8	
24	30.4	
32	29.8	
48		
64		
96		
128		
192		
256		

Material Retained 20mm (%) **64**

Moisture Content (%) **8.9**

MCV Value (%) **5.0**



Operator

Conor



4161



7 - 11 Harding Street
Leicester
LE1 4DH

GSTL

Unit 3-4 Heol Aur
Dafen Ind Estate
Dafen
SA14 8QN

Analytical Test Report: L24/02246/GSL - 24-42870

Your Project Reference:	71666 PO24-0166 University of Reading Access Roads		
Your Order Number:	71666	Samples Received / Instructed:	14/03/2024 / 14/03/2024
Report Issue Number:	1	Sample Tested:	14/03 to 22/03/2024
Samples Analysed:	5 soil samples	Report issued:	22/03/2024

Signed



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 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

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.

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



4161



7 - 11 Harding Street
Leicester
LE1 4DH

L24/02246/GSL - 24-42870

Project Reference - 71666 PO24-0166 University of
Reading Access Roads

Analytical Test Results - Chemical Analysis

Lab Reference			346973	346974	346975	346976	346977
Client Sample ID			-	-	-	-	-
Client Sample Location			WS02	WS04	WS10	WS07	WS04
Client Sample Type			D	D	D	D	D
Client Sample Number			-	-	-	-	-
Depth - Top (m)			1.45	0.50	0.50	0.40	0.60
Depth - Bottom (m)			1.55	0.60	0.60	0.40	0.80
Date of Sampling			-	-	-	-	-
Time of Sampling			-	-	-	-	-
Sample Matrix			Clay	Clay	Clay	Clay	Clay
Determinant	Units	Accreditation					
Water soluble sulphate (as SO ₄)	(mg/l)	u	44	14	< 10	55	11
Acid Soluble Sulphate	(%)	u	< 0.01	< 0.01	0.02	0.02	< 0.01
Total Sulphur	(%)	UKAS	0.01	< 0.01	0.02	0.02	0.01
pH Value	pH Units	MCERTS	7.9	7.2	6.9	7.4	6.9



4161



7 - 11 Harding Street
Leicester
LE1 4DH

L24/02246/GSL - 24-42870

Project Reference - 71666 PO24-0166 University of Reading Access Roads

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 (%)
346973	-	WS02	D	-	Reddish brown silty clay	-	-	87
346974	-	WS04	D	-	Reddish brown silty clay	-	-	100
346975	-	WS10	D	-	Brown sandy clay	-	-	86
346976	-	WS07	D	-	Brown sandy clay	-	-	100
346977	-	WS04	D	-	Reddish brown silty clay	-	-	92



4161



7 - 11 Harding Street
Leicester
LE1 4DH

L24/02246/GSL - 24-42870

Project Reference - 71666 PO24-0166 University of Reading Access Roads

Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
346973	-	WS02	D	-	
346974	-	WS04	D	-	
346975	-	WS10	D	-	
346976	-	WS07	D	-	
346977	-	WS04	D	-	

L24/02246/GSL - 24-42870

Project Reference - 71666 PO24-0166 University of Reading Access Roads

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
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)
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
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
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)

L24/02246/GSL - 24-42870

Project Reference - 71666 PO24-0166 University of Reading Access Roads

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

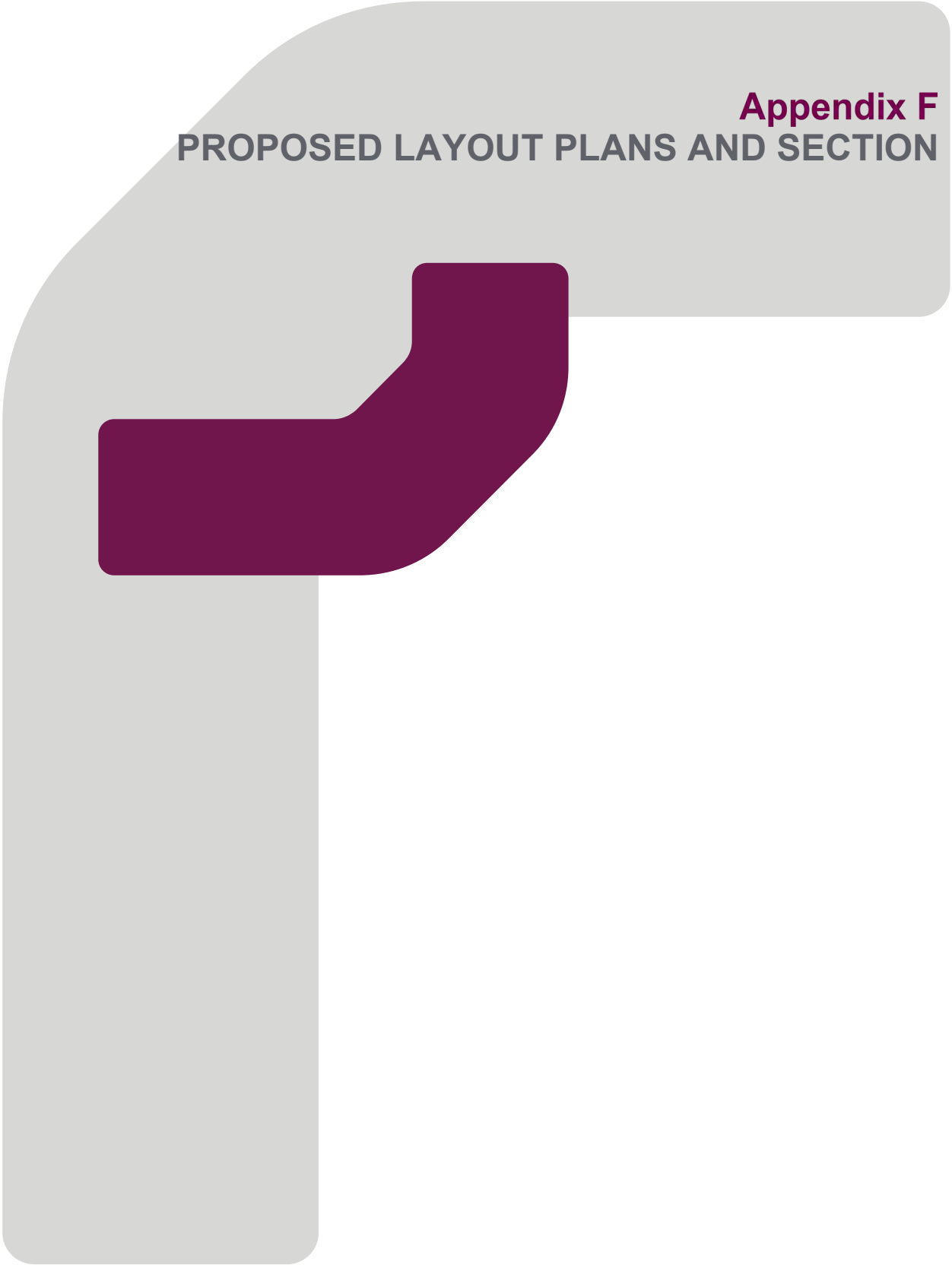
T - Temperature on receipt exceeds storage temperature

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

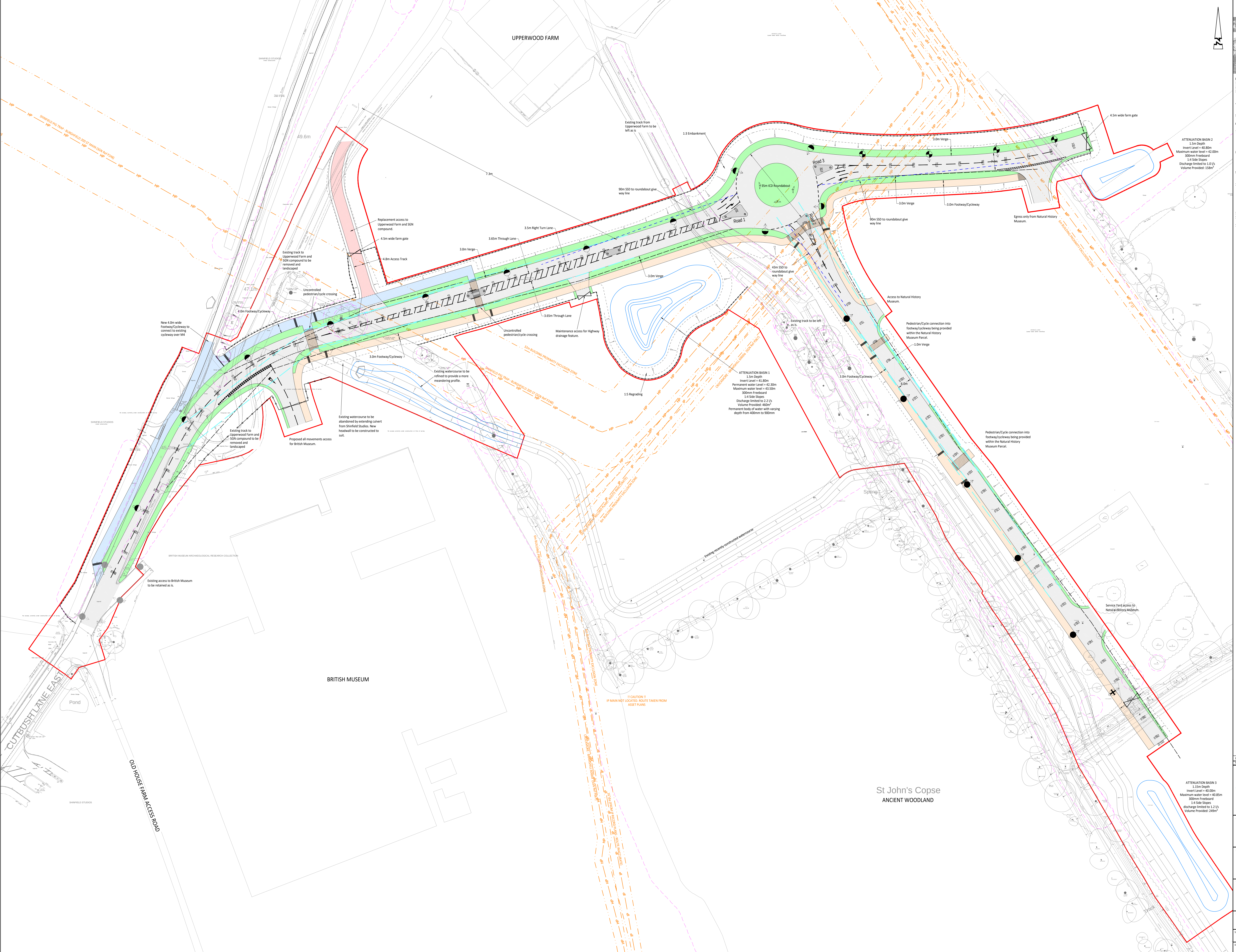
X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
346973	-	WS02	D	-		A
346974	-	WS04	D	-		A
346975	-	WS10	D	-		A
346976	-	WS07	D	-		A
346977	-	WS04	D	-		A



Appendix F

PROPOSED LAYOUT PLANS AND SECTION



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NOTES:

- Do not scale.
- Refer to all other Project Drawings and supporting notes.
- Positions of existing services/utility undertakes apparatus adjacent to or crossing proposed excavations are to be checked by the contractor prior to starting work.
- This drawing is to be read in conjunction with and checked against all other drawings, Engineering details, Specification and any structural, geotechnical or other specialist document provided. Any anomaly or contradiction between any of the above is to be reported to the Engineer.
- This drawing is schematic for clarity only, positions of pipe runs and manholes may vary on site due to site conditions.
- Traffic management and safety measures shall comply in all respects to Chapter 8 of the Traffic Signs Manual published by HMG. The Contractor shall submit his proposals for the approval of the Engineer and Local Highway Authority prior to commencing any work.
- The Contractor shall contract all utility companies prior to commencing and excavation. It is the Contractor's responsibility to locate the exact position of all underground and overhead services, cables, pipes etc prior to the excavations and to take all necessary protective measures.
- The Contractor shall make good any damage caused to fences, kerling, surfacing, road signs etc at his own expense as instructed by the Highway Authority.
- The Contractor shall indemnify the Client, Engineer and Local Authority against damage to any highway authority property, statutory undertakers plant and any costs associated with the duration of services and the repair/replacement of the damaged plant. No work on site shall commence until written evidence of the above indemnity has been submitted to and accepted by the Engineer.
- Highway Inspector to be present during inspections/CEN testing.
- The Contractor shall maintain access to all properties affected by the works.
- Street lighting positions to be pegged on site and agreed by the Local Authority PRIOR to erection commencing.

KEY:

- PROPOSED ASPHALT CARRIAGEWAY
- EXISTING ASPHALT FOOTWAY
- PROPOSED ASPHALT CYCLEWAY
- PROPOSED VERGE (LANDSCAPING AS PER LANDSCAPE ARCHITECTS PLANS)
- PROPOSED ACCESS TRACK CONSTRUCTION
- BLOCKED PAVED STRIP AT PEDESTRIAN CROSSING
- PROPOSED TACTILE/CORDUROY PAVINGS
- SLUICE BASIN
- POST AND 3 RAIL TIMBER FENCE
- Y MESH SECURITY FENCING TO MATCH EXISTING
- FORWARD VISIBILITY SPLAY
- 2.4 x 70m JUNCTION VISIBILITY
- 70m PEDESTRIAN VISIBILITY
- PROPOSED LIGHTING COLUMN
- ROAD NAME AND CHANGE
- EXISTING GAS MAINS
- GAS MAIN EXCLUSION ZONE
- TREE ROOT PROTECTION ZONES

Scale: 1:500

PL: R3/24 FIRST ISSUE

AL ABLE LETCHFORD PARTNERSHIP
Consulting Engineers
3 Tealgate, Charnham Park
Hungerford, Berkshire RG17 0YT
www.alpce.co.uk Tel: 01488 684390

Client: UNIVERSITY OF READING

Project: THAMES VALLEY SCIENCE PARK PRIMARY INFRASTRUCTURE

Site: NHM ACCESS ROAD GENERAL ARRANGEMENT

Status:

Drawn	1:500 @ A0	Date	MAR 2024	Project	KLW	Checked	LA
Drawn by		Drawn by		Drawn by		Drawn by	

HD065-101 P1



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NOTES:
1. Do not scale.
2. Refer to all other Project Drawings and supporting notes.

KEY:
Proposed Foul Water Network
Proposed Granular access track
Proposed grass verge

Scale 1:500
0 5 10 15 20 25m

PR	11/21	COMPOUND FENCELINE UPDATED	KLW	LPA
PR	10/21	TRACK ALLOWANCE/NOT UPDATED	KLW	LPA
P2	09/21	TRACK UPDATED	JA	KLW
PL	09/21	FIRST ISSUE	KLW	LA

Client
UNIVERSITY OF READING

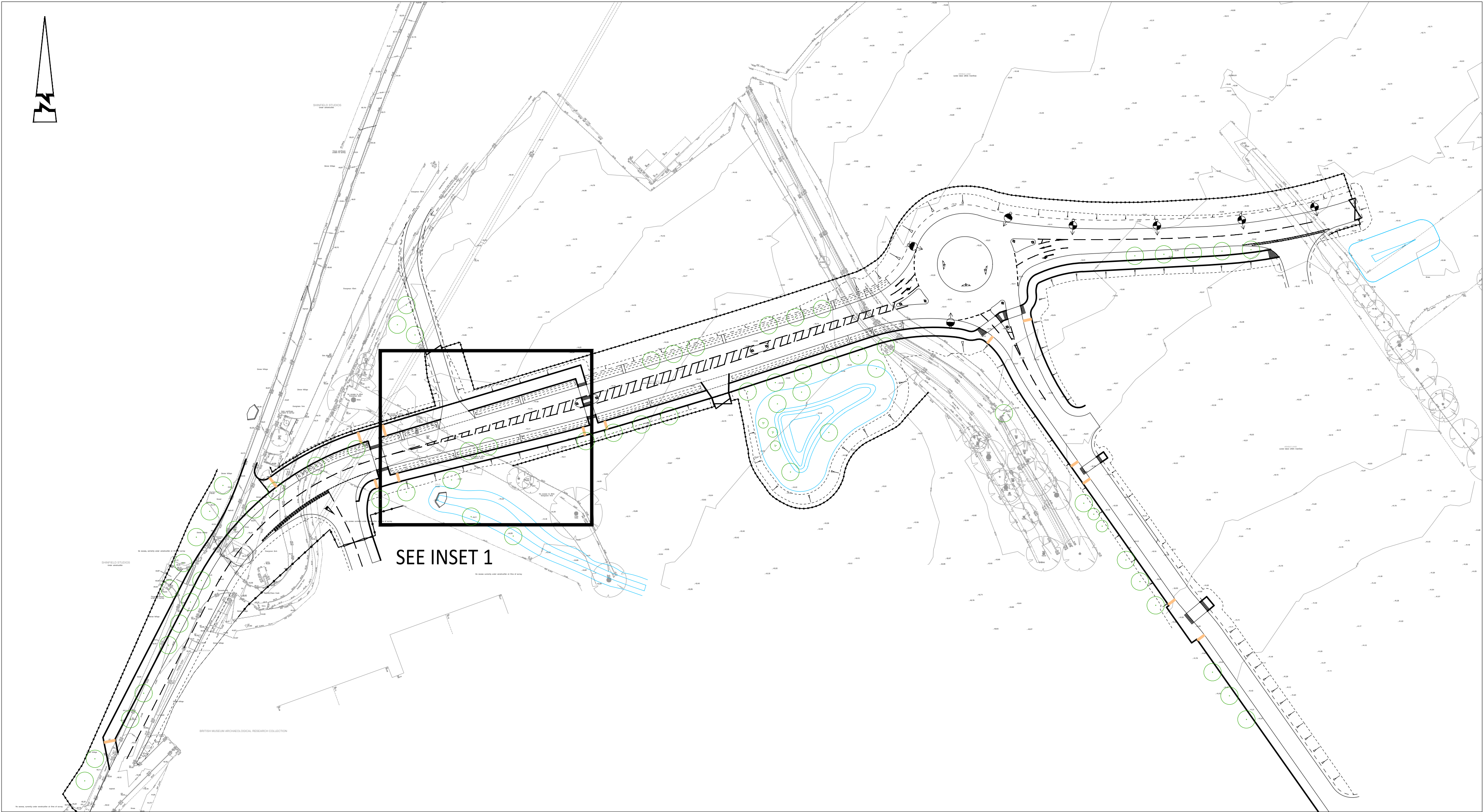
Project
**THAMES VALLEY SCIENCE PARK
PRIMARY INFRASTRUCTURE**

Title
**FOUL PUMPING STATION
AND ACCESS TRACK
GENERAL ARRANGEMENT**

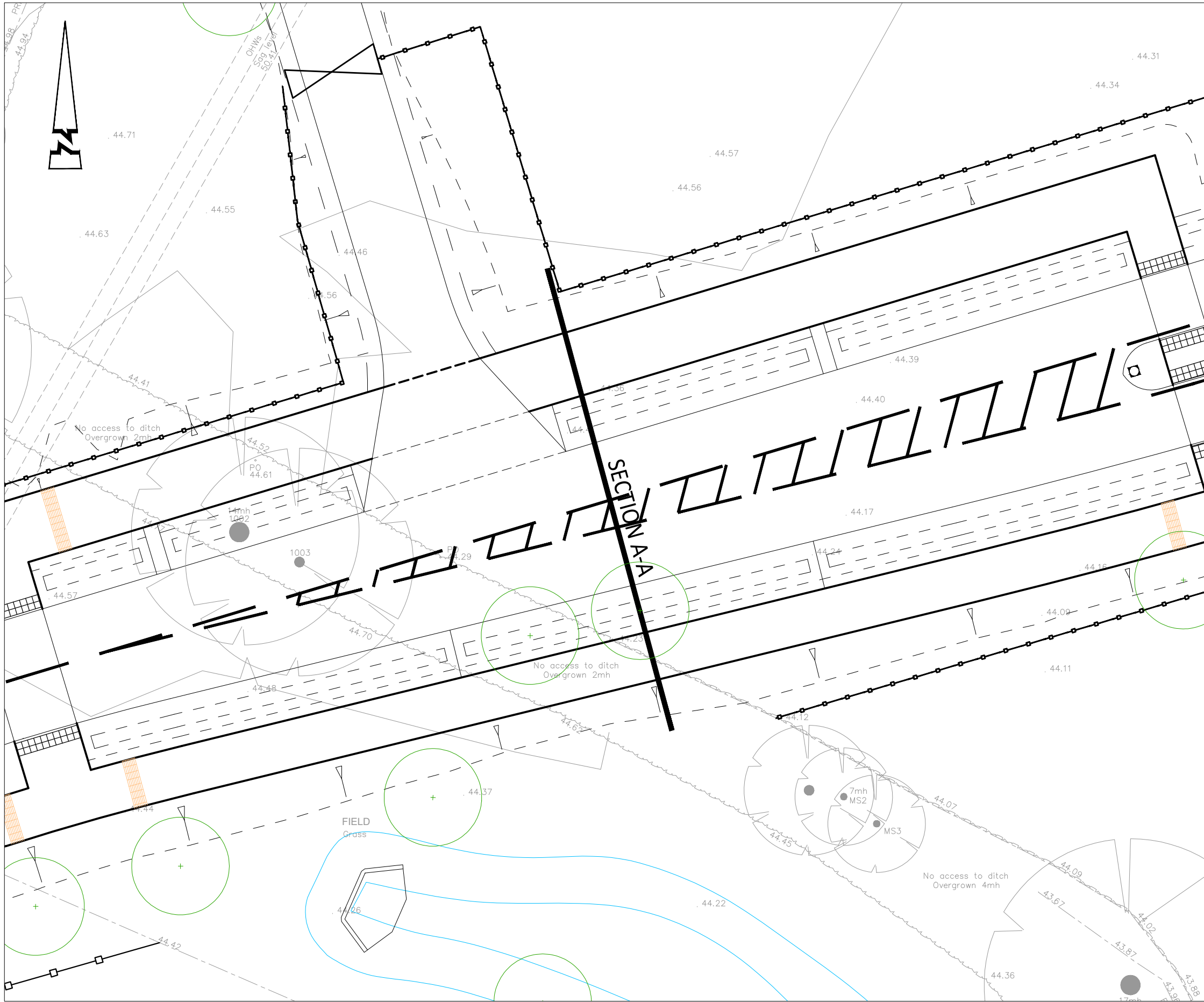
Status

Scale	Date	Author	Checked
1:500 @ A0	SEPT 2023	KLW	LA

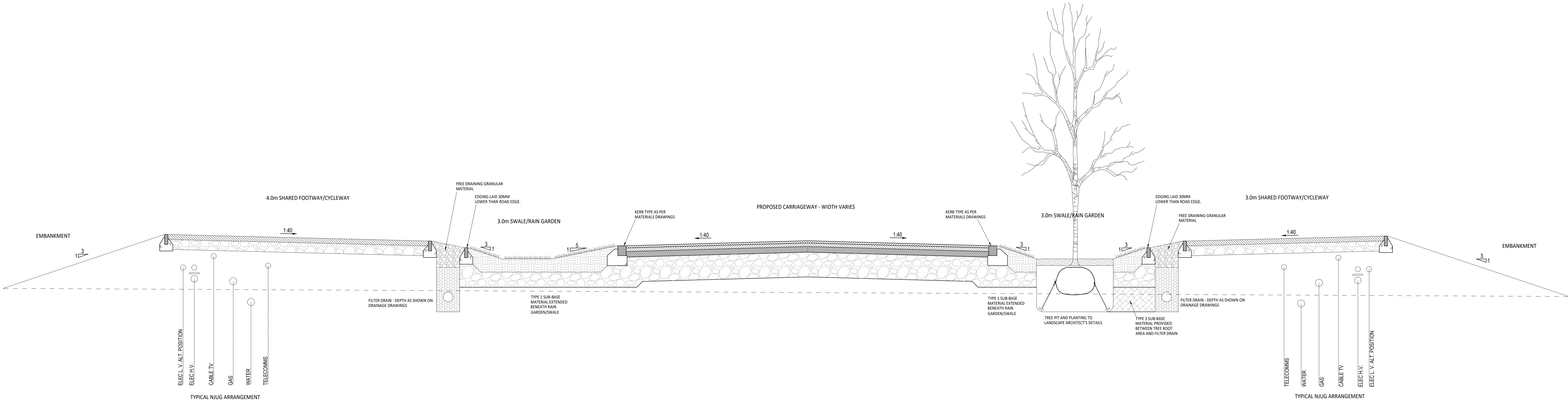
Drawing No. **A392-IV2-101** Revision **P4**



OVERALL SITE PLAN - SCALE 1:1000



INSET 1 - SCALE 1:250



SECTION A-A - SCALE 1:25

P3	R3.24	UPDATED TO SUIT LATEST LANDSCAPING	LPA	LPA
P2	R3.24	TYPE 3 MATERIAL ADDED BETWEEN TREE AND FILTER DRAIN	KLW	LPA
P1	R3.24	FIRST ISSUE	KLW	LPA

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Project							
NHM ACCESS ROAD							
Title							
ACCESS ROAD TYPICAL SECTION							
Status							
Issue	AS SHOWN	Date	MAR 2024	Drawn	KLW	Checked	LPA
Drawing No	HD065-SK01					Revision	P3

FACTUAL AND INTERPRETATIVE GROUND INVESTIGATION REPORT

University of Reading Access Roads

2024-04-18

794-ENV-GDE-20318

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Contact

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Appendix D – SuDS Maintenance Schedules

Cellular Tanks Operation & Maintenance Requirements

Regular inspection and maintenance is required to ensure the effective long-term operation of below ground modular storage systems.

Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements.

Modular systems – operation and maintenance requirements

Maintenance schedule	Required action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for three months then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pretreatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlets, overflows, and vents	As required
Monitoring	Inspect/check all inlets, outlets, overflows, and vents to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment buildup and remove if necessary	Every five years or as required

Maintenance activities should be detailed in the health and safety plan and a risk assessment should be undertaken.

Detention Basin Operation & Maintenance Requirements

Regular inspection and maintenance is important for the effective operation of detention basins as designed.

Regular mowing in and around detention basins is required only along maintenance access routes, amenity areas (e.g. footpaths), across embankments and across the main storage area. The remaining areas can be managed as “meadow”, unless additional management is required for landscaping purposes.

Where a detention basin has a micro pool at the outlet, its submerged and emergent aquatic vegetation should be managed as for ponds or wetlands. Plant management, to achieve the desired habitat effect, should be specified clearly in a maintenance schedule.

Adequate access must be provided to the detention basin for inspection and maintenance, including for appropriate equipment and vehicles, e.g. mowing equipment. Operation and maintenance requirements for detention basins are described below.

Detention basin operation and maintenance requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets, and overflows for blockages, and clear if required	Monthly
	Inspect bank sides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year) then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlets, and forebays	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required

Maintenance schedule	Required action	Frequency
	Prune and trim any trees and remove cuttings	Every two years, or as required
	Remove sediment from inlets, outlets, forebays, and main basin when required.	Every five years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets, and overflows	As required
	Re-level uneven surfaces and reinstate design levels	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/after large storms.
	Inspect bank sides, structures, pipework etc for evidence of physical damage.	Monthly/after large storms.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.
	Check penstocks and other mechanical devices.	Half yearly.

Sediments excavated from detention basins that receive runoff from residential or standard road and roof areas are generally not toxic or hazardous material and can be safely disposed of by either land application or land filling. However, consultation should take place with the environmental regulator to confirm appropriate protocols. Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff, sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on site if there is an appropriate safe and acceptable location to do so.

Maintenance activities should be detailed in the health and safety plan and a risk assessment should be undertaken. Provided preventive maintenance measures are conscientiously undertaken, the need for corrective maintenance should rarely arise.

Many of the maintenance activities for detention basins can be undertaken as part of landscape maintenance and, if landscape management is already required at site, should have marginal cost implications.

Filter Drains Operation & Maintenance Requirements

Regular inspection and maintenance is important for the effective operation of filter drains as designed.

Access for maintenance vehicles must be available, but this is not usually a constraint due to the likely location of the filter drain adjacent to impermeable areas.

Operation and maintenance requirements for filter drains are described below.

Filter drains operation and maintenance requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass – to retain grass height within specified design range	Monthly (during growing season) or as required
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect filter drain surface to identify evidence of erosion, poor vegetation growth, compaction, ponding, sedimentation and contamination (e.g. oils)	Monthly (at start, then half yearly)
	Check flow spreader and filter drain surface for even gradients	Monthly (at start, then half yearly)
	Inspect gravel flow spreader upstream of filter drain for clogging	Monthly (at start, then half yearly)
	Inspect silt accumulation rates and establish appropriate removal frequencies	Monthly (at start, then half yearly)
Occasional maintenance	Reseed areas of poor vegetation growth ; alter plant types to better suit conditions, if required	As required or if bare soil is exposed over >10% of the filter strip area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Re-level uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break-up silt deposits, and prevent compaction of the soil surface	As required
	Remove buildup of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required
Monitoring	Inspect filter drain surface to identify evidence of erosion, compaction, ponding, sedimentation and contamination (e.g. oils)	Half yearly

Maintenance schedule	Required action	Frequency
	Check flow spreader and filter drain surface for even gradients	Half yearly
	Inspect gravel diaphragm trench upstream of filter drain for clogging	Half yearly
	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

Sediments excavated from a filter drain or upstream flow spreader that receive runoff from residential or standard road and roof areas are generally not toxic or hazardous material and can be safely disposed of by either land application or land filling. However, consultation should take place with the environmental regulator to confirm appropriate protocols. Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff, sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on site if there is an appropriate safe and acceptable location to do so.

Many of the specific maintenance activities for filter drains can be undertaken as part of a general landscaping contract. If landscape management is already required at site, this should have marginal cost implications.

Maintenance activities should be detailed in the Health and Safety Plan and a risk assessment should be undertaken.

Swales Operation & Maintenance Requirements

Regular inspection and maintenance is important for the effective operation of swales as designed.

Adequate access must be provided to all swale areas for inspection and maintenance, including for appropriate equipment and vehicles. Operation and maintenance requirements for swales are described below.

Swales operation and maintenance requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets, and overflows for blockages and clear of required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for >48hrs	Monthly, or when required
	Inspect vegetation coverage	Monthly for six months, quarterly for two years, then bi-annually
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseed	As required
	Re-level uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits, and prevent compaction of the soil surface	As required
	Remove buildup of sediment on upstream gravel trench, flow spreader of the soil surface	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly

Maintenance schedule	Required action	Frequency
	Inspect infiltration surfaces for ponding, compaction, silt accumulation. Record areas where water is ponding for >48 hours	Monthly, or when required
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Half yearly

Sediments excavated from swales that receive runoff from residential or standard road and roof areas are generally not toxic or hazardous material and can be safely disposed of by either land application or land filling. However, consultation should take place with the environmental regulator to confirm appropriate protocols. Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff, sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on site if there is an appropriate safe and acceptable location to do so.

Many of the specific maintenance activities for swales can be undertaken as part of a general landscaping contract and so if landscape management is already required at site, should have marginal cost implications.

Maintenance activities should be detailed in the health and safety plan and a risk assessment should be undertaken.

Vortex Flow Control Operation & Maintenance Requirements

Regular inspection and maintenance are required to ensure the effective long-term operation of vortex flow control systems

Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements.

Vortex Flow control – operation and maintenance requirements

Maintenance schedule	Required action	Recommended Frequency
Project completion	Following installation of the Flow Control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber.	On completion of the project by the contractor
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly then annually
	Debris removal from chamber (where may cause risks to performance)	As required during inspections
	Check bypass door is operational	Annually
	Remove sediment	Annually, or as required
Remedial actions	Repair / replace flow control if damaged	As required
Monitoring	Inspect/check to ensure that they are in good condition and operating as designed	Annually and after large storms

Maintenance activities should be detailed in the health and safety plan and a risk assessment should be undertaken.

Transport
Development Planning
Sustainable
Deliver
Trusted
Enable
Site Appraisal
Hydrology
Highways
Civil Engineering
Successful
Travel Planning
Support
Drainage
Dynamic
Masterplanning
Flood Risk Assessment
Infrastructure Design

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