



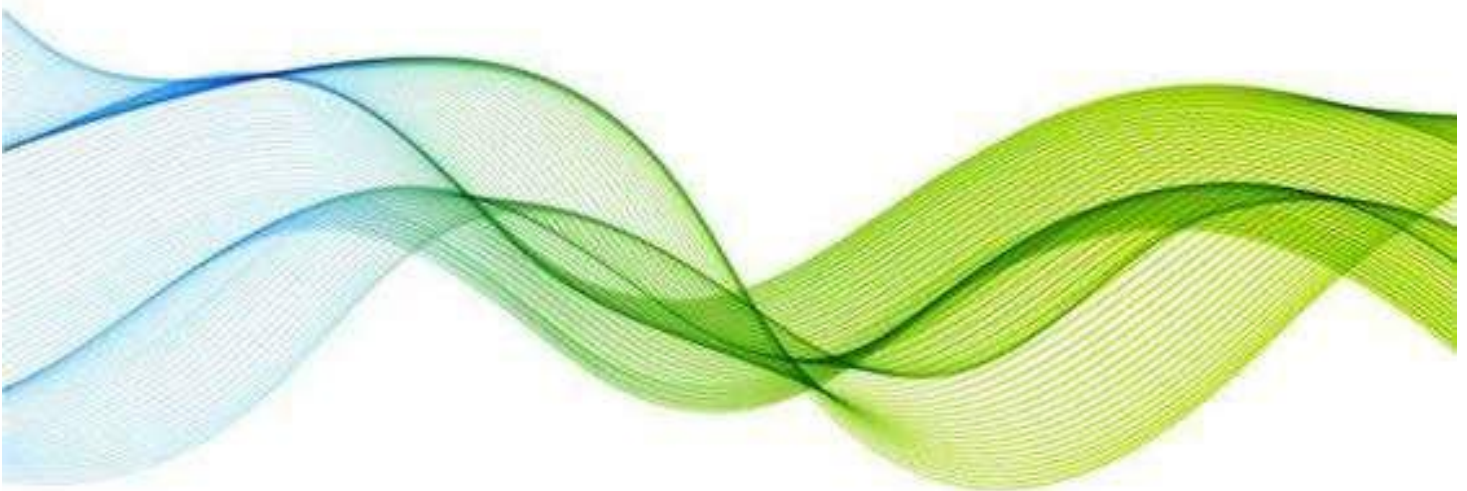
**Phase I - II
Geo-Environmental Site Assessment**

Land east of Moorhill Road, West End, Southampton, SO30 3AX

Prepared for:
Highwood Homes
The Hay Barn
Upper Ashfield Farm
Hoe Lane
Romsey
SO51 9HU

July 2023

Omnia ref: A11641/1.3



ISO Accredited Certification



QUALITY ASSURANCE

Project Number: A11641

August 2022

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Executive Summary	
Site Address	Land east of Moorhill Road, West End, Southampton, SO30 3AX
National Grid Reference	447112, 113545
Site Area	0.72 ha
Current Site Use	Open land, with demolition rubble and mixed stockpiles scattered across the site.
Site History	From the first historical map dated coniferous woodland, with a dirt track running west to east along the southern boundary until 1896. From 1896-2020 a residential house was erected with one (1no.) outbuilding in the centre of the northern boundary and two (2no.) smaller structures appeared within the southern extent, associated with the residential dwelling to the south. From 2020, the on-site residential house and associated structure are demolished, and the site is depicted as open land, with areas of hard standing.
Geology & Hydrogeology	Geology BGS records indicate that the site is directly underlain by Superficial Deposits of the River Terrace Deposits, comprising Sand and Gravel, which is classified as a Secondary A Aquifer. Bedrock geology is Wittering Formation, comprising of Clay, Silt and Sand, which is classified as a Secondary A Aquifer. The Groundsure report records no data for Artificial and Made Ground on the proposed site. Made Ground, landscaped ground and reclaimed ground were not identified within 250m of the site. The closest Made Ground being 304m north of the site. Geology encountered during intrusive works was topsoil/ made ground (within one location), over superficial deposits of River Terrace Deposits, overlaying the Wittering Formation. Hydrogeology Review of the environmental database indicates that the site is not located within a groundwater Source Protection Zone. There are no active or historical water abstractions are located within 250m of the site. The closest active groundwater abstraction is located 1012m northeast. There are no active or historical potable water abstractions are located within 250m of the site.
Hydrology & Flooding	Groundwater vulnerability data indicates that the site is underlain by a Secondary A Aquifer with medium vulnerability, as well as a Secondary A Superficial Aquifer with Medium vulnerability. Based on local topography, where the site is elevated and the location of surface watercourses it is considered that shallow groundwater, if present, will follow local topography and flow away from site West towards The River Itchen.
Landfill Sites & Ground Gases	The Groundsure Report identified no records of historic landfill sites or historic waste treatment sites within 250m of the subject site. The Groundsure Report identified no active or recently closed licensed waste sites within 250m of the site boundary.
Radon	The site lies within an area where less than 1% of the properties are above the Action Level. At these levels BRE publication BR211 indicates that no special radon protective measures are required in the construction of new extensions or dwellings.
Revised Conceptual Site Model	
Following completion of the Tier 1 risk assessment no active pollution pathways have been identified based on a residential end use without homegrown produce.	

Ground Gas Assessment
Following the revised ground gas assessment, the site is classified as Characteristic Situation 1 (CS-1) and ground gas protection measures are not required for the proposed development.
Waste Acceptance Criteria Testing
WAC assessment of soils analysed at incremental depths across the site material at depths of 0.10-0.20 at (WS102) and 0.40-0.60 (WS105) is classed as Inert Waste for waste disposal purposes based on the analysis and classification with values within the Inert Waste criteria limits. Samples were also screened using Hazwaste software which classified the waste as non hazardous waste for disposal. Omnia have provided an anticipated Waste Classification of soil derived from values presented within the laboratory results. However, the acceptance criteria for materials are dependent on the license held by the individual landfill site. As a result, waste acceptance criteria may vary between landfill sites and it is therefore recommended that the test results are submitted to the preferred waste disposal site for review.
Concrete Classification
Soils encountered beneath the site have been classified in accordance with DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z with the recommendations provided in BRE Special Digest 1 (2005).
Geotechnical Assessment
Foundations All foundations should be placed beneath any Made Ground or Topsoil to found on the underlying natural strata. Presumed bearing capacities at 1.20m bgl within the Head Deposits provide bearing capacities of 150-500kN/m² within the granular deposits across site. In the location of WS102 where cohesive soils of the Head Deposits were encountered, bearing capacities of 200-400 kN/m² have been provided. Bearing capacities at 2.00m bgl provide bearing capacities of 500-800kN/m² within the granular soils of the Head Deposits across site. Within the shallow soils of the Wittering Formation, it is considered that a traditional strip foundation of 1.00m width at a depth 2.00m bgl provides a presumed bearing capacity of approximately 50-100 kN/m².
Ground Floor Slabs Due to the High volume change potential of the ground, it is considered that ground floor slabs are not suitable for adoption and therefore a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2 to mitigate against the effects of differential settlement.
Pavement Construction CBR values ranged from 8.0% to 73.2% between ground level and 878mm bgl. Using a conservative approach, a CBR value of 8.0% should be adopted across the site at this stage. Notwithstanding these results, confirmatory CBR testing should be carried out at formation level once details are finalised.
Recommendations
Environmental All monitoring points should be decommissioned in accordance with Environment Agency guidance ahead of site development in order to avoid the creation of preferential pathways. If during the development stage any evidence of contamination is identified, works should be halted, and contact made with a suitably qualified Environmental Consultant. As determined appropriate by the Consultant, further investigation and sampling may be required to determine the appropriate actions. Upon completion contact should be made with the regulator to achieve sign off of the works.

Geotechnical

Values for foundation are based on approximate ultimate bearing capacity and are given to provide outline options and should be subject to detailed analysis by the Structural Engineer. Should the bearing strength set out above prove to be incompetent for the proposed loading, consideration should be given to a deeper foundation solution. As necessary, and as dictated by the site layout plan this may lead to a requirement for an assessment of deeper soils for a piled foundation.

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1 INTRODUCTION

1.1 Background

Omnia have been commissioned by Highwood Homes to undertake a Geo-Environmental investigation at the site of Land east of Moorhill Road, West End, Southampton, SO30 3AX to assist with their full planning application. A site location plan is presented as Figure 1.0 within Appendix III.

1.2 Proposed Development

It is understood that Highwood Homes are proposing to redevelop the site to comprise a Care Home with 70 beds over 3 storeys with associated areas of vehicle parking, access routes and infrastructure to the west of the site. We note that the site has existing planning permission for a replacement dwelling, under the local authority reference [F/20/87694](#), however the proposed care home development scheme as outlined in the Feasibility Booklet entitled 'Proposed Care Home, Moorhill, West End, Southampton' (dated May 2021) requires a new planning application.

The outline proposed site layout is presented as Figure 2.0 (Appendix III).

1.3 Objectives

The objectives of the Phase I-II Geo-Environmental Site Assessment are to:

- Undertake a site walkover and inspection;
- Review historical plans, site investigations, geology, hydrogeology, site sensitivity, floodplain issues, mining records and any local authority information available in order to complete a Desk Study in line with the Environment Agency (EA) document *Land Contamination Risk Management (LCRM)*;
- Undertake an assessment of the near surface through intrusive site investigation;
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors;
- Provide a general geotechnical characterisation of the site, including outline recommendations for pavement design and appropriate foundation options; and,
- Provide a factual and interpretative report relating to the site and provide recommendations on any potential development issues with consideration of residential and environmental receptors.

1.4 Sources of Information

Background information was sought from the following sources:

- Groundsure Environmental Database Search (GS-8775595);

- Historical Ordnance Survey Mapping (1868 –2022);
- The British Geological Survey (BGS) map for the site (Sheet 315, Southampton, Solid and Drift Edition at a scale of 1:50,000, 1987);
- Environment Agency flood designations, aquifer designations and groundwater source protection zones (<https://magic.defra.gov.uk/MagicMap.aspx>) [Accessed: 2022/0622];
- Zetica UXO Risk Maps (<https://zeticauxo.com/downloads-and-resources/risk-maps>); [Accessed: 2022/06/22]
- British Standard BS10175:2011+A2:2017 – Investigation of Potentially Contaminated Sites – Code of Practice;
- British Standard BS5930:2015+A1:2020 – *Code of Practice for Ground Investigations*;
- British Standard BS1377-9:1990 Incorporating Amendment No. 1 – *Methods of Test for Soils for Civil Engineering Purposes – Part 9: In-situ Tests*;
- British Standard BS8485:2015+A1:2019 – *Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings*;
- CIRIA Publication C665 (2007). *Assessing Risks Posed by Hazardous Ground Gases to Buildings*;
- BRE DG365 (2016). *Soakaway Design*;
- BRE Special Digest 1 (2005). *Concrete in Aggressive Ground*;
- Tomlinson, M.J. (2001). *Foundation Design and Construction*. 7th Edition. Pearson Prentice;
- NHBC Standards (2019). Chapter 4.2 – *Building Near Trees* (2020); and,
- British Standard BS8004:2015 - *Code of Practice for Foundations*.

1.5 Limitations

The limitations of this report are presented in Appendix I.

1.6 Confidentiality

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

2 SITE SETTING

2.1 Site Details

Table 2-1 Site Details

Site Address	Land east of Moorhill Road, West End, Southampton, SO30 3AX
National Grid Reference	447112 113545
Site Area	0.72ha

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location plan is presented as Figure 1.0 (Appendix III).

2.2 Current Site Use

2.2.1 Site Description

The area of investigation is located approximately 2.0 km east of Southampton city centre, and 800m southwest of West End, Southampton. It is approximately rectangular in shape, covering an area of 0.72ha. Access was from the north western corner of the site, off Moorhill Road (A27) to the west.

At the time of the site walkover the site was accessed via a private tarmac road which was noted from visual inspection to be in good condition. The site was secured by two (2no.) wooden gates with concrete pillars at this access point from Moorhill Road (Photograph 1). The wooden gates were secured by key padlocks. The remainder of the site was bordered by wooden fencing.

During the site walkover, the site comprised open, heavily vegetated land with three (3no.) mixed stockpiles scattered throughout the site. Further detail on these stockpiles are explained below. A dirt track, assumed to be previous soft landscaping ran along the west and southern border of the boundary.

Within the north-western corner of the site presumed fly-tipped waste was noted and comprised three (3no.) disused fridges (Photograph 2). Within the centre of the site was an approximately 10.00m x 3.00m x 2.00m pile of presumed demolition rubble (Photograph 3) which is presumed to be from the demolition of the former residential house evident on historical mapping. The demolition rubble contained glass, brick, concrete, and metal and was overgrown with grass.

In the centre of the northern extent of the site was a stockpile of metal (Photograph 4). This was rusted, and staining was noted on the hardcore tarmac floor from previous burning. The pile of metal contained metal racking, corrugated iron roofing approximately 5.00m x 2.00m x 2.00m in size.

On the north western boundary was a rusted green above ground storage tank (AST) tank (Photograph 5) measuring approximately 1.50m x 1.50m x 1.50m. There was no visual evidence of leaking or staining on the floor, however a tar like substance (Photograph 6) was noted within the

pipe exiting the tank. A concrete covered reservoir was also noted in the neighbouring site to the north, which ran the length of the northern boundary, which was identified as such on contemporary OS mapping.

The site was overgrown with vegetation, of dense bushes, weeds, long grass, and scattered deciduous and coniferous trees apart from in the west and centre. Multiple mature coniferous trees were present surrounding the boundary of the site and scattered in the western extent of the site. These were noted to be approximately 8.00m tall.

The site boundary was noted to be surrounded on all sides with wooden panelled fencing. One fence panel had fallen down on the southern boundary, which showed a mound associated with a covered reservoir located to the south and identified as such on contemporary OS mapping. Adjacent to the southern boundary was a control building associated with the reservoir with attached aerials presumed for a telemetry system (Photograph 7).

The general topography of the site was flat, with a gradual west to east slope.

An annotated site location plan showing observations from the walk-over survey is presented as Figure 2.0 and 3.0 (Appendix III). Relevant photographs from the site walk-over survey are located in Appendix IV.

2.2.2 Hazardous Materials Storage

In the northern extent of the site was a green above ground storage tank (Photograph 5) approximately 1.50x1.50x1.50m. There was no visual evidence that the tank was leaking and no staining on the floor, however a tar like substance was noted with the pipe exiting the tank.

2.2.3 Potential Asbestos Containing Material (PACM)

The exact ages of the demolished buildings is unknown, but they are considered to pre-date the year 2000 as historical mapping denotes a residential house and outbuilding from 1896- 2020. As such, they were considered to have the potential to contain Asbestos Containing Materials (ACMs) within the building fabric. It was noted in the site walkover that mixed stockpiles from what is assumed the previous building is still on-site, and therefore it is considered that the stockpiles of demolition rubble have the potential to contain Asbestos Containing Materials. It is therefore recommended that the material within the stockpiles is classified prior to the commencement of site works and further testing is required for potential ACMs.

2.2.4 Waste Storage

Within the north-western corner of the site were three (3no.) presumably fly-tipped disused fridges (Photograph 2) and within the centre of the site an approximately 10.0x3.0x2.0m pile of demolition rubble (Photograph 3) which is presumed to be from the residential house from historical mapping. The demolition rubble contained glass, brick, concrete, and metal and overgrown with grass.

In the centre of the northern extent of the site was a stockpile of metal (Photograph 4). This was rusted, and staining was noted on the hardcore tarmac floor from previous burning. The pile of metal contained metal racking, corrugated iron roofing approximately 5.00x2.00x2.00m.

2.2.5 Tree Species

At the time of the site walkover the site was overgrown with bushes, weeds, long grass and had multiple coniferous trees on the western boundary of the site, these were noted to be approximately 8.00m tall. Additional coniferous and deciduous trees were scattered around the site.

2.2.6 Potential Invasive Species

During the site walkover no obvious signs of potential invasive species were identified.

2.3 Surrounding Area

The surrounding land uses are summarised in Table 2-2 below:

Table 2-2 Land Use

Direction	Land Use
North	Covered reservoir Telegraph Road, with residential housing beyond.
East	Dense coniferous woodland
South	Covered reservoir beyond which is dense woodland, golf course and residential housing.
West	Moorhill Road, with residential housing beyond.

3 SITE HISTORY

3.1 Site History

A review of historical land use pertinent to the site and within a 250m radius is summarised in Table 3-1.

Table 3-1 Historical Land Use

Map Edition	Historical Land Use	
	On Site	Off Site
1868-1869 (1:10,560) (1:2,500)	Site is entirely occupied by undeveloped with coniferous trees. An access track runs west to east along the southern boundary. The southwest corner of the site is deciduous woodland.	The immediate area around the site is mapped as predominately undeveloped land, with to the south and coniferous forests immediately to the north and east. A residential house with five (5no.) associated buildings on the southern boundary on the site. Residential housing from 181m north and from 26m west. A well is noted 53m west and 119m northwest.
1896-1871 (1:10,560 -Partial mapping) (1:2,500)	The site occupied with a residential house denoted 'Fir Cottage' in the northwest of the site with an additional associated building in the centre of the northern extent. The eastern of the site is denoted as coniferous woodland. An assumed greenhouse is located within the southern extent, and a single structure within the south-eastern corner. These are both assumed to be associated with the residential development to the south.	Gravel pits located 111m and 178m north. Pump noted 143m south.
1895-1910 (1:2,500) (1:10,560)	No significant change.	The gravel pit 111m north has been extended to the south, and now is located 81m north. Additional gravel pit 227m north.
1932-1938 (1:10,560)	Partial mapping, no mapping across the site, mapping only shows from 273m west.	Partial mapping, no mapping across the site, mapping only shows from 273m west.

Map Edition	Historical Land Use	
	On Site	Off Site
1940-1950 (1:2,500- Partial mapping) (1:10,560)	No significant change.	Reservoir 24m southwest. Gravel pit 62m northeast. Gravel pit 81m north infilled, coniferous woodland present within the gravel pit. Unspecified tank 108m south. Increase in residential development to the west and north.
1951-1959 (1:2,500-Partial mapping) (1:10,560- Partial mapping)	Additional access added in the northwest corner connection the two buildings along the northern boundary. Structures within the south are no longer depicted on mapping.	Additional residential development to the west. Gravel pit 227m north no longer depicted on mapping.
1962-1967 (1:2,500) (1:10,560)	Outbuilding present on the track of the southern boundary. .	Drain noted 185m northeast, running west to east. Tank 7m southeast and 250m northeast. Gravel pit 18m northeast are no longer present.
1970-1978 (1:10,000) (1:2,500-Partial mapping)	No significant change.	Reservoir on the southern boundary of the site. Electrical substation 40m southwest. No gravel pits present.
1987 (1:10,000)	No significant change.	Reservoir north of the northern boundary of the site. This appears to contain water.
1993 (1:10,000) (1:1,250)	No significant change.	Reservoir to the south depicted as 'covered'.
2001 (1:10,000)	No significant change.	Gravel pit 227m northeast no longer present.
2003 (1:10,000)	No significant change.	Reservoir southwest, now replaced with residential housing.
2010 (1:10,000)	No significant change.	No significant change.
2020 (Aerial Photograph)	Residential house and outbuildings demolished.	No significant change.
2022 (1:10,000)	No significant change.	No significant change.

A selection of historical maps are presented in Appendix V.

3.2 Historical Tank Database

The Groundsure Report identified one (1no.) records of historical tanks within 250m of the study site. The one (1no.) record relating to a single tank located approximately 108m southeast of the site which was identified on historic mapping dated from 1940.

3.3 Historical Energy Features Database

The Groundsure Report identified two (2no.) historical energy features within a 250m radius of the subject site.

- 35-40m southwest – Electricity Substation (1970-1993), shown on historical mapping from 1970; and,
- 212m west – Electricity Substation (1955).

Due to the distance and groundwater flow direction being away from the site in a westerly direction towards the river Itchen and the low mobility of PCBs, the identified electricity sub stations are not considered to have the potential to impact the subject site and have therefore not been considered further.

3.4 Historic Garages and Petrol Stations

The Groundsure Report did not identify any historical petrol stations or historical garages within a 250m radius of the site.

3.5 Historic Industrial Land Uses

The Groundsure Report identified fourteen (14no.) records of historical industrial land uses within 250m of the study site, upon further review these relate to seven (7no.) separate historical land uses.

The identified land uses are:

- 23-27m southwest – Unspecified Heap (2 records) – (1957);
- 50-54m northeast – Gravel Pit (3 Records) – (1957);
- 82m north – Unspecified Pit (2 Records) – (1967-1993);
- 83-115m north – Gravel Pits (3 Records) – (1895-1993);
- 130m north – Unspecified Tank (2 Records) – (1977-1993);
- 184m north – Gravel Pits – (1897); and,
- 218-263m northeast - Gravel Pits (2 Records) – (1897-1957).

Due to the distance from site, the expected groundwater flow direction and the industrial use profiles, the unspecified tank is not considered to have the potential to impact the subject site and have therefore not been considered further.

3.6 Planning History

A review of the online planning portal of Eastleigh Borough Council identified five (5no.) planning applications attributed to the site postcode.

Numerous applications relate to Tree Protection Orders (TPO) and extensions, with any pertinent information summaries below. All application for tree works on TPO's were granted or withdrawn by the applicant.

No environmental conditions were places on the applications for the extensions.

One (1no.) application was the current planning permission held for a replacement dwelling, under the local authority reference [F/20/87694](#).

3.7 Unexploded Ordnance Risk Assessment

A review of publicly available information (provided by Zetica UXO) shows the site as having a 'low risk' associated with bombing density and bomb risk.

The site is consequently considered **Low Risk** with regards to unexploded ordnance.

4 ENVIRONMENTAL SETTING

4.1 Geology and Hydrogeology

British Geological Survey Map (Sheet 315, Southampton, Solid and Drift Edition at a scale of 1:50,000, 1987) indicates that the site is underlain by the following geological sequence:

Table 4-1 Geology

Geological Unit	Formation Name	Description	Aquifer Classification
Superficial	River Terrace Deposits	Sand & Gravel	Secondary A
Bedrock	Wittering Formation	Sand, silt and clay	Secondary A

The Groundsure report records no data for Artificial and Made Ground on the proposed site. Made Ground, landscaped ground and reclaimed ground were not identified within 250m of the site. The closest Made Ground being 304m north of the site.

Review of the environmental database indicates that the site is not located within a groundwater Source Protection Zone. There are no active or historical water abstractions located within 250m of the site. The closest active groundwater abstraction is located 1012m northeast. There are no active or historical potable water abstractions located within 250m of the site.

Groundwater vulnerability data indicates that the site is underlain by a Superficial Secondary A Aquifer with medium vulnerability, as well as a Secondary A Aquifer with medium vulnerability within the bedrock.

Based on local topography and the location of surface watercourses, it is considered that shallow groundwater, if present, will follow local topography and flow away from site in a westerly direction towards The River Itchen.

4.1.1 Groundwater Flooding

The Groundsure report indicates that the site is at low risk of groundwater flooding, with land within 50m north of the site having a low risk.

4.2 Hydrology and Flooding

The Groundsure report identifies three (3no.) inland watercourses within 250m of the site (two located 153-169m southeast and one located 178m northeast of the site). These are all unaffected by tidal action. Historical maps indicate these watercourses to be drainage pathways and attributed to the reservoirs.

Two (2no.) surface water body catchments were recorded onsite, noted as a costal catchment for both The River Itchen and East Hampshire Rivers. The southeast Hampshire Group was noted as

having chemical and ecological ratings of 'poor' and 'good' respectively, with an overall rating of 'poor' measured in 2016 by the Environment Agency.

No surface water abstraction licences were identified on-site or within a 250m radius.

The Groundsure Report identified the site to be within an area of both low risk of river and coastal flooding and negligible risk of surface water flooding.

4.3 Geotechnical Data

Geotechnical Data presented within the Groundsure Report identifies the following potential ground hazards which are summarised in Table 4-2 below:

Table 4-2 Geotechnical Data

Hazard	Designation
Shrink-Swell Clay	Moderate- Ground conditions predominantly high plasticity.
Landslides	Very Low- Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
Ground Dissolution	Negligible- Deposits with potential to collapse when loaded and saturated are unlikely to be present.
Compressible Ground	Negligible- Compressible strata are not thought to occur.
Collapsible Deposits	Very Low- Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.
Running Sand	Very Low- Running sand conditions are unlikely.

4.4 Mining and Ground Workings

The site is not located within an area that is affected by coal mining and therefore no Coal Authority mining report was obtained for the purposes of this report.

BritPits, which is a database containing information of active and closed surface and underground mineral workings, detailed two (2no.) records of pits. These are located 136m and 208m north, both named as Telegraph Wood Gravel Pit.

There are no active records of mining within 500m of the site however the Groundsure identified twenty-five (25no.) records exist for historic surface ground workings within 250m of the study site, which relate to eight (8no.) different uses, summarised below:

- 6m north - Reservoir (2 records) - (1987-1993); -this source is still current, the date relate to the covering of the reservoir.
- 11m south - Reservoir (3 records) - (1977-1993);-this source is still current, the date relate to the covering of the reservoir.
- 18-30m southwest – Reservoirs (3 records) – (1977-1993);
- 23-30m southwest - Unspecified Heap (3 records) - (1957);
- 50-54m northeast - Gravel Pit (3 records) – (1957);

- 82m north - Unspecified Pit (4 records) – (1967-1993);
- 83-184 north - Gravel Pits (4 records) – (1895-1910); and,
- 218m northeast – Gravel Pits (3 records) – (1957).

4.5 Radon Risk Potential

The site lies within an area where less than 1% of the properties are above the Action Level. At these levels BRE publication BR211 indicates that no special radon protective measures are required in the construction of new extensions or dwellings.

4.6 Current Industrial Land Uses

The Groundsure Report identified seven (7no.) current industrial land uses within a 250m radius of the subject site:

- 6m north - Reservoir (Current);- *this feature is currently active, filled with water and maintained therefore is not considered to pose a significant risk and therefore will not be considered further.*
- 11m south - Reservoir (Current);- *this feature is currently active, filled with water and maintained therefore is not considered to pose a significant risk and therefore will not be considered further.*
- 26m southwest - Pumping Station;- *this feature was identified within the site walkover as a control building for the covered reservoir.*
- 38m southwest - Electrical Substation;
- 91m southeast – Pylon- *After review this feature is not considered to pose a significant risk and therefore will not be considered further;*
- 93m south – Mast – *After review this feature is not considered to pose a significant risk and therefore will not be considered further;*
- 144m south – J P Appliances and Aztec Appliances – *After review it is a repair service operating as a home call out business and therefore is not considered to have the potential to pose a significant risk and will not be considered further;* and,
- 215m west – Electrical substation.

As set out in Section 3.3, due to the distance and direction from the site and the low mobility of PCBs, the identified electricity sub stations are not considered to have the potential to impact the subject site and have therefore not been considered further.

4.7 Sensitive Land Uses

The Groundsure report indicates that the site is located within a currently defined Nitrate Vulnerable Zone (NVZ) associated with the Hamble Estuary.

The Groundsure report also identified the site to be within a SSSI Impact Risk Zone.

4.7.1 Sites of Special Scientific Interest (SSSI) Impact Risk Zones

The Groundsure Report identified that the site is located within an SSSI Impact Risk Zone associated with Moorgreen Meadows.

The Groundsure Report states that any discharges of water or waste to ground or a surface watercourse require consultation, and it is recommended that contact should be made with a suitably qualified planning consultant for further information.

4.7.2 Nitrate Vulnerable Zone (NVZ)

The site lies within the Hamble Estuary Eutrophic Nitrate Vulnerable Zone and due to site lying within a SSSI Impact Risk Zone, the nutrient contents of all discharges, including those to the main sewer, need to be considered in combination for impacts on the surrounding area and Solent Water.

It is considered likely that a nitrate balance report will be required as part of the planning application to assess the potential risk posed from the proposed development on nitrates entering surrounding waters.

4.8 Site Sensitivity Assessment

Based on the information presented in the sections above, the site is considered as being located within a Low-Moderate sensitivity setting due to the following reasons:

- Underlying Secondary A Aquifer within superficial strata and bedrock;
- Geological mapping indicates granular deposits for both superficial deposits and bedrock deposits beneath the site;
- Site located within a SSSI impact risk zone (Moorgreen Meadows);
- Site is within a Nitrate Vulnerable Zone (NVZ); and,
- Moderate groundwater flooding risk.

5 CONSULTATIONS

5.1 Contaminated Land Officer

Contact was made with Eastleigh Borough Council via email in June 2022 regarding whether the council were aware of any environmental issues pertaining to the site.

A response was received stating that there are no entries in the register maintained under S.78 R (1) of the Environmental Protection Act 1990 regarding the site.

5.2 Landfill and Waste Treatment Sites

The Groundsure Report identified no records of historic landfill sites or historic waste treatment sites within 250m of the subject site.

The Groundsure Report identified no active or recently closed licensed waste sites within 250m of the site boundary.

5.3 Potentially Infilled Land

The Groundsure report identified no areas of infilled land within 250m of the site. However, a review of Section 4.4 and historical maps indicates historical ground workings that have the potential to have been infilled as listed below:

- 6m north - Reservoir (2 records) - (1987-1993); *-this source is still current; the dates relate to the covering of the reservoir.*
- 11m south - Reservoir (3 records) - (1977-1993); *-this source is still current; the dates relate to the covering of the reservoir.*
- 18-30m southwest – Reservoirs (3 records) – (1977-1993);
- 23-30m southwest - Unspecified Heap (3 records) - (1957);
- 50-54m northeast - Gravel Pit (3 records) – (1957);
- 82m north - Unspecified Pit (4 records) – (1967-1993);
- 83-184 north - Gravel Pits (4 records) – (1895-1910); and,
- 218m northeast – Gravel Pits (3 records) – (1957).

5.4 Regulatory Database

The following information has been obtained from a commercially available environmental database. The summary table (Table 5-1) only includes records not otherwise detailed in the report. Where more than two entries have been identified, the Table summarises the closest two entries to the site.

Table 5-1 Summary of Groundsure Data

	0-249m	250-500m	Details
Sites Determined as Contaminated Land	0	0	N/A
Control of Major Accident Hazards (COMAH)	0	0	N/A
Regulated Explosive Sites	0	0	N/A
Hazardous substance storage/usage	0	0	N/A
Historical licensed Industrial Activities (IPC)	0	0	N/A
Licensed Industrial Activities (Part A(1))	0	0	N/A
Licensed Pollutant Release (Part A(2)/B)	0	0	N/A
Radioactive Substance Authorisations	0	0	N/A
Licensed discharges to controlled waters	0	2	276m South – Sewage discharges into unnamed land (No longer active, revocation in 1989) 421m south – sewage discharges into unnamed land (no longer active, revocation in 1978)
Pollutant release to surface water (Red List)	0	0	N/A
Pollutant Release to public sewer	0	0	N/A
List 1 Dangerous Substances	0	0	N/A
List 2 Dangerous Substances	1	3	N/A
Pollution Incidents (EA/NRW)	0	0	N/A
Pollution Inventory Substances	0	0	N/A
Pollution Inventory Waste Transfers	0	0	N/A
Pollution Inventory Radioactive Waste	0	0	N/A

6 CONCEPTUAL SITE MODEL (CSM)

6.1 Initial CSM

In accordance with Environment Agency, CLR 11 (2004) and BSI 10175 (Code of Practice for Investigation of Potentially Contaminated Land), Omnia Environmental Consulting have developed an initial CSM to identify potential contamination sources, migration pathways and receptors within the study area. A residential end use has been adopted given the proposed site development.

6.1.1 On-site Potential Sources

- Made Ground associated with historical development of the site;
- Onsite Burning (Historic) – *Identified within the site walkover; and,*
- Metal Tank (Current) – *Identified within the site walkover.*
- *Waste stock Piles, presumed building demolition rubble and stockpile of waste metal*

6.1.2 Off-site Potential Sources

- 6m south – Electrical Substation (Current) – *Identified within Site Walkover;*
- 23-30m southwest - Unspecified Heap (Historic);
- 26m southwest- Pump station (Current);
- 30m southwest – Reservoir (1940-2003);
- 50-218m northeast and 83-184m north - Gravel Pits (Historic);
- 82m north – Unspecified Pit (Historic);
- 130m north – Unspecified tank (Historic).

6.1.3 Potential Pathways

- Inhalation and ingestion of impacted soils and dusts;
- Dermal contact with impacted soils;
- Inhalation of vapours;
- Vertical and lateral migration; and,
- Migration of gas into confined spaces.

6.1.4 Potential Receptors

- Future Site Users.
- Controlled Waters
 - Groundwater in underlying Secondary A Aquifer
 - Inland watercourses within 250m of the site (two located 153-169m southeast and one located 178m northeast of the site).

Construction workers are not considered to be a plausible receptor due to management of their exposure through the use of suitable PPE and hygienic working practices as required under HSE/CDM regulations. Furthermore, the length of any exposure is considered to be very short in comparison to the criteria for which the adopted end use has been derived. An Initial Conceptual Site Model has been prepared for the site and is presented overleaf within Table 6-1.

Table 6-1 Initial Conceptual Site Model

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
On-Site Potential Sources							
Made Ground associated with historical development of the site	Ground Gas (CO ₂ , CH ₄)	Vertical and lateral migration into confined spaces	Future site users	Low	Severe	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7). Gas Monitoring being undertaken (See Section 8.3.4)
	Metals (As, B, Cd, Cr, Pb, Hg, Se, Ni, Zn)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Vertical and lateral migration	Controlled Waters	Moderate	Minor	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Asbestos	Inhalation of fibres	Future site users	Moderate	Moderate	Moderate	

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
On-site Burning	Total Petroleum Hydrocarbons (TPH)	Ingestion of impacted soils and dust	Future site users	Low	Moderate	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
Metal above ground storage tank (AST)	Total Petroleum Hydrocarbons (TPH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
Off-Site Potential Sources							
Electrical Substation 6m south (Current)	Polychlorinated Biphenyls (PCBs)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
		Vertical and lateral migration into confined spaces	Future site users	Moderate	Severe	High	
23-30m southwest - Unspecified Heap (1967-1993)	Ground Gas (CO ₂ , CH ₄)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Inactive – Due to the source being a heap, it is considered that ground gas would vent freely and not migrate. In addition due direction of the source, and the anticipated groundwater flow it is considered unlikely to pose a potential risk for the future site users..
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
50-218m northeast and 83-184m north Gravel Pit (1895-1993)	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7). Inactive – Due to the direction of the potential source away from site and
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Asbestos	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Ground Gas (CO ₂ , CH ₄)	Vertical and lateral migration into confined spaces	Future site users	Moderate	Severe	High	
	Metals (As, B, Cd, Cr, Pb, Hg,	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
82m north Unspecified Pit (1967-1993)	Se, Ni, Zn)	Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	the anticipated groundwater flow, it is considered unlikely to pose a potential risk for the future site users.
		Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
		Vertical and lateral migration into confined spaces	Future site users	Moderate	Severe	High	
	Metals (As, B, Cd, Cr, Pb, Hg, Se, Ni, Zn)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Inactive – Due to the direction of the potential source away from site and the anticipated groundwater flow, it is considered unlikely to pose a potential risk for the future site users.
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
130m north Unspecified Tank (1977-1993)	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Inactive – Due to the direction of the potential source away from site and the anticipated groundwater flow, it is considered unlikely to pose a potential risk for the future site users.
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	

7 SITE INVESTIGATION

7.1 General

A ground investigation was designed based on your requirements and the proposed site development as shown in Figure 2.0 (Appendix III).

Following completion of the desk study and a review of the available data, ground investigation works were required on site to investigate the potential for impacted materials to be present on-site from identified on-site and nearby off-site potential sources.

Exploratory fieldwork was conducted over two (2no.) working days, commencing on 25th May 2022 and comprised the following:

Table 7-1 Site Investigation Summary

Potential Source/Rationale	Location Hole	Type	Maximum Depth (m bgl)	Borehole Response Zone (m bgl)
To investigate any spill from the tank identified within the site walkover.	HP101	Hand Pit	0.60	N/A
Locations for the assessment of drainage conditions of shallow soils to facilitate soakaway design. To allow the assessment of potential contamination and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	SA101	Machine Excavated Trial Pit	2.30	
Locations for the assessment of drainage conditions of shallow soils to facilitate soakaway design. To allow the assessment of potential contamination from the stockpile of mixed rubble from the previous residential house and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	SA102		1.60	
Locations for the assessment of drainage conditions of shallow soils to facilitate soakaway design. To allow the assessment of potential contamination from the stock pile of metal and to gather information on geotechnical	SA103		2.60	

Potential Source/Rationale	Location Hole	Type	Maximum Depth (m bgl)	Borehole Response Zone (m bgl)
characterisation of the soil and collection of chemical and geotechnical samples.				
To undertake additional soakaway testing in full accordance with BRE DG365 – <i>Soakaway Design</i> , in locations specified by the drainage engineer.	SA201		1.70	N/A
	SA202		1.70	
	SA203		1.80	
	SA204		2.10	
With locations targeting below the proposed footprint of the development onsite to allow the assessment of potential contamination and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	WS101	Window Sampling	2.00	1.00-2.00
	WS102		1.70	N/A
To allow the assessment of potential contamination from the tank identified within the site walkover and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	WS105		2.10	
To allow the assessment of potential contamination and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	WS103		2.00	1.00-2.00
To allow the assessment of potential contamination from the stockpile of mixed rubble from the previous residential house and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	WS104		1.30	0.60-1.30
Targeted below the proposed roads, used for derivation of in-situ California Bearing Ratios use to facilitate road pavement design	DCP101	Dynamic Cone Penetrometer	0.86	N/A
	DCP102		0.86	
	DCP103		0.86	
	DCP104		0.34	
	DCP105		0.87	

The exploratory hole locations are illustrated on Figure 3.0 (Appendix III). The ground conditions encountered are indicated on the exploratory hole logs, which are provided in Appendix VI.

7.2 Laboratory Analysis

Selected soil samples were submitted for a range of chemical analysis including:

- CLEA Metals;
- Asbestos fibres in soil;
- Speciated Polycyclic Aromatic Hydrocarbons (PAHs);
- Banded Gasoline Range Organics (GRO);
- Banded Extractable Petroleum Hydrocarbons (TPHs);
- Total Cyanide;
- PH;
- Phenols; and,
- Polychlorinated Biphenyls (PCBs).

Element Materials Technology of Deeside undertook the analytical work in accordance with UKAS accreditation where applicable and the laboratory analysis certificates are presented as Appendix VII and discussed in Section 9.

Selected soil samples were submitted to I2 Analytical for a range of geotechnical testing, in accordance with UKAS methodology where applicable, comprising:

- Moisture Content;
- Atterberg Limit Testing;
- Partial Size Distribution (PSD) Wet Sieve;
- PH; and,
- Water Soluble Sulphate (2:1).

The geotechnical analysis certificates are presented in Appendix IX.

7.3 Ground Gas and Groundwater Monitoring

Concentrations of methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) were measured using an infrared gas analyser (GA5000), calibrated to a reference standard (before and after each survey) and gas flow rates were measured using an internal flow pod.

Gas concentrations were recorded at thirty second intervals until gas concentrations stabilised for three (3no.) consecutive readings (a minimum of ninety seconds) at each location, at which point the maximum concentrations of CH₄ and CO₂, together with the lowest concentration of O₂ were recorded.

Groundwater monitoring was undertaken using an electronic dip tape to record the depth to groundwater. Ground gas and groundwater results are presented in Section 8.3.4 and discussed in Section 9.

8 GROUND AND GROUNDWATER CONDITIONS

8.1 Summary of Ground Conditions

The published British Geological Survey (BGS) map for the site (Sheet 315, Southampton, Solid and Drift Edition at a scale of 1:50,000, 1987) indicates that the superficial geology on-site comprises River Terrace Deposits of sand and gravel overlying bedrock deposits of the Wittering Formation across the entire site.

Geology encountered on site generally corresponds with that highlighted within published BGS Mapping and the findings have been outlined below.

8.1.1 Made Ground

Made Ground was encountered within four (4no.) intrusive location (SA101, SA202-SA204) and generally comprised grass over reddish brown slightly silty gravelly fine to coarse SAND with frequent rootlets. Gravel was angular to subrounded fine to coarse flint, brick, concrete, and tile.

The Made Ground encountered within SA203 consisted of 200mm of Reddish brown and grey Type 1 concrete crush.

Made Ground was encountered to a maximum depth of 0.60m bgl within SA204.

8.1.2 Topsoil

Topsoil was encountered within nine (9no.) intrusive locations, and generally comprised grass over dark brown gravelly fine SAND. Gravel was subangular to rounded fine to medium flint. Topsoil was encountered to a maximum depth of 0.60m bgl.

8.1.3 Superficial Deposits

8.1.3.1 River Terrace Deposits

Superficial deposits were encountered within all thirteen (13no.) intrusive locations and generally comprised orangish brown slightly clayey gravelly fine to medium SAND. Gravel was subangular to subrounded fine to medium flint.

Within five (5no.) intrusive locations (SA101, SA103, WS101, WS105 and SA202) the superficial deposits comprised soft orange gravelly sandy CLAY/SILT. Sand was coarse, gravel was subangular to subrounded fine to coarse flint; and within one (1no.) intrusive location (SA101) and comprised soft orange mottled blueish grey CLAY.

The base of the superficial deposits was not proven by the intrusive investigation.

8.1.4 Groundwater Conditions

Groundwater strikes were encountered during works in one (1no.) location only, as summarised in Table 8-1.

Table 8-1. Summary of Groundwater Conditions

Location	Depth (m bgl)	Strata	Type of Water Strike
SA103	2.60	River Terrace Deposits	Seepage

8.2 Laboratory Classification Analysis

Soil classification testing, including Atterberg Limits, Moisture Content, Particle Size Distribution and pH and Sulphate results are summarised in Table 8-2 – Table 8-5 with analysis certificates presented in Appendix VIII.

8.2.1 Soil Plasticity

Five (5no.) samples taken from cohesive deposits across the site were submitted to the laboratory for laboratory plasticity analysis. The results of this analysis have been summarised in Table 8-2 below.

Table 8-2. Summary of Soil Plasticity

Location	Depth (m bgl)	Geology	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Percentage passing 425µm sieve (%)	Modified Plasticity Index	Plasticity	Volume Change Potential
SA101	0.40-0.50	Brown very gravelly slightly sandy CLAY	12	48	24	24	34	8	Medium	low
SA101	2.00-2.30	Yellowish brown CLAY	30	86	32	54	100	54	High	High
SA103	0.70-0.80	Yellowish brown slightly gravelly sandy CLAY	11	35	16	19	81	15	Low	Medium
WS101	0.50-0.80	Brown gravelly very sandy CLAY	17	34	24	10	41	4	Low	Low
WS102	1.30-1.50	Yellowish brown slightly sandy CLAY	20	47	21	26	100	26	Medium	Medium

The results presented in Table 8-2 indicate that the plasticity of the clay present on site is Low to High. The volume change potential generally ranges from low to high.

8.2.2 Particle Size Distribution Analysis

Two (2no.) soil samples were submitted to the laboratory for Particle Size Distribution (PSD) analysis, with the results presented below in Table 8-3. The results are consistent with the on-site observations and descriptions.

Table 8-3. Summary of Particle Size Distribution

Location	Depth (m bgl)	Granulometric Composition (%)					
		Laboratory Description	Fines (<0.063mm)		Sand	Gravel	Cobbles
			Clay	Silt			
SA101	1.90-2.00	Yellowish brown slightly silty, clayey, sandy GRAVEL	9	6	21	64	0
SA103	1.10-1.30	Yellowish brown slightly clayey, silty, very sandy GRAVEL	3	10	42	45	0

8.2.3 Moisture Content

Seven (7no.) samples taken from deposits across the site were submitted to the laboratory for moisture content analysis. The results of this analysis have been summarised in Table 8-4 below.

Table 8-4. Summary of Moisture Content

Location	Depth (m bgl)	Natural Moisture Content (%)	Lab Description
SA101	1.90-2.00	8.6	Brown clay and loam with gravel and vegetation
SA101	2.00-2.30	17	Brown clay and loam
SA103	1.10-1.30	12	Brown sand with gravel
WS101	0.50-0.80	14	Brown clay and loam with gravel and vegetation
WS102	0.10-0.20	25.5	Brown soil/stones
	1.30-1.50	12	Brown clay and sand
WS105	0.40-0.60	11.1	Brown soil/stones

8.2.4 pH and Sulphate

Chemical analysis for pH and soluble sulphate content are summarised in Table 8-5 below with analysis certificates presented as Appendix VII and IX.

Table 8-5. Summary of pH and Sulphate Data

Location	Depth (m bgl)	SO ₄ in 2:1 water / soil (mg/l)	pH Value
HP101	0.20-0.30	11.3	4.56
SA101	0.10-0.20	8.4	7.91
	1.90-2.00	67	7.2
	2.00-2.30	36	5.2
SA102	0.40-0.60	9.4	4.96
SA103	1.10-1.30	29	4.9
WS101	0.30-0.50	26.3	6.68
	0.50-0.80	19	7.7
WS102	0.30-0.50	4.39	5.02
	1.30-1.50	4.3	4.7
WS103	0.90-1.00	87.9	4.36
WS104	0.10-0.20	9.6	6.17
WS105	0.40-0.60	38.3	7.58

Due to the size of the dataset (>10 samples), characteristic pH and SO₄ values were calculated using the highest 20% measured sulphate concentrations and the lowest 20% measured pH value as stated in the BRE Special Digest (2005) producing a site characteristic value for sulphate of 64.4mg/l and a pH value of 4.54.

Soils encountered beneath the site have been classified in accordance with DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z for brownfield locations with the recommendations provided in BRE Special Digest 1 (2005).

8.3 In-Situ Testing

8.3.1 Standard Penetration Tests (SPT)

Standard Penetration Tests (SPT) were carried out in all windowless sampling boreholes in accordance with techniques outlined in BS1377, to assess the strength/density of the underlying strata. The 'N' value (number of blows per 300mm penetration) was recorded for each test. The results of these in-situ tests, including full blow counts, are presented on the borehole logs within Appendix VI.

8.3.2 Dynamic Cone Penetrometer (DCP) Testing

In-situ California Bearing Ratio (CBR) values for near surface strata were obtained via Dynamic Cone Penetrometer (DCP) testing and were undertaken at within locations DCP101 – DCP105 in areas of proposed access infrastructure, as presented on Figure 3.0, Appendix III. The results are summarised in Table 8-6 below with CBR values of underlying strata provided.

The DCP results sheets are included within Appendix IX. CBR results have been given from the blow counts across the strata tested, abnormally high blow counts are likely attributed from larger granular material within the strata and have been excluded as they are not considered to be representative.

Table 8-6. Summary of In-situ CBR Results

Location	Depth (mm bgl)	CBR Value (%)
DCP101	32-330	8.4
	330-600	20.3
	600-860	22.2
DCP102	21-140	17.4
	140-600	12.1
	140-862	44.7
DCP103	43-350	9.8
	350-610	7.6
	610-860	24.3
DCP104	28-110	22.4
	110-200	68.1
	200-341	34.3
DCP105	25-230	42.4
	230-640	32.0
	640-878	14.0

CBR values ranged from 7.6% to 68.1% between ground level and 878mm bgl. Using a conservative approach, a CBR value of 7.6% should be adopted across the site at this stage. Notwithstanding these results, confirmatory CBR testing should be carried out at formation level once details are finalised.

8.3.3 Soil Infiltration Testing – Falling Head Permeability Test

In-situ soil infiltration testing was undertaken in general accordance with BRE DG365 – *Soakaway Design* within the near surface at locations SA101-SA103 at a depths of 1.40-2.40m bgl during the initial intrusive investigation works undertaken in May 2022.

Additional soil infiltration testing was undertaken in full accordance with BRE DG365 – *Soakaway Design* within the near surface at locations SA201-SA104 at a depths of 1.70-2.10m bgl during the additional works undertaken in July 2022.

All soil Infiltration test certificates are presented as Appendix XI and summarised in Table 8-7 below.

Table 8-7. Summary of Soil Infiltration Testing

Location	Test	Pit Dimensions (L x W x D) (m)	Depth to fill (m bgl)	Strata Type	Duration of test (hrs:mm)	Soil Infiltrations Rate (m/s)
SA101	1*	2.10x0.55x2.00	1.30	Orange clayey gravelly SAND	24 Hours	1.83×10^{-6}
	2	2.10x0.55x2.00	0.88		5 hours 34 mins	Fail
SA102	1	2.15x0.50x1.60	0.60	Orange slightly clayey gravelly SAND	22 hours	3.25×10^{-6}
	2	2.15x0.50x1.40	0.45		6 hours 12 mins	Fail
SA103	1	2.70x0.50x2.40	1.54	Orange slightly	22 hours 25 mins	9.04×10^{-6}

Location	Test	Pit Dimensions (L x W x D) (m)	Depth to fill (m bgl)	Strata Type	Duration of test (hrs:mm)	Soil Infiltrations Rate (m/s)
	2	2.70x0.50x2.40	1.28	clayey gravelly SAND	6 hours 9 mins	7.91×10^{-6}
SA201	1	2.70x0.70x1.70	0.53	Orangish brown slightly silty	7 hours 30 mins	7.24×10^{-6}
	2	2.70x0.70x1.70	0.54	gravelly SAND and sandy	12 hours 40 mins	4.34×10^{-6}
	3	2.70x0.70x1.70	0.70	clayey GRAVEL	15 hours	3.82×10^{-6}
SA202	1	2.30x0.60x1.52	0.50	Orangish brown	2 hours 46 mins	1.71×10^{-5}
	2	2.30x0.60x1.52	0.35	slightly silty gravelly SAND and	4 hours 16 mins	1.17×10^{-5}
	3	2.30x0.60x1.52	0.55	sandy SILT	2 hours 36 mins	1.34×10^{-5}
SA203	1	2.30x0.70x1.83	0.90	Orange and dark brown	49 mins	6.31×10^{-5}
	2	2.30x0.70x1.83	0.58	slightly gravelly	40 mins	7.94×10^{-5}
	3	2.30x0.70x1.83	0.48	slightly silty SAND	54 mins	5.99×10^{-5}
SA204	1	2.60x0.80x1.94	0.91	Orangish brown silty	6 hours 21 mins	8.74×10^{-6}
	2	2.60x0.80x1.94	0.88	gravelly SAND and	15 hours	3.59×10^{-6}
	3	2.60x0.80x1.94	0.90	clayey sandy GRAVEL	22 hours 5 mins	2.52×10^{-6}

**Extrapolated data to provide an indicative soil infiltration rate only*

SA101-SA103

Test 1 within SA102 and Tests 1-2 within SA103 were considered successful as both the 25% and 75% effective storage depths were reached for each test, with infiltration rates provide above within Table 8-7 above. Due to the proximity of the results to the 25% depth intercept within Test 1 of SA101, the data has been extrapolated using a line of best fit for the linear part of the graph to provide an indicative soil infiltration rate. It should be noted that the infiltration rate for Test 1 of SA101 should be treated as indicative only and should not be used for design purposes.

The results of the soakaway tests are consistent with the encountered geology, with soakaway tests yielding soil infiltration rates ranging from 3.25×10^{-6} to 9.04×10^{-6} . By reference to published data (Carter & Bentley, 1981), the results are indicative of low to medium permeability and good drainage conditions.

The required 25% and 75% effective storage depth intercepts were not reached during Tests 2 of SA101 and SA102 and so the tests were considered to be unsuccessful and soil infiltration rates could not be calculated.

SA201-SA204

All three (3no.) tests within SA201-SA204 were considered successful as both the 25% and 75% effective storage depths were reached for each test, with infiltration rates provided above within Table 8-7 above.

The results of the soakaway tests are consistent with the encountered geology, with soakaway tests yielding soil infiltration rates ranging from 2.52×10^{-6} to 7.94×10^{-5} m/s. By reference to published data (Carter & Bentley, 1981), the results are indicative of low to medium permeability and good drainage conditions.

Based on the results presented above soils beneath the site may prove suitable for the adoption of conventional soakaway design. However, it is recommended that the calculated infiltration rates are provided to a suitability qualified drainage engineer. The application of soakaway drainage will ultimately be dependent on the specific requirements of the development. All soakaways should be designed in accordance with BRE Special Digest 365-Soakaway Design.

8.3.4 Ground Gas

A total of six (6no.) ground gas and groundwater monitoring visits have been undertaken across three (3no.) monitoring wells (WS101, WS103 and WS104) at the site. An initial three (3no.) visits were undertaken between 06/06/2022 and 22/06/2022 with an additional three (3no.) visits undertaken between 05/08/2022 and 16/08/2022. The results of the gas and groundwater monitoring are presented in Table 8-8 overleaf.

Table 8-8: Summary of Ground Gas and Groundwater Monitoring Results

Well	Date	CH ₄ Peak %v/v	CH ₄ Steady %v/v	CH ₄ GSV l/hr	CO ₂ Peak %v/v	CO ₂ Steady %v/v	CO ₂ GSV l/hr	O ₂ %v/v	Atmos (mb)	Atmos. Dynamic	Flow (l/hr)	Depth to Base (m bgl)	Depth to Water (m bgl)
WS101	06/06/2022	0.1	0.1	0.0001	8.2	6.2	0.0082	14.7	1015	Steady	<0.1	1.98	Dry
	13/06/2022	0.1	0.1	0.0001	8.7	8.0	0.0087	13.8	1018	Steady	0.1	2.00	Dry
	22/06/2022	<0.1	<0.1	0.0001	8.3	6.4	0.0083	14.6	1005	Steady	0.1	1.98	Dry
	05/08/2022	<0.1	<0.1	0.0001	4.3	3.4	0.0043	18.1	1016	Rising	0.1	1.98	Dry
	12/08/2022	<0.1	<0.1	0.0002	4.9	4.9	0.0098	17.6	1008	Falling	0.2	2.10	Dry
	16/08/2022	<0.1	<0.1	0.0001	4.6	1.7	0.0046	19.2	1011	Steady	<0.1	1.08	Dry
	06/06/2022	0.1	0.1	0.0001	2.5	2.5	0.0025	18.9	1015	Steady	0.1	1.93	Dry
	13/06/2022	0.1	0.1	0.0001	2.7	2.7	0.0027	18.7	1018	Steady	0.1	1.95	Dry
WS103	22/06/2022	<0.1	<0.1	0.0001	2.4	2.4	0.0024	19.1	1005	Steady	<0.1	1.94	Dry
	05/08/2022	<0.1	<0.1	0.0001	1.2	1.2	0.0012	20.1	1015	Rising	0.1	1.94	Dry
	12/08/2022	<0.1	<0.1	0.0002	1.1	1.1	0.0022	19.8	1008	Falling	0.2	1.92	Dry
	16/08/2022	<0.1	<0.1	0.0001	1.1	1.1	0.0011	20.5	1011	Steady	<0.1	1.85	Dry
	06/06/2022	0.1	0.1	0.0001	2.0	1.9	0.0020	19.1	1015	Steady	0.1	1.12	Dry
	13/06/2022	0.1	0.1	0.0001	2.1	2.1	0.0021	19.1	1017	Steady	<0.1	1.11	Dry
	22/06/2022	<0.1	<0.1	0.0001	1.7	1.7	0.0017	19.0	1005	Steady	0.1	1.23	Dry
	05/08/2022	<0.1	<0.1	0.0001	1.0	1.0	0.0010	20.4	1015	Rising	0.1	1.23	Dry
WS104	12/08/2022	<0.1	<0.1	0.0002	0.9	0.9	0.0018	20.00	1008	Falling	0.2	1.30	Dry
	16/08/2022	<0.1	<0.1	0.0001	0.9	0.1	0.0009	20.8	1011	Steady	<0.1	1.30	Dry

9 TIER 1 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

Omnia has undertaken a Tier 1 qualitative risk assessment to determine if any potential contaminants within the underlying soils pose an unacceptable level of risk to the identified receptors.

9.1 Human Health Risk Assessment

At a Tier 1 stage the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published by the EA (Contaminated Land Exposure Assessment (CLEA) Soil Guideline Values (SGV)) and where absent, Generic Assessment Criteria (GACs) published by LQM/CIEH Suitable for Use Levels (S4UL) 2015. There are no currently defined screening values specifically for end use as a residential care home set out within UK guidance. Therefore, based on our understanding of the proposed development and a review of the proposed site layout, Omnia have adopted a conservative approach and have assessed soil concentrations against Tier 1 screening values for a residential end use without homegrown produce. The origin of the GAC values are presented within Appendix VIII.

The results of this comparison have been summarised within Table 9-1.

Table 9-1. Summary of Inorganic and Hydrocarbon Toxicity Assessment for a Residential End Use without Home Grown Produce

Determinant	Units	GAC	n	MC	Loc. of Ex	Pathway	Assessment
Inorganics							
Metals							
Arsenic	mg/kg	40	8	16.1	N/A	1	No Further Action
Beryllium	mg/kg	1.7	8	0.7	N/A	1	No Further Action
Boron	mg/kg	11,000	8	0.5	N/A	1	No Further Action
Cadmium	mg/kg	85	8	<0.1	N/A	1	No Further Action
Chromium (III)	mg/kg	910	8	91.2	N/A	1	No Further Action
Chromium (VI)	mg/kg	6	8	<0.3	N/A	1	No Further Action
Copper	mg/kg	7,100	8	20	N/A	1	No Further Action
Lead	mg/kg	310	8	256	N/A	1	No Further Action
Mercury	mg/kg	56	8	<0.1	N/A	4	No Further Action
Nickel	mg/kg	180	8	19.4	N/A	1	No Further Action
Selenium	mg/kg	430	8	2	N/A	1	No Further Action
Vanadium	mg/kg	1,200	8	53	N/A	1	No Further Action
Zinc	mg/kg	40,000	8	95	N/A	1	No Further Action
General Inorganics							
Asbestos	%	0.001	9	NAD	N/A	6	No Further Action
Total Cyanide *	mg/kg	50	9	0.9	N/A	1	No Further Action
Organics							
General Organics							
Phenol	mg/kg	750	9	<0.15	N/A	4,1	No Further Action
PAH							
Naphthalene	mg/kg	2.3	9	0.05	N/A	4	No Further Action
Acenaphthylene	mg/kg	2,900	9	0.12	N/A	1	No Further Action
Acenaphthene	mg/kg	3,000	9	<0.05	N/A	1	No Further Action
Fluorene	mg/kg	2,800	9	0.05	N/A	1	No Further Action
Phenanthrene	mg/kg	1,300	9	0.98	N/A	1	No Further Action
Anthracene	mg/kg	31,000	9	0.13	N/A	1	No Further Action

Fluoranthene	mg/kg	1,500	9	1.49	N/A	1	No Further Action
Pyrene	mg/kg	3,700	9	1.21	N/A	1	No Further Action
Benzo(a)Anthracene	mg/kg	11	9	0.54	N/A	1	No Further Action
Chrysene	mg/kg	30	9	0.67	N/A	1	No Further Action
Benzo(b)Fluoranthene	mg/kg	3.9	9	0.92	N/A	1	No Further Action
Benzo(k)Fluoranthene	mg/kg	110	9	0.36	N/A	1	No Further Action
Benzo(a)Pyrene	mg/kg	3.2	9	0.62	N/A	1	No Further Action
Indeno(123-cd)Pyrene	mg/kg	45	9	0.6	N/A	1	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.31	9	0.11	N/A	1	No Further Action
Benzo(ghi)Perylene	mg/kg	360	9	0.61	N/A	1	No Further Action
BTEX							
Benzene	mg/kg	0.38	9	<5	N/A	4	No Further Action
Toluene	mg/kg	880	9	<5	N/A	4	No Further Action
Ethylbenzene	mg/kg	83	9	<5	N/A	4	No Further Action
Xylenes (p-Xylene)	mg/kg	79	9	<5	N/A	4	No Further Action
MTBE	mg/kg	73	9	<5	N/A	4	No Further Action
Banded TPH							
TPH EC 5-6**	mg/kg	42	9	<0.1	N/A	4	No Further Action
TPH EC >6-8**	mg/kg	100	9	<0.1	N/A	4	No Further Action
TPH EC >8-10**	mg/kg	27	9	<5	N/A	4	No Further Action
TPH EC >10-12**	mg/kg	130(vap)	9	<10	N/A	4	No Further Action
TPH EC > 12-16**	mg/kg	1,100(sol)	9	<10	N/A	4	No Further Action
TPH EC > 16-21**	mg/kg	1,900	9	32	N/A	2	No Further Action
TPH EC > 21-35**	mg/kg	1,900	9	362	N/A	1	No Further Action
TPH EC > 35-44**	mg/kg	1,900	9	61	N/A	1	No Further Action
Notes Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil; 3 = Dermal Contact (Indoor & Outdoor); 4 = Inhalation of Vapour (Indoor & Outdoor); 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance. Total cyanide Tier 1 GAC is taken from the Dutch Intervention Value (2010) for complex cyanide. * The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. Omnia has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health. (sol) – GAC presented exceeds the solubility saturation limit (vap) – GAC presented exceeds the vapour saturation limit.							

Two (2no.) samples were also screened for PCBs which were less than the level of detect and therefore no active pollution pathways have been identified based on a residential end use without homegrown produce.

Following the completion of the Tier 1 risk assessment no exceedance were identified and therefore no active pollution pathways have been identified based on a residential end use without homegrown produce.

9.2 Controlled Waters Assessment

The site is considered to present a low risk to controlled waters for the following reasons:

- Site is Underlain by superficial and bedrock strata classified as Secondary A Aquifers;
- No history of industrial land use on site with the site comprising a residential property, outbuilding and associated garden since c.1896 with the site showing no significant change in configuration;
- No history of significant industrial land use in the surrounding area;
- Laboratory results generally show low concentrations across the site and do not suggest widespread impact of the underlying soils;
- Short chain, highly mobile TPH determinants were encountered at concentrations of less than the laboratory limit of detection;
- Long-chain, low mobility hydrocarbons were identified at relatively low concentrations and are not considered to have the potential to present a significant risk to controlled waters;
- The site is not located within a currently defined Source Protection Zone;
- There are no groundwater abstractions, including potable water supply abstractions within 250m of the subject site; and,
- The closest surface waters receptor is a inland watercourse located approximately 159-169m southeast of the site.

9.3 Waste Acceptance Criteria Testing

Two (2no.) composite soil samples were collected from across the site area and scheduled for Waste Acceptance Criteria (WAC) testing. The results of the laboratory testing are presented in Table 9-2 below and certificates are presented within Appendix VII.

Table 9-2 - Waste Acceptance Criteria (WAC) Summary

Sample Location (depth, m)	Classification	Exceedances
WS102 (0.10-0.20)	Inert Waste	N/A
WS105 (0.40-0.60)	Inert Waste	N/A

Based on the above assessment of soils analysed at incremental depths across the site material at depths of 0.10-0.20m bgl (WS102) and 0.40-0.60m bgl (WS105) is likely to be classed as Inert Waste for waste disposal purposes based on the analysis and classification above with values within the Inert Waste criteria limits.

Omnia have provided an anticipated Waste Classification of soil derived from values presented within the laboratory results. However, the acceptance criteria for materials are dependent on the license held by the individual landfill site. As a result, waste classifications may vary between landfill sites, and it is therefore recommended that the test results are submitted to the preferred waste disposal site for confirmation of suitability.

The two (2no.) soil samples results were entered in Hazardous Waste Classification software (Hawaste) to determine the likely classification of the material for waste disposal purposes. The

results of this classification are presented in Table X below and Hazardous Waste Classification certificated are presented within Appendix VII.

Table 9-3 Hazardous Waste Classification Summary

Sample Location (depth, m)	Classification	Exceedances
WS102 (0.10-0.20)	Non-Hazardous Waste	N/A
WS105 (0.40-0.60)	Non-Hazardous Waste	N/A

Based on the above assessment of soils analysed at incremental depths across the site material at depths of 0.10-0.20 at WS102, and 0.40-0.60 at WS105 is likely to be classed as Inert Waste for waste disposal purposes based on the analysis and classification above with values within the Inert Waste criteria limits.

Omnia have provided an anticipated Waste Classification of soil derived from values presented within the laboratory results. However, the acceptance criteria for materials are dependent on the license held by the individual landfill site. As a result, waste acceptance criteria may vary between landfill sites and it is therefore recommended that the test results are submitted to the preferred waste disposal site for review.

9.4 Ground Gas Assessment

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in CIRIA Report C665 (*Assessing risks posed by hazardous ground gases to buildings*, 2007). However, it is recommended that the full ground gas assessment and any recommended protection measures are agreed with the local authority prior to the adoption of any protection measures on-site. Furthermore, the installation of any gas protection measures should be validated by a suitably qualified engineer.

The results of the ground gas monitoring and calculated Gas Screening Values (GSVs) are presented in Table 8-8.

Six (6no.) ground gas monitoring visits have been undertaken at locations WS101, WS103, and WS104. CH₄ concentrations were recorded to a maximum concentration of 0.1% v/v at all locations. CO₂ concentrations were recorded to a maximum of 8.7% v/v at location WS101. Negligible ground gas flow rates were recorded across the site, with a maximum flow rate of 0.2l/hr recorded at all locations.

In accordance with the methodology outlined within the CIRIA publication C665, Omnia have utilised the results of the ground gas monitoring surveys to calculate a tentative Gas Screening Value (GSV). The maximum GSV calculated for methane was 0.0002l/hr whilst the maximum GSV for carbon dioxide was 0.0174l/hr.

It is understood that the proposed development is for the construction of a residential Care Home of 70 beds over 3-storeys with associated areas of vehicle parking, access routes and infrastructure to the west of the site.

Therefore, the proposed development is composed of low-rise residential dwellings assessed under BS8485:2015 classed as a **Type B** building.

9.4.1 BS 8485:2015 – Type B Building – Private Ownership with no Central Building Management

Guidance set out in BS 8485(2015)+A1(2019), which is equivalent to the Characteristic Situations of the modified Wilson & Card classification established in CIRIA Publication C665, stipulates a site characteristic GSV of <0.07 l/hr, with typical permissible concentrations of 1%v/v (CH₄) and 5% v/v (CO₂), for classification as Characteristic Situation 1 (CS-1); a very low hazard potential.

A review of Table 8-8 indicates that the calculated GSVs for both CH₄ (0.0002l/hr) and CO₂ (0.0098l/hr) are compliant with the maximum permissible GSV of <0.07l/hr for classification as CS-1. However, whilst the maximum recorded CH₄ concentration (0.1%v/v) is compliant with a CS-1 classification, the maximum recorded value of CO₂ (8.7%v/v) exceeds the typical permissible concentration of 5% (CO₂) for classification as CS-1. .

9.4.2 Ground Gas Discussion

A review of Section 6.1 indicates that the following potential sources of ground gas were identified:

- On-site – Made Ground
- 30m southwest – Covered reservoir – Infilled c.1998 (Planning App: Z/34487/000/00);
- 83m north – Historic Gravel Pit
- 50-218m northeast – Historic Gravel Pits

Following a review of published LiDAR data, contemporary topographic mapping, historic mapping and geological mapping, of the potential sources listed above, sources 2, 3 and 4 are considered to be a plausible source of ground gas for the following reasons:

- Made Ground (1) – Given the limited development on-site and a review of ground conditions encountered, which indicate Made Ground to a maximum thickness of 0.60m bgl, it is considered unlikely that Made Ground beneath the site will prove to be of sufficient thickness to present a plausible ground gas generation source;
- Infilled Covered Reservoir 30m southwest (2) – Based on OS mapping, and a review of the planning portal, it is considered that the reservoir was infilled in c.1998 based on planning application dates. Given that the structure has been built upon it is considered unlikely that putrescible waste would have been used as infill due to the potential for ground instability. However, due to the absence of scanned documents from the planning register, it is considered that the risks posed by this source to the subject site are low.
- Historic Gravel Pit (3) 83m north – Based on a review of contemporary and historic mapping together with a review of LiDAR data, it is unclear whether the gravel pit has been infilled and as such it is still considered to be a plausible source of ground gas;

- Historic Gravel Pits (3) 50-218m northeast - Based on a review of contemporary and historic mapping together with a review of LiDAR data, it is unclear whether the gravel pit has been infilled and as such it is still considered to be a plausible source of ground gas;

As set out above the calculated GSVs for CH₄ and CO₂ for the site fall comfortably within the range of values permissible for classification as CS-1, but the maximum concentrations for CO₂ have been found to exceed the 5% threshold set out within CIRIA C665.

Given the exceedance of the maximum permissible concentration of CO₂ for a CS-1 classification, Omnia have followed the procedure presented within BS 8485(2015)+A1(2019) to calculate the maximum hazardous gas flow rate for the site using the following equation:

$$Q_{hg} = q \left(\frac{C_{hg}}{100} \right)$$

Where:

C_{hg} is the maximum measured hazardous gas concentration (in %v/v) for the site

q is the maximum measured flow rate (l/hr) for the site

This results in the following *Q_{hg}* values:

$$Q_{hg}CH_4 = 0.2 \times \left(\frac{0.1}{100} \right) = 0.0002l/hr$$

$$Q_{hg}CO_2 = 0.2 \times \left(\frac{8.7}{100} \right) = 0.0174l/hr$$

Therefore, using a worst-case scenario of the highest recorded concentrations and highest recorded flow rates detected at the site yields worst-case *Q_{hg}* values which are compliant with a CS-1 classification.

A review of Table 8-8 indicates that the highest CO₂ concentrations (8.3 – 8.7%v/v) were detected at location WS101 following the installation of monitoring wells in June 2022. When supplementary ground gas monitoring was undertaken in August 2022, the maximum CO₂ concentrations recorded at location WS102 (4.3-4.9% v/v) were found to be lower and compliant with a CS-1 Classification.

It is generally accepted that CO₂ is widespread in the subsurface environment and is naturally generated by microbial and geochemical processes. Organic matter present within soils has the potential to generate CO₂ at elevated concentrations and in the UK, elevated concentrations of CO₂ are commonly encountered within Glacial Till, Chalk, River Terrace Gravels, Thanet Sand, Lambeth Group and Made Ground.

When ground gas monitoring wells are installed into soils, the small volumes of organic material present are exposed to oxygen which can result in biological respiration or oxidation of the material resulting in the production of CO₂ leading to elevated CO₂ concentrations within the well headspace.

Wilson, et al. (2018) states that low volumes of organic material in soils can degrade aerobically to produce CO₂, or may locally be degrading anaerobically with the process being so slow that the CH₄ completely oxidises to CO₂ before reaching the well headspace and that in all these cases the CO₂ is

generated so slowly that it will not be emitted from the ground surface in quantities or at a rate that is sufficient to pose a risk to overlying development.

Given the decrease in maximum recorded concentrations between June 2022 and August 2022, the fact that CO₂ concentrations stabilise at lower concentrations during each monitoring visit and the fact that the most recently recorded peak concentrations are compliant with a CS-1 Omnia consider that a CS-1 classification is suitable for the site and do not consider that an increase of the classification to CS-2 is required.

10 REVISED CONCEPTUAL SITE MODEL

Following completion of the Tier 1 risk assessment no active pollution pathways have been identified based on a residential end use without homegrown produce.

11 GEOTECHNICAL ASSESSMENT

11.1 Proposed Development

It is understood that Highwood Homes are proposing to redevelop the site to comprise a Care Home with 70 beds over 3 storeys with associated areas of vehicle parking, access routes and infrastructure to the west of the site. We note that the site has existing planning permission for a replacement dwelling, under the local authority reference [F/20/87694](#), however the proposed care home development scheme as outlined in the Feasibility Booklet entitled 'Proposed Care Home, Moorhill, West End, Southampton' (dated May 2021) requires a new planning application.

The outline proposed site layout is presented as Figure 2.0 (Appendix III).

11.2 Site Preparation

The site should be cleared of any vegetation below the areas of proposed development and stripped in accordance with [Series 200 of Specification of Highway Works](#).

Any roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting voids in-filled with suitable compacted material. This should also be undertaken for any redundant or re-routed services.

11.3 Ground Profile

Based on the findings on the current ground investigation, ground conditions at the site comprise Topsoil/Made Ground overlying superficial deposits of River Terrace Deposits, further underlain by bedrock attributed to Wittering Formation to the full depth of the ground investigation, discussed in 8.1. Site ground conditions are summarised in Table 11-1.

Table 11-1 Summary of site ground conditions

Borehole	Topsoil Thickness (m)	Made Ground Thickness (m)	Superficial Deposits	Bedrock	Groundwater (m bgl)
			FORMATION 1 Thickness (m)	FORMATION 2 Thickness (m)	
HP101	0.30	-	0.30	-	-
SA101	-	0.40	2.00	-	-
SA102	0.40	-	1.20	-	-
SA103	0.60	-	2.00	-	2.60
WS101	0.20	-	1.80	-	-
WS102	0.25	-	1.45	-	-
WS103	0.40	-	1.60	-	-
WS104	0.40	-	0.90	-	-
WS105	0.60	-	2.10	-	-

11.4 Shallow Foundations

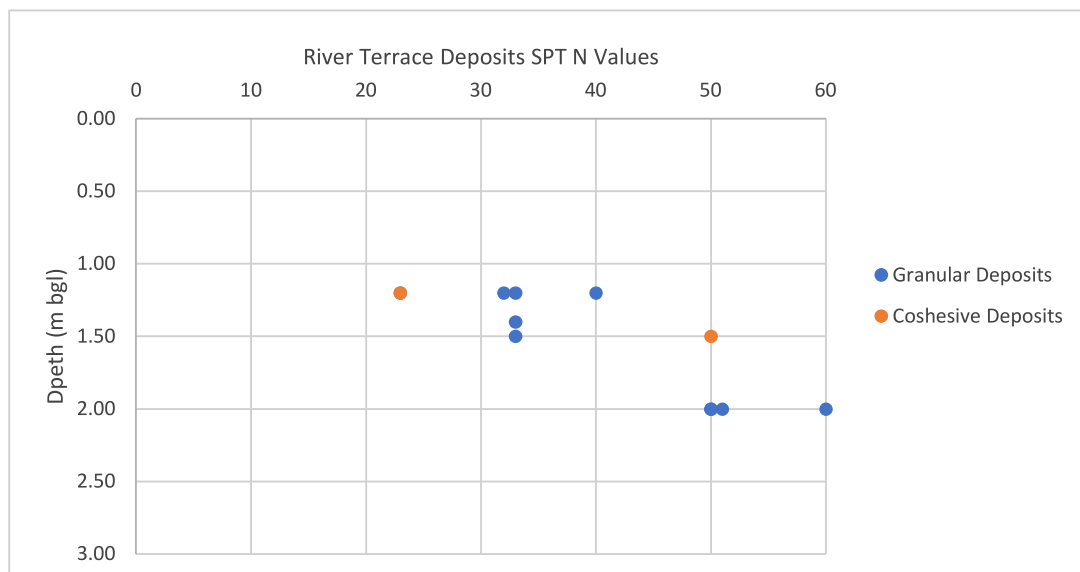
The following geotechnical assessment has been undertaken based on in-situ testing, laboratory analysis, and descriptions on the underlying geology. Foundation depths presented are indicative only based on a minimum presumed bearing value for a particular foundation type. Line loadings have not been made available such that the final depth and type of foundation required following design could vary.

It is considered that Topsoil/Made Ground would not form a suitable founding stratum due to characteristic variability and the associated potential for differential settlement. As such it is recommended that loads are transferred through the Topsoil/Made Ground to a depth at which competent geology, sufficient to support the proposed load, is encountered.

11.4.1 In Situ-Testing

Standard Penetration Testing was undertaken throughout the granular/cohesive River Terrace Deposits. The results are presented in Figure 11-1 below:

Figure 11-1 SPT vs Depth



The SPT data shows an increase in N-value with depth from N=23 at 1.20m bgl to N>50 at 2.00m bgl for the River Terrace Deposits.

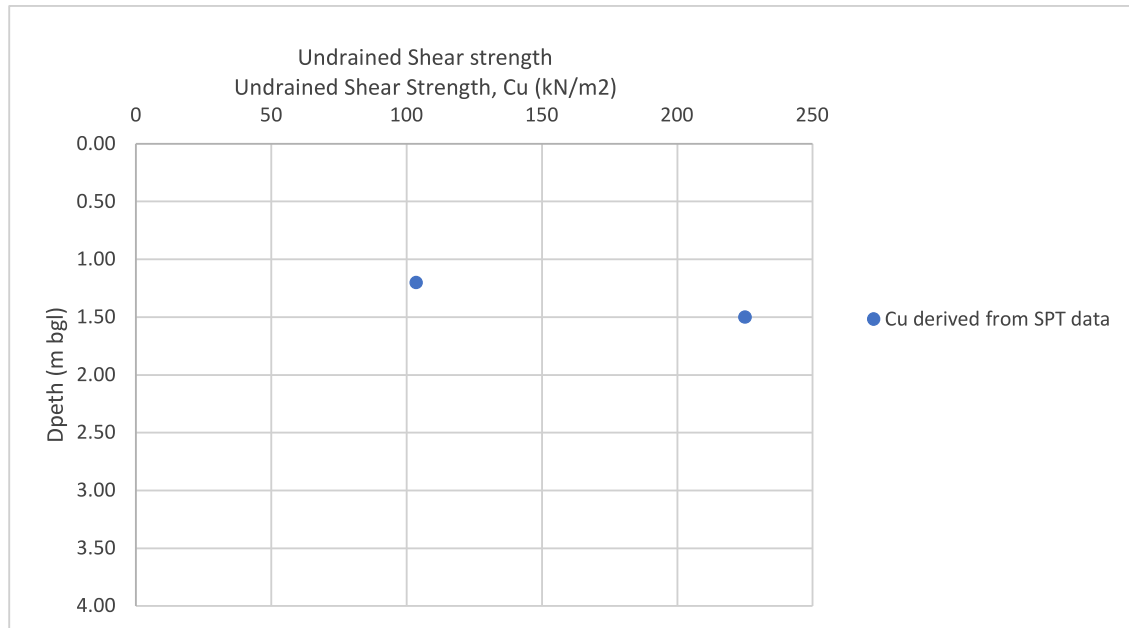
11.4.2 Shear Strength

The undrained Shear Strength of the cohesive layers within the River Terrace Deposits have been determined by using the widely accepted empirical relationship, where f_1 is based on the correlation factor based on the plasticity index of the soil (Stroud, 1974):

$$C_u = f_1 \times SPTN$$

Using a correlation factor of 4.5 gives characteristic undrained shear strengths (C_{uk}) of 104 kN/m² at 1.20m bgl within WS101 and 225kN/m² at a depth of 1.50m bgl within WS102, represented in Table 11-2 below. These values are consistent with the formation becoming medium strength material.

Table 11-2 Shear Strength vs Depth



11.4.3 Bearing Capacities

11.4.3.1 River Terrace Deposits

Indicative Bearing Capacity at 1.20m bgl

At a depth of 1.20m bgl within the coarse-grained soils of the River Terrace Deposits, SPT N values were recorded as N=23 to N=40, indicating medium dense to dense materials. It is considered a traditional strip foundation of 1.00m width at a depth 1.20m bgl provides a presumed bearing capacity of approximately 150-500kN/m².

Within WS102 fine-grained soils of the River Terrace Deposits were encountered at 1.20m bgl, with a recorded SPT N value of N=23, providing undrained shear strengths of 104 kN/m², indicating firm soils. It is considered that a traditional strip foundation at a depth of 1.20m bgl provides a presumed bearing capacity of approximately 200-400kN/m².

Indicative Bearing Capacity at 2.00m bgl

At a depth of 2.00m bgl within the coarse-grained soils of the River Terrace Deposits, SPT N values recorded as $N=50$ to $N>50$, indicating dense to very dense materials. It is considered that a traditional strip foundation at a depth 2.00m bgl provides a presumed bearing capacity of approximately 500-800 kN/m².

Within one (1no.) location (SA101) at a depth of 2.00m bgl. Hand Shear Vane (HSV) data was collected from this location, with undrained shear strengths recorded between 20 and 32 kN/m² indicating very soft to soft soils.

Within the shallow soils of the River Terrace Deposits, it is considered that a traditional strip foundation at a depth 2.00m bgl provides a presumed bearing capacity of approximately 50-100 kN/m².

The above are presumed bearing capacities and are indicative only and are subject to design. A foundation design will be required once the foundation type is finalised by structural engineer.

11.5 Groundwater Levels

Consideration should also be given to shallow groundwater encountered across the site. Groundwater was encountered at 2.60m bgl across the site. If groundwater is below the base of the foundation at a depth of less than the width of the proposed foundation, then groundwater can significantly reduce the bearing capacity of fine-grained soils.

11.6 Building Near Trees

11.6.1 NHBC Minimum Depth to Foundations

The shallow fine-grained soils on site have been shown via laboratory analysis to generally be of low to high plasticity and low to very high volume change potential. Modified plasticity indices range from 8% to 54%, it is considered that a conservative approach is taken, and therefore soils of the Head Deposits are of very high Volume Change Potential.

NHBC guidance offers two foundation depth scenarios dependant on future planting regimes for High Volume Change Soils which utilises Tables 4 and 5 of NHBC Chapter 4.2 – Building Near Trees, summarised in Table 11-3 below.

Table 11-3 Minimum depth of foundations (after NHBC 2021)

Depth of Foundation	Description	No Tree Planting Zone (m)		
		High Water Demand	Moderate Water Demand	Low Water Demand
1.0m	No tree planting within Zone of Influence	1.25m x mature height	0.75 x mature height	0.50 x mature height

Depth of Foundation	Description	No Tree Planting Zone (m)		
		High Water Demand	Moderate Water Demand	Low Water Demand
1.50m	Restricted tree planting within zone of influence	1.0 x mature height	0.50 x mature height	0.20 x mature height

NHBC guidance indicates a minimum foundation depth of 1.00m bgl for high volume change soils outside of the zone of tree influence (Column B, Table 5) which is dependent on the tree species but may be up to 1.25 x mature tree height. Foundation depths will need to be increased within the zones of influence of existing or recently removed trees, as set out by NHBC Guidance (Chapter 4.2 – Building near Trees).

11.6.2 Lateral pressure and heave

Where foundations are more than 1.5m deep, within the influence of trees which are to remain or be removed, and may be subject to heave, they should be protected by voids, void formers or compressible materials to be take into account the effects of lateral swelling of soils. Minimum thicknesses of voids are set out in Table 7 of NHBC Chapter 4.2 – Building Near Trees.

Guidance is set out in NHBC the basic requirement is that compressible material or void former should be installed on the inside faces of external foundation walls. With piled foundation additional voids are required below ring beams. Position of heave precautions are set out in Table 8 of NHBC Chapter 4.2 – Building Near Trees.

11.7 Shallow Excavations

Particular consideration should be made when excavating due to high groundwater/pit instability being encountered during site works and follow-on monitoring visits, which may cause pit instability within granular deposits. Where sand deposits are encountered with high groundwater, running sands may be encountered, which may require the local deepening of foundations. It is recommended that special construction techniques are utilised, when necessary, when excavating foundations, such as dewatering and pit stabilisation.

11.8 Ground Floor Slabs

Due to the Volume Change Potential of the soil it is considered that ground floor slabs are not considered suitable for adoption and therefore it is recommended that a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2 to mitigate against the effects of differential settlement.

If levels were to be changed on site requiring steps in the substructure, further consideration should be given to the adoption of floor slabs, with reference to NHBC Standards (2011) 5.1 – *Substructure and ground bearing floors*.

11.9 Pavement Construction

CBR values ranged from 7.6% to 68.1% between ground level and 878mm bgl. Using a conservative approach, a CBR value of 7.6% should be adopted across the site at this stage. Notwithstanding these results, confirmatory CBR testing should be carried out at formation level once details are finalised.

11.10 Concrete Durability

Due to the size of the dataset (>10 samples), characteristic pH and SO_4 values were calculated using the highest 20% measured sulphate concentrations and the lowest 20% measured pH value as stated in the BRE Special Digest (2005) producing a site characteristic value for sulphate of 64.4mg/l and a pH value of 4.54.

Soils encountered beneath the site have been classified in accordance with DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z with the recommendations provided in BRE Special Digest 1 (2005).

11.11 Discussion

At this stage, It is understood that a Highwood Homes are within the pre-application stage of planning for a Care Home of 70 beds over 3 storeys with associated areas of vehicle parking, access routes and infrastructure to the west of the site.

Presumed bearing capacities at 1.20m bgl within the River Terrace Deposits provide bearing capacities of 150-500kN/m² within the granular deposits across site. In the location of WS102 where cohesive soils of the River Terrace Deposits were encountered, bearing capacities of 200-400 kN/m² have been provided.

Bearing capacities at 2.00m bgl provide bearing capacities of 500-800kN/m² within the granular soils of the River Terrace Deposits across site.

Within the shallow soils of the Wittering Formation, it is considered that a traditional strip foundation of 1.00m width at a depth 2.00m bgl provides a presumed bearing capacity of approximately 50-100 kN/m².

Should loadings exceed those set out above then alternative founding solutions will need to be explored.

Subject to regulatory requirements, the potential requirement exists to calculate bearing capacities and undertaken settlement analysis for foundations through production of a Geotechnical Design Report (GDR) which would provide calculations to current guidance, UK National Annex to EC7. Foundation design should be completed by a suitably qualified Structural Engineer, with specific consideration given to the variability in soil strengths.

A minimum foundation depth of 1.00m bgl is anticipated for a High Change Volume soil within the Wittering Formation outside of the zone of tree influence, in accordance with NHBC. Where

foundations are likely to be within the influence of trees foundation depths will require locally deepening. The extent to which they should be deepened should be in accordance with NHBC guidance, Chapter 4.2 – Building Near Trees (Tables 4 and 5). Existing mature trees that are presumed to be remaining along the boundaries of the site and scattered throughout.

12 CONCLUSIONS AND RECOMMENDATIONS

Revised Conceptual Site Model
Following completion of the Tier 1 risk assessment no active pollution pathways have been identified based on a residential end use without homegrown produce.
Ground Gas Assessment
Following the revised ground gas assessment, the site is classified as Characteristic Situation 1 (CS-1) and ground gas protection measures are not required for the proposed development.
Waste Acceptance Criteria Testing
WAC assessment of soils analysed at incremental depths across the site material at depths of 0.10-0.20 at (WS102) and 0.40-0.60 (WS105) is classed as Inert Waste for waste disposal purposes based on the analysis and classification with values within the Inert Waste criteria limits. Samples were also screened using Hazwaste software which classified the waste as non hazardous waste for disposal.
Omnia have provided an anticipated Waste Classification of soil derived from values presented within the laboratory results. However, the acceptance criteria for materials are dependent on the license held by the individual landfill site. As a result, waste acceptance criteria may vary between landfill sites and it is therefore recommended that the test results are submitted to the preferred waste disposal site for review.
Concrete Classification
Soils encountered beneath the site have been classified in accordance with DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z with the recommendations provided in BRE Special Digest 1 (2005).
Geotechnical Assessment
Foundations
All foundations should be placed beneath any Made Ground or Topsoil to found on the underlying natural strata.
Presumed bearing capacities at 1.20m bgl within the Head Deposits provide bearing capacities of 150-500kN/m ² within the granular deposits across site. In the location of WS102 where cohesive soils of the Head Deposits were encountered, bearing capacities of 200-400 kN/m ² have been provided.
Bearing capacities at 2.00m bgl provide bearing capacities of 500-800kN/m ² within the granular soils of the Head Deposits across site.
Within the shallow soils of the Wittering Formation, it is considered that a traditional strip foundation of 1.00m width at a depth 2.00m bgl provides a presumed bearing capacity of approximately 50-100 kN/m ² .
Ground Floor Slabs
Due to the High volume change potential of the ground, it is considered that ground floor slabs are not suitable for adoption and therefore a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2 to mitigate against the effects of differential settlement.
Pavement Construction
CBR values ranged from 8.0% to 73.2% between ground level and 878mmbgl. Using a conservative approach, a CBR value of 8.0% should be adopted across the site at this stage. Notwithstanding these results, confirmatory CBR testing should be carried out at formation level once details are finalised.
Recommendations
Environmental
All monitoring points should be decommissioned in accordance with Environment Agency guidance ahead of site development in order to avoid the creation of preferential pathways.

If during the development stage any evidence of contamination is identified, works should be halted, and contact made with a suitably qualified Environmental Consultant. As determined appropriate by the Consultant, further investigation and sampling may be required to determine the appropriate actions. Upon completion contact should be made with the regulator to achieve sign off of the works.

Geotechnical

Values for foundation are based on approximate ultimate bearing capacity and are given to provide outline options and should be subject to detailed analysis by the Structural Engineer. Should the bearing strength set out above prove to be incompetent for the proposed loading, consideration should be given to a deeper foundation solution. As necessary, and as dictated by the site layout plan this may lead to a requirement for an assessment of deeper soils for a piled foundation.

APPENDIX I - LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Omnia and the Client as indicated in Section 1.2.
 2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
 3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
 4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
 5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
 6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
 7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
 8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
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 10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.
-

APPENDIX II – GLOSSARY

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (Chlorinated Solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (Petrol, Diesel, Kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo-Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCS	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation

UNITS

M	Metres
KM	Kilometres
%	Percent
%V/V	Percent Volume in Air
MB	Milli Bars (Atmospheric Pressure)
L/HR	Litres Per Hour
µG/L	Micrograms Per Litre (Parts Per Billion)
PPB	Parts Per Billion
MG/KG	Milligrams Per Kilogram (Parts Per Million)
PPM	Parts Per Million
MG/M ³	Milligram Per Metre Cubed
M BGL	Metres Below Ground Level

M BCL	Metres Below Cover Level
MAOD	Metres Above Ordnance Datum (Sea Level)
KN/M ²	Kilo Newtons Per Metre Squared
µM	Micrometre

APPENDIX III - DRAWINGS

Key



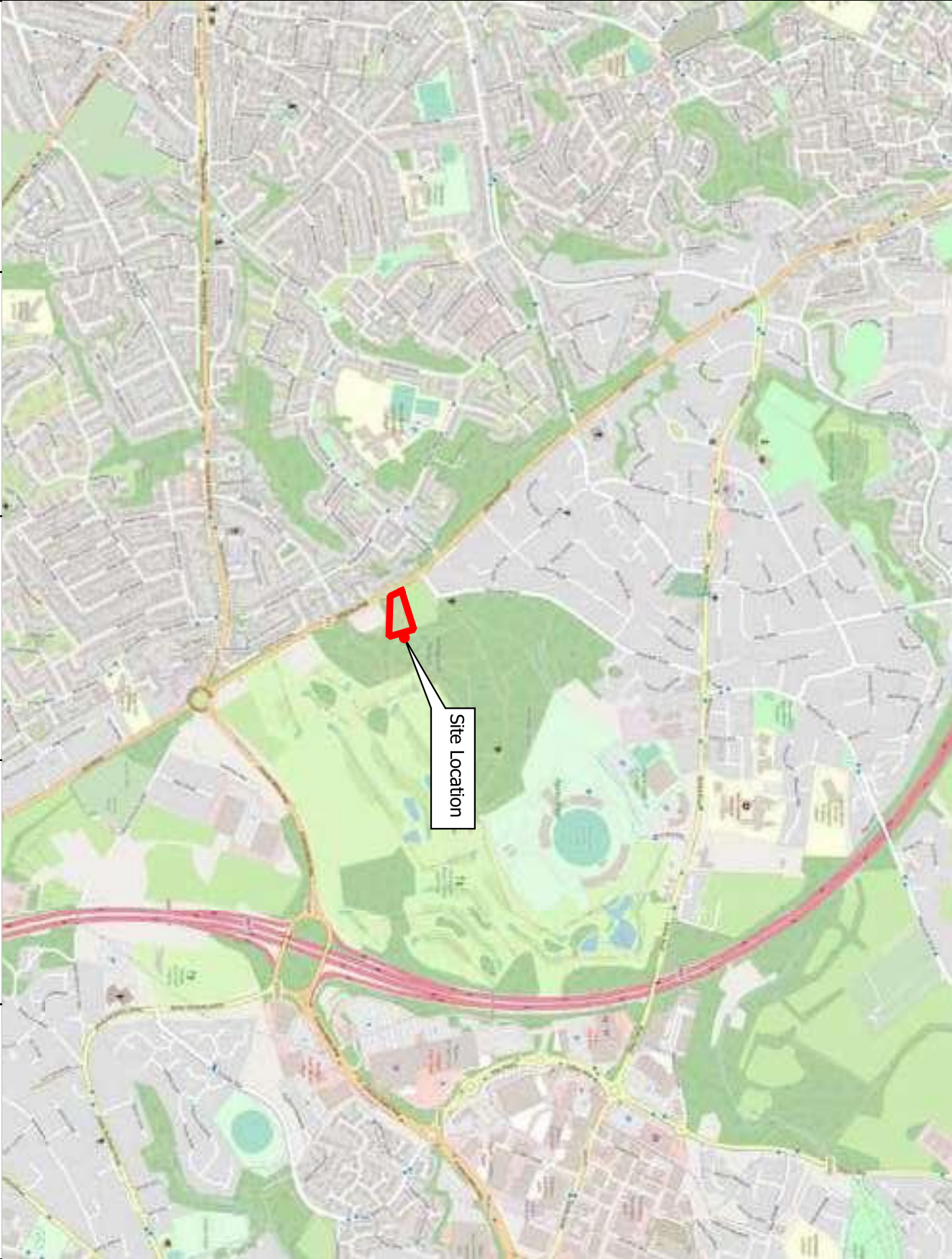
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Job Title:
Moorthill, Southampton

Client:
Highwood

Project Number:
A11641

Drawn By:
T.Holloway

Date:
25/05/2022

Authorised By:
O.Maxwell

Drawing Title:
Figure 1.0
Site Location Map



Scale	Paper Size
1:600	A4

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Job Title:
Moorthill, Southampton

Client:
Highwood

Project Number:
A11641
Drawn By:
T.Holloway

Date:
07/10/2022
Authorised By:
G. Wass

Drawing Title:
Figure 2.0
Proposed Development Plan

Key

Site walkover fridges



Scale
1:580

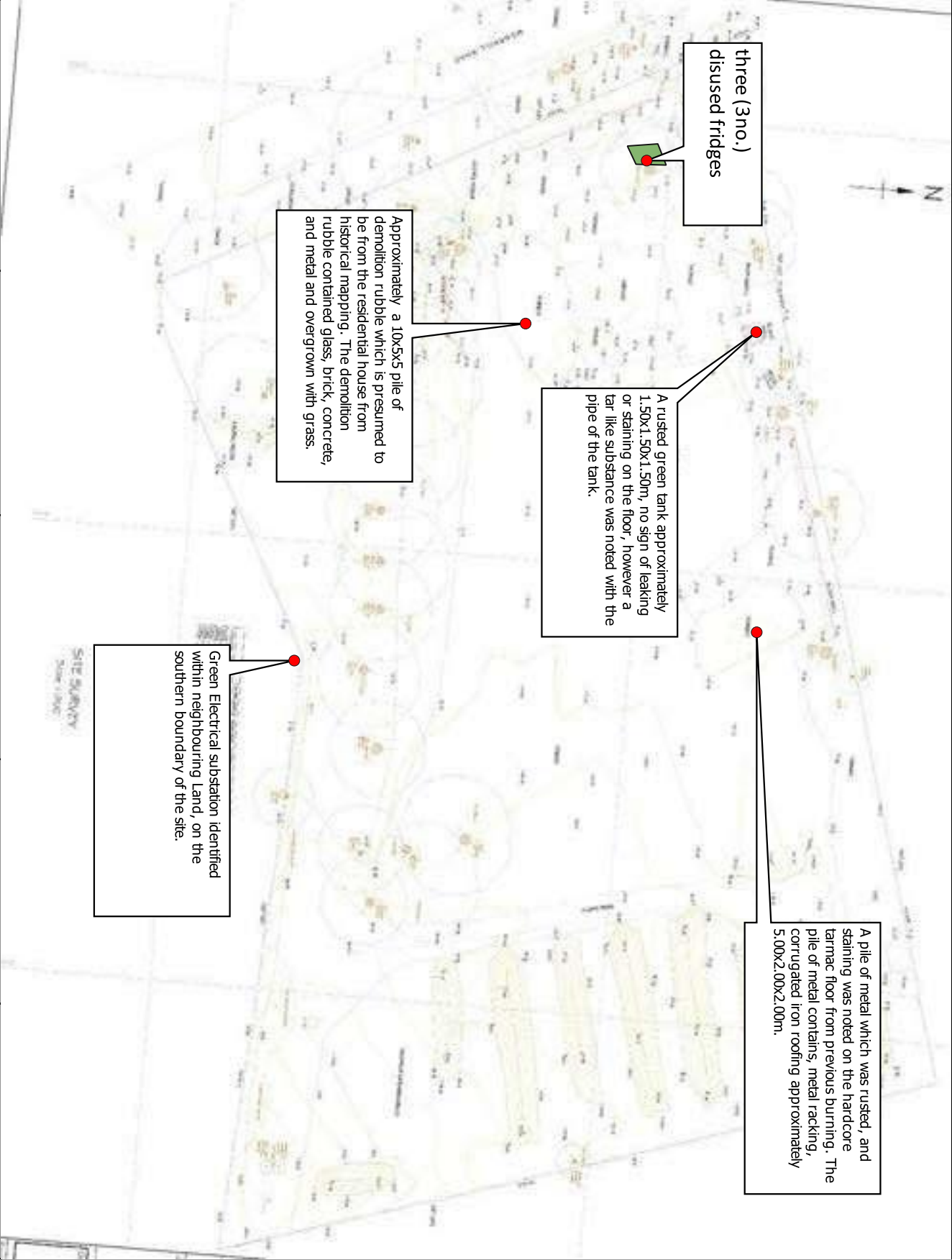
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Job Title:
Moorthill, Southampton

Client:
Highwood Group

Project Number:
A11641

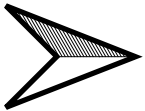
Drawn By:
H. Spurling

Date:
27/06/2022

Authorised By:
O.Maxwell

Drawing Title:
Figure 3.0
Site Walkover Plan

Key



- Site Boundary
- DCP Locations
- HP Location
- SA Locations
- WS Locations



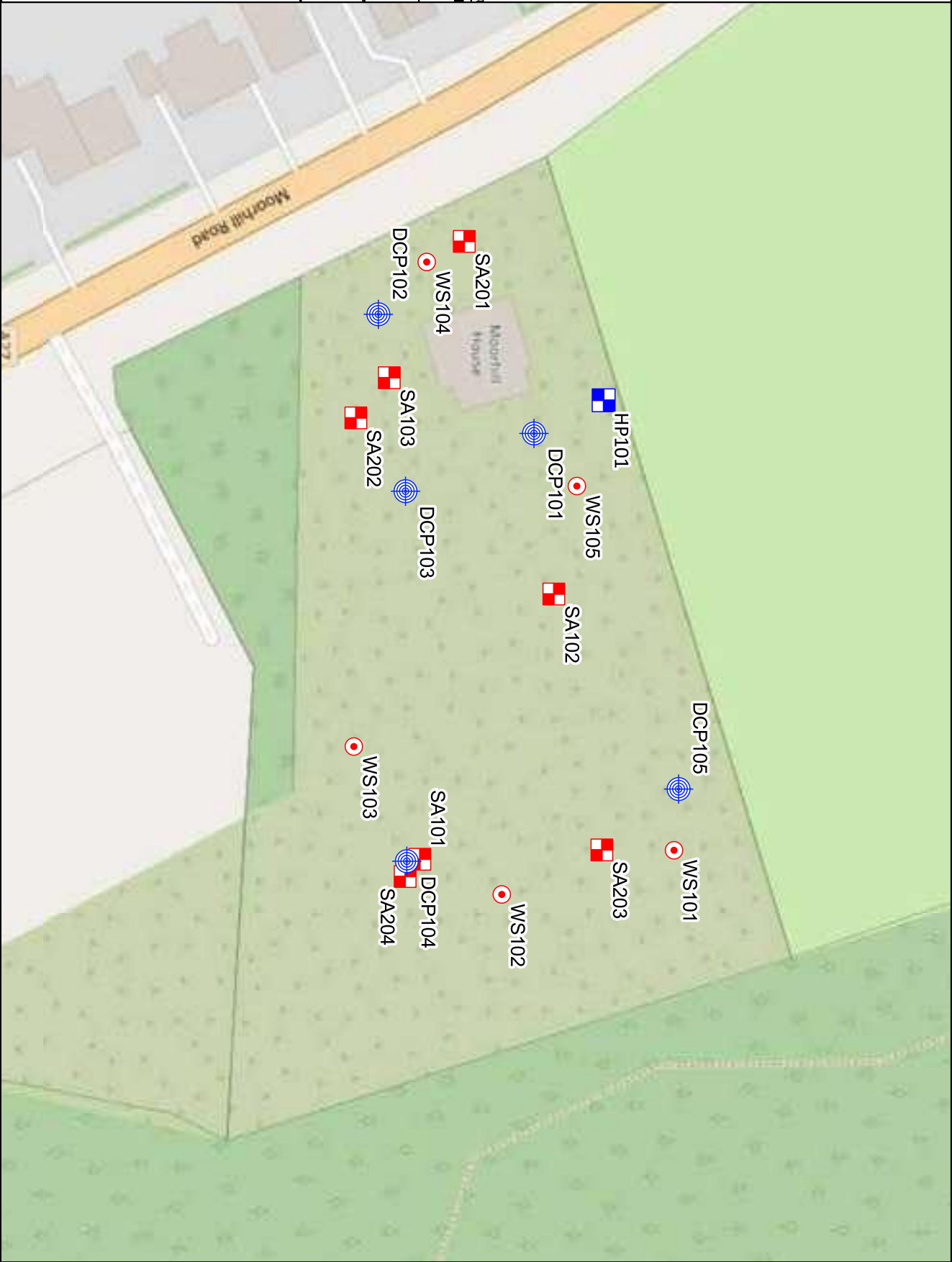
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Job Title:
Moorhill, west End

Client:
Highwood

Project Number:
A11641

Drawn By:
H.Larcombe

Date:
24/07/23

Authorised By:
O. Maxwell

Drawing Title:
Figure 4.0
Intrusive Location Plan

APPENDIX IV - PHOTOGRAPHS



Photograph 1- Access gate from Moorhill Road, facing east.



Photograph 2- Fridge appliances on the western boundary. Facing southeast.



Photograph 3- Waste storage containing demolition rubble from previous residential house. Facing south.



Photograph 4- Waste storage containing metal. Facing East.



Photograph 5- Rusted Green tank in the northeast of the site. Facing North



Photograph 6- Tar Substance within pipe of rusted green tank on northern boundary. Facing west.



Photograph 7- Electrical substation on the southern boundary of the site, within neighbouring property.
Facing South.

APPENDIX V - HISTORICAL MAPS



Site Details:

MOORHILL, MOORHILL ROAD,
WEST END, SO30 3AZ

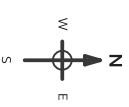
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Report Ref:	GS-8775594
Grid Ref:	447111, 113541

Map Name: County Series

Map date: 1868-1869

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1869	Surveyed 1868
Revised 1889	Revised 1828
Edition N/A	Edition N/A
Copyright N/A	Copyright N/A
Labeled N/A	Labeled N/A



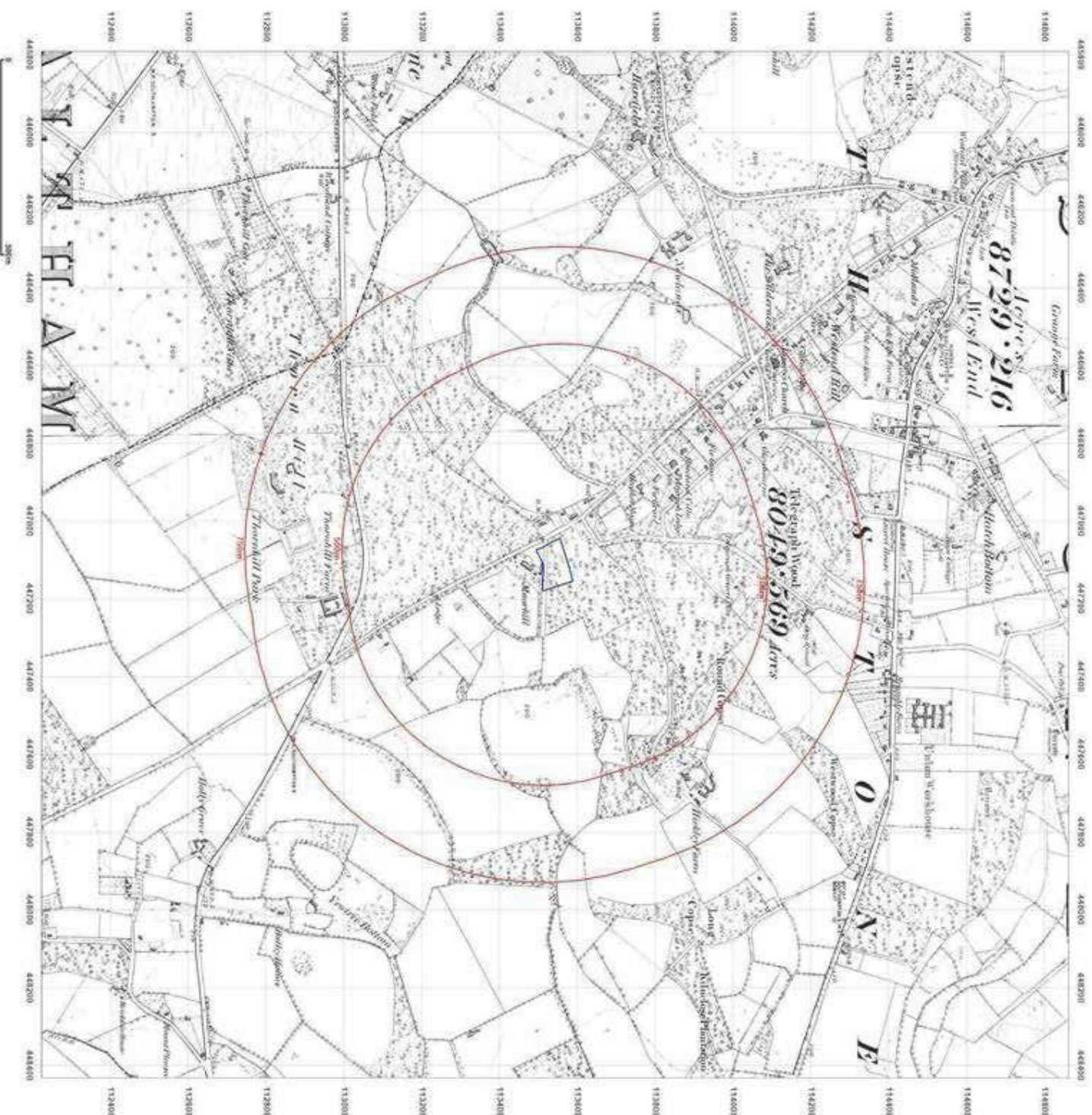
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Production date: 25 May 2022

Map legend available at:

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Site Details:

MOORHILL, MOORHILL ROAD,
WEST END, SO30 3AZ

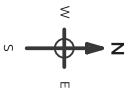
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Report Ref: GS-8775594
Grid Ref: 447111, 113541

Map Name: County Series

Map date: 1895-1896

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1896
Edition N/A
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Levelled N/A

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Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1867
Revised 1895
Edition N/A
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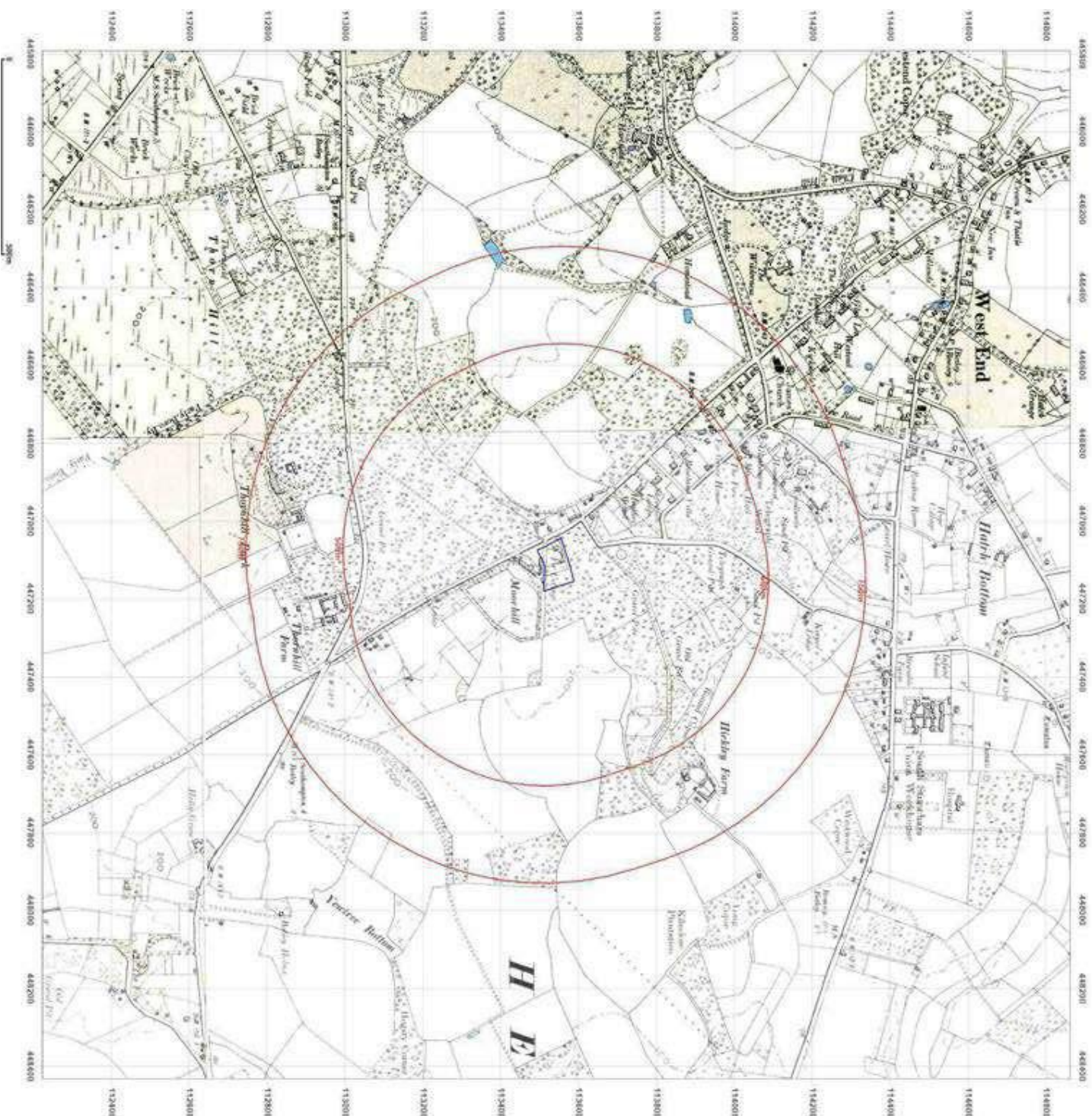


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Site Details:

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WEST END, SO30 3AZ

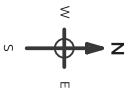
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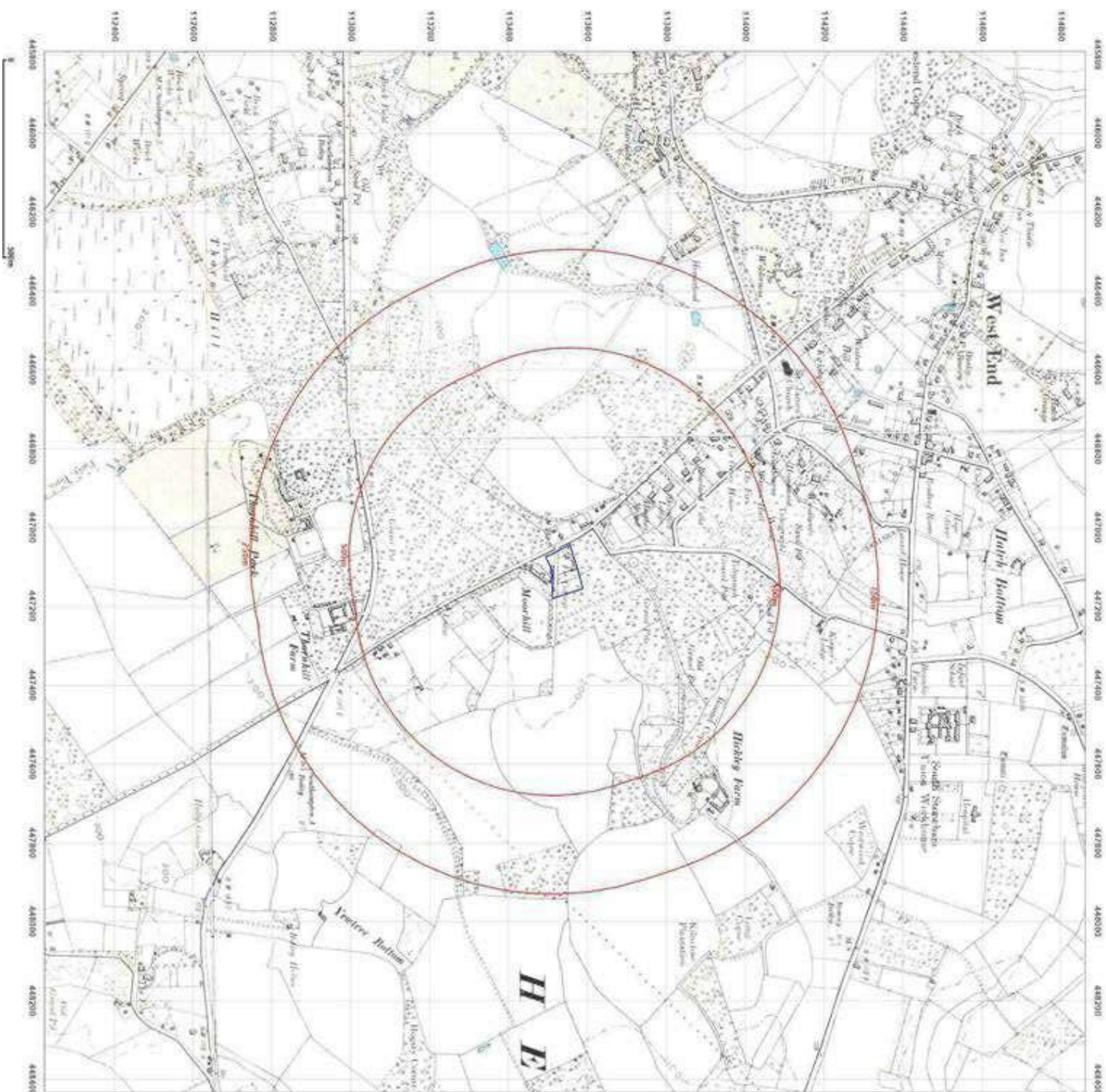


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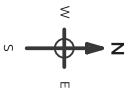
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Grid Ref: 447111, 113541

Map Name: County Series

Map date: 1908-1910

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1908
Edition 1910
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Surveyed 1867
Revised 1908
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1867
Revised 1908
Edition N/A
Copyright N/A
Levelled N/A

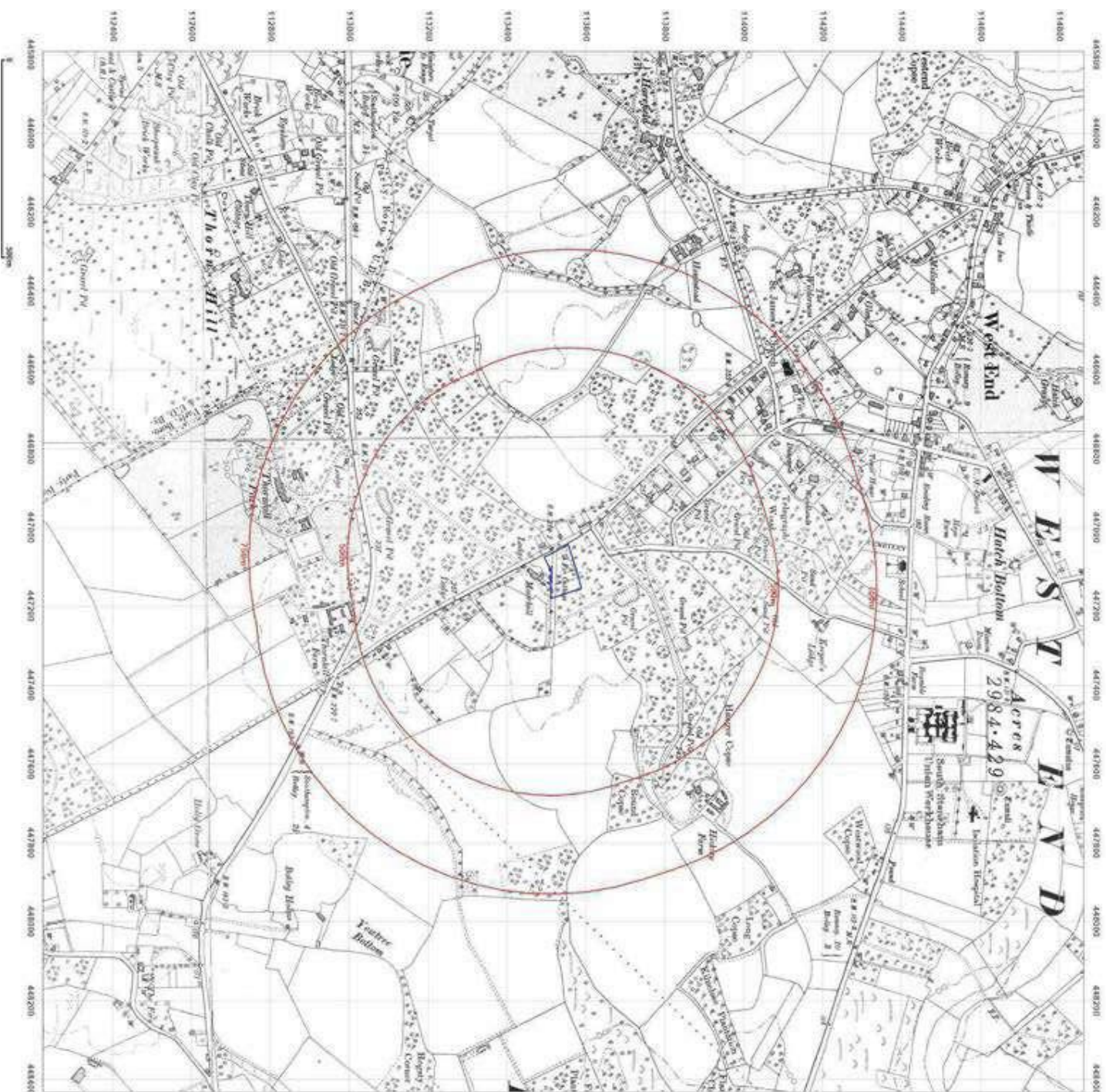


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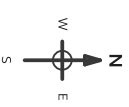
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Map Name: Provisional

Map date: 1957

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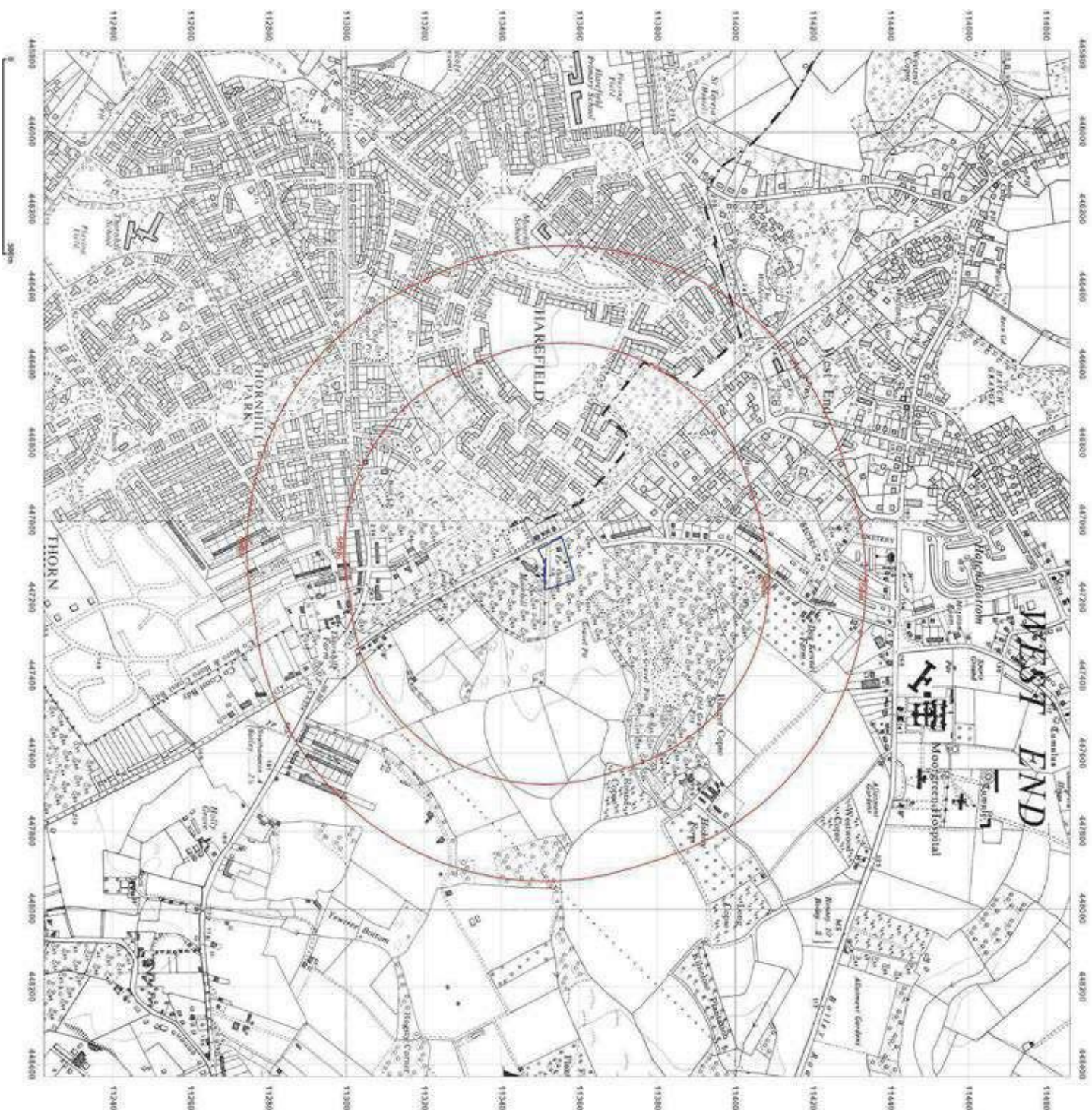


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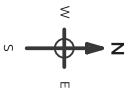
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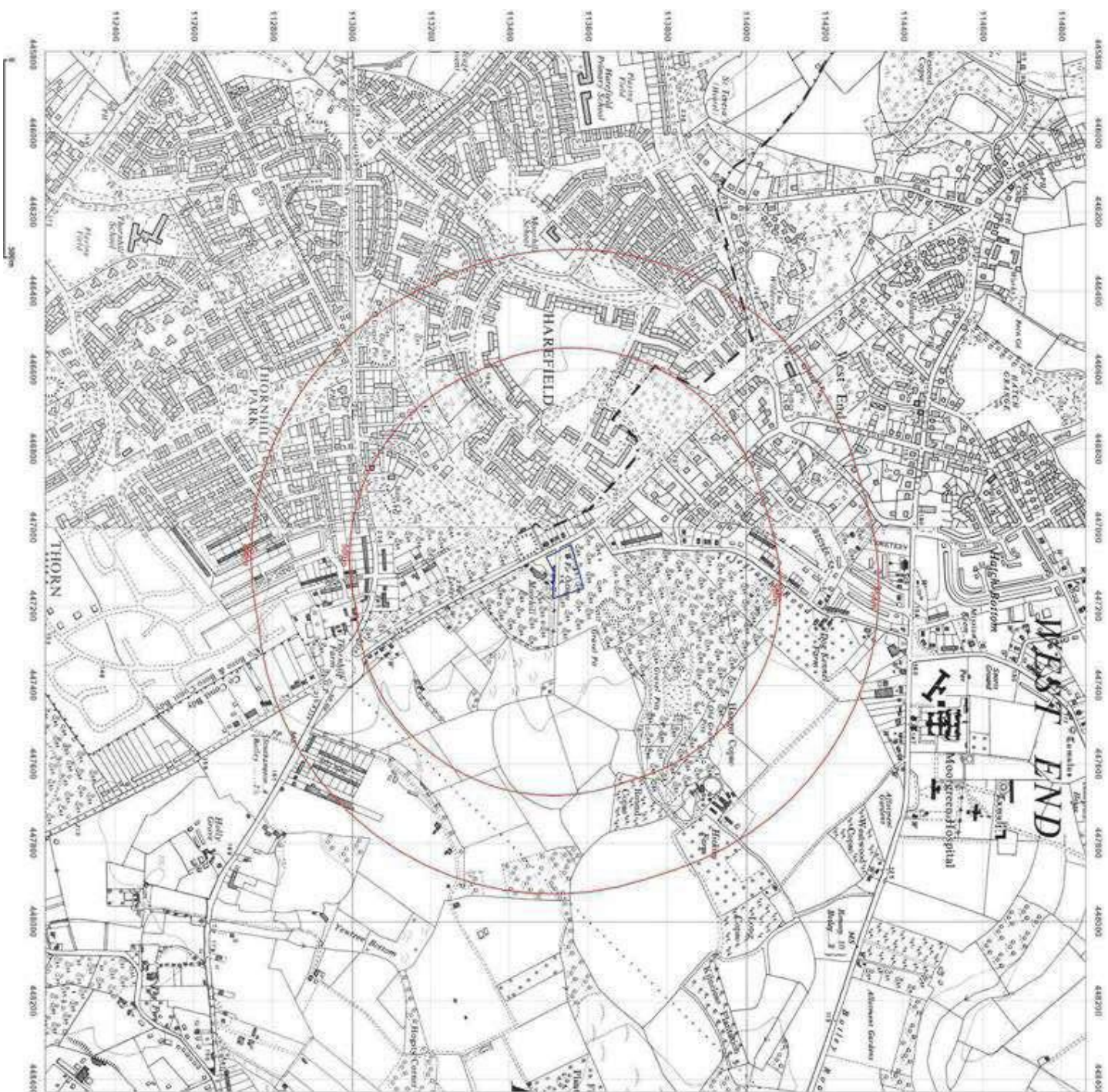


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Client Ref: A11641
Report Ref: GS-875594
Grid Ref: 447111, 113541

Map Name: Provisional

Map date: 1967

Scale: 1:10,560

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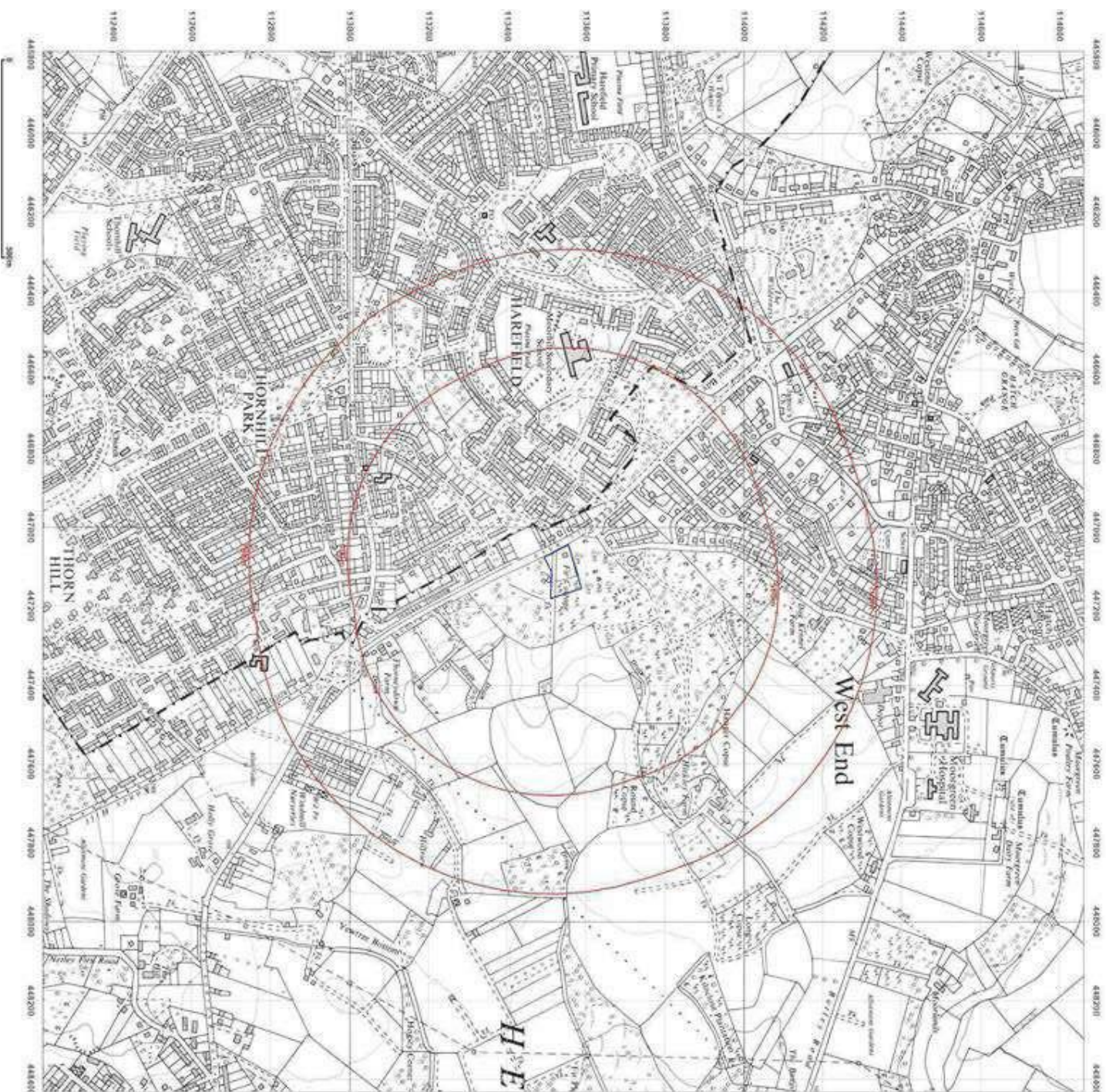


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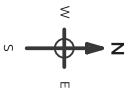
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Map Name: National Grid

Map date: 1978

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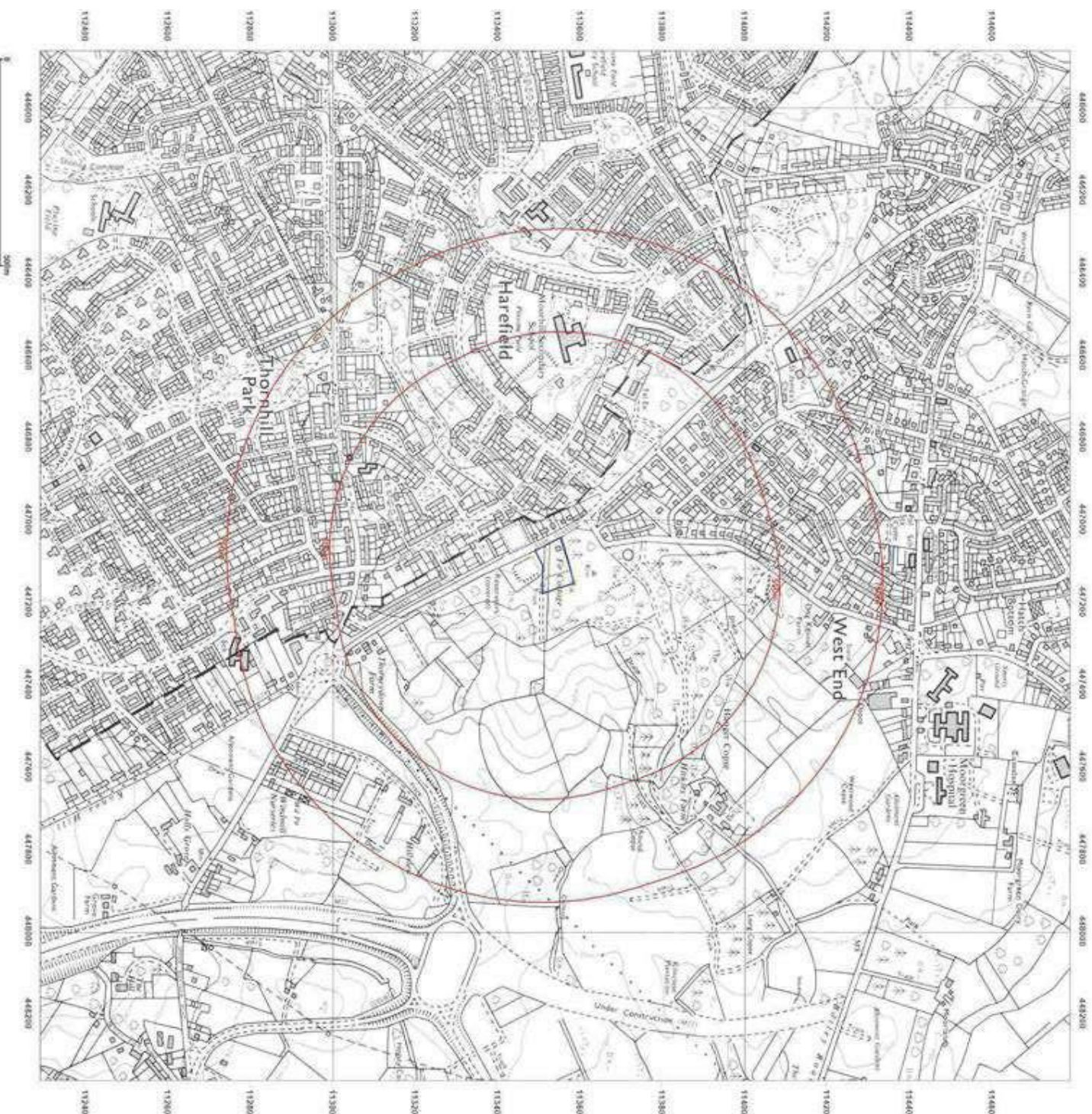


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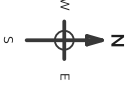
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Map Name: National Grid

Map date: 1987

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Printed at: 1:10,000

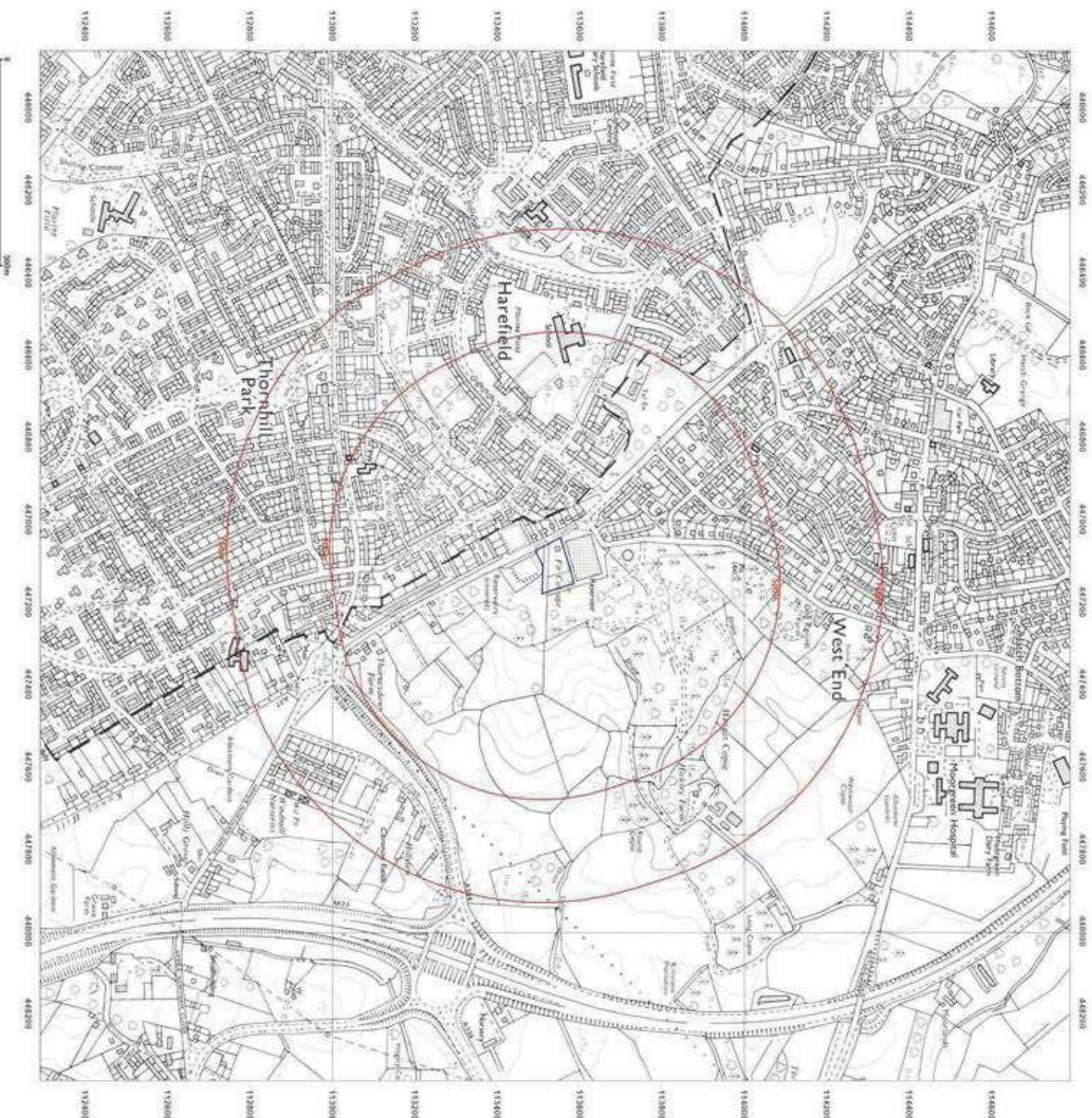


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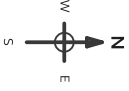
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Map Name: National Grid

Map date: 1993

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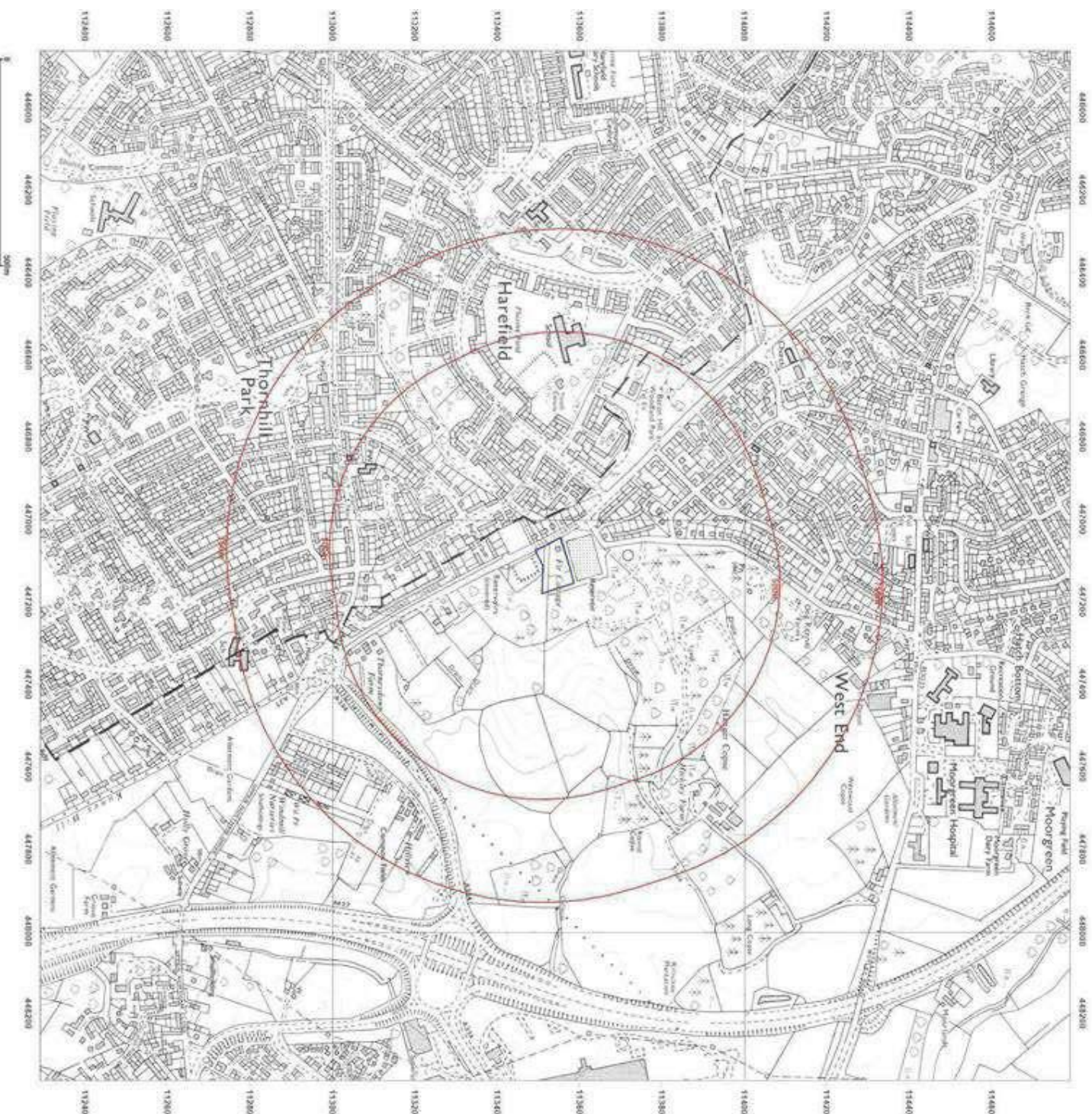


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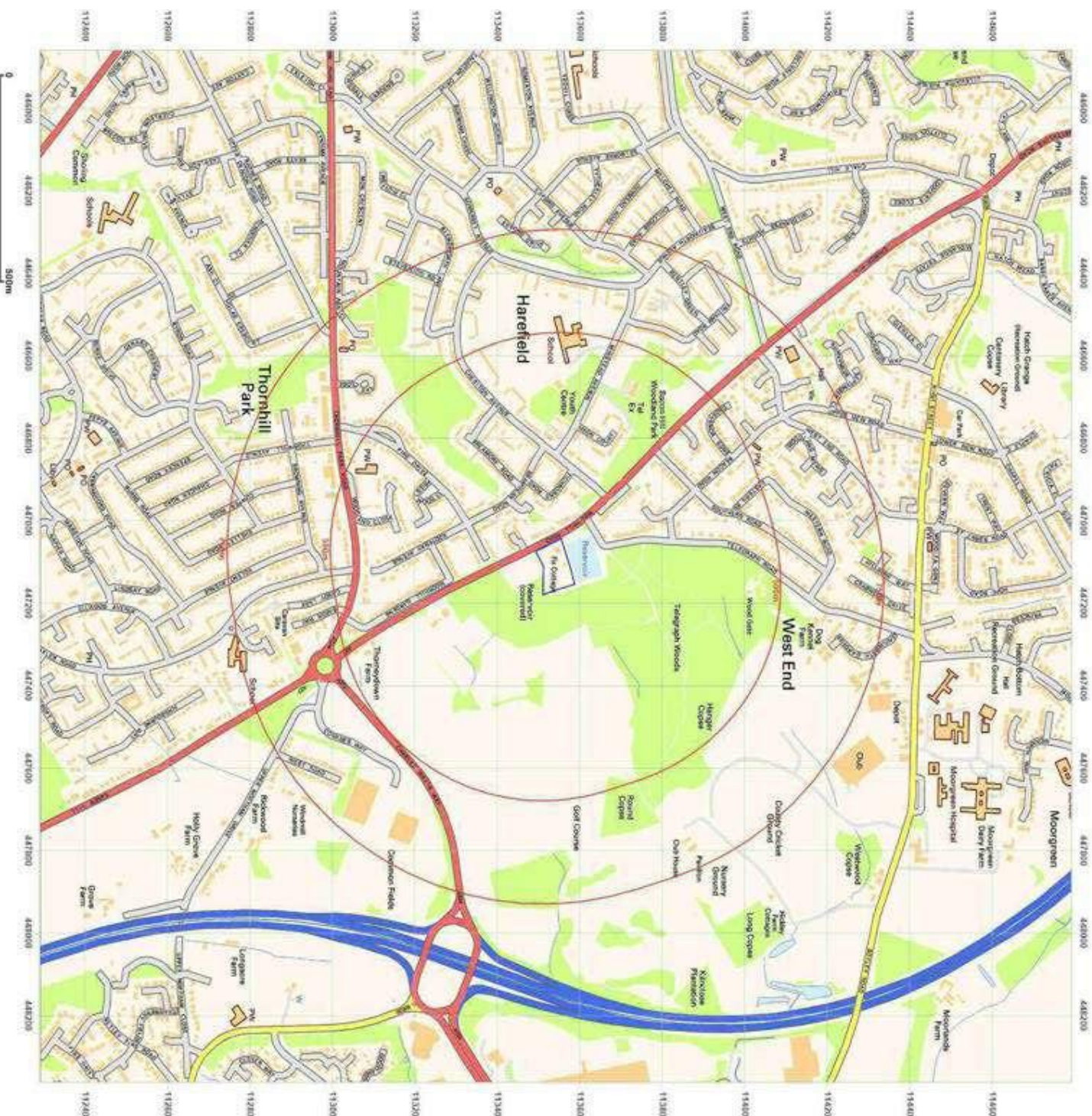
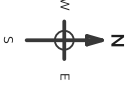
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Report Ref: GS-875594
Grid Ref: 447111, 113541

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000



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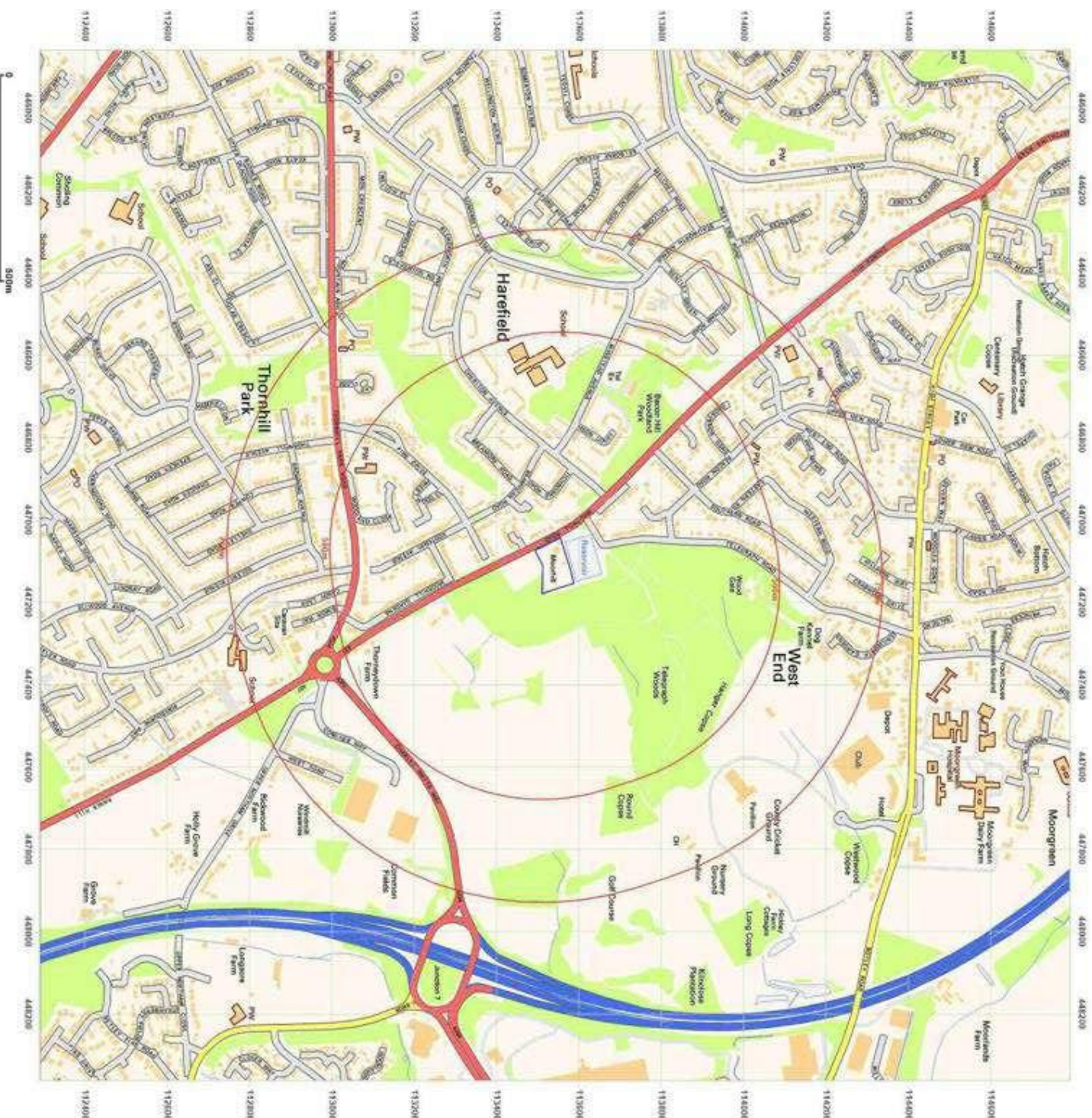
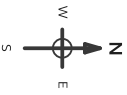
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Report Ref: GS-8775594
Grid Ref: 447111, 113541

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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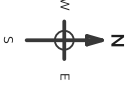
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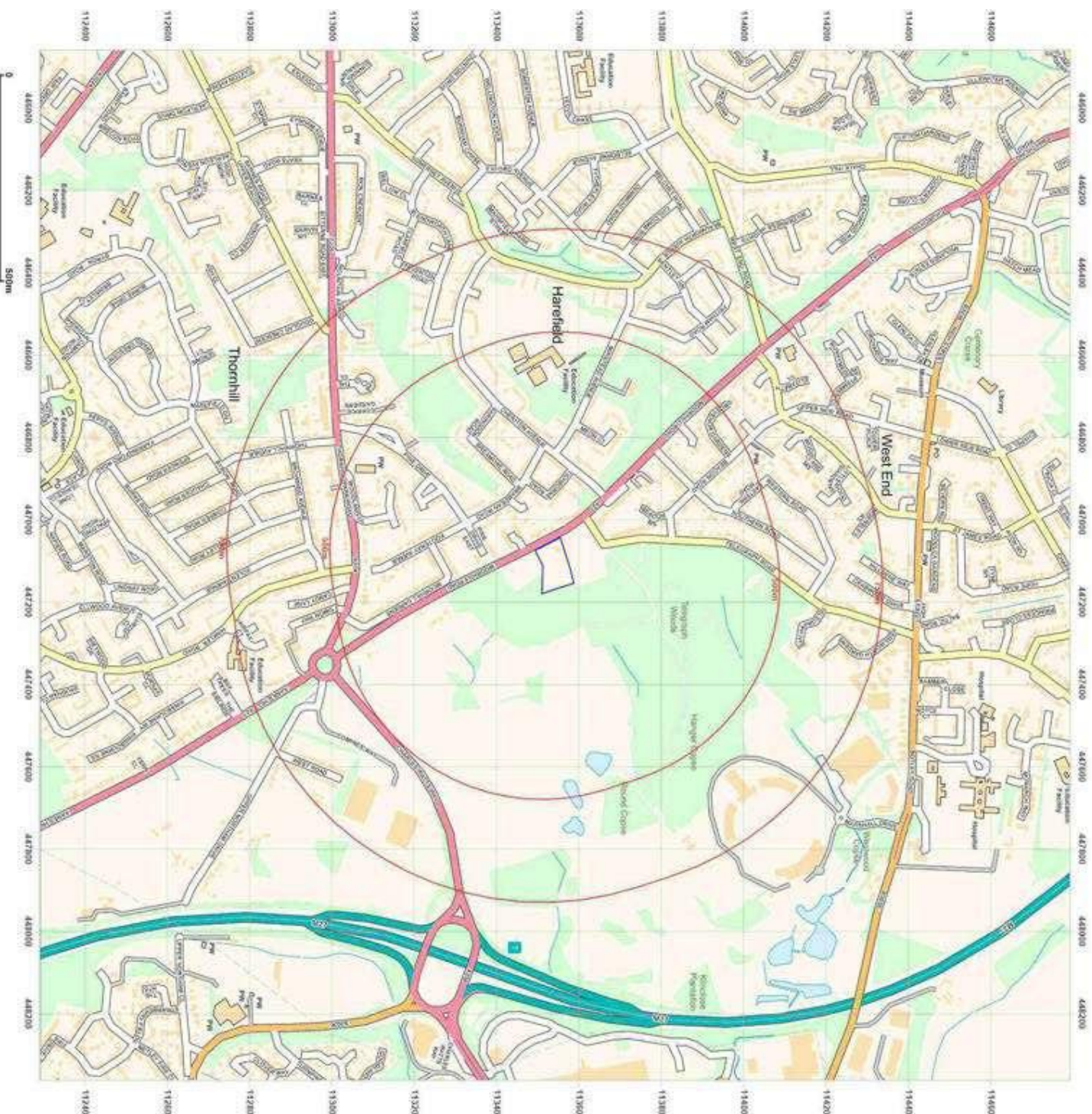


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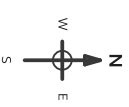
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Grid Ref: 447111, 113541

Map Name: County Series

Map date: 1869

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1869
Revised 1869
Edition N/A
Copyright N/A
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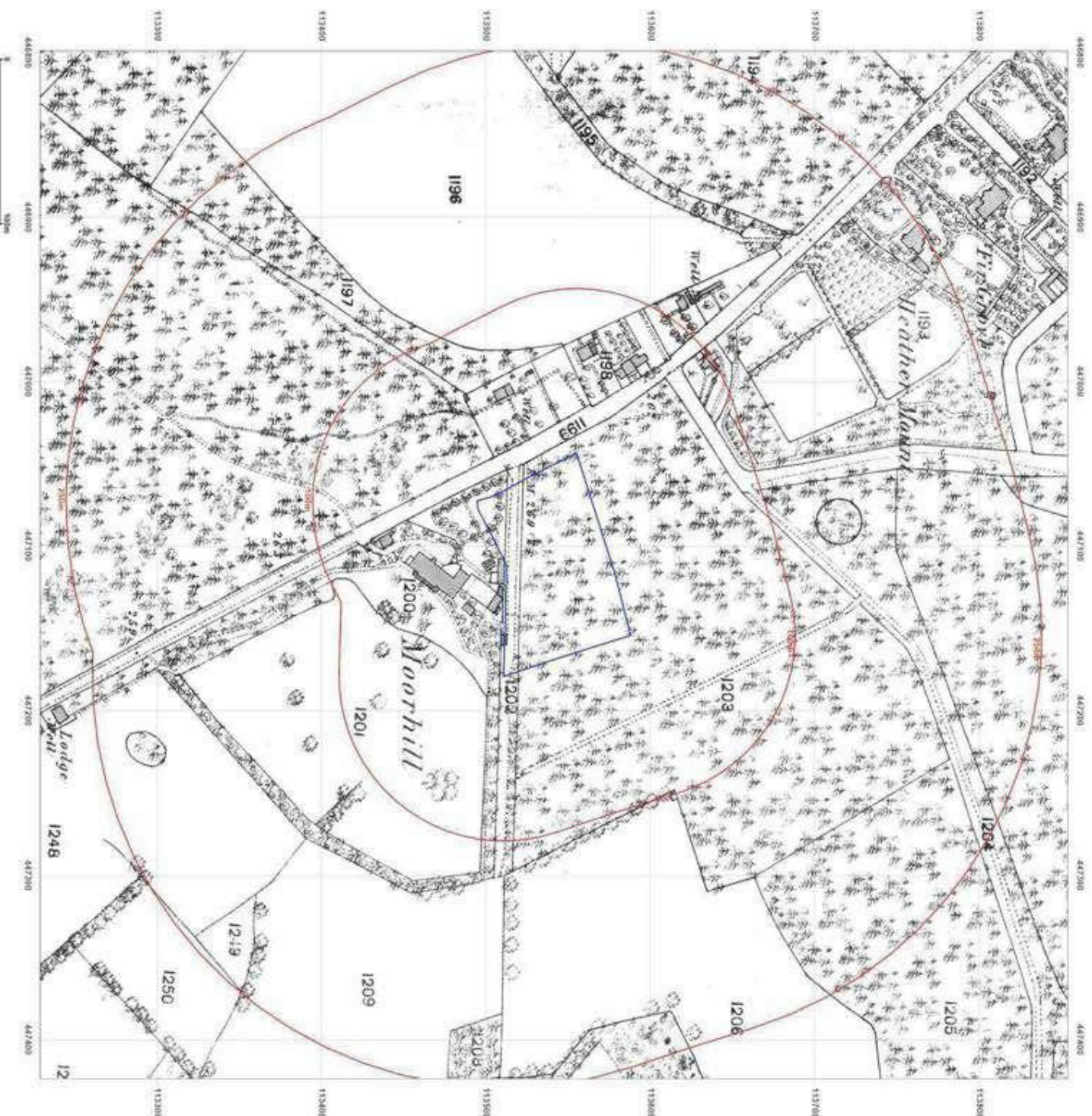
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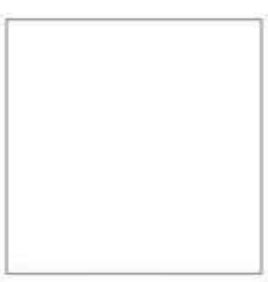
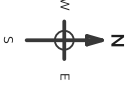
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Grid Ref: 447111, 113541

Map Name: County Series

Map date: 1896

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1896
Revised 1896
Edition N/A
Copyright N/A
Licensing N/A

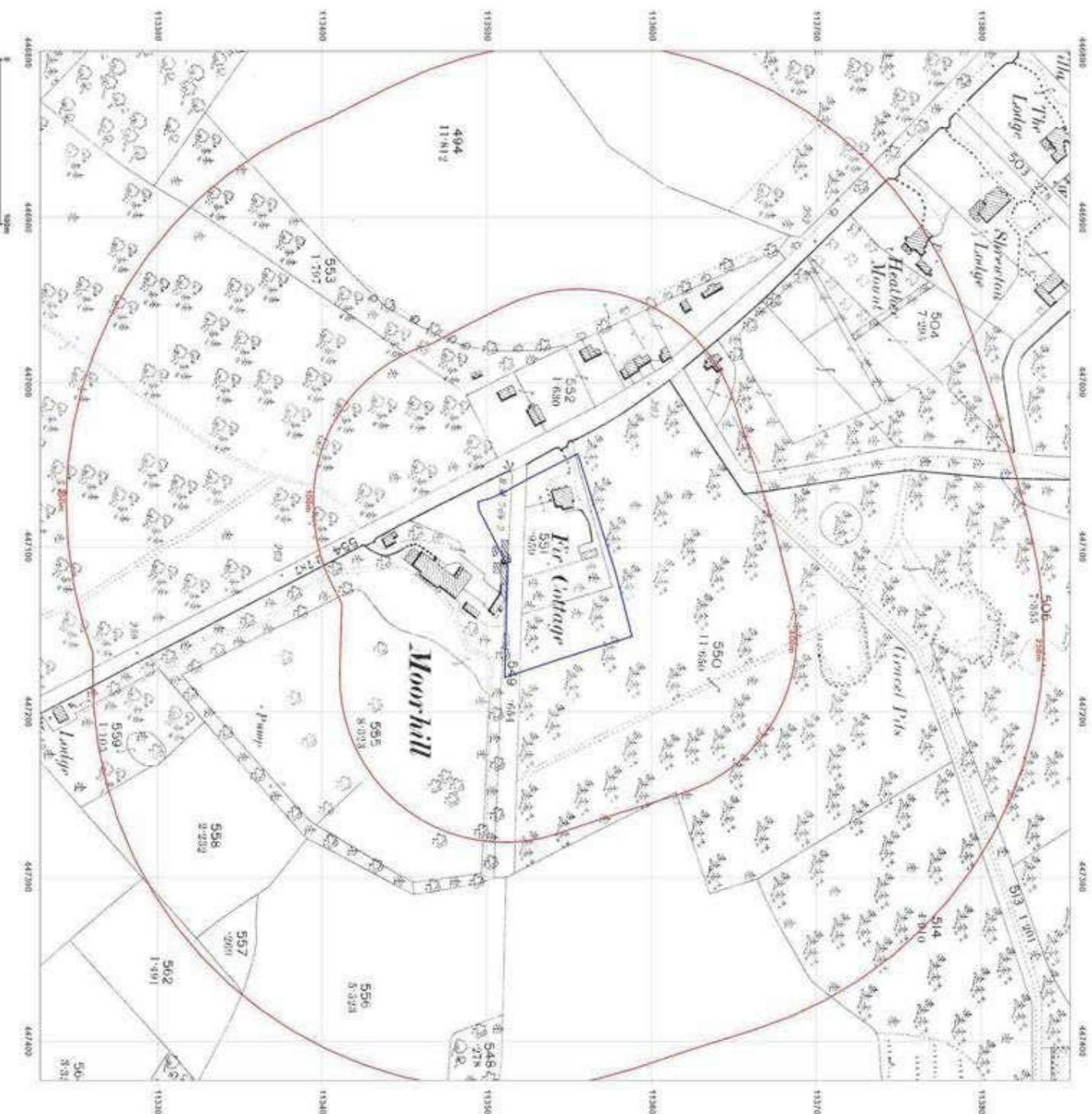


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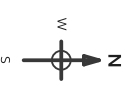
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Map Name: County Series

Map date: 1910

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1910
Revised 1910
Edition N/A
Copyright N/A
Landed N/A

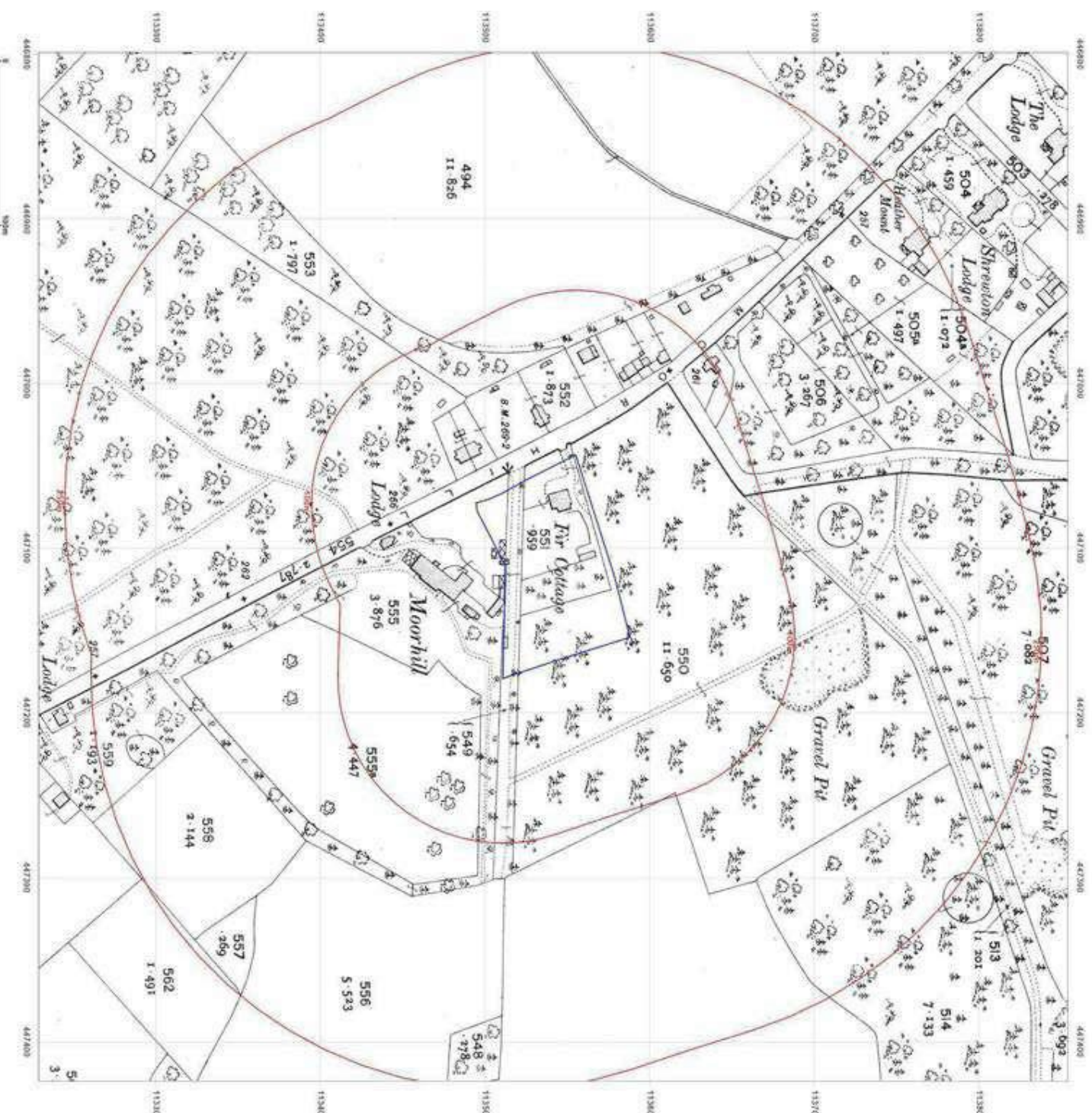


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Client Ref: A11641
Report Ref: GS-8775594
Grid Ref: 447111, 113541

Map Name: County Series

Map date: 1940

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1940
Revised 1940
Edition N/A
Copyright N/A
Levelled N/A

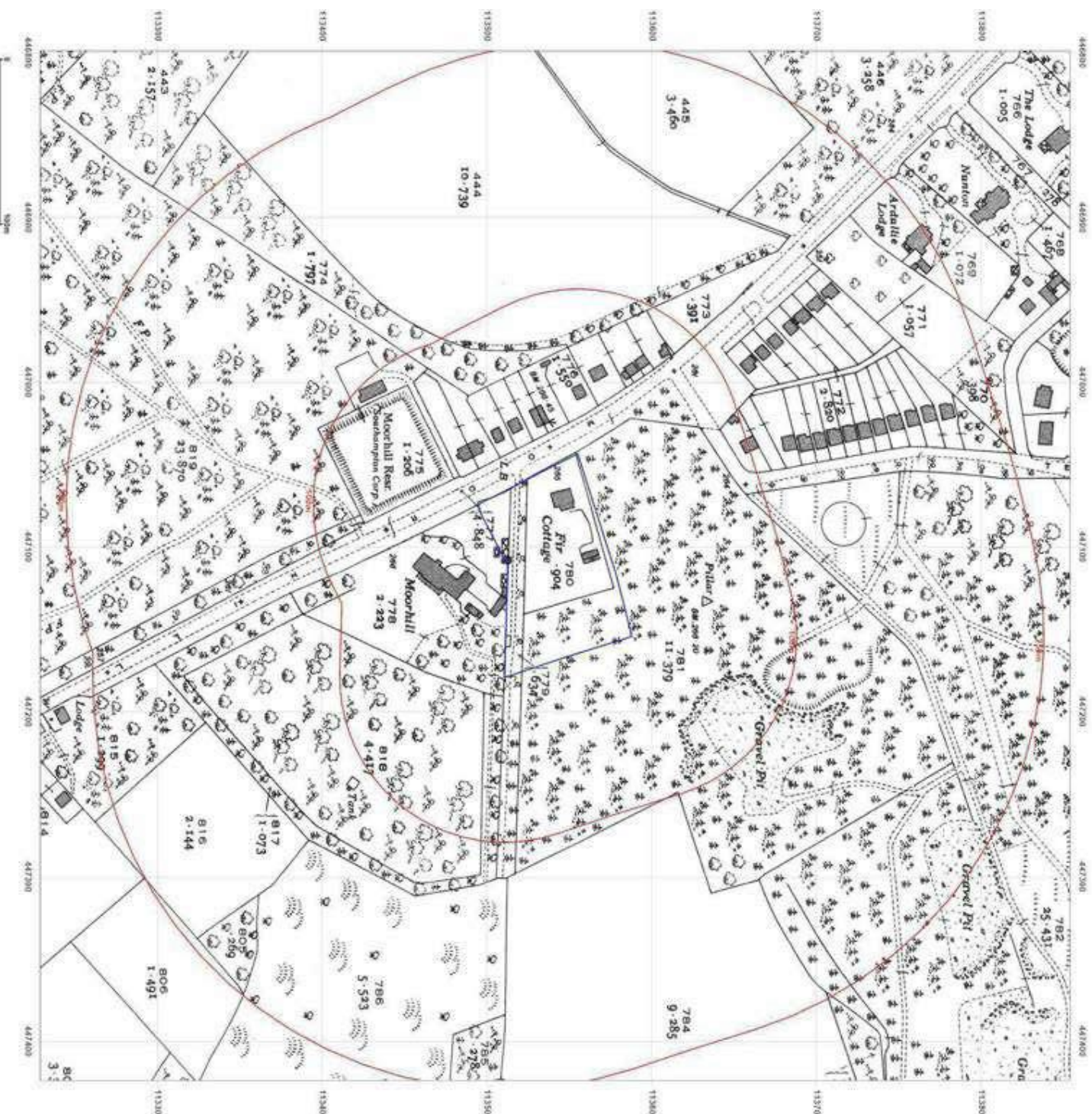


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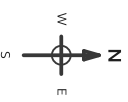
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Grid Ref: 447111, 113541

Map Name: National Grid

Map date: 1955-1959

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1954
Revised 1954
Edition N/A
Copyright 1955
Levelled 1947



Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled 1959

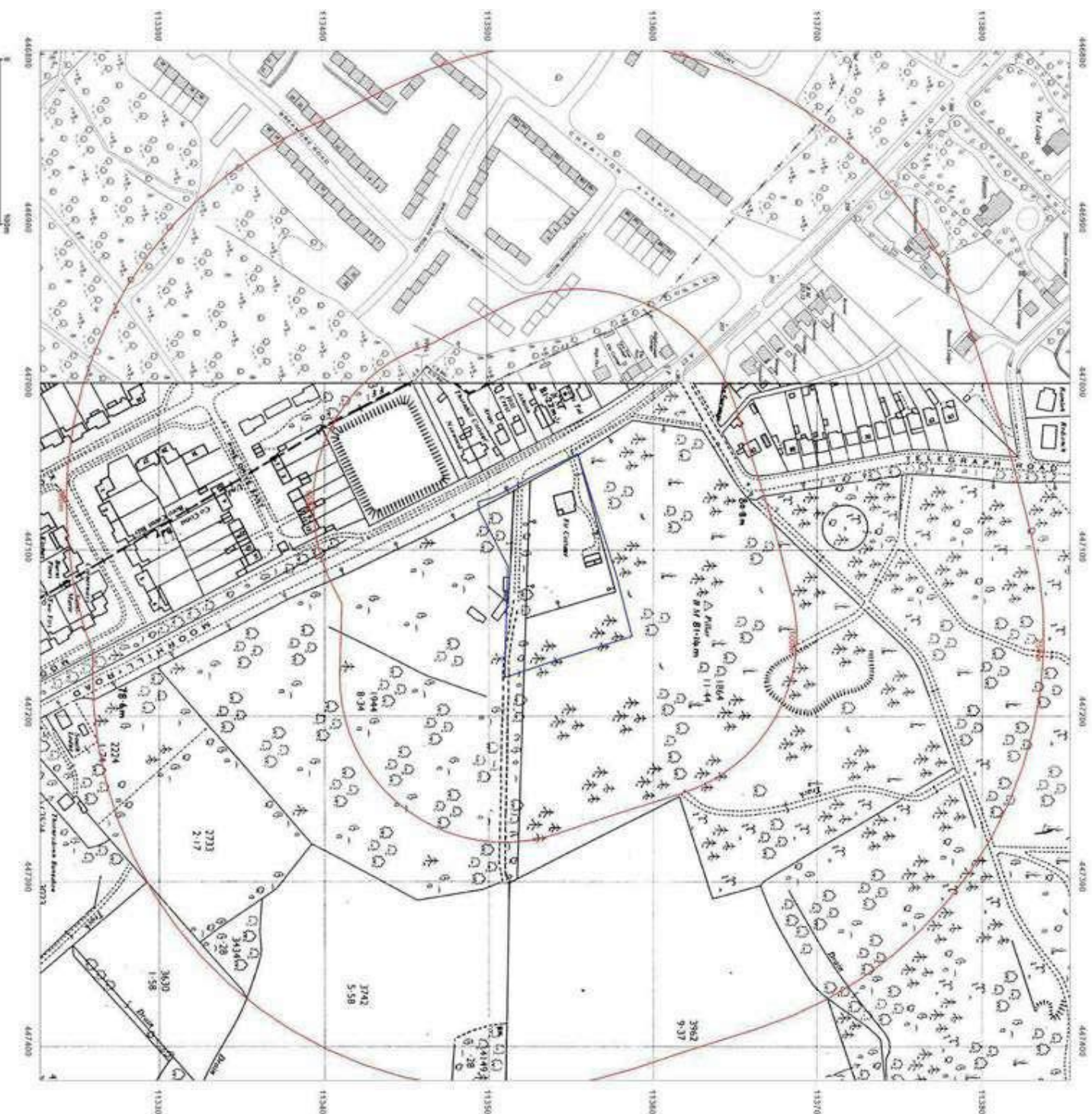


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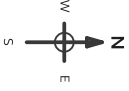
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Map Name: National Grid

Map date: 1965

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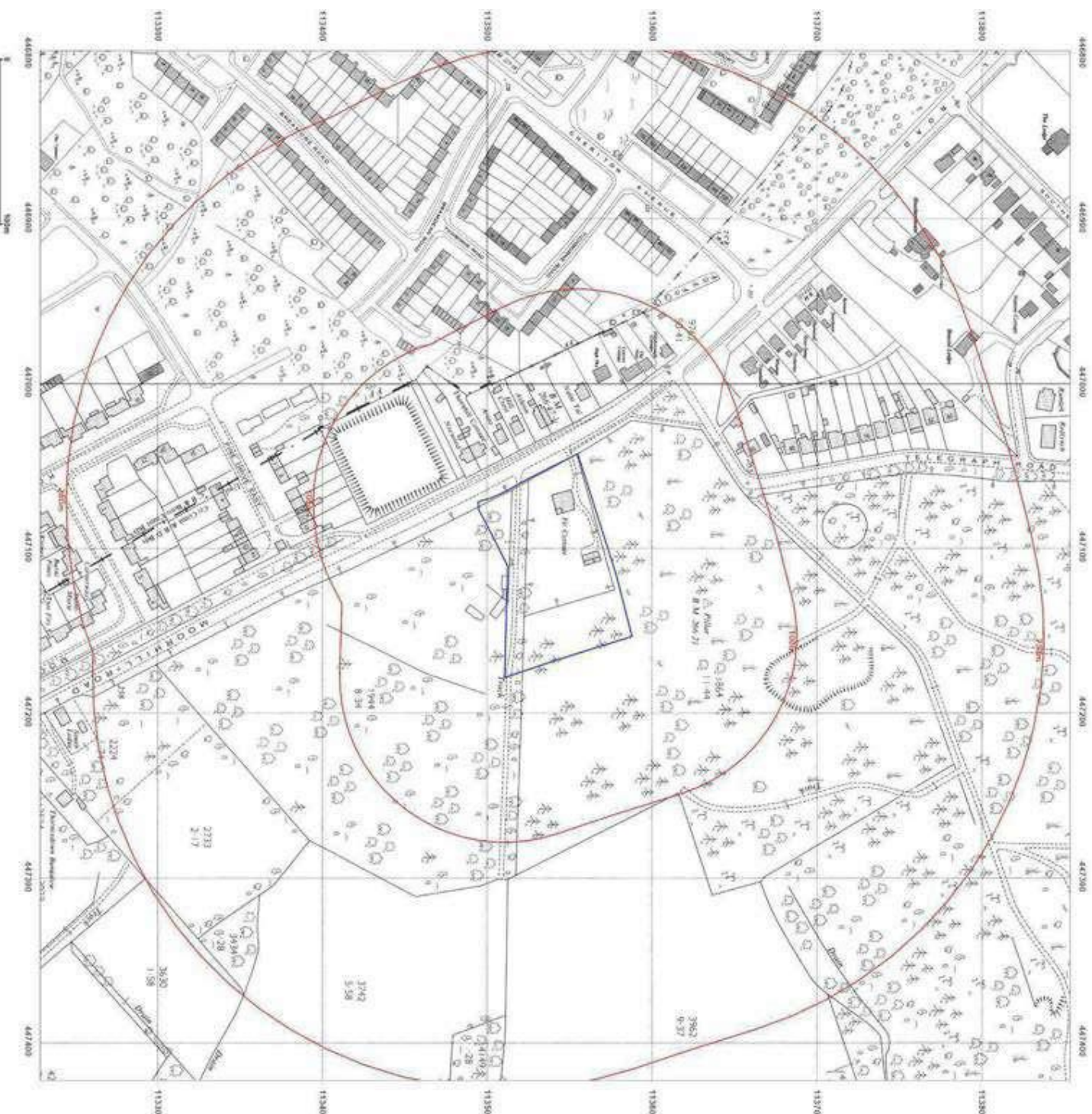


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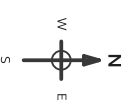
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Grid Ref: 447111, 113541

Map Name: National Grid

Map date: 1965

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
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Edition N/A
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Revised N/A
Edition N/A
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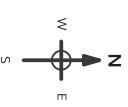
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Grid Ref:	447111, 113541

Map Name: National Grid

Map date: 1993

Scale: 1:1,250

Printed at: 1:2,000



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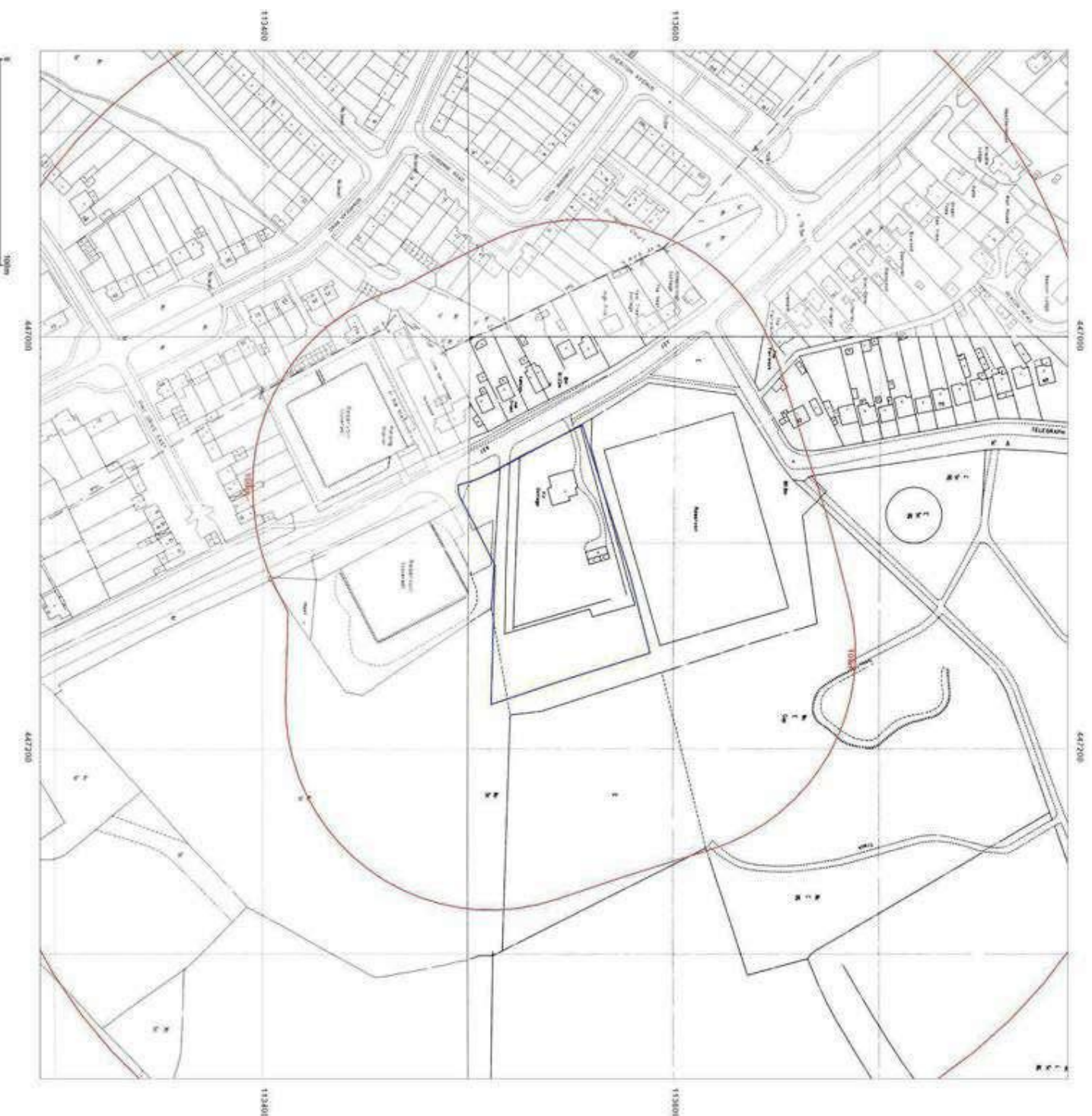
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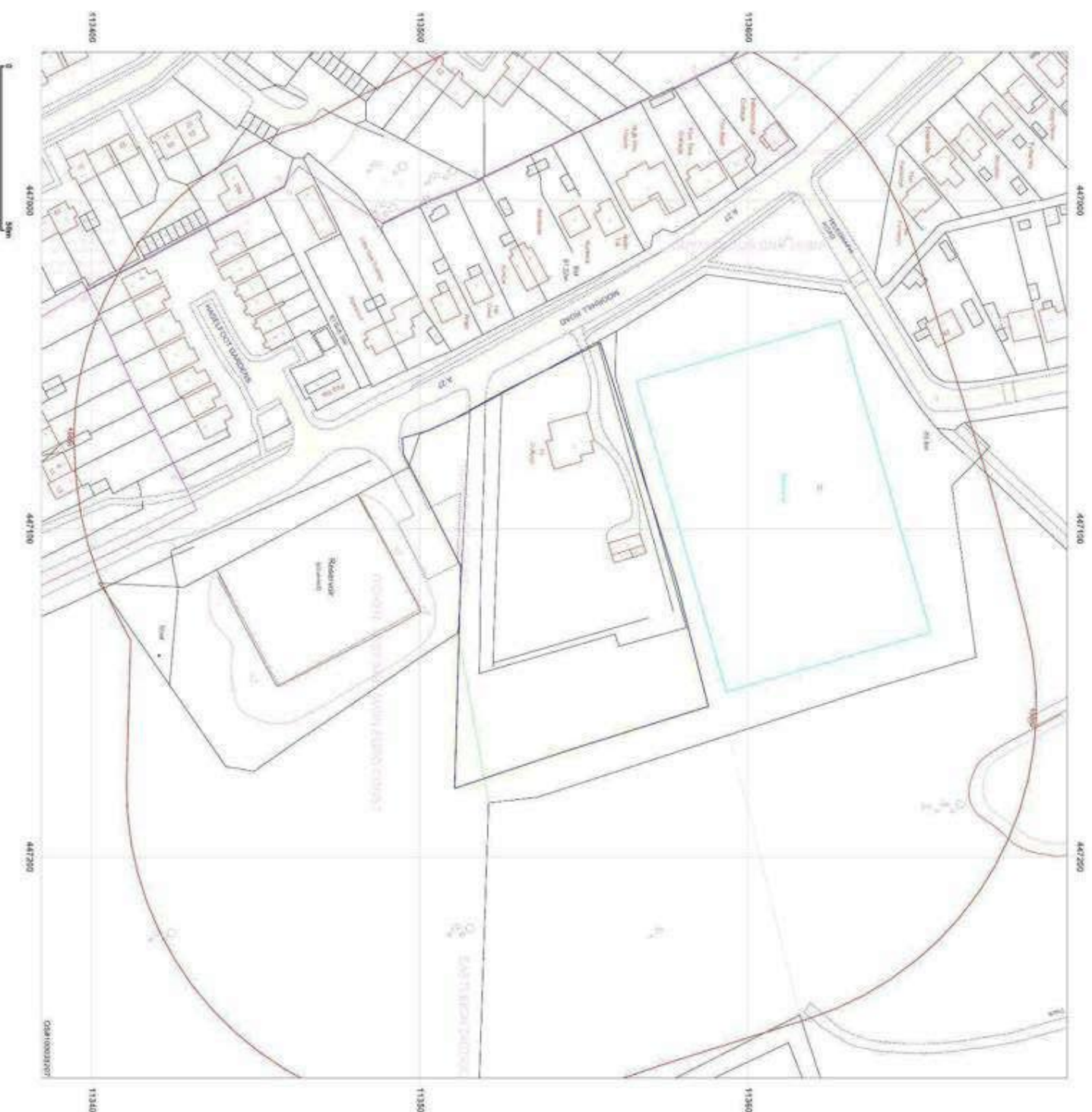
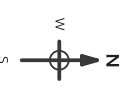
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Report Ref: GS-8775594
Grid Ref: 447111, 113541

Map Name: Landline

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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APPENDIX VI - EXPLORATORY HOLE LOGS

				Trial Pit Log			Trialpit No SA101 Sheet 1 of 1		
Project Name: Land east of Moorhill Road				Project No. A11641		Co-ords: 447143.00 - 113536.00 Level:		Date 26/05/2022	
Location: Moorhill Road, West End, Southampton, SO30 3AZ				Dimensions (m):		2.1		Scale 1:20	
Client: Highwood				Depth 2.30		0.55		Logged HS	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	ES	HVP=20 HVP=23 HVP=32	0.40			Grass over reddish brown slightly silty gravelly fine to coarse SAND with frequent rootlets. Gravel is angular to sub-rounded fine to coarse flint, brick, concrete crush and tile. [MADE GROUND]		
	0.40 - 0.50	D					Soft orange gravelly sandy CLAY. Sand is coarse. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE DEPOSITS]		
	1.00 - 1.20	D		Clay pipe at 1.20m bgl					
	1.90 - 2.00	B		Orange clayey, silty very sandy fine to coarse sub-angular to sub-rounded GRAVEL of flint. Sand is fine to coarse. [RIVER TERRACE DEPOSITS]					
	2.00 - 2.30	D		Soft orange and blueish grey mottled CLAY. [RIVER TERRACE DEPOSITS]					
End of pit at 2.30 m								4	
Remarks: Position scanned with calibrated CAT & 'Genny' prior to excavation. Groundwater not encountered.									
Stability: STABLE									

				Trial Pit Log			Trialpit No SA103 Sheet 1 of 1	
Project Name: Land east of Moorhill Road				Project No. A11641		Co-ords: 447069.00 - 113533.00 Level:		Date 26/05/2022
Location: Moorhill Road, West End, Southampton, SO30 3AZ				Dimensions (m): Depth 2.60		2.7 		Scale 1:20 Logged HS
Client: Highwood								
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.20	ES		0.60			Dark brown slightly silty gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to medium flint. [TOPSOIL]	
	0.60 - 0.70 0.70 - 0.80	ES D					Orangish red mottled greenish grey very sandy CLAY. Sand is coarse. [RIVER TERRACE DEPOSITS]	
	1.10 - 1.30	B		1.10			Orange slightly clayey silty very sandy fine to medium subangular to rounded GRAVEL of flint. Sand is coarse. [RIVER TERRACE DEPOSITS]	
	2.00 - 2.10	B		2.60			End of pit at 2.60 m	
	2.50 - 2.60	B						
								1 2 3 4
Remarks: Position scanned with calibrated CAT & 'Genny' prior to excavation. Groundwater seepage at 2.60m bgl.								
Stability: STABLE								

					Borehole Log			Borehole No. WS101 Sheet 1 of 1			
Project Name: Land east of Moorhill Road					Project No. A11641		Co-ords: 447139.00 - 113572.00		Hole Type WS		
Location: Moorhill Road, West End, Southampton, SO30 3AZ					Level:		Scale 1:25		Logged By TH		
Client: Highwood					Dates: 26/05/2022 - 26/05/2022						
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.10 - 0.20	ES		0.20		Vegetation over reddish brown and grey slightly clayey sandy sub-angular to sub-rounded fine to coarse flint GRAVEL. Sand is fine to coarse. [TOPSOIL]	Brown slightly gravelly sandy CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint. Sand is fine to coarse. [RIVER TERRACE DEPOSITS]	1		
		0.30 - 0.50	ES								
		0.50 - 0.80	B								
		0.80 - 1.00	ES								
		1.20	D	N=23 (3,4/4,5,7,7)	1.10		Brownish orange slightly gravelly clayey fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE DEPOSITS]	Orangish brown slightly sandy clayey sub-angular to sub-rounded fine to coarse flint GRAVEL. [RIVER TERRACE DEPOSITS]	2		
		1.50 1.50 - 1.70		N=33 (7,8/9,8,8,8)	1.30						
2.00		51 (7,14/51 for 225mm)	2.00		End of borehole at 2.00 m			5			
Remarks											
1. Position scanned with calibrated CAT & 'Genny' prior to excavation. Groundwater not encountered.											

					Borehole Log			Borehole No. WS102 Sheet 1 of 1		
Project Name: Land east of Moorhill Road					Project No. A11641		Co-ords: 447145.00 - 113548.00		Hole Type WS	
Location: Moorhill Road, West End, Southampton, SO30 3AZ					Level:			Scale 1:25		
Client: Highwood					Dates: 26/05/2022 - 26/05/2022			Logged By TH		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.10 - 0.20	ES	N=23 (3,3/3,5,5,10) 50 (19,15/50 for 225mm)	0.25			Vegetation over brownish grey slightly clayey gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [TOPSOIL]	1	
		0.10 - 0.30	D							
		0.30 - 0.50	ES							
		0.50 - 0.80	B							
		0.80 - 0.90	D		0.80			Brownish orange slightly gravelly clayey fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE DEPOSITS]		
		0.80 - 1.00	ES							
		1.20	D							
		1.30 - 1.50								
		1.50	1.70				Firm mottled grey and brownish orange sandy CLAY with occasional angular to sub-rounded medium flint gravel. [RIVER TERRACE DEPOSITS]			
				From 1.60m bgl becomes gravelly. Gravel is sub-angular to sub-rounded fine to coarse flint. End of borehole at 1.70 m						
								2		
									3	
									4	
									5	
Remarks										
1. Position scanned with calibrated CAT & 'Genny' prior to excavation. Groundwater not encountered.										

				Borehole Log				Borehole No. WS103 Sheet 1 of 1		
Project Name: Land east of Moorhill Road				Project No. A11641		Co-ords: 447124.00 - 113538.00		Hole Type WS		
Location: Moorhill Road, West End, Southampton, SO30 3AZ				Level:		Scale 1:25		Logged By TH		
Client: Highwood				Dates: 26/05/2022 - 26/05/2022						
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.10 - 0.20	ES		0.40			Grass over grey slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [TOPSOIL]	1	
		0.40 - 0.60	ES							
	0.60 - 0.90	B								
	0.90 - 1.00	ES								
		1.20	D	N=33 (3,6/6,7,9,11)	1.00			Orangish brown slightly clayey sandy angular to sub-rounded fine to coarse flint GRAVEL. Sand is fine to coarse. [RIVER TERRACE DEPOSITS]	2	
		1.30 - 1.50								
	1.40									
		2.00		60 (5,13/60 for 225mm)	2.00			End of borehole at 2.00 m	3	
										4
										5
Remarks 1. Position scanned with calibrated CAT & 'Genny' prior to excavation. Groundwater not encountered.										

					Borehole Log			Borehole No. WS104 Sheet 1 of 1		
Project Name: Land east of Moorhill Road					Project No. A11641		Co-ords: 447058.00 - 113538.00		Hole Type WS	
Location: Moorhill Road, West End, Southampton, SO30 3AZ					Level:			Scale 1:25		
Client: Highwood					Dates: 26/05/2022 - 26/05/2022			Logged By TH		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.10 - 0.20	ES	N=32 (10,9/9,8,7,8) 50 (11,14/50 for 225mm)	0.40			Grass over grey slightly clayey gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [TOPSOIL]	1	
		0.40 - 0.60	ES					Dark brown slightly sandy clayey sub-angular to sub-rounded fine to coarse flint GRAVEL. Sand is fine to coarse. [RIVER TERRACE DEPOSITS] <i>From 0.60-0.85m bgl becomes orange</i> <i>From 0.85m bgl becomes reddish orange</i>		
		0.40 - 0.70	B							
		0.60 - 0.80	D							
		0.80 - 1.00	ES							
1.10 - 1.30	D	End of borehole at 1.30 m	2							
1.20										
1.30										
									3	
									4	
									5	
Remarks 1. Position scanned with calibrated CAT & 'Genny' prior to excavation. Groundwater not encountered.										

					Borehole Log			Borehole No. WS105 Sheet 1 of 1					
Project Name: Land east of Moorhill Road					Project No. A11641		Co-ords: 447089.00 - 113558.00		Hole Type WS				
Location: Moorhill Road, West End, Southampton, SO30 3AZ					Level:		Scale 1:25		Logged By TH				
Client: Highwood					Dates: 26/05/2022 - 26/05/2022								
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description					
		Depth (m)	Type	Results									
		0.10 - 0.30	ES	N=40 (4,6/7,9,12,12)	0.60			Grass over brown slightly gravelly sandy CLAY. Gravel is sub-angular to rounded fine to medium flint. Sand is fine to coarse. [TOPSOIL]	1				
		0.40 - 0.60	D										
		0.60 - 0.70	ES										
		0.60 - 0.90	B										
		0.80 - 0.90	ES										
1.20 1.20 - 1.40	D	N=50 (6,11/13,13,14,10)	2.10			From 0.85-1.60 becomes slightly clayey and sandy. Sand is fine to coarse.	2						
2.00													
End of borehole at 2.10 m								3					
									4				
										5			
Remarks 1. Position scanned with calibrated CAT & 'Genny' prior to excavation. Groundwater not encountered.													

				Trial Pit Log			Trialpit No SA201 Sheet 1 of 1	
Project Name: Land east of Moorhill Road				Project No. A11641		Co-ords: 447056.00 - 113542.00 Level:		Date 26/07/2022
Location: Moorhill Road, West End, Southampton, SO30 3AZ				Dimensions (m): Depth 1.70		2.7 0.7		Scale 1:20 Logged HS
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.50			Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [TOPSOIL] <i>From 0.20m bgl: Colour becomes light greyish brown.</i>	
							Orangish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE DEPOSITS]	
							Orange sandy angular to sub-rounded GRAVEL of flint. Sand is coarse. [RIVER TERRACE DEPOSITS]	
							Orange clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE DEPOSITS]	
				1.10				
				1.20				
				1.70			End of pit at 1.70 m	
Remarks: Position scanned with calibrated CAT & 'Genny' prior to excavation								
Stability: STABLE								

				Trial Pit Log			Trialpit No SA202 Sheet 1 of 1	
Project Name: Land east of Moorhill Road				Project No. A11641		Co-ords: 447080.00 - 113527.00 Level:		Date 26/07/2022
Location: Moorhill Road, West End, Southampton, SO30 3AZ				Dimensions (m): Depth 1.70		2.3 		Scale 1:20 Logged HS
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.50			Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint with rare angular coarse brick. [MADE GROUND]	
							Orangish brown and reddish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE DEPOSITS]	
				1.30			Mottled red blueish grey and orange sandy SILT. Sand is fine to coarse. [RIVER TERRACE DEPOSITS]	
				1.60			Orange slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE DEPOSITS]	
				1.70			End of pit at 1.70 m	
Remarks: Position scanned with calibrated CAT & 'Genny' prior to excavation								
Stability: STABLE								

				Trial Pit Log			Trialpit No SA204 Sheet 1 of 1	
Project Name: Land east of Moorhill Road				Project No. A11641		Co-ords: 447142.00 - 113533.00 Level:		Date 26/07/2022
Location: Moorhill Road, West End, Southampton, SO30 3AZ				Dimensions (m): Depth 2.10		2.6 		Scale 1:20 Logged HS
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.15			Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]	
							Dark brown sandy angular to sub-angular fine to coarse GRAVEL of flint, slate and rare brick. [MADE GROUND]	
				0.60			Orangish brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE DEPOSITS]	
				1.30			Orangish brown clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE DEPOSITS]	
				2.10			End of pit at 2.10 m	
Remarks: Position scanned with calibrated CAT & 'Genny' prior to excavation								
Stability: STABLE								

APPENDIX VII - CHEMICAL ANALYSIS CERTIFICATES



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Attention : Georgia Wass
Date : 17th June, 2022
Your reference : A11641
Our reference : Test Report 22/9100 Batch 1
Location : Moorhill
Date samples received : 2nd June, 2022
Status : Final Report
Issue : 1

Twenty three samples were received for analysis on 2nd June, 2022 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.

Authorised By:



Liza Klebe
Project Co-ordinator

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Omnia
Reference: A11641
Location: Moorhill
Contact: Georgia Wass
EMT Job No: 22/9100

Report : Solid

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

EMT Sample No.	1-3	7-9	13-16	26-28	32-34	35-37	47-49	50-52	62		Please see attached notes for all abbreviations and acronyms		
Sample ID	HP101	SA101	SA102	WS101	WS102	WS102	WS103	WS104	WS105				
Depth	0.20-0.30	0.10-0.20	0.40-0.60	0.30-0.50	0.10-0.20	0.30-0.50	0.90-1.00	0.10-0.20	0.40-0.60				
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	T				
Sample Date	26/05/2022	26/05/2022	26/05/2022	26/05/2022	26/05/2022	26/05/2022	26/05/2022	26/05/2022	26/05/2022				
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	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022		LOD/LOR	Units	Method No.
Arsenic #	5.9	15.0	5.4	7.1	-	5.4	16.1	8.1	10.7		<0.5	mg/kg	TM30/PM15
Barium #	20	84	18	128	-	35	21	41	50		<1	mg/kg	TM30/PM15
Beryllium	<0.5	0.7	<0.5	<0.5	-	0.5	0.5	<0.5	<0.5		<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM30/PM15
Chromium #	73.6	74.1	91.2	57.1	-	65.9	78.7	81.6	62.3		<0.5	mg/kg	TM30/PM15
Copper #	8	20	6	4	-	6	7	8	16		<1	mg/kg	TM30/PM15
Lead #	38	256	10	11	-	11	10	60	68		<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM30/PM15
Nickel #	6.2	19.4	9.1	7.8	-	7.0	9.6	9.2	10.6		<0.7	mg/kg	TM30/PM15
Selenium #	<1	2	1	1	-	2	2	1	<1		<1	mg/kg	TM30/PM15
Vanadium	28	38	35	41	-	39	53	32	45		<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.4	0.5	0.2	0.3	-	0.3	0.2	0.3	0.5		<0.1	mg/kg	TM74/PM32
Zinc #	30	95	18	24	-	65	21	33	45		<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.12	0.04	<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		<0.05	mg/kg	TM4/PM8
Fluorene #	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.98	0.17	<0.03	<0.03	0.04	<0.03	<0.03	0.10	0.06		<0.03	mg/kg	TM4/PM8
Anthracene #	0.13	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Fluoranthene #	1.49	0.50	<0.03	<0.03	0.15	<0.03	<0.03	0.29	0.07		<0.03	mg/kg	TM4/PM8
Pyrene #	1.21	0.47	<0.03	<0.03	0.12	<0.03	<0.03	0.25	0.07		<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.54	0.30	<0.06	<0.06	<0.06	<0.06	<0.06	0.14	0.07		<0.06	mg/kg	TM4/PM8
Chrysene #	0.67	0.36	<0.02	<0.02	0.12	<0.02	<0.02	0.16	0.19		<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene #	1.28	0.69	<0.07	<0.07	0.13	<0.07	<0.07	0.26	0.12		<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.62	0.34	<0.04	<0.04	0.05	<0.04	<0.04	0.12	0.06		<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.60	0.36	<0.04	<0.04	0.05	<0.04	<0.04	0.14	0.06		<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.11	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.61	0.31	<0.04	<0.04	0.05	<0.04	<0.04	0.12	0.06		<0.04	mg/kg	TM4/PM8
Coronene	-	-	-	-	<0.04	-	-	-	<0.04		<0.04	mg/kg	TM4/PM8
PAH 16 Total	8.5	3.7	<0.6	<0.6	-	<0.6	<0.6	1.6	0.8		<0.6	mg/kg	TM4/PM8
PAH 17 Total	-	-	-	-	0.71	-	-	-	0.76		<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.92	0.50	<0.05	<0.05	0.09	<0.05	<0.05	0.19	0.09		<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.36	0.19	<0.02	<0.02	0.04	<0.02	<0.02	0.07	0.03		<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	91	92	94	85	92	94	89	90	93		<0	%	TM4/PM8
EPH >C8-C10 (EH_1D_Total) #	<5	<5	<5	<5	-	<5	<5	<5	<5		<5	mg/kg	TM5/PM8
EPH >C10-C12 (EH_1D_Total) #	<10	<10	<10	<10	-	<10	<10	<10	<10		<10	mg/kg	TM5/PM8
EPH >C12-C16 (EH_1D_Total) #	<10	<10	<10	<10	-	<10	<10	<10	<10		<10	mg/kg	TM5/PM8
EPH >C16-C21 (EH_1D_Total) #	<10	<10	<10	<10	-	<10	<10	32	<10		<10	mg/kg	TM5/PM8
EPH >C21-C35 (EH_1D_Total) #	362	70	<10	71	-	<10	<10	168	<10		<10	mg/kg	TM5/PM8
EPH >C35-C44 (EH_1D_Total)	61	<10	<10	<10	-	<10	<10	37	<10		<10	mg/kg	TM5/PM8
EPH >C8-C44 (EH_1D_Total)	423	70	<30	71	-	<30	<30	237	<30		<30	mg/kg	TM5/PM8

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

Please see attached notes for all abbreviations and acronyms

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	25.5
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	79.7
Particle Size <4mm =	>95%		
EMT Job No	22/9100	Landfill Waste Acceptance Criteria Limits	
Sample No	34		
Client Sample No	WS102		
Depth/Other	0.10-0.20		
Sample Date	26/05/2022		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.35	3	5
Loss on Ignition (%)	1.6	-	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)	0.71	100	-
pH (pH Units)	8.24	-	>6
ANC to pH 7 (mol/kg)	0.03	-	to be evaluated
ANC to pH 4 (mol/kg)	0.19	-	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	0.063	0.63	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	1.0	10	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	<0.5	<5	1000
Total Dissolved Solids	72	720	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	7	70	500

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	11.1
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	90.0
Particle Size <4mm =	>95%		
EMT Job No	22/9100	Landfill Waste Acceptance Criteria Limits	
Sample No	62		
Client Sample No	WS105		
Depth/Other	0.40-0.60		
Sample Date	26/05/2022		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.93	3	5
Loss on Ignition (%)	4.4	-	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)	0.76	100	-
pH (pH Units)	7.58	-	>6
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated
ANC to pH 4 (mol/kg)	0.05	-	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	0.014	0.14	20
Cadmium	<0.0005	<0.005	0.04
Chromium	0.0024	0.024	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	0.004	0.04	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.006	0.06	4
Chloride	0.5	5	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	1.9	19	1000
Total Dissolved Solids	36	360	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	4	40	500

Client Name: Omnia
Reference: A11641
Location: Moorhill
Contact: Georgia Wass

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.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/9100	1	HP101	0.20-0.30	3	Catherine Coles	17/06/2022	General Description (Bulk Analysis)	soil, roots, stone
					Catherine Coles	17/06/2022	Asbestos Fibres	NAD
					Catherine Coles	17/06/2022	Asbestos ACM	NAD
					Catherine Coles	17/06/2022	Asbestos Type	NAD
22/9100	1	SA101	0.10-0.20	9	Andrew Alker	17/06/2022	General Description (Bulk Analysis)	brown soil and stone
					Andrew Alker	17/06/2022	Asbestos Fibres	NAD
					Andrew Alker	17/06/2022	Asbestos ACM	NAD
					Andrew Alker	17/06/2022	Asbestos Type	NAD
22/9100	1	SA102	0.40-0.60	15	Simon Postlewhite	17/06/2022	General Description (Bulk Analysis)	Brown soil/stones
					Simon Postlewhite	17/06/2022	Asbestos Fibres	NAD
					Simon Postlewhite	17/06/2022	Asbestos ACM	NAD
					Simon Postlewhite	17/06/2022	Asbestos Type	NAD
22/9100	1	WS101	0.30-0.50	28	Simon Postlewhite	17/06/2022	General Description (Bulk Analysis)	Brown soil/stones
					Simon Postlewhite	17/06/2022	Asbestos Fibres	NAD
					Simon Postlewhite	17/06/2022	Asbestos ACM	NAD
					Simon Postlewhite	17/06/2022	Asbestos Type	NAD
22/9100	1	WS102	0.30-0.50	37	Simon Postlewhite	17/06/2022	General Description (Bulk Analysis)	Brown soil/stones
					Simon Postlewhite	17/06/2022	Asbestos Fibres	NAD
					Simon Postlewhite	17/06/2022	Asbestos ACM	NAD
					Simon Postlewhite	17/06/2022	Asbestos Type	NAD
22/9100	1	WS103	0.90-1.00	49	Simon Postlewhite	17/06/2022	General Description (Bulk Analysis)	Brown soil/stones
					Simon Postlewhite	17/06/2022	Asbestos Fibres	NAD
					Simon Postlewhite	17/06/2022	Asbestos ACM	NAD
					Simon Postlewhite	17/06/2022	Asbestos Type	NAD
22/9100	1	WS104	0.10-0.20	52	Andrew Alker	17/06/2022	General Description (Bulk Analysis)	brown soil and stone
					Andrew Alker	17/06/2022	Asbestos Fibres	NAD
					Andrew Alker	17/06/2022	Asbestos ACM	NAD
					Andrew Alker	17/06/2022	Asbestos Type	NAD
22/9100	1	WS105	0.40-0.60	62	Simon Postlewhite	16/06/2022	General Description (Bulk Analysis)	Brown soil/stones
					Simon Postlewhite	16/06/2022	Asbestos Fibres	NAD
					Simon Postlewhite	16/06/2022	Asbestos ACM	NAD
					Simon Postlewhite	16/06/2022	Asbestos Type	NAD

Matrix : Solid

[illegible]

Element Materials Technology

Client Name:

Omnia

Reference:

A11641

Location:

Moorhill

Contact:

Georgia Wass

Notification of Deviating Samples

Matrix : Solid

[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.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/9100

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 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease 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 or Fats, Oils and Grease 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 UKAS requirement 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.

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 calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
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: 22/9100

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 GC/FID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GC/FID. For waters the solvent extracts dissolved phase plus a sheen if present.	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 GC/FID. 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
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, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	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

EMT Job No: 22/9100

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
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; SOLIS 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.			AD	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; SOLIS 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), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 20131	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), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 20131	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), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 20131	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
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

EMT Job No: 22/9100

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
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
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM77	Modified DDCENT/S method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM89	Modified USEPA method QIA-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
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			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	NONE	No Method Code			AD	Yes
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	

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)



IHB48-MF6EI-5TW6P

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

Job name

A11641

Description/Comments

Project

Site

Moorhill, Southampton

Classified by

Name: **William Bennett**
 Date: **27 Jun 2022 14:30 GMT**
 Telephone: **01489 808 088**
 Company: **Omnia Environmental Consulting**
3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

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

Date
 50% complete

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS102	0.10-0.20	Non Hazardous		2
2	WS105	0.40-0.60	Non Hazardous		4

Related documents

#	Name	Description
1	Screening Suite 1	waste stream template used to create this Job

Report

Created by: William Bennett

Created date: 27 Jun 2022 14:30 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	6
Appendix B: Rationale for selection of metal species	7
Appendix C: Version	8

Classification of sample: WS102

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

Sample details

Sample name:	LoW Code:
WS102	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.10-0.20 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No 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	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
2	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
3	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
4	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
5	phenanthrene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
		201-581-5	85-01-8									
6	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7									
7	fluoranthene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
		205-912-4	206-44-0									
8	pyrene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
		204-927-3	129-00-0									
9	benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
10	chrysene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
	601-048-00-0	205-923-4	218-01-9									
11	benzo[b]fluoranthene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
	601-034-00-4	205-911-9	205-99-2									
12	benzo[k]fluoranthene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
	601-036-00-5	205-916-6	207-08-9									
13	benzo[a]pyrene; benzo[def]chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
	601-032-00-3	200-028-5	50-32-8									
14	indeno[123-cd]pyrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		205-893-2	193-39-5									
15	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									
16	benzo[ghi]perylene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		205-883-8	191-24-2									
17	arsenic { arsenic }				<0.025	mg/kg		<0.025	mg/kg	<0.0000025 %		<LOD
	033-001-00-X	231-148-6	7440-38-2									
18	barium { barium oxide }				0.63	mg/kg	1.117	0.703	mg/kg	0.0000703 %		
		215-127-9	1304-28-5									

#		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							
19		cadmium { cadmium oxide }				<0.005 mg/kg	1.142	<0.0057 mg/kg	<0.000000571 %		<LOD
		048-002-00-0	215-146-2	1306-19-0							
20		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.015 mg/kg	1.923	<0.0288 mg/kg	<0.00000288 %		<LOD
		024-001-00-0	215-607-8	1333-82-0							
21		copper { dicopper oxide; copper (I) oxide }				<0.07 mg/kg	1.126	<0.0788 mg/kg	<0.00000788 %		<LOD
		029-002-00-X	215-270-7	1317-39-1							
22		lead {  lead compounds with the exception of those specified elsewhere in this Annex }			1	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		082-001-00-6									
23		mercury { mercury }				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		080-001-00-0	231-106-7	7439-97-6							
24		nickel { nickel }			7	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
		028-002-00-7	231-111-4	7440-02-0							
25		selenium { selenium }				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		034-001-00-2	231-957-4	7782-49-2							
26		zinc { zinc powder - zinc dust (stabilised) }				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		030-001-01-9	231-175-3	7440-66-6							
								Total:	0.0002 %		

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
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS105

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

Sample details

Sample name:	LoW Code:
WS105	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.40-0.60 m	

Hazard properties

None identified

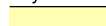
Determinands

Moisture content: 0% No 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	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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
	006-007-00-5											
2	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
3	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
4	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
5	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
6	phenanthrene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
		201-581-5	85-01-8									
7	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7									
8	fluoranthene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
		205-912-4	206-44-0									
9	pyrene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
		204-927-3	129-00-0									
10	benzo[a]anthracene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
	601-033-00-9	200-280-6	56-55-3									
11	chrysene				0.19	mg/kg		0.19	mg/kg	0.000019 %		
	601-048-00-0	205-923-4	218-01-9									
12	benzo[b]fluoranthene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
	601-034-00-4	205-911-9	205-99-2									
13	benzo[k]fluoranthene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
	601-036-00-5	205-916-6	207-08-9									
14	benzo[a]pyrene; benzo[def]chrysene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
	601-032-00-3	200-028-5	50-32-8									
15	indeno[123-cd]pyrene				0.6	mg/kg		0.6	mg/kg	0.00006 %		
		205-893-2	193-39-5									
16	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									
17	benzo[ghi]perylene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
		205-883-8	191-24-2									

#	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							
18	 arsenic { arsenic }				10.7 mg/kg		10.7 mg/kg	0.00107 %		
	033-001-00-X	231-148-6	7440-38-2							
19	 barium {  barium oxide }				50 mg/kg	1.117	55.825 mg/kg	0.00558 %		
		215-127-9	1304-28-5							
20	 beryllium { beryllium }				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	004-001-00-7	231-150-7	7440-41-7							
21	 boron { diboron trioxide; boric oxide }				0.05 mg/kg	3.22	0.161 mg/kg	0.0000161 %		
	005-008-00-8	215-125-8	1303-86-2							
22	 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							
23	 chromium in chromium(III) compounds {  chromium(III) oxide }				62.3 mg/kg	1.462	91.055 mg/kg	0.00911 %		
		215-160-9	1308-38-9							
24	 chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
25	 copper { dicopper oxide; copper (I) oxide }				16 mg/kg	1.126	18.014 mg/kg	0.0018 %		
	029-002-00-X	215-270-7	1317-39-1							
26	 lead {  lead compounds with the exception of those specified elsewhere in this Annex }			1	68 mg/kg		68 mg/kg	0.0068 %		
	082-001-00-6									
27	 mercury { mercury }				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	080-001-00-0	231-106-7	7439-97-6							
28	 nickel { nickel }			7	10.6 mg/kg		10.6 mg/kg	0.00106 %		
	028-002-00-7	231-111-4	7440-02-0							
29	 selenium { selenium }				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	034-001-00-2	231-957-4	7782-49-2							
30	 vanadium { divanadium pentaoxide; vanadium pentoxide }				45 mg/kg	1.785	80.333 mg/kg	0.00803 %		
	023-001-00-8	215-239-8	1314-62-1							
31	 zinc { zinc powder - zinc dust (stabilised) }				45 mg/kg		45 mg/kg	0.0045 %		
	030-001-01-9	231-175-3	7440-66-6							
32	 TPH (C6 to C40) petroleum group				<30 mg/kg		<30 mg/kg	<0.003 %		<LOD
			TPH							
Total:								0.0414 %		

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
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

• 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

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

GB MCL index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
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

• **barium oxide** (EC Number: 215-127-9, CAS Number: 1304-28-5)

Description/Comments: Data from ECHA's C&L Inventory Database, Sigma Aldrich SDS dated 6/2/20
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/88825>
Data source date: 02 Apr 2020
Hazard Statements: Acute Tox. 3; H301 , Skin Corr. 1B; H314 , Eye Dam. 1; H318 , Acute Tox. 1; H332

• **lead compounds with the exception of those specified elsewhere in this Annex**

GB MCL index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2
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 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

• **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

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

Description/Comments: Data from ECHA's C&L inventory database
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>
Data source date: 30 Apr 2020
Hazard Statements: Acute Tox. 4; H302 , Skin Sens. 1; H317 , Eye Irrit. 2; H319

• **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

Appendix B: Rationale for selection of metal species

arsenic {arsenic}

No evidence to specify otherwise

barium {barium oxide}

Most likely

cadmium {cadmium oxide}

Most likely

chromium in chromium(VI) compounds {chromium(VI) oxide}

Most likely

copper {dicopper oxide; copper (I) oxide}

No evidence to specify otherwise

lead {lead compounds with the exception of those specified elsewhere in this Annex}

No evidence to specify otherwise

mercury {mercury}

No evidence to specify otherwise

nickel {nickel}

No evidence to specify otherwise

selenium {selenium}

No evidence to specify otherwise

zinc {zinc powder - zinc dust (stabilised)}

No evidence to specify otherwise

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}

No evidence to specify otherwise

beryllium {beryllium}

No evidence to specify otherwise

boron {diboron trioxide; boric oxide}

Most likely

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

Most likely

vanadium {divanadium pentaoxide; vanadium pentoxide}

No evidence to specify otherwise

Appendix C: Version

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

HazWasteOnline Classification Engine Version: 2022.176.5209.9795 (25 Jun 2022)

HazWasteOnline Database: 2022.176.5209.9795 (25 Jun 2022)

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

APPENDIX VIII - ORIGIN OF GAC VALUES

	DOC REF	DOCUMENT NAME
	TECH11102	Residential End Use without Homegrown Produce

Determinant	Unit	GAC	Exposure Pathway	Origin of Risk Assessment Value
Metals				
Arsenic	mg/kg	40	1	LQM CIEH Suitable for Use Levels (S4UL) 2015- Inorganic Arsenic
Beryllium	mg/kg	1.7	1	LQM CIEH Suitable for Use Levels (S4UL) 2015
Boron	mg/kg	11,000	1	
Cadmium	mg/kg	85	1	
Chromium (III)	mg/kg	910	1	
Chromium (VI)	mg/kg	6	1	
Copper	mg/kg	7,100	1	
Lead	mg/kg	310	1	Category 4 Screening Level (C4SL) utilising exposure parameters from CLEA SR3 report.
Mercury	mg/kg	56	4	LQM CIEH Suitable for Use Levels (S4UL) 2015- Inorganic Mercury
Nickel	mg/kg	180	1	LQM CIEH Suitable for Use Levels (S4UL) 2015
Selenium	mg/kg	430	1	
Vanadium	mg/kg	1,200	1	
Zinc	mg/kg	40,000	1	
General Inorganics				
Total Cyanide*	mg/kg	50	1	Dutch Intervention Values 2010
Asbestos	%	0.001%	6	OEC Derived Value based on ICRCL
General Organics				
Phenol	mg/kg	750	4,1	LQM CIEH Suitable for Use Levels (S4UL) 2015 1%SOM
PAHs				
Naphthalene	mg/kg	2.3	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM
Acenaphthylene	mg/kg	2,900	1	
Acenaphthene	mg/kg	3,000	1	
Fluorene	mg/kg	2,800	1	
Phenanthrene	mg/kg	1,300	1	
Anthracene	mg/kg	31,000	1	
Fluoranthene	mg/kg	1,500	1	
Pyrene	mg/kg	3,700	1	
Benzo(a)Anthracene ^l	mg/kg	11	1	
Chrysene	mg/kg	30	1	
Benzo(b)Fluoranthene	mg/kg	3.9	1	
Benzo(k)Fluoranthene	mg/kg	110	1	
Benzo(a)Pyrene	mg/kg	3.2	1	
Indeno(123-cd)Pyrene	mg/kg	45	1	
Dibenzo(a,h)Anthracene	mg/kg	0.31	1	

DOCUMENT VERSION	DOCUMENT DATE	OWNER
5	March 2019	T.Mitchell

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	DOC REF	DOCUMENT NAME
	TECH11102	Residential End Use without Homegrown Produce

Determinant	Unit	GAC	Exposure Pathway	Origin of Risk Assessment Value
Benzo(ghi)Perylene	mg/kg	360	1	
BTEX & MTBE				
Benzene	mg/kg	0.38	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 1%SOM
Toluene	mg/kg	880	4	
Ethylbenzene	mg/kg	83	4	
Xylenes	mg/kg	79	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 1% SOM p-Xylene
MTBE	mg/kg	73	4	CL:AIRE SGV 2010 1% SOM
TPH-CWG				
Aliphatic				LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM
Aliphatic EC 5-6	mg/kg	42	4	
Aliphatic EC >6-8	mg/kg	100	4	
Aliphatic EC >8-10	mg/kg	27	4	
Aliphatic EC >10-12	mg/kg	130 ^(vap)	4	
Aliphatic EC > 12-16	mg/kg	1,100 ^(sol)	4	
Aliphatic EC > 16-35	mg/kg	65,000 ^(sol)	1	
Aliphatic EC >35-44	mg/kg	65,000 ^(sol)	1	
Aromatic				LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM
Aromatic EC 5-7	mg/kg	370	4	
Aromatic EC>7-8	mg/kg	860	4	
Aromatic EC> 8-10	mg/kg	47	4	
Aromatic EC> 10-12	mg/kg	250	2	
Aromatic EC> 12-16	mg/kg	1,800	2	
Aromatic EC> 16-21	mg/kg	1,900	2	
Aromatic EC> 21-35	mg/kg	1,900	1	
Aromatic EC> 35-44	mg/kg	1,900	1	
Banded TPH				
TPH EC 5-6**	mg/kg	42	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM, utilising the most conservative of the Ali/Aro chain lengths.
TPH EC >6-8**	mg/kg	100	4	
TPH EC >8-10**	mg/kg	27	4	
TPH EC> 10-12**	mg/kg	130	4	
TPH EC> 12-16**	mg/kg	1,100	4	
TPH EC> 16-21**	mg/kg	1,900	2	
TPH EC> 21-35**	mg/kg	1,900	1	
TPH EC> 35-44**	mg/kg	1,900	1	

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5	March 2019	T.Mitchell

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	DOC REF	DOCUMENT NAME
	TECH11102	Residential End Use without Homegrown Produce

Notes

Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil, 3 = Dermal contact (Indoor & Outdoor); 4 = Inhalation of Vapour (Indoor & Outdoor), 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres.

Abbreviations: GAC = General Assessment Criteria

* Total cyanide Tier 1 GAC is taken from the Dutch Intervention Value (2010) for complex cyanide.

** The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. OEC has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health.

(sol) – GAC presented exceeds the solubility saturation limit.

(vap) – GAC presented exceeds the vapour saturation limit

DOCUMENT VERSION	DOCUMENT DATE	OWNER
5	March 2019	T.Mitchell

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APPENDIX IX - GEOTECHNICAL ANALYSIS CERTIFICATES

**Samples**

Omnia Environmental Consulting
3-6 The Quarterdeck
Port Solent
Portsmouth
PO6 4TP

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

e: samples@omnia-consulting.co.uk

Analytical Report Number : 22-64835

Project / Site name:	Moorhill	Samples received on:	01/06/2022
Your job number:	A11641	Samples instructed on/ Analysis started on:	31/05/2022
Your order number:	PO-980	Analysis completed by:	23/06/2022
Report Issue Number:	1	Report issued on:	24/06/2022
Samples Analysed:	5 soil samples		

Signed:

Martyna Langer
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-64835

Project / Site name: Moorhill

Your Order No: PO-980

Lab Sample Number				2312943	2312944	2312945	2312946	2312947
Sample Reference				SA101	SA101	SA103	WS101	WS102
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90-2.00	2.00-2.30	1.10-1.30	0.50-0.80	1.30-1.50
Date Sampled				26/05/2022	26/05/2022	26/05/2022	26/05/2022	26/05/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	8.6	17	12	14	12
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.3	0.3

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.2	5.2	4.9	7.7	4.7
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.067	0.036	0.029	0.019	0.0043

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 22-64835

Project / Site name: Moorhill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2312943	SA101	None Supplied	1.90-2.00	Brown clay and loam with gravel and vegetation.
2312944	SA101	None Supplied	2.00-2.30	Brown clay and loam.
2312945	SA103	None Supplied	1.10-1.30	Brown sand with gravel.
2312946	WS101	None Supplied	0.50-0.80	Brown clay and sand with gravel and vegetation.
2312947	WS102	None Supplied	1.30-1.50	Brown clay and sand.

Analytical Report Number : 22-64835

Project / Site name: Moorhill

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.



4041

TEST CERTIFICATE**DETERMINATION OF LIQUID AND PLASTIC LIMITS**

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

Contact: Samples

Site Address: Moorhill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: A11641

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 20/06/2022

Sampled By: Client- TH/HS

Test Results:

Laboratory Reference: 2312935

Hole No.: SA101

Sample Reference: Not Given

Sample Description: Brown very gravelly slightly sandy CLAY

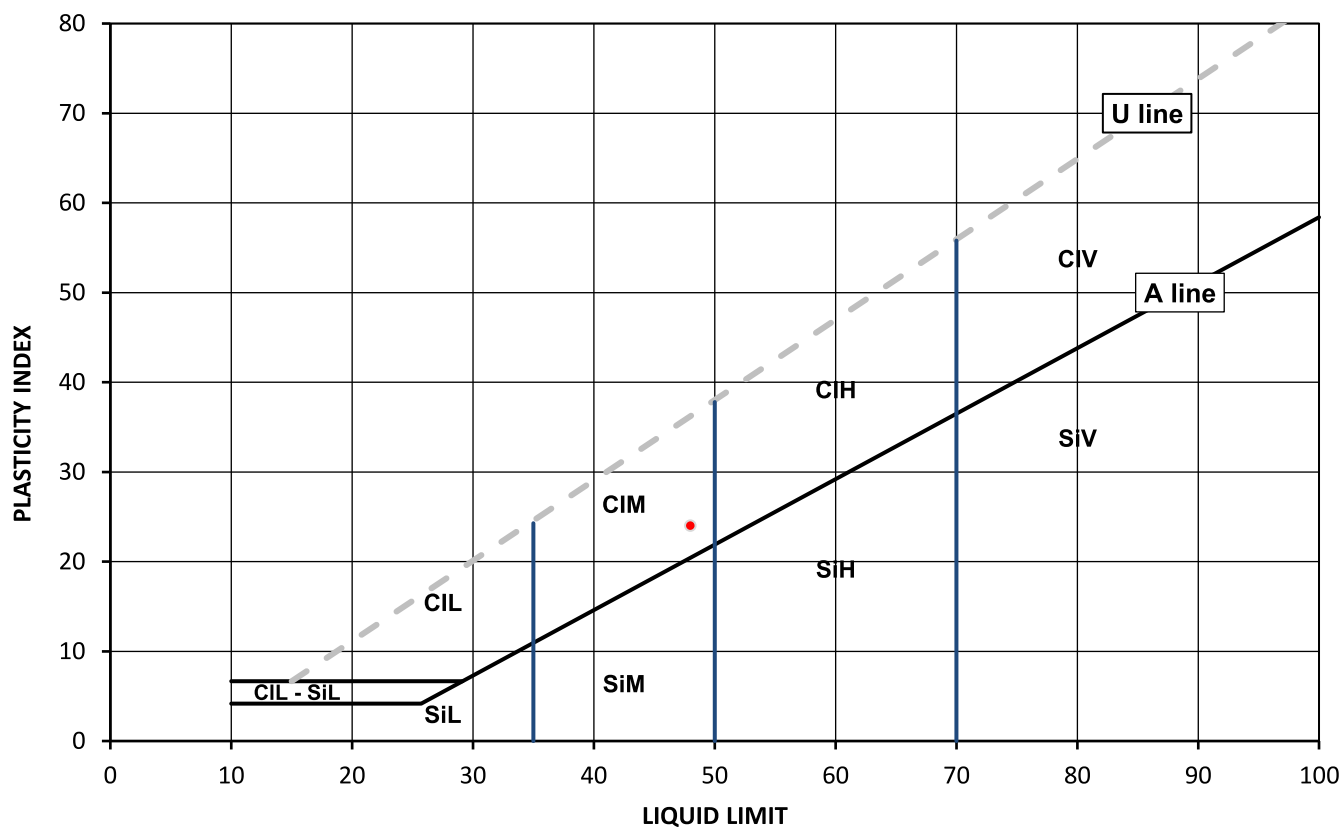
Depth Top [m]: 0.40

Depth Base [m]: 0.50

Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
12	48	24	24	34



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE**DETERMINATION OF LIQUID AND PLASTIC LIMITS**

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

Contact: Samples

Site Address: Moorhill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: A11641

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 20/06/2022

Sampled By: Client- TH/HS

Test Results:

Laboratory Reference: 2312937

Hole No.: SA101

Sample Reference: Not Given

Sample Description: Yellowish brown CLAY

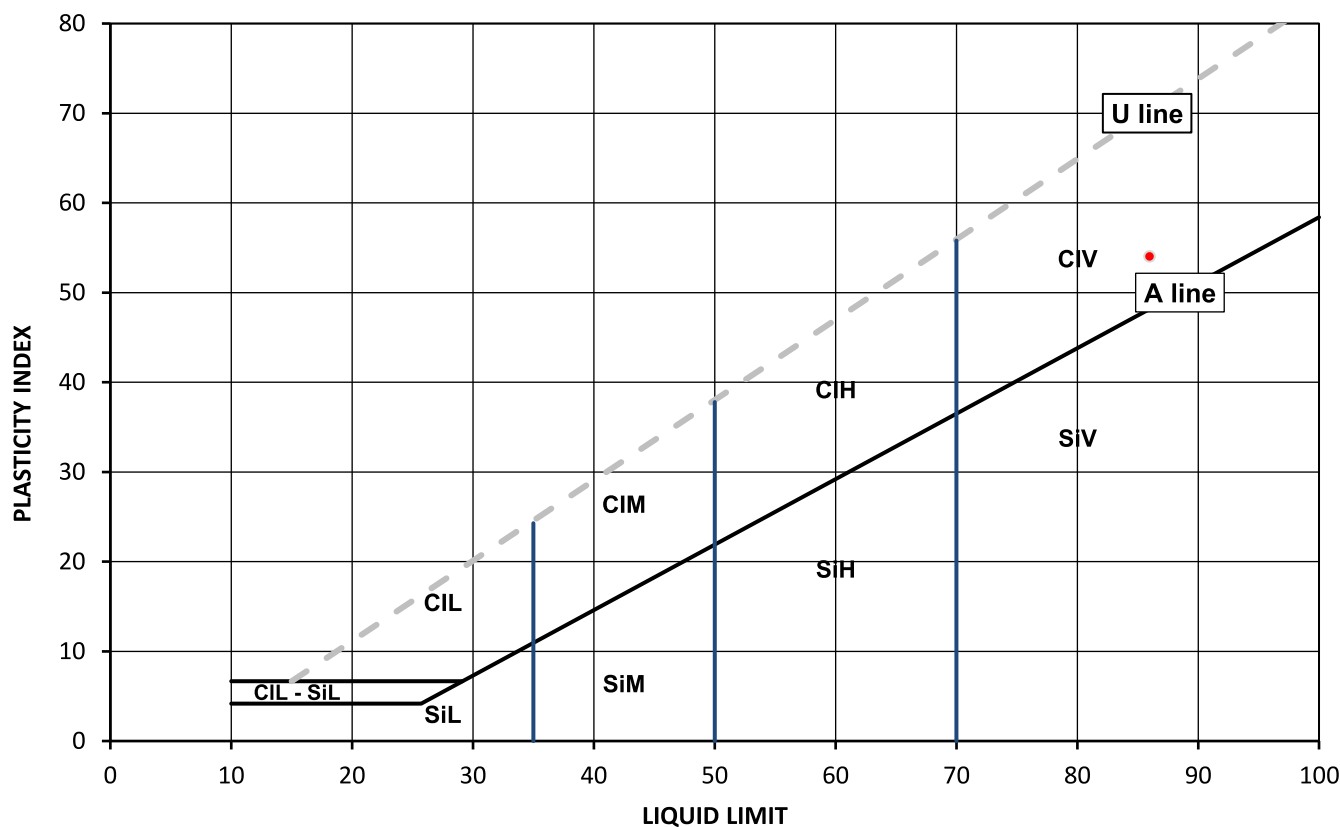
Depth Top [m]: 2.00

Depth Base [m]: 2.30

Sample Type: D

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
30	86	32	54	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	L Low
Si	Silt	M Medium
		H High
		V Very high
	O Organic	O append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

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Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE**DETERMINATION OF LIQUID AND PLASTIC LIMITS**

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

Contact: Samples

Site Address: Moorhill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: A11641

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 20/06/2022

Sampled By: Client- TH/HS

Test Results:

Laboratory Reference: 2312938

Hole No.: SA103

Sample Reference: Not Given

Sample Description: Yellowish brown slightly gravelly sandy CLAY

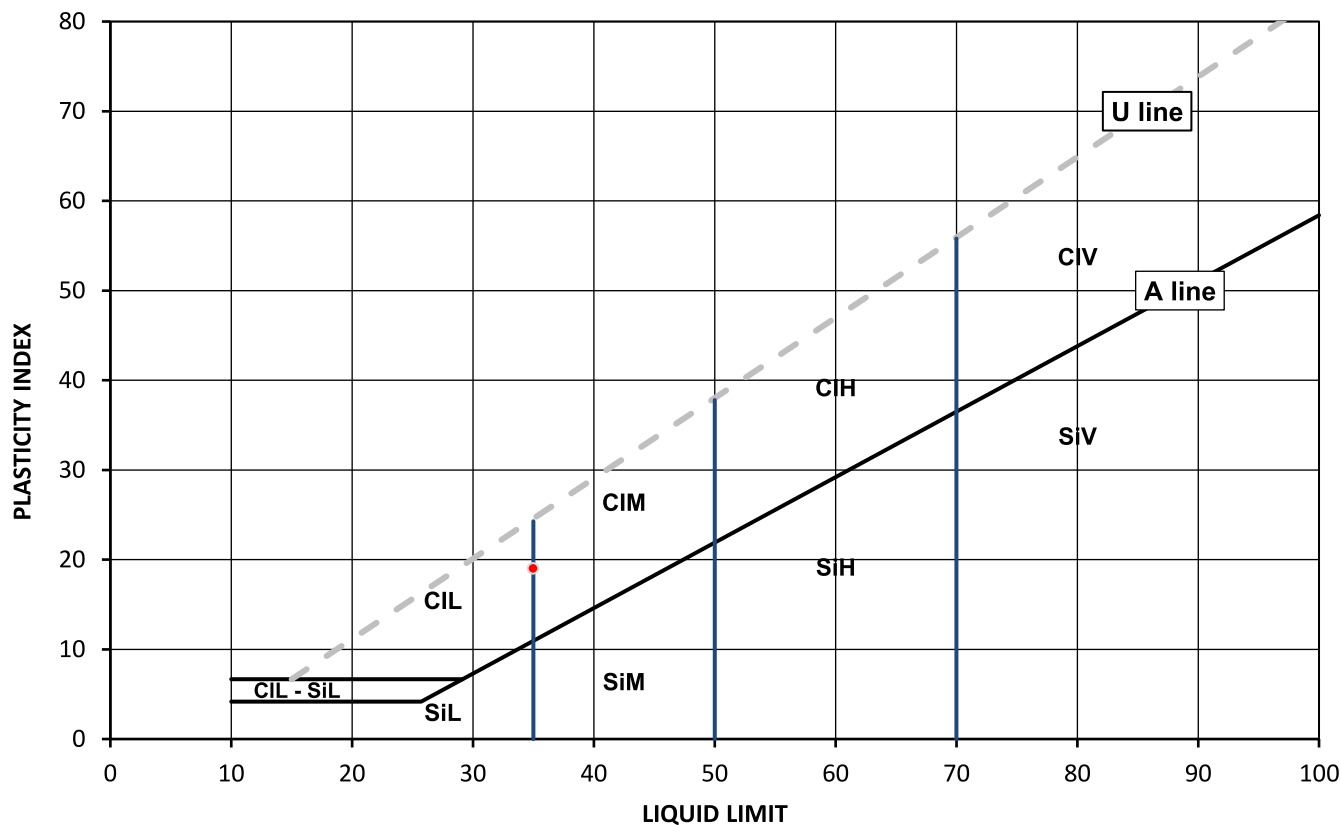
Depth Top [m]: 0.70

Depth Base [m]: 0.80

Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
11	35	16	19	81



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

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Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

Contact: Samples

Site Address: Moorhill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: A11641

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 18/06/2022

Sampled By: Client- TH/HS

Test Results:

Laboratory Reference: 2312940

Hole No.: WS101

Sample Reference: Not Given

Sample Description: Brown gravelly very sandy CLAY

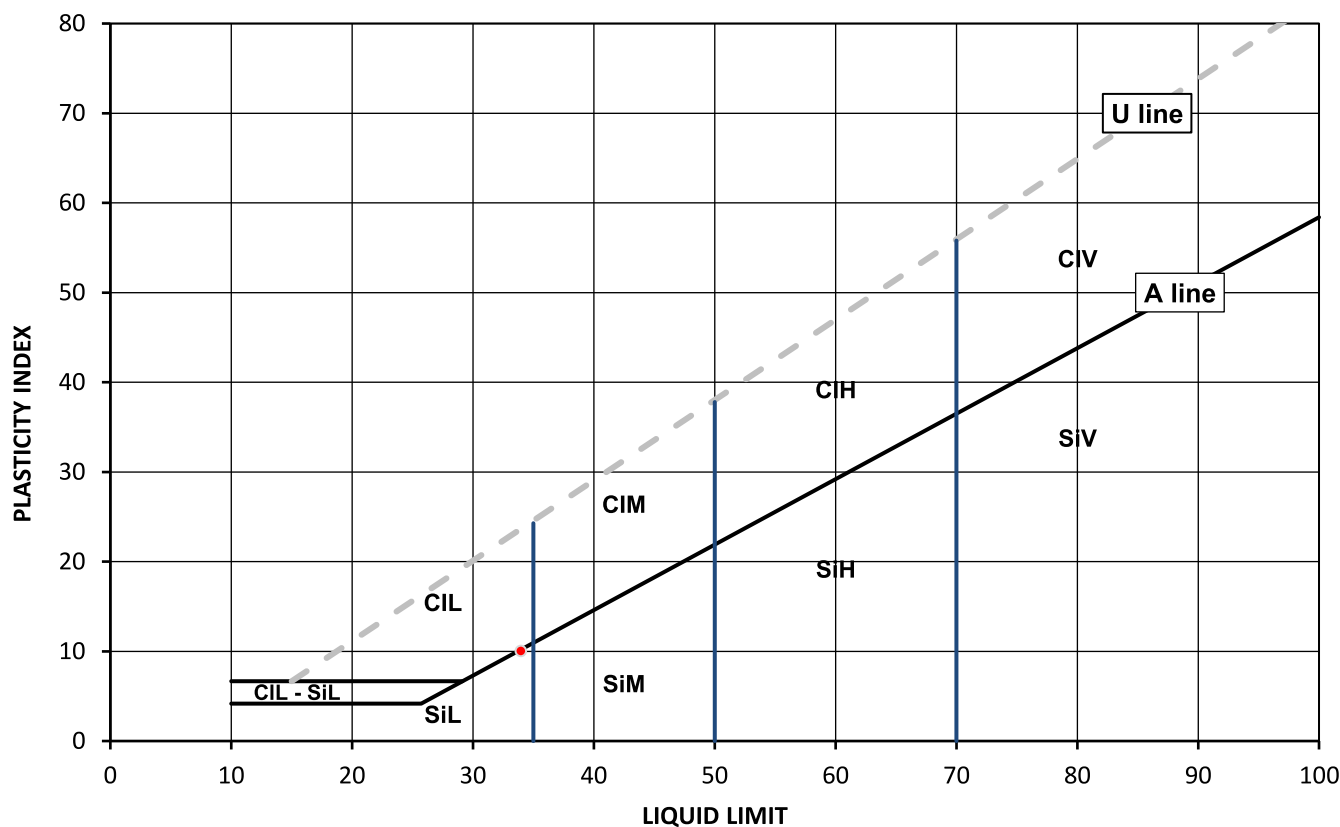
Depth Top [m]: 0.50

Depth Base [m]: 0.80

Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
17	34	24	10	41



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	L Low below 35
Si	Silt	M Medium 35 to 50
		H High 50 to 70
		V Very high exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

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TEST CERTIFICATE**DETERMINATION OF LIQUID AND PLASTIC LIMITS**

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

Contact: Samples

Site Address: Moorhill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: A11641

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 20/06/2022

Sampled By: Client- TH/HS

Test Results:

Laboratory Reference: 2312941

Hole No.: WS102

Sample Reference: Not Given

Sample Description: Yellowish brown slightly sandy CLAY

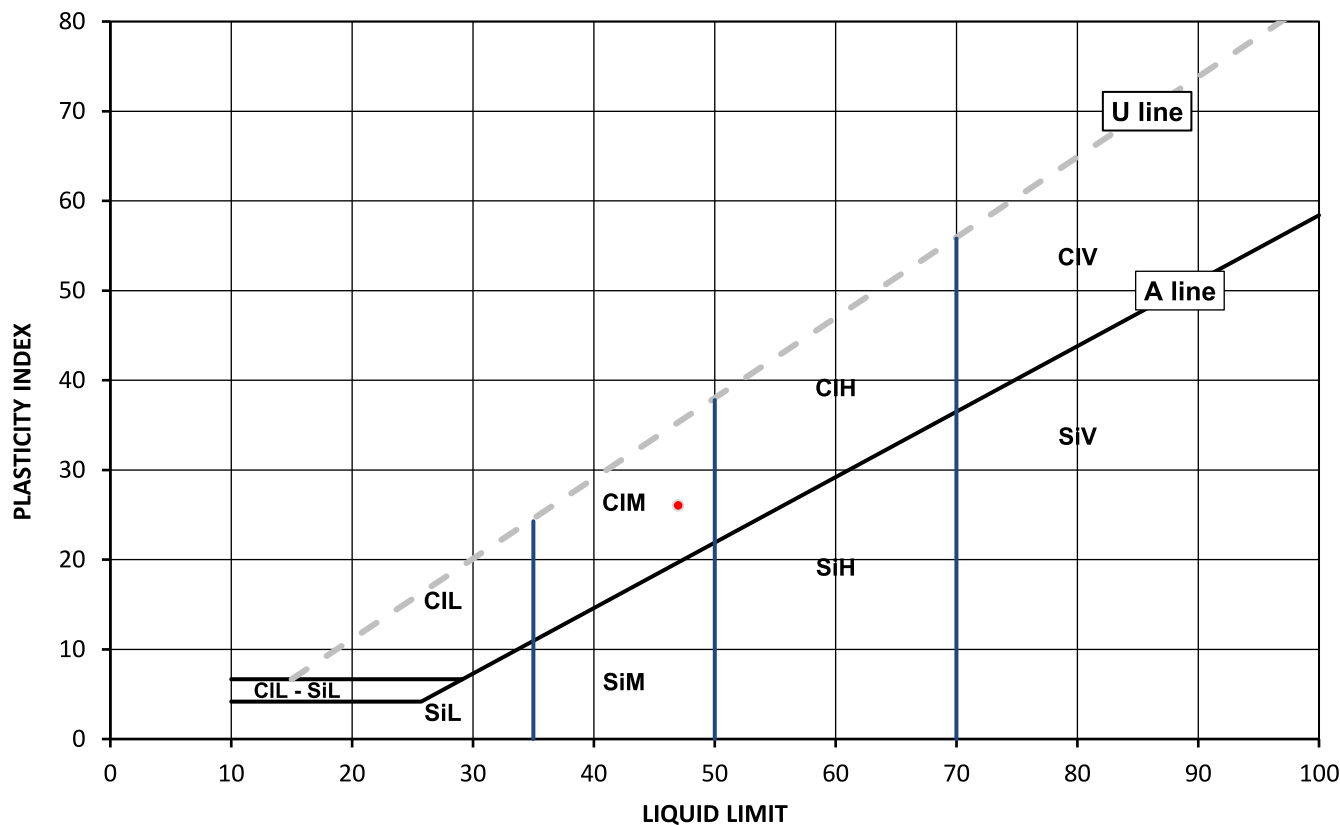
Depth Top [m]: 1.30

Depth Base [m]: 1.50

Sample Type: D

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	47	21	26	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

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SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

Client:

Omnia Environmental Consulting

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

1990: Clause 8.2

Client Reference: A11641

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 18/06 - 20/06/2022

Sampled By: Client- TH/HS

Samples

Moorthill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

[illegible]

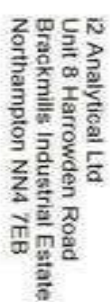
Note: # Non accredited; NP - Non plastic

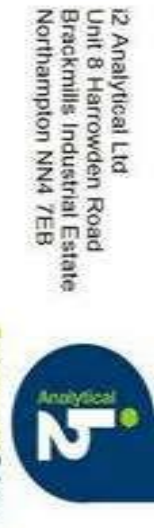
Comments:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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DETERMINATION OF WATER CONTENT

4041

Omnia Environmental Consulting

3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

Samples

Moorhill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 18/06 - 20/06/2022

Sampled By: Client- TH/HS

[illegible]

Signed:

Monika Siewior

Reporting Specialist

for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE**DETERMINATION OF PARTICLE SIZE DISTRIBUTION**

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

Contact: Samples

Site Address: Moorhill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: A11641

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 18/06/2022

Sampled By: Client- TH/HS

Test Results:

Laboratory Reference: 2312936

Hole No.: SA101

Sample Reference: Not Given

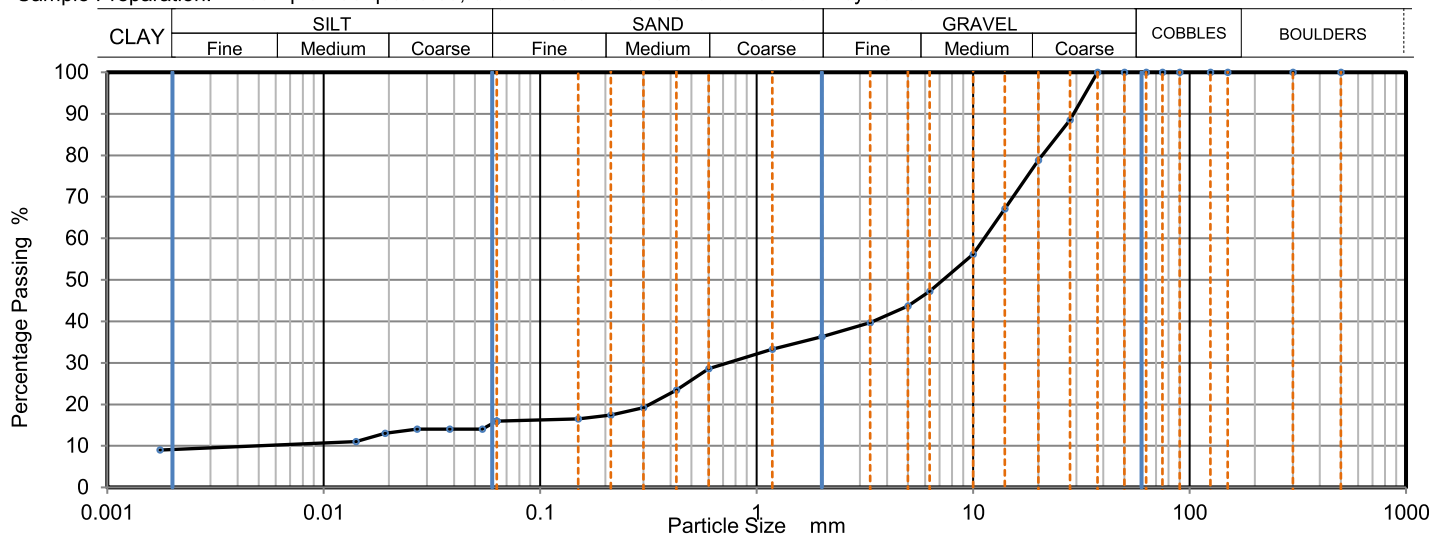
Sample Description: Yellowish brown slightly silty clayey sandy GRAVEL

Sample Preparation: Sample was quartered, oven dried at 106 °C and broken down by hand.

Depth Top [m]: 1.90

Depth Base [m]: 2.00

Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	16
300	100	0.0540	14
150	100	0.0382	14
125	100	0.0270	14
90	100	0.0192	13
75	100	0.0141	11
63	100	0.0107	9
50	100		
37.5	100		
28	89		
20	79		
14	67		
10	56		
6.3	47		
5	44		
3.35	40	Particle density (assumed) 2.65 Mg/m ³	
2	36		
1.18	33		
0.6	29		
0.425	23		
0.3	19		
0.212	17		
0.15	17		
0.063	16		

Sample Proportions	% dry mass
Very coarse	0
Gravel	64
Sand	21
Silt	6
Clay	9

Grading Analysis		
D100	mm	37.5
D60	mm	11.2
D30	mm	0.733
D10	mm	0.00524
Uniformity Coefficient		2100
Curvature Coefficient		9.1

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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i2 Analytical Ltd
Unit 8 Harrowden Road
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Northampton NN4 7EB



Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent,
Portsmouth, PO6 4TP

Contact: Samples

Site Address: Moorhill

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: A11641

Job Number: 22-64833

Date Sampled: 26/05/2022

Date Received: 01/06/2022

Date Tested: 18/06/2022

Sampled By: Client- TH/HS

Test Results:

Laboratory Reference: 2312939

Hole No.: SA103

Sample Reference: Not Given

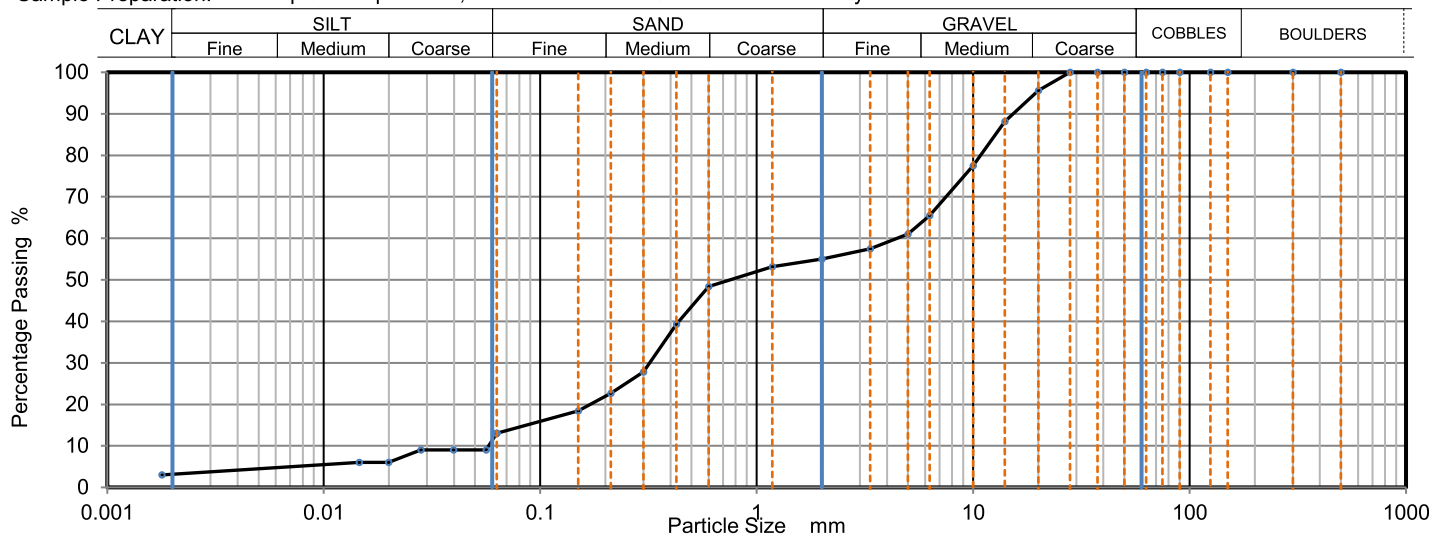
Sample Description: Yellowish brown slightly clayey silty very sandy GRAVEL

Sample Preparation: Sample was quartered, oven dried at 106 °C and broken down by hand.

Depth Top [m]: 1.10

Depth Base [m]: 1.30

Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	13
300	100	0.0562	9
150	100	0.0397	9
125	100	0.0281	9
90	100	0.0200	6
75	100	0.0146	6
63	100	0.0106	3
50	100		
37.5	100		
28	100		
20	96		
14	88		
10	78		
6.3	66		
5	61		
3.35	58	Particle density (assumed) 2.65 Mg/m ³	
2	55		
1.18	53		
0.6	48		
0.425	39		
0.3	28		
0.212	23		
0.15	18		
0.063	13		

Sample Proportions	% dry mass
Very coarse	0
Gravel	45
Sand	42
Silt	10
Clay	3

Grading Analysis		
D100	mm	28
D60	mm	4.47
D30	mm	0.321
D10	mm	0.0573
Uniformity Coefficient		78
Curvature Coefficient		0.4

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

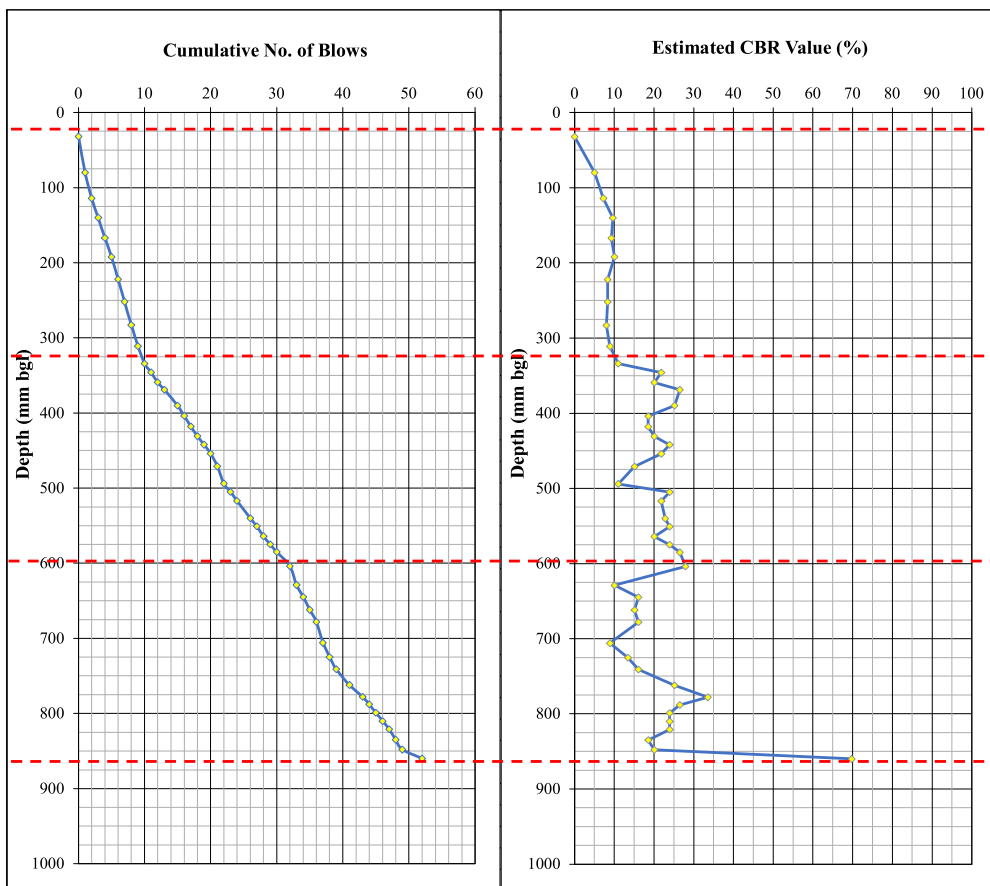
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APPENDIX X - IN-SITU DCP TEST CERTIFICATES

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Name:	Moorhill, Southampton		Test Date:	27/05/2022
Site Ref:	A11641		Test Location:	DCP101
Initial Depth:	32 mm bgl		Test No.:	1 of 1
Final Depth:	860 mm bgl		Undertaken By:	TH



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
32	330	298	9	33	7.5
330	600	270	21	13	20.3
600	860	260	22	12	22.2

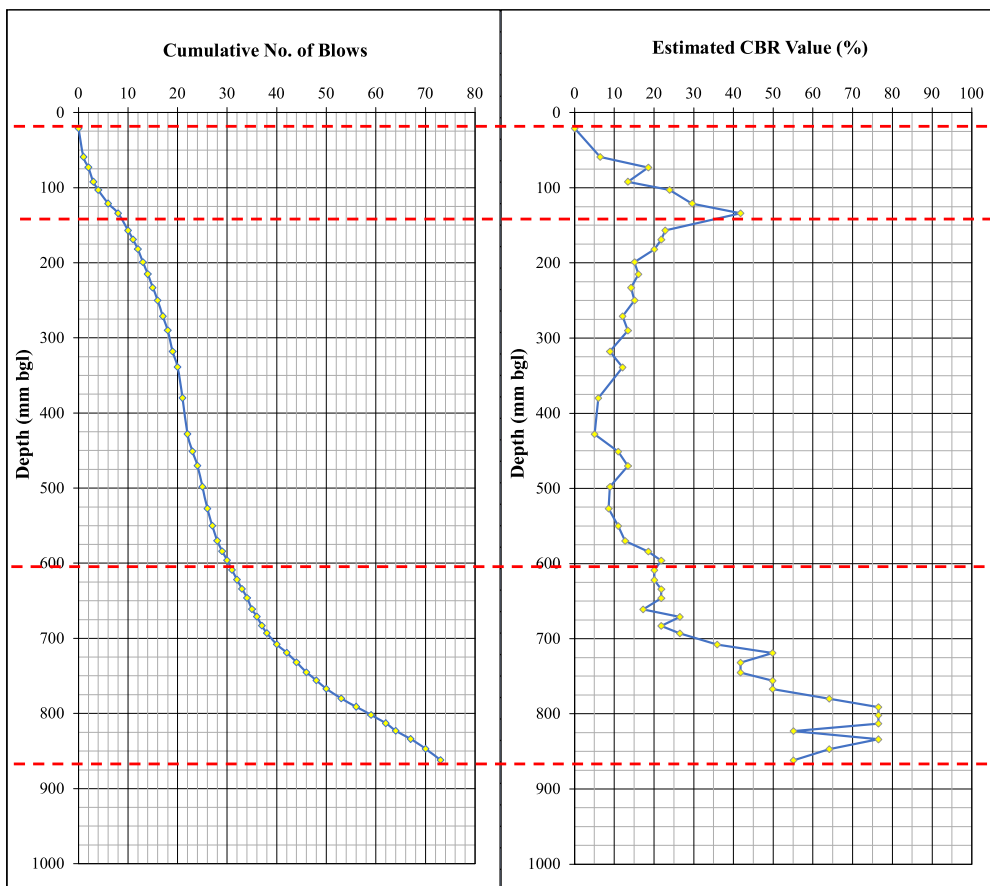
Comments

Site Engineer:	Date:	Checked and Approved By:	Date:	Location
TH	27/05/2022	LB	29/06/2022	DCP101

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Name:	Moorhill, Southampton		Test Date:	27/05/2022
Site Ref:	A11641		Test Location:	DCP102
Initial Depth:	21 mm bgl		Test No.:	1 of 1
Final Depth:	862 mm bgl		Undertaken By:	TH



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
21	140	119	8	15	17.4
140	600	460	22	21	12.1
600	862	262	43	6	44.7

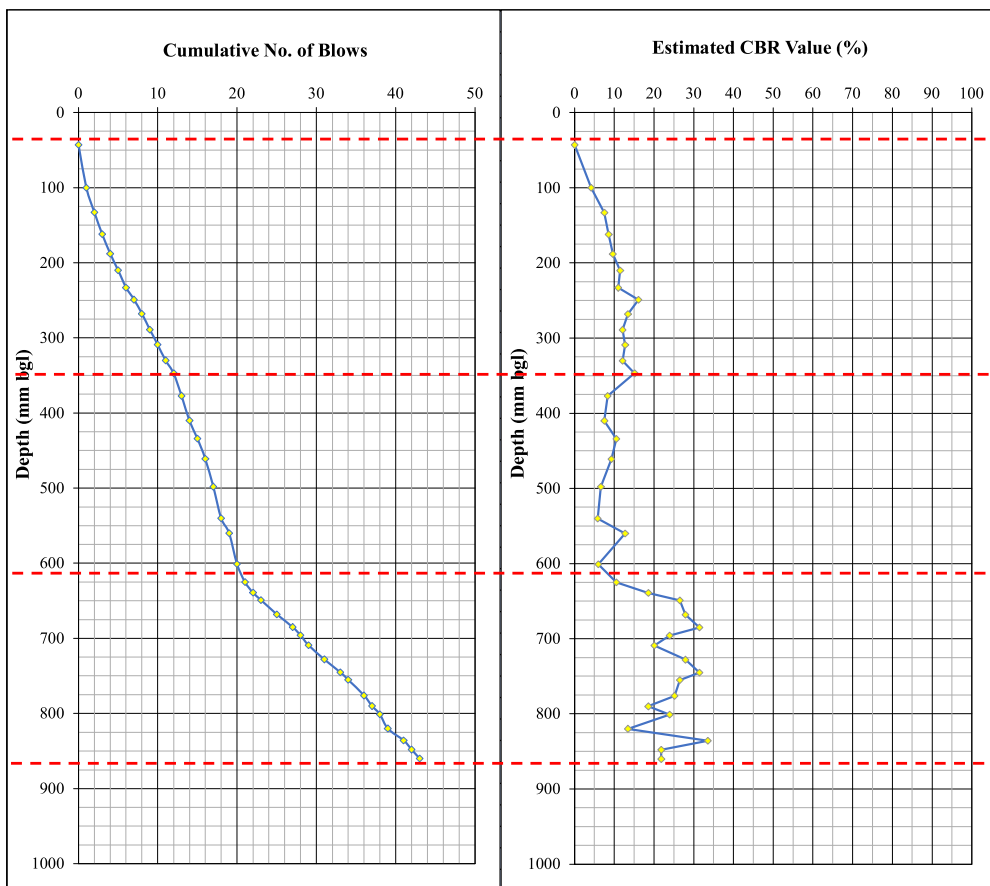
Comments

Site Engineer:	Date:	Checked and Approved By:	Date:	Location:
TH	27/05/2022	LB	29/06/2022	DCP102

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Name:	Moorhill, Southampton		Test Date:	27/05/2022
Site Ref:	A11641		Test Location:	DCP103
Initial Depth:	43 mm bgl		Test No.:	1 of 1
Final Depth:	860 mm bgl		Undertaken By:	TH



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
43	350	307	12	26	9.8
350	610	260	8	33	7.6
610	860	250	23	11	24.3

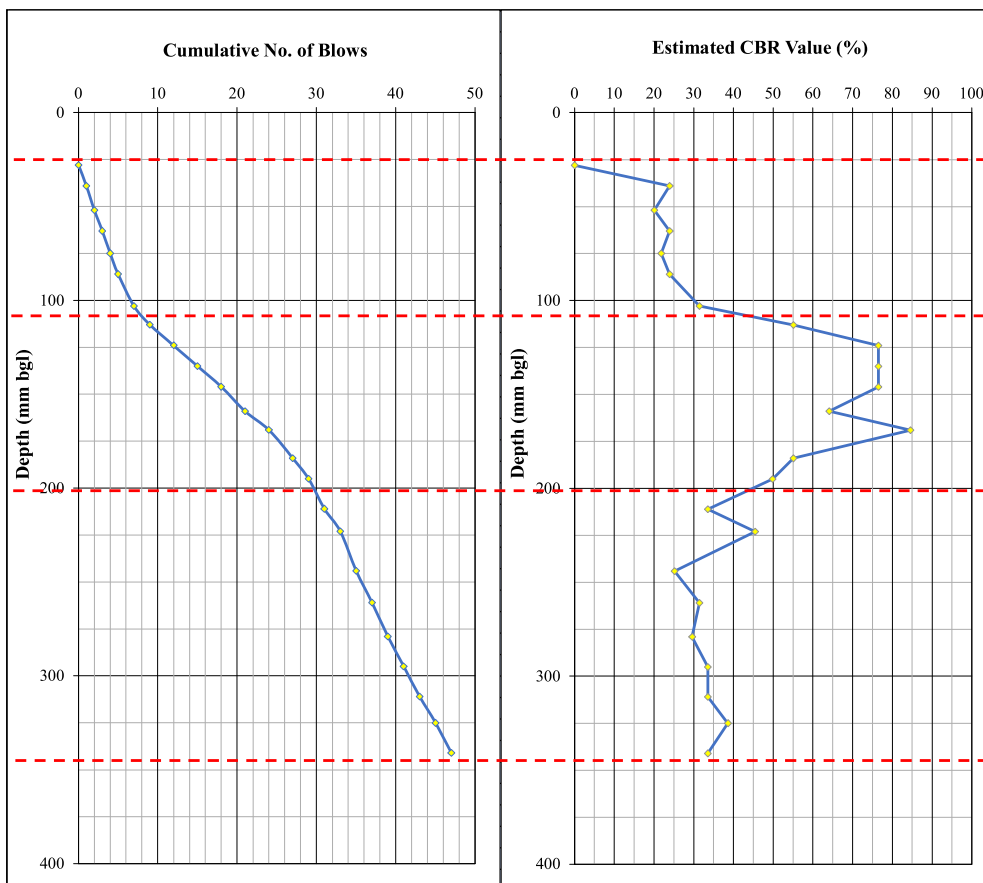
Comments

Site Engineer:	Date:	Checked and Approved By:	Date:	Location
TH	27/05/2022	LB	29/06/2022	DCP103

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Name:	Moorhill, Southampton		Test Date:	27/05/2022
Site Ref:	A11641		Test Location:	DCP104
Initial Depth:	28 mm bgl		Test No.:	1 of 1
Final Depth:	341 mm bgl		Undertaken By:	TH



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
28	110	82	7	12	22.4
110	200	90	22	4	68.1
200	341	141	18	8	34.3

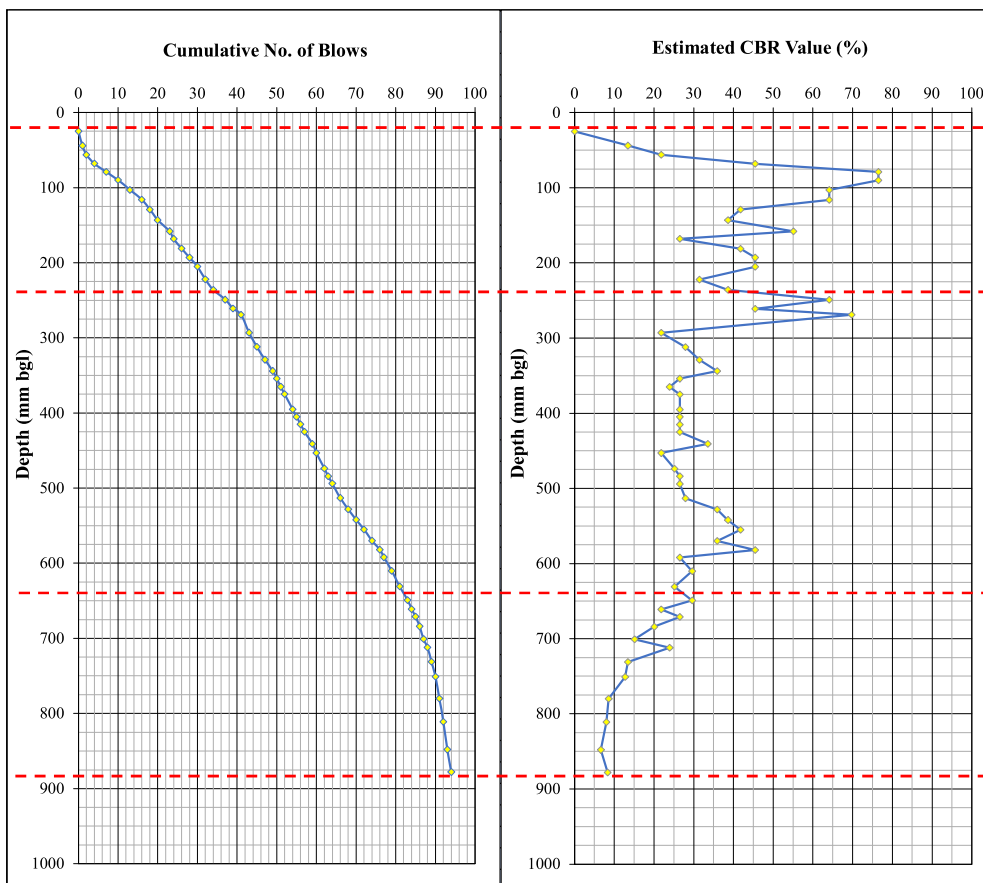
Comments
DCP rod snapped

Site Engineer:	Date:	Checked and Approved By:	Date:	Location
TH	27/05/2022	LB	29/06/2022	DCP104

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Name:	Moorhill, Southampton		Test Date:	27/05/2022
Site Ref:	A11641		Test Location:	DCP105
Initial Depth:	25 mm bgl		Test No.:	1 of 1
Final Depth:	878 mm bgl		Undertaken By:	TH



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
25	230	205	32	6	42.4
230	640	410	49	8	32.0
640	878	238	13	18	14.0

Comments

Site Engineer:	Date:	Checked and Approved By:	Date:	Location
TH	27/05/2022	LB	29/06/2022	DCP105

APPENDIX XI - BRE DG365 SOAKAWAY TEST CERTIFICATES

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	26/05/2022



Trial Pit Identification:	SA101
Trial Pit Length (m):	2.10
Trial Pit Width (m):	0.55
Trial Pit Depth (m):	2.00
Groundwater Level (m bgl):	N/A

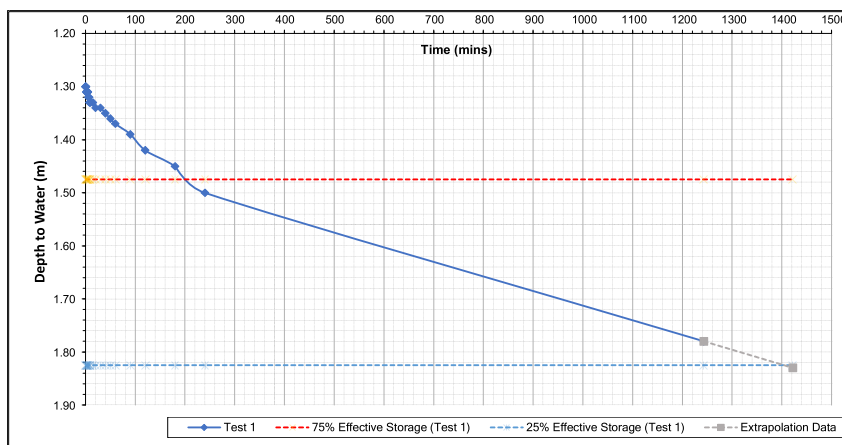
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.40m bgl Grass over purplish brown slightly silty gravelly fine to coarse SAND with frequent rootlets. Gravel is angular to sub-rounded fine to coarse flint, brick, concrete crush and tile. [MADE GROUND]
0.4-1.90m bgl Soft orange gravelly sandy CLAY. Sand is coarse. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.90-2.0m bgl Orange clayey gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded flint. [RIVER TERRACE]
2.0-2.30m bgl Soft orange and blueish grey mottled CLAY. [WITTERING FORMATION]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
0.70	0.00	1.30
	0.25	1.30
75% Effective Storage Depth (m):	0.50	1.30
0.53	1.00	1.30
	1.50	1.31
(i.e. Depth Below Ground Level) (m):	2.00	1.31
1.48	2.50	1.31
	3.00	1.31
25% Effective Storage Depth (m):	3.50	1.31
0.18	4.00	1.31
	4.50	1.31
(i.e. Depth Below Ground Level) (m):	5.00	1.31
1.83	6.00	1.32
	7.00	1.32
Effective Storage Depth Across 75% - 25% (m):	8.00	1.33
0.35	9.00	1.33
	10.00	1.33
Time to Fall to 75% Effective Depth (min):	15.00	1.33
200	20.00	1.34
	30.00	1.34
Time to Fall to 25% Effective Depth (min):	40.00	1.35
1422	50.00	1.36
	60.00	1.37
Vp75%-25% (m3):	90.00	1.39
0.40	120.00	1.42
	180.00	1.45
As50% (m2):	240.00	1.50
3.01	1243.00	1.78
	1422.00	1.83
Tp75%-25% (mins):		
1222		

DESIGN SOIL INFILTRATION RATE, f (m/s):	1.83E-06
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Comments:
SA101 Failed to reach the 25% intercept in the time, extrapolated data has been provided. A soil infiltration rate has been provided from extrapolated data.



Site Engineer:	Date:
HS/TH	26/05/2022

Checked and Approved By:	Date:
LB	20.06.2022

Location
SA101

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	26/05/2022

Trial Pit Identification:	SA101
Trial Pit Length (m):	2.10
Trial Pit Width (m):	0.55
Trial Pit Depth (m):	2.00
Groundwater Level (m bgl):	N/A



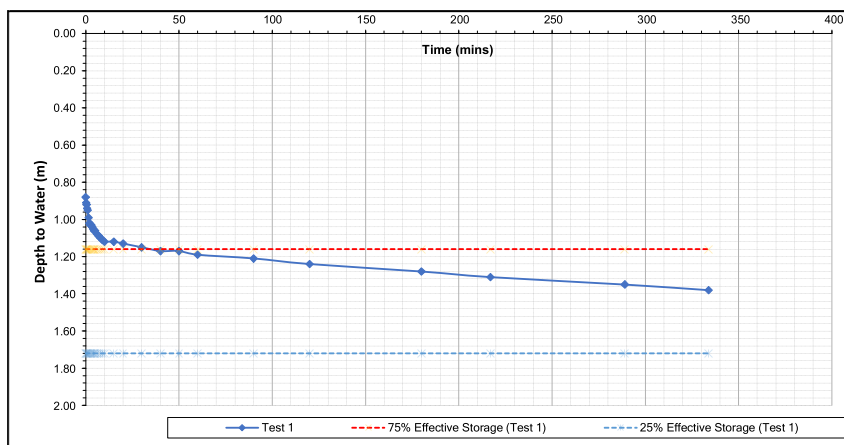
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.40m bgl Grass over purplish brown slightly silty gravelly fine to coarse SAND with frequent rootlets. Gravel is angular to sub-rounded fine to coarse flint, brick, concrete crush and tile. [MADE GROUND]
0.4-1.90m bgl Soft orange gravelly sandy CLAY. Sand is coarse. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.90-2.0m bgl Orange clayey gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded flint. [RIVER TERRACE]
2.0-2.30m bgl Soft orange and blueish grey mottled CLAY. [WITTERING FORMATION]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.12	0.00	0.88
	0.25	0.91
75% Effective Storage Depth (m):	0.50	0.92
0.84	0.75	0.94
	1.00	0.95
(i.e. Depth Below Ground Level) (m):	1.50	0.99
1.16	2.00	1.02
	2.50	1.03
25% Effective Storage Depth (m):	3.00	1.03
0.28	3.50	1.04
	4.00	1.05
(i.e. Depth Below Ground Level) (m):	4.50	1.06
1.72	5.00	1.06
	6.00	1.08
Effective Storage Depth Across 75% - 25% (m):	7.00	1.09
0.56	8.00	1.10
	9.00	1.11
Time to Fall to 75% Effective Depth (min):	10.00	1.12
	15.00	1.12
	20.00	1.13
Time to Fall to 25% Effective Depth (min):	30.00	1.15
	40.00	1.17
N/A	50.00	1.17
Vp75%-25% (m3):	60.00	1.19
	90.00	1.21
	120.00	1.24
As50% (m2):	180.00	1.28
	217.00	1.31
	289.00	1.35
Tp75%-25% (mins):	334.00	1.38
N/A		

DESIGN SOIL INFILTRATION RATE, f (m/s):	N/A
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Comments:
NOTE: During the duration of the test the required intercept failed to be reached. Therefore the test is considered not to have been successful



Site Engineer:	Date:
HS/TH	26.05.2022

Checked and Approved By:	Date:
LB	20.06.22

Location
SA101

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	26/05/2022



Trial Pit Identification:	SA102
Trial Pit Length (m):	2.15
Trial Pit Width (m):	0.50
Trial Pit Depth (m):	1.40
Groundwater Level (m bgl):	N/A

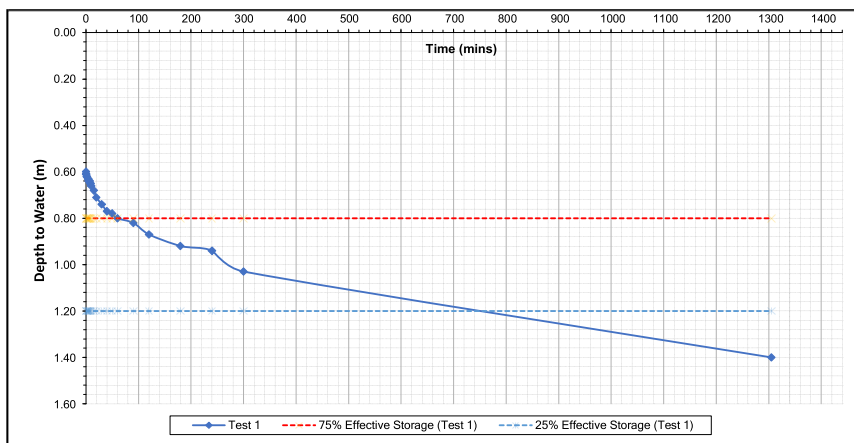
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.0-0.40m bgl Grass over dark brown gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [TOPSOIL]
0.40-1.60m bgl Orange slightly clayey gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
0.80	0.00	0.60
	0.25	0.61
75% Effective Storage Depth (m):	0.50	0.61
0.60	1.50	0.62
	2.00	0.62
(i.e. Depth Below Ground Level) (m):	4.00	0.63
0.80	4.30	0.63
	5.00	0.64
25% Effective Storage Depth (m):	6.00	0.64
0.20	7.00	0.64
	8.00	0.65
(i.e. Depth Below Ground Level) (m):	9.00	0.65
	10.00	0.66
	15.00	0.68
Effective Storage Depth Across 75% - 25% (m):	20.00	0.71
0.40	30.00	0.74
	40.00	0.77
Time to Fall to 75% Effective Depth (min):	50.00	0.78
60	60.00	0.80
	90.00	0.82
Time to Fall to 25% Effective Depth (min):	120.00	0.87
	180.00	0.92
	240.00	0.94
Vp75%-25% (m3):	300.00	1.03
0.43	1305.00	1.40
As50% (m2):		
3.20		
Tp75%-25% (mins):		
690		

DESIGN SOIL INFILTRATION RATE, f (m/s):	3.25E-06
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Comments:



Site Engineer:	Date:
HS/TH	26/05/2022

Checked and Approved By:	Date:
LB	20.06.22

Location
SA102

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	26/05/2022



Trial Pit Identification:	SA102
Trial Pit Length (m):	2.15
Trial Pit Width (m):	0.50
Trial Pit Depth (m):	1.40
Groundwater Level (m bgl):	N/A

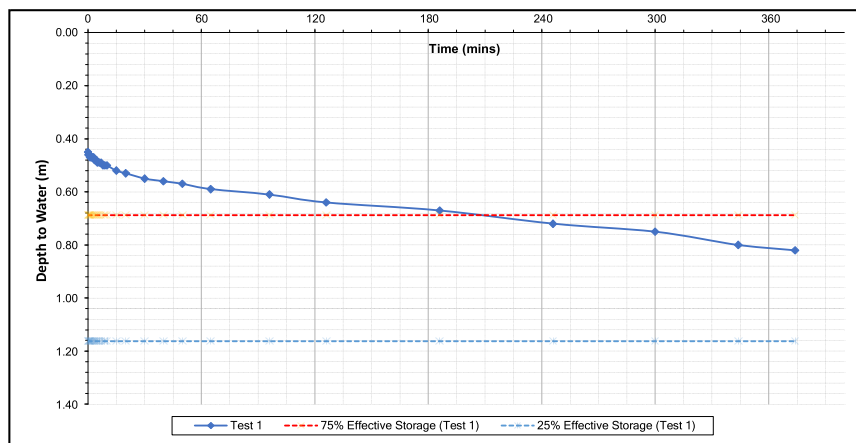
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.0-0.40m bgl Grass over dark brown gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [TOPSOIL]
0.40-1.60m bgl Orange slightly clayey gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
0.95	0.00	0.45
	0.25	0.46
75% Effective Storage Depth (m):	0.50	0.46
0.71	0.75	0.46
	1.00	0.47
(i.e. Depth Below Ground Level) (m):	1.50	0.47
0.69	2.00	0.47
	2.50	0.47
25% Effective Storage Depth (m):	3.00	0.47
0.24	3.50	0.48
	4.00	0.48
(i.e. Depth Below Ground Level) (m):	4.50	0.48
1.16	5.00	0.49
	6.00	0.49
Effective Storage Depth Across 75% - 25% (m):	7.00	0.49
0.48	8.00	0.50
	9.00	0.50
Time to Fall to 75% Effective Depth (min):	10.00	0.50
N/A	15.00	0.52
	20.00	0.53
Time to Fall to 25% Effective Depth (min):	30.00	0.55
N/A	40.00	0.56
	50.00	0.57
Vp75%-25% (m3):	65.00	0.59
0.51	96.00	0.61
	126.00	0.64
As50% (m2):	186.00	0.67
3.59	246.00	0.72
	300.00	0.75
Tp75%-25% (mins):	344.00	0.80
N/A	374.00	0.82

DESIGN SOIL INFILTRATION RATE, f (m/s):	N/A
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Comments:
NOTE: During the duration of the test the required intercept failed to be reached. Therefore the test is considered not to have been successful.



Site Engineer:	Date:
HS/TH	25/02/2022

Checked and Approved By:	Date:
LB	20.06.2022

Location
SA102

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	26/05/2022



Trial Pit Identification:	SA103
Trial Pit Length (m):	2.70
Trial Pit Width (m):	0.50
Trial Pit Depth (m):	2.40
Groundwater Level (m bgl):	N/A

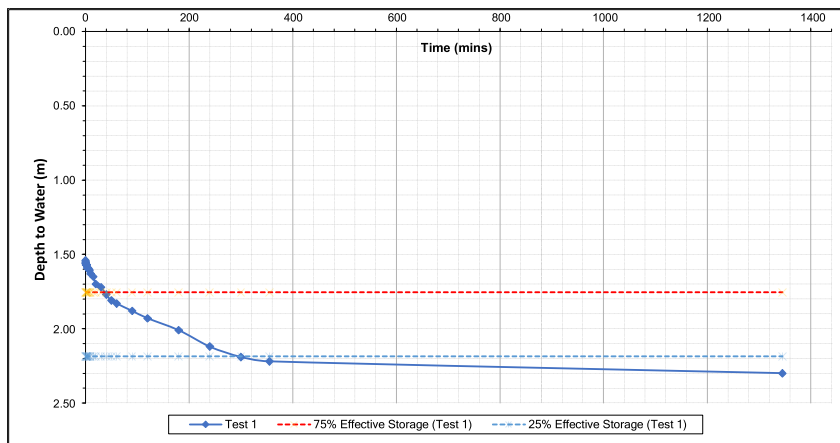
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.60m bgl Dark brown slightly silty gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to medium flint. [TOPSOIL]
0.60-1.10m bgl Orangish red mottled greenish grey very sandy CLAY. Sand is coarse. [RIVER TERRACE]
1.10-2.60m bgl Orange slightly clayey gravelly coarse SAND. Gravel is sub-angular to rounded fine to medium flint. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
0.86	0.00	1.54
	0.25	1.55
75% Effective Storage Depth (m):	0.50	1.56
0.65	0.75	1.56
	1.00	1.57
(i.e. Depth Below Ground Level) (m):	1.50	1.57
1.76	2.00	1.57
	2.50	1.57
25% Effective Storage Depth (m):	3.50	1.59
0.22	4.00	1.59
	4.50	1.59
(i.e. Depth Below Ground Level) (m):	6.00	1.60
2.19	7.00	1.60
	8.00	1.61
Effective Storage Depth Across 75% - 25% (m):	10.00	1.63
0.43	15.00	1.65
	20.00	1.70
Time to Fall to 75% Effective Depth (min):	30.00	1.72
39	40.00	1.77
	50.00	1.81
Time to Fall to 25% Effective Depth (min):	60.00	1.83
	90.00	1.88
300	120.00	1.93
Vp75%-25% (m3):	180.00	2.01
0.58	240.00	2.12
	300.00	2.19
As50% (m2):	355.00	2.22
4.10	1345.00	2.30
Tp75%-25% (mins):		
261		

DESIGN SOIL INFILTRATION RATE, f (m/s):	9.04E-06
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Comments:



Site Engineer:	Date:
HS/TH	26/05/2022

Checked and Approved By:	Date:
LB	20.06.22

Location
SA103

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	26/05/2022

Trial Pit Identification:	SA103
Trial Pit Length (m):	2.70
Trial Pit Width (m):	0.50
Trial Pit Depth (m):	2.40
Groundwater Level (m bgl):	N/A



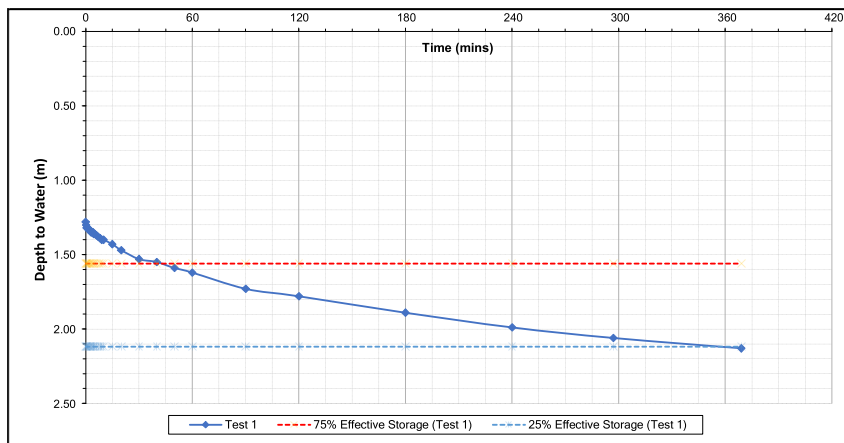
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.60m bgl Dark brown slightly silty gravelly fine to coarse SAND. Gravel is sub-angular to rounded fine to medium flint. [TOPSOIL]
0.60-1.10m bgl Orangish red mottled greenish grey very sandy CLAY. Sand is coarse. [RIVER TERRACE]
1.10-2.60m bgl Orange slightly clayey gravelly coarse SAND. Gravel is sub-angular to rounded fine to medium flint. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.12	0.00	1.28
	0.25	1.30
75% Effective Storage Depth (m):	0.50	1.32
0.84	0.75	1.32
	1.00	1.32
(i.e. Depth Below Ground Level) (m):	1.50	1.33
1.56	2.00	1.33
	2.50	1.34
25% Effective Storage Depth (m):	3.00	1.35
0.28	3.50	1.35
	4.00	1.35
(i.e. Depth Below Ground Level) (m):	4.50	1.36
2.12	5.00	1.36
	6.00	1.37
Effective Storage Depth Across 75% - 25% (m):	7.00	1.38
0.56	8.00	1.39
	9.00	1.40
Time to Fall to 75% Effective Depth (min):	10.00	1.40
42.00	15.00	1.43
	20.00	1.47
Time to Fall to 25% Effective Depth (min):	30.00	1.53
365.00	40.00	1.55
	50.00	1.59
Vp75%-25% (m3):	60.00	1.62
0.76	90.00	1.73
	120.00	1.78
As50% (m2):	180.00	1.89
4.93	240.00	1.99
	297.00	2.06
Tp75%-25% (mins):	369.00	2.13
323.00		

DESIGN SOIL INFILTRATION RATE, f (m/s):	7.91E-06
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Comments:



Site Engineer:	Date:
HS/TH	26/05/2022

Checked and Approved By:	Date:
LB	20.06.22

Location
SA103

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA201
Trial Pit Length (m):	2.70
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.70
Groundwater Level (m bgl):	N/A

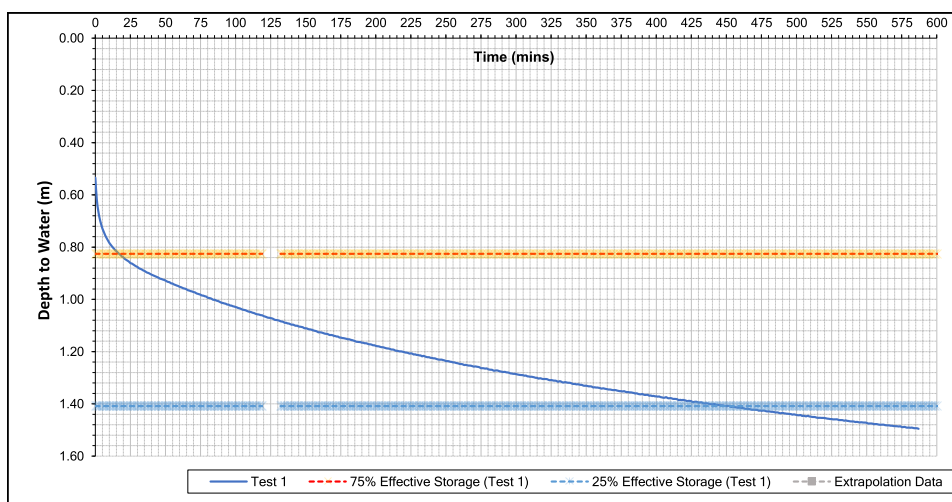
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [TOPSOIL]
0.50-1.10: Orangish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.10-1.20: Orange sandy angular to sub-rounded GRAVEL of flint. Sand is coarse. [RIVER TERRACE]
1.20-1.70: Orange clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.17	0.00	0.53
	1.00	0.62
75% Effective Storage Depth (m):	2.00	0.66
0.87	3.00	0.69
	902.00	
(i.e. Depth Below Ground Level) (m):	903.00	
0.83	904.00	
	905.00	
25% Effective Storage Depth (m):	906.00	
0.29	907.00	
	908.00	
(i.e. Depth Below Ground Level) (m):	909.00	
1.41	910.00	
	911.00	
Effective Storage Depth Across 75% - 25% (m):	912.00	
0.58	913.00	
	914.00	
Time to Fall to 75% Effective Depth (min):	915.00	
17	916.00	
	917.00	
Time to Fall to 25% Effective Depth (min):	918.00	
450	919.00	
	920.00	
Vp75%-25% (m3):	921.00	
1.10	922.00	
	923.00	
As50% (m2):	924.00	
5.85	925.00	
	926.00	
Tp75%-25% (mins):	927.00	
433	928.00	

DESIGN SOIL INFILTRATION RATE, f (m/s):	7.24E-06
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Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA201

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA201
Trial Pit Length (m):	2.70
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.70
Groundwater Level (m bgl):	N/A

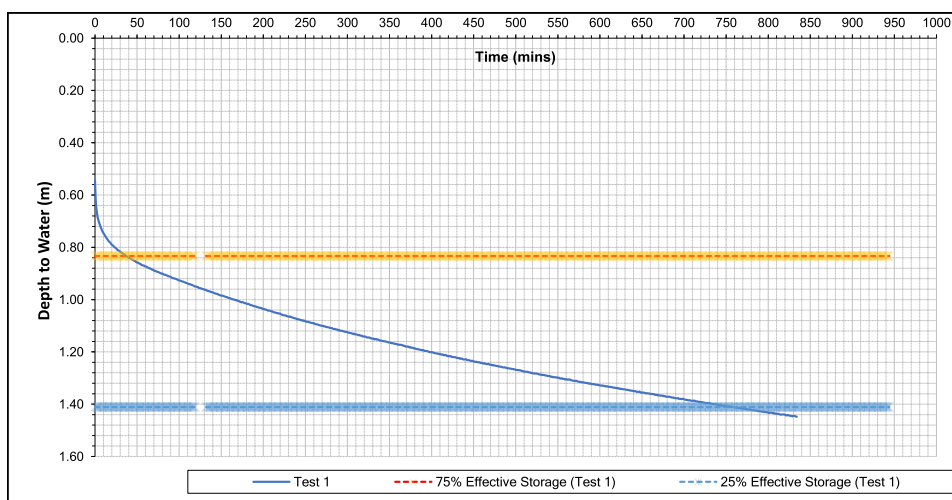
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [TOPSOIL]
0.50-1.10: Orangish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.10-1.20: Orange sandy angular to sub-rounded GRAVEL of flint. Sand is coarse. [RIVER TERRACE]
1.20-1.70: Orange clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.16	0.00	0.54
	1.00	0.63
75% Effective Storage Depth (m):	807.00	1.44
0.87	808.00	1.44
	809.00	1.44
(i.e. Depth Below Ground Level) (m):	810.00	1.44
0.83	811.00	1.44
	812.00	1.44
25% Effective Storage Depth (m):	813.00	1.44
0.29	814.00	1.44
	815.00	1.44
(i.e. Depth Below Ground Level) (m):	816.00	1.44
1.41	817.00	1.44
	818.00	1.44
Effective Storage Depth Across 75% - 25% (m):	819.00	1.44
0.58	820.00	1.44
	821.00	1.44
Time to Fall to 75% Effective Depth (min):	822.00	1.44
40.00	823.00	1.44
	824.00	1.44
Time to Fall to 25% Effective Depth (min):	825.00	1.44
760.00	826.00	1.44
	827.00	1.44
Vp75%-25% (m3):	828.00	1.45
1.09	829.00	1.45
	830.00	1.45
As50% (m2):	831.00	1.45
5.82	832.00	1.45
	833.00	1.45
Tp75%-25% (mins):	834.00	1.45
720.00	835.00	1.45
	836.00	1.45

DESIGN SOIL INFILTRATION RATE, f (m/s):	4.34E-06
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Comments:



Site Engineer:	Date:
TH	26.05.2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA201

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA201
Trial Pit Length (m):	2.70
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.70
Groundwater Level (m bgl):	N/A

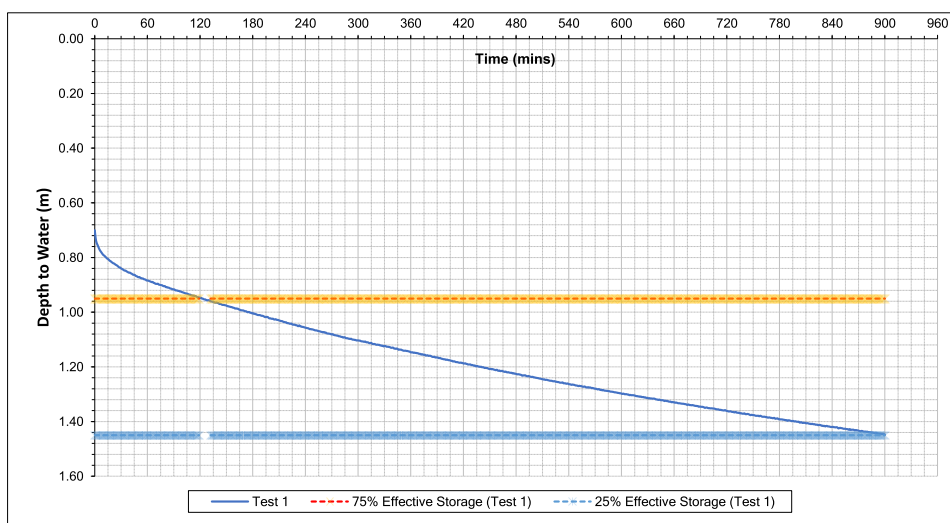
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [TOPSOIL]
0.50-1.10: Orangish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.10-1.20: Orange sandy angular to sub-rounded GRAVEL of flint. Sand is coarse. [RIVER TERRACE]
1.20-1.70: Orange clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 3	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.00	0.00	0.70
	1.00	0.73
75% Effective Storage Depth (m):	2.00	0.75
0.75		
(i.e. Depth Below Ground Level) (m):		
0.95		
25% Effective Storage Depth (m):		
0.25		
(i.e. Depth Below Ground Level) (m):		
1.45		
Effective Storage Depth Across 75% - 25% (m):		
0.49975		
Time to Fall to 75% Effective Depth (min):		
120		
Time to Fall to 25% Effective Depth (min):		
900		
Vp75%-25% (m3):		
0.94		
As50% (m2):		
5.2883		
Tp75%-25% (mins):		
780		

DESIGN SOIL INFILTRATION RATE, f (m/s):	3.82E-06
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Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA201

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA202
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.60
Trial Pit Depth (m):	1.52
Groundwater Level (m bgl):	N/A

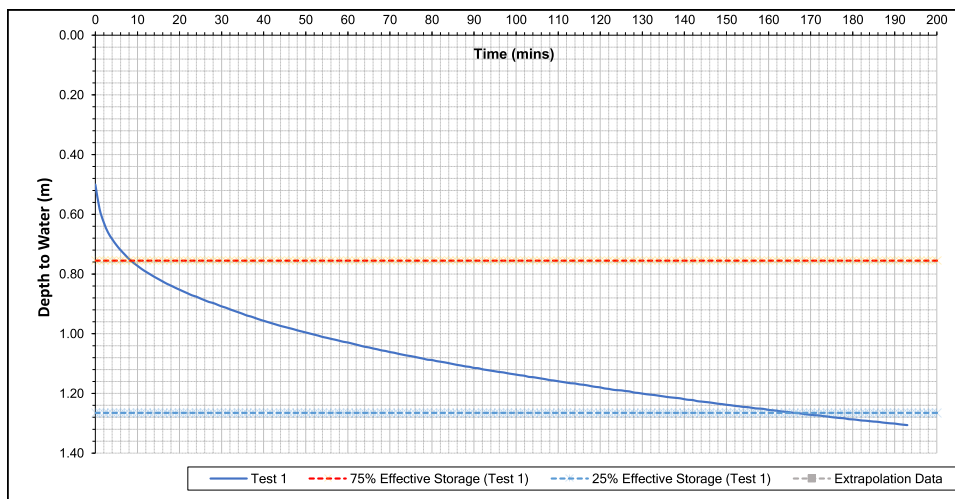
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint with rare angular coarse brick. [MADE GROUND]
0.50-1.30: Orangish brown and reddish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.30-1.60: Mottled red blueish grey and orange sandy SILT. Sand is fine to coarse. [RIVER TERRACE]
1.60-1.70: Orange slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.02	0.00	0.50
	1.00	0.58
75% Effective Storage Depth (m):	2.00	0.63
0.76	3.00	0.66
	4.00	0.68
(i.e. Depth Below Ground Level) (m):	5.00	0.70
0.76	6.00	0.72
	7.00	0.73
25% Effective Storage Depth (m):	8.00	0.75
0.25	9.00	0.76
	10.00	0.77
(i.e. Depth Below Ground Level) (m):	11.00	0.78
1.27	12.00	0.79
	13.00	0.80
Effective Storage Depth Across 75% - 25% (m):	14.00	0.81
0.51	15.00	0.82
	16.00	0.82
Time to Fall to 75% Effective Depth (min):	17.00	0.83
8	18.00	0.84
	19.00	0.85
Time to Fall to 25% Effective Depth (min):	20.00	0.85
166	21.00	0.86
	22.00	0.87
Vp75%-25% (m3):	23.00	0.87
0.70	24.00	0.88
	25.00	0.88
As50% (m2):	26.00	0.89
4.34	27.00	0.89
	28.00	0.90
Tp75%-25% (mins):	29.00	0.90
158	30.00	0.91
	31.00	0.91

DESIGN SOIL INFILTRATION RATE, f (m/s):	1.71E-05
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Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA202

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA202
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.60
Trial Pit Depth (m):	1.52
Groundwater Level (m bgl):	N/A

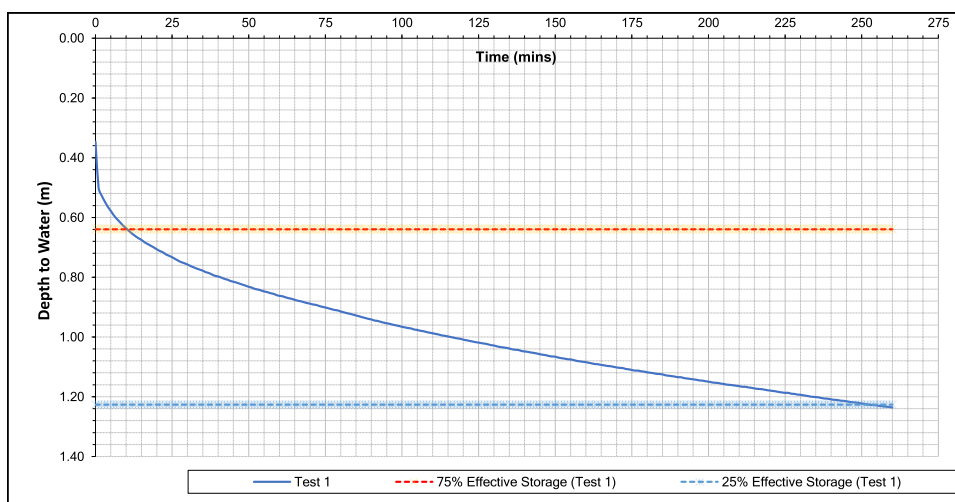
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint with rare angular coarse brick. [MADE GROUND]
0.50-1.30: Orangish brown and reddish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.30-1.60: Mottled red blueish grey and orange sandy SILT. Sand is fine to coarse. [RIVER TERRACE]
1.60-1.70: Orange slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.17	0.00	0.35
	1.00	0.50
75% Effective Storage Depth (m):	2.00	0.53
0.88	3.00	0.55
	4.00	0.56
(i.e. Depth Below Ground Level) (m):	5.00	0.58
0.64	6.00	0.59
	7.00	0.61
25% Effective Storage Depth (m):	8.00	0.62
0.29	9.00	0.63
	10.00	0.64
(i.e. Depth Below Ground Level) (m):	11.00	0.65
1.23	12.00	0.65
	13.00	0.66
Effective Storage Depth Across 75% - 25% (m):	14.00	0.67
0.59	15.00	0.68
	16.00	0.68
Time to Fall to 75% Effective Depth (min):	17.00	0.69
10.00	18.00	0.69
	19.00	0.70
Time to Fall to 25% Effective Depth (min):	20.00	0.71
252.00	21.00	0.71
	22.00	0.72
Vp75%-25% (m3):	23.00	0.72
0.81	24.00	0.73
	25.00	0.73
As50% (m2):	26.00	0.74
4.78	27.00	0.74
	28.00	0.75
Tp75%-25% (mins):	29.00	0.75
242.00	30.00	0.76
	31.00	0.76

DESIGN SOIL INFILTRATION RATE, f (m/s):	1.17E-05
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Comments:



Site Engineer:	Date:
TH	26.05.2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA202

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA202
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.60
Trial Pit Depth (m):	1.52
Groundwater Level (m bgl):	N/A

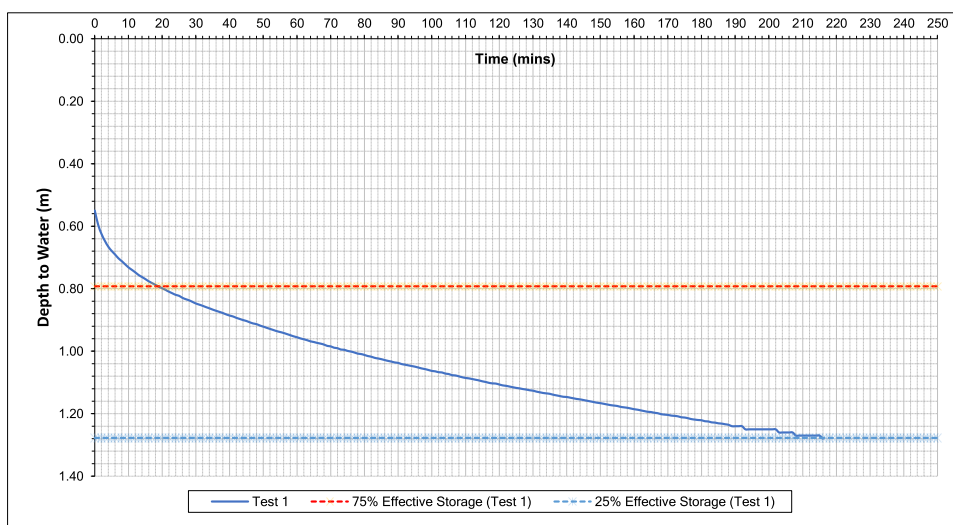
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint with rare angular coarse brick. [MADE GROUND]
0.50-1.30: Orangish brown and reddish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.30-1.60: Mottled red blueish grey and orange sandy SILT. Sand is fine to coarse. [RIVER TERRACE]
1.60-1.70: Orange slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE]

Test Parameters	TEST 3	
Effective Storage Depth (m):	Time (min)	Depth (m)
0.97	0.00	0.55
	1.00	0.60
75% Effective Storage Depth (m):	2.00	0.62
0.73	3.00	0.65
	4.00	0.67
(i.e. Depth Below Ground Level) (m):	5.00	0.68
0.79	6.00	0.69
	7.00	0.70
25% Effective Storage Depth (m):	8.00	0.71
0.24	9.00	0.72
	10.00	0.73
(i.e. Depth Below Ground Level) (m):	11.00	0.74
1.28	12.00	0.75
	13.00	0.76
Effective Storage Depth Across 75% - 25% (m):	14.00	0.76
0.48515	15.00	0.77
	16.00	0.78
Time to Fall to 75% Effective Depth (min):	17.00	0.78
18	18.00	0.79
	19.00	0.79
Time to Fall to 25% Effective Depth (min):	20.00	0.80
216	21.00	0.80
	22.00	0.81
Vp75%-25% (m3):	23.00	0.81
0.67	24.00	0.82
	25.00	0.82
As50% (m2):	26.00	0.83
4.19387	27.00	0.83
	28.00	0.84
Tp75%-25% (mins):	29.00	0.84
198	30.00	0.85
	31.00	0.85

DESIGN SOIL INFILTRATION RATE, f (m/s):	1.34E-05
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Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA202

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA203
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.83
Groundwater Level (m bgl):	N/A

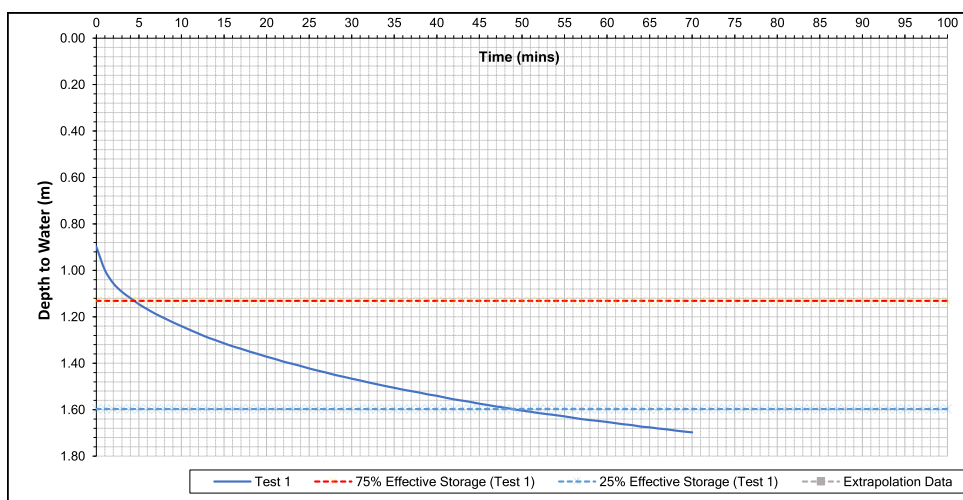
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.20: Light reddish brown grey type 1 concrete crush. [MADE GROUND]
0.20-0.40: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.40-1.80: Orange and dark brown slightly gravelly slightly silty coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
0.93	0.00	0.90
	1.00	1.00
75% Effective Storage Depth (m):	2.00	1.06
0.70	3.00	1.09
	4.00	1.12
(i.e. Depth Below Ground Level) (m):	5.00	1.15
1.13	6.00	1.17
	7.00	1.19
25% Effective Storage Depth (m):	8.00	1.21
0.23	9.00	1.22
	10.00	1.24
(i.e. Depth Below Ground Level) (m):	11.00	1.26
1.60	12.00	1.27
	13.00	1.29
Effective Storage Depth Across 75% - 25% (m):	14.00	1.30
0.47	15.00	1.31
	16.00	1.33
Time to Fall to 75% Effective Depth (min):	17.00	1.34
4	18.00	1.35
	19.00	1.36
Time to Fall to 25% Effective Depth (min):	20.00	1.37
49	21.00	1.38
	22.00	1.39
Vp75%-25% (m3):	23.00	1.40
0.75	24.00	1.41
	25.00	1.42
As50% (m2):	26.00	1.43
4.41	27.00	1.44
	28.00	1.45
Tp75%-25% (mins):	29.00	1.46
45	30.00	1.47
	31.00	1.47

DESIGN SOIL INFILTRATION RATE, f (m/s):	6.31E-05
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Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA203

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA203
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.83
Groundwater Level (m bgl):	N/A

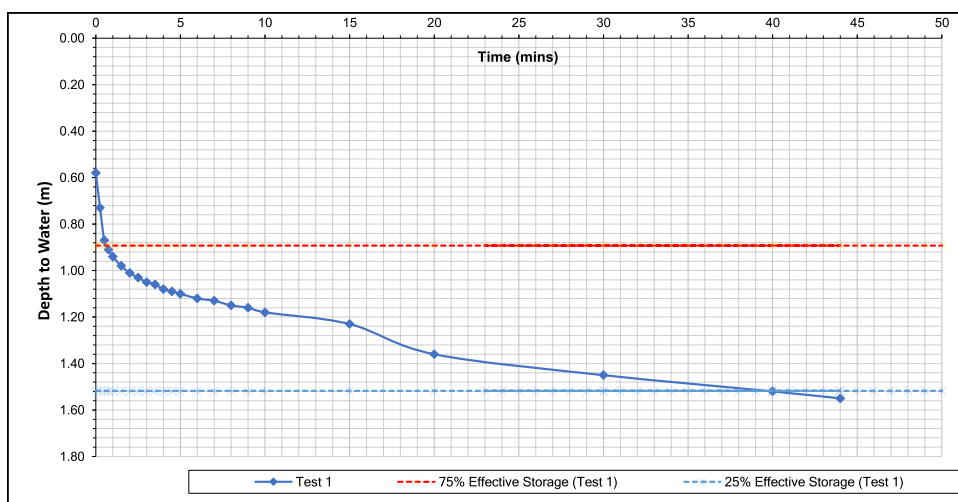
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.20: Light reddish brown grey type 1 concrete crush. [MADE GROUND]
0.20-0.40: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.40-1.80: Orange and dark brown slightly gravelly slightly silty coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.25	0.00	0.58
	0.25	0.73
75% Effective Storage Depth (m):	0.50	0.87
0.94	0.75	0.91
	1.00	0.94
(i.e. Depth Below Ground Level) (m):	1.50	0.98
0.89	2.00	1.01
	2.50	1.03
25% Effective Storage Depth (m):	3.00	1.05
0.31	3.50	1.06
	4.00	1.08
(i.e. Depth Below Ground Level) (m):	4.50	1.09
1.52	5.00	1.10
	6.00	1.12
Effective Storage Depth Across 75% - 25% (m):	7.00	1.13
0.63	8.00	1.15
	9.00	1.16
Time to Fall to 75% Effective Depth (min):	10.00	1.18
0.60	15.00	1.23
	20.00	1.36
Time to Fall to 25% Effective Depth (min):	30.00	1.45
40.00	40.00	1.52
	44.00	1.55
Vp75%-25% (m3):	23.00	
1.01	24.00	
	25.00	
As50% (m2):	26.00	
5.36	27.00	
	28.00	
Tp75%-25% (mins):	29.00	
39.40	30.00	
	31.00	

DESIGN SOIL INFILTRATION RATE, f (m/s):	7.94E-05
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Comments:



Site Engineer:	Date:
TH	26.05.2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA203

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA203
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.83
Groundwater Level (m bgl):	N/A

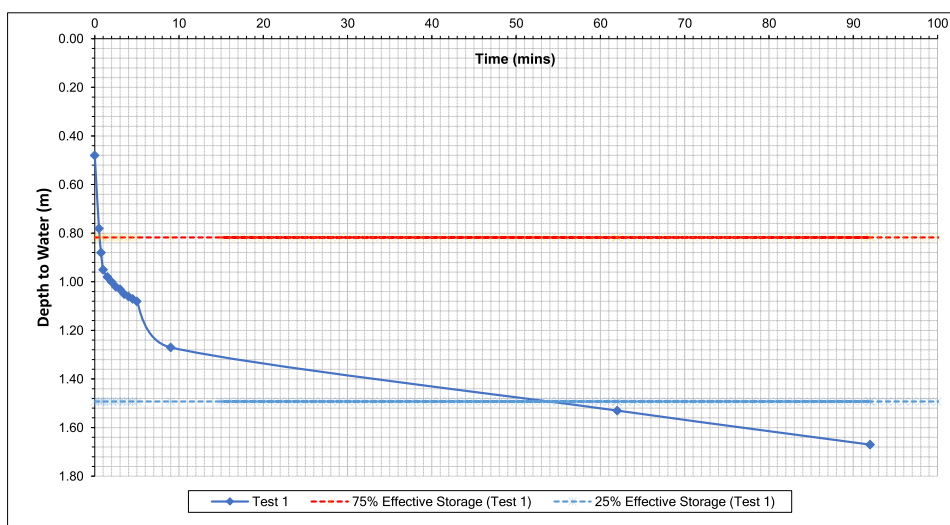
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.20: Light reddish brown grey type 1 concrete crush. [MADE GROUND]
0.20-0.40: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.40-1.80: Orange and dark brown slightly gravelly slightly silty coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]

Test Parameters	TEST 3	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.35	0.00	0.48
	0.50	0.78
75% Effective Storage Depth (m):	0.75	0.88
1.01	1.00	0.95
	1.50	0.98
(i.e. Depth Below Ground Level) (m):	2.00	1.00
0.82	2.50	1.02
	3.00	1.03
25% Effective Storage Depth (m):	3.50	1.05
0.34	4.00	1.06
	4.50	1.07
(i.e. Depth Below Ground Level) (m):	5.00	1.08
1.49	9.00	1.27
	62.00	1.53
Effective Storage Depth Across 75% - 25% (m):	92.00	1.67
0.675	15.00	
	16.00	
Time to Fall to 75% Effective Depth (min):	17.00	
	18.00	
0.55	19.00	
Time to Fall to 25% Effective Depth (min):	20.00	
	21.00	
54	22.00	
Vp75%-25% (m3):	23.00	
1.09	24.00	
	25.00	
As50% (m2):	26.00	
5.66	27.00	
	28.00	
Tp75%-25% (mins):	29.00	
53.45	30.00	
	31.00	

DESIGN SOIL INFILTRATION RATE, f (m/s): 5.99E-05

Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA203

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA204
Trial Pit Length (m):	2.60
Trial Pit Width (m):	0.80
Trial Pit Depth (m):	1.94
Groundwater Level (m bgl):	N/A

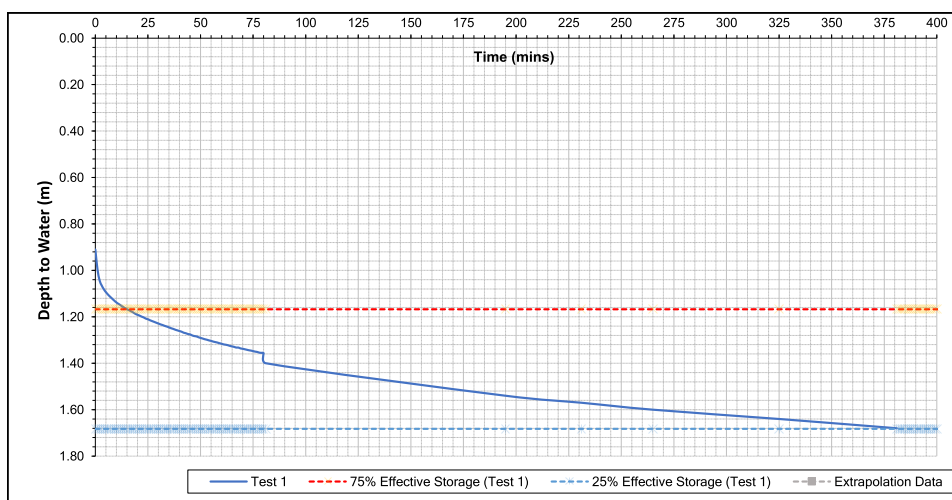
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.15: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.15-0.60: Dark brown sandy angular to sub-angular fine to coarse GRAVEL of flint, slate and rare brick. [MADE GROUND]
0.60-1.30: Orangish brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.20-1.70: Orangish brown clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.03	0.00	0.91
	1.00	0.99
75% Effective Storage Depth (m):	2.00	1.04
0.77	3.00	1.06
	4.00	1.08
(i.e. Depth Below Ground Level) (m):	5.00	1.09
1.17	6.00	1.10
	7.00	1.11
25% Effective Storage Depth (m):	8.00	1.12
0.26	9.00	1.13
	10.00	1.14
(i.e. Depth Below Ground Level) (m):	11.00	1.14
1.68	12.00	1.15
	13.00	1.16
Effective Storage Depth Across 75% - 25% (m):	14.00	1.16
0.52	15.00	1.17
	16.00	1.17
Time to Fall to 75% Effective Depth (min):	17.00	1.18
15	18.00	1.18
	19.00	1.19
Time to Fall to 25% Effective Depth (min):	20.00	1.19
381	21.00	1.19
	22.00	1.20
Vp75%-25% (m3):	23.00	1.20
1.07	24.00	1.21
	25.00	1.21
As50% (m2):	26.00	1.21
5.58	27.00	1.22
	28.00	1.22
Tp75%-25% (mins):	29.00	1.23
366	30.00	1.23
	31.00	1.23

DESIGN SOIL INFILTRATION RATE, f (m/s):	8.74E-06
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Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA204

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA204
Trial Pit Length (m):	2.60
Trial Pit Width (m):	0.80
Trial Pit Depth (m):	1.94
Groundwater Level (m bgl):	N/A

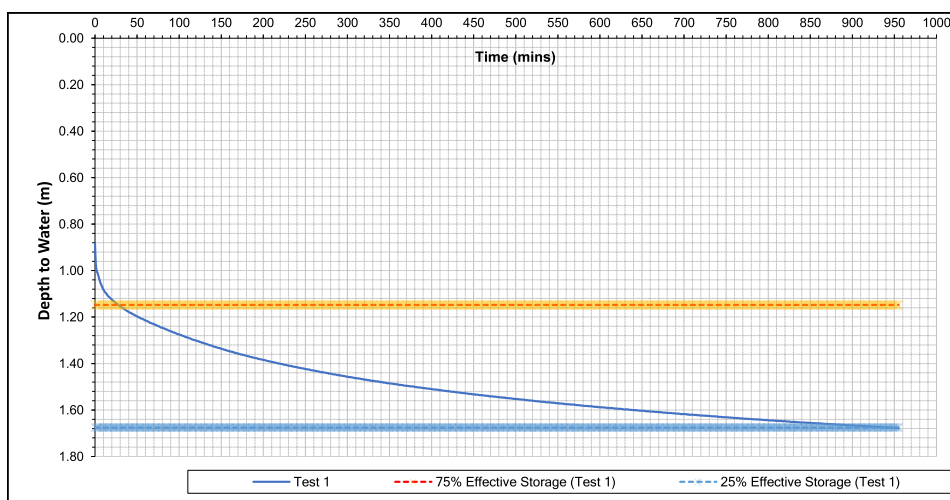
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.15: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.15-0.60: Dark brown sandy angular to sub-angular fine to coarse GRAVEL of flint, slate and rare brick. [MADE GROUND]
0.60-1.30: Orangish brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.20-1.70: Orangish brown clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.06	0.00	0.88
	1.00	0.97
75% Effective Storage Depth (m):	2.00	1.00
0.79	3.00	1.01
	4.00	1.02
(i.e. Depth Below Ground Level) (m):	5.00	1.04
1.15	6.00	1.05
	7.00	1.06
25% Effective Storage Depth (m):	8.00	1.07
0.26	9.00	1.07
	10.00	1.08
(i.e. Depth Below Ground Level) (m):	11.00	1.09
1.68	12.00	1.09
	13.00	1.10
Effective Storage Depth Across 75% - 25% (m):	14.00	1.10
0.53	15.00	1.11
	16.00	1.11
Time to Fall to 75% Effective Depth (min):	17.00	1.11
30.00	18.00	1.12
	19.00	1.12
Time to Fall to 25% Effective Depth (min):	20.00	1.13
930.00	21.00	1.13
	22.00	1.13
Vp75%-25% (m3):	23.00	1.13
1.10	24.00	1.14
	25.00	1.14
As50% (m2):	26.00	1.14
5.67	27.00	1.15
	28.00	1.15
Tp75%-25% (mins):	29.00	1.15
900.00	30.00	1.15
	31.00	1.16

DESIGN SOIL INFILTRATION RATE, f (m/s):	3.59E-06
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Comments:



Site Engineer:	Date:
TH	26.05.2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA204

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA204
Trial Pit Length (m):	2.60
Trial Pit Width (m):	0.80
Trial Pit Depth (m):	1.94
Groundwater Level (m bgl):	N/A

SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.15: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.15-0.60: Dark brown sandy angular to sub-angular fine to coarse GRAVEL of flint, slate and rare brick. [MADE GROUND]
0.60-1.30: Orangish brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.20-1.70: Orangish brown clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 3	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.04	0.00	0.90
	1.00	0.96
75% Effective Storage Depth (m):	2.00	0.97
0.78	3.00	0.99
	4.00	1.00
(i.e. Depth Below Ground Level) (m):	5.00	1.01
1.16	6.00	1.02
	7.00	1.02
25% Effective Storage Depth (m):	8.00	1.03
0.26	9.00	1.04
	10.00	1.04
(i.e. Depth Below Ground Level) (m):	11.00	1.05
1.68	12.00	1.05
	13.00	1.06
Effective Storage Depth Across 75% - 25% (m):	14.00	1.06
0.52235	15.00	1.07
	16.00	1.07
Time to Fall to 75% Effective Depth (min):	17.00	1.07
50	18.00	1.08
	19.00	1.08
Time to Fall to 25% Effective Depth (min):	20.00	1.08
1325	21.00	1.09
	22.00	1.09
Vp75%-25% (m3):	23.00	1.09
1.09	24.00	1.09
	25.00	1.10
As50% (m2):	26.00	1.10
5.63198	27.00	1.10
	28.00	1.10
Tp75%-25% (mins):	29.00	1.10
1275	30.00	1.11
	31.00	1.11

DESIGN SOIL INFILTRATION RATE, f (m/s):	2.52E-06
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Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA204