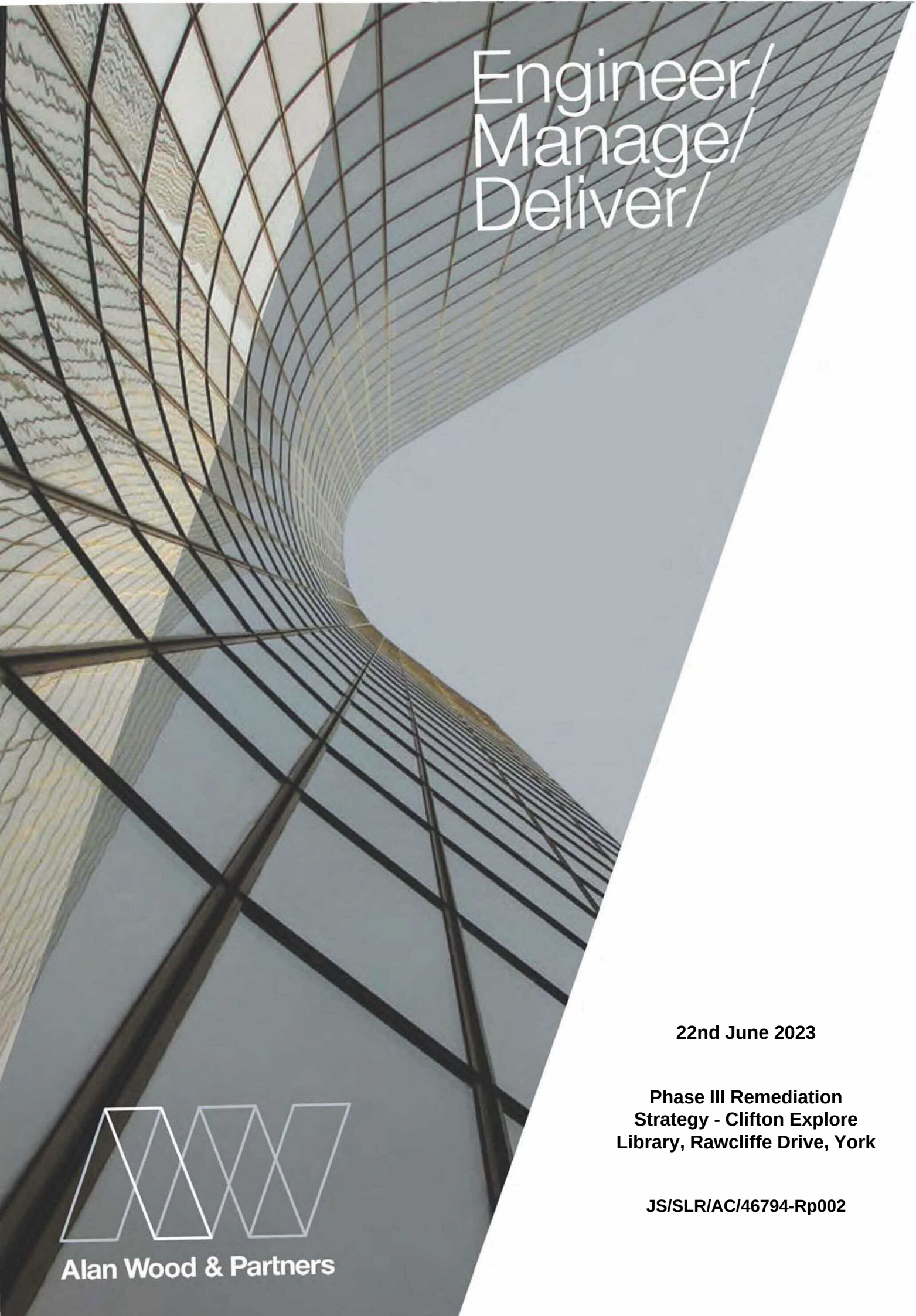

22nd June 2023

Phase III Remediation Strategy - Clifton Explore Library, Rawcliffe Drive, York

JS/SLR/AC/46794-Rp002

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PHASE III REMEDIATION STRATEGY - CLIFTON EXPLORE LIBRARY

For

City of York Council

Project Reference: JMS/SLR/AC/46794-Rp002

Prepared by: **A. Clark** *BSc (Hons) MSc FGS*

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Date: 22nd June 2023

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Signed: [redacted]

Date: 22nd June 2023

Issue	Revision	Revised by	Approved by	Revised Date

For the avoidance of doubt, the parties confirm that these conditions of engagement shall not and the parties do not intend that these conditions of engagement shall confer on any party any rights to enforce any term of this Agreement pursuant of the Contracts (Rights of third Parties) Act 1999.
The Appointment of Alan Wood & Partners shall be governed by and construed in all respects in accordance with the laws of England & Wales and each party submits to the exclusive jurisdiction of the Courts of England & Wales

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46794/001 **SITE LOCATION PLAN**

46794/002 **GROUND INVESTIGATION LOCATION PLAN**

APPENDICES

APPENDIX A: **PHASE I/II GEO-ENVIRONMENTAL INVESTIGATION REPORT JS/AC/46794-RP-001 REV A, DATED MARCH 2022**

APPENDIX B: **YALPAG TECHNICAL GUIDANCE FOR DEVELOPERS, LANDOWNERS AND CONSULTANTS "VERIFICATION REQUIREMENTS FOR COVER SYSTEMS"**

1 INTRODUCTION

1.1 Appointment

1.1.1 Alan Wood & Partners (AWP) were appointed by City of York Council (the 'Client') to provide technical services associated with the environmental remediation and validation of the development at Clifton Explore Library, Rawcliffe Drive, York.

1.1.2 This remediation strategy should be read in conjunction with the following documentation:

Phase I/II Geo-Environmental Investigation Report JS/AC/46794-Rp-001 Rev A, dated March 2022.

1.1.3 This report has been prepared for the sole use and reliance of City of York Council.

1.1.4 No other third party may rely on, reproduce or redistribute any content of this report without the prior written consent of Alan Wood and Partners. Any unauthorised third parties using the information presented in this report do so entirely at their own risk and are duly excluded from any warranty, duty of care or skill.

1.2 Objectives

1.2.1 The site is to be redeveloped with a library, therefore a public open space near residential land end use scenario has been adopted. The proposed development includes redevelopment of the existing building on site, along with some demolition and new construction, landscaped areas, infrastructure and associated hard standing.

1.2.2 To achieve a suitable-for-use site, some remediation will be required to ensure that unacceptable harm to human health during normal site occupancy and use following re-development does not occur.

1.2.3 This report presents the evaluation and identification of environmental remediation options for the site. Specifically, the report presents:

A summary of the site setting;
Definition of remediation objectives;
The identification of contamination remediation options;
Recommended remediation strategy; and
Verification Plan.

2 SITE DETAILS AND DESCRIPTION

2.1 Site Location

2.1.1 The site is located to the east of the junction between Rawcliffe Lane and Rawcliffe Drive, approximately 2km to the north of York City Centre, and is centred at approximate National Grid Reference 459031mE, 453620mN. A site location plan is presented as Figure 46794/001.

2.2 Site Description

2.2.1 The site area is irregular in shape and covers approximately 0.72 hectares. The topography of the site is flat, at level with the majority of the surrounding area. The only exception to this is the north-western boundary with Rawcliffe Drive, where the road is elevated in comparison to the site.

2.2.2 A derelict former school building is located on the site, with a playground area to the south surfaced with tarmac. A further area of soft landscaping is located along the southern boundary of the site, comprising a grassed area on the eastern half and an area with trees and shrubbery on the western half.

2.2.3 A number of mature trees are located on the southern edge of the site, with some additional trees adjacent to the northern boundary.

2.3 Site History

2.3.1 The site was developed with the school buildings in the 1930s, with construction and demolition of a number of structures on the southern boundary of the site.

2.3.2 The surrounding area underwent residential development from the 1900s, up until the early 2000's, with a school built to the north of the site.

3 GROUND CONDITIONS

3.1 Conditions Encountered

3.1.1 Reference should be made to the AWP Phase II Geo-Environmental Assessment Report which accompanies this report for full details of the ground conditions encountered.

3.1.2 A summary of the ground conditions that prevail on site within the boreholes is given below. Individual trial pit and window sampling records are presented within the Phase II report included in Appendix A.

Table 3-1 Summary of Ground Conditions

Lithology	Exploration Location	Approximate proven depth (m) to base from existing ground level	Approximate Thickness (m)	Approximate Safe Bearing Capacity (kN/m^2)
Topsoil	WS4, WS6	0.35 - 0.50		N/A
Tarmac/Concrete	WS1, WS2, WS3, TP1, TP2, TP3, TP4	0.14 – 0.21		N/A
Made Ground	WS1, WS2, WS3, WS6, TP1, TP2, TP3, TP4	0.30 - 0.50	0.14 - 0.36	Nil
Clay Deposits	WS1, WS2, WS3, WS4, WS6, TP1, TP2, TP3, TP4	2.00 – 5.00	0.05 – 2.30	75
Silt Deposits	WS1, WS6	1.00 – 1.95	0.50 – 0.75	Nil
Sand Deposits	WS1, WS2, WS3, WS4, WS6, TP1, TP2, TP3, TP4	1.20 – 5.00	0.25 – 2.40	40
Groundwater	WS1 – 0.95m bgl WS2 – 1.80m bgl WS3 – 1.00m bgl WS6 – 1.20m bgl TP1 – 1.80m bgl TP2 – 1.80m bgl TP3 – 1.80m bgl			

3.1.3 **Topsoil**: Topsoil was recorded to a maximum of 0.50mbgl in WS4 on the southern edge of the site. Further topsoil was recorded in WS6 to the north of the existing building.

3.1.4 **Made Ground**: Granular made ground was recorded below the former playground area, thought to be a subbase material, with further made ground below the topsoil to the north of the existing building.

3.1.5 Both cohesive and granular superficial deposits, comprising clays, silts and sands, were recorded below the site with groundwater recorded in all exploratory holes with the exception of WS4 and TP4.

3.1.6 **Groundwater**: Shallow groundwater was recorded in WS1 (0.95m), WS3 (1.00m) and WS6 (1.20m), with slightly deeper groundwater recorded in WS2, TP1, TP2 and TP3 (1.80m).

3.2 Visual & Olfactory Evidence of Contamination

3.2.1 Visual and olfactory evidence of contamination was recorded during the investigation within WS1. A strong hydrocarbon odour was noted between 0.14 and 0.50m below ground level.

4 ENVIRONMENTAL INVESTIGATION

4.1 Introduction

4.1.1 A ground investigation was carried out by AWP to identify potential environmental liabilities in relation to the proposed redevelopment of the site. The environmental investigation was designed to collect site-specific data with respect to any potential soil, groundwater and ground gas contamination associated with the site so that risks could be quantified in relation to the *source-pathway-receptor* scenarios and plausible contaminant linkages postulated in the initial Conceptual Site Model.

4.1.2 The fieldwork carried out AWP was undertaken on the 5th of February and the 13th of April 2022. Table 4.1 summarises field works completed.

Table 4-1 - Summary of Works

Method of Investigation	No.	Maximum Recorded Depth (m bgl)
Windowless Sampler Boreholes	5	5.00
In situ permeability testing	1	2.00
Mechanically excavated trial pits	4	3.20

4.1.3 No specific areas of interest were targeted from either a geotechnical or environmental point of view.

4.2 Sampling

4.2.1 Given the potentially historic contaminative nature of the on-site soils, it was considered possible that, when considered within the context of proposed end-use, the on-site soils may present a potential risk to human health and/or the wider environment.

4.2.2 The positions of the exploratory holes are shown on the appended ground investigation plan, Figure 46794/002.

4.2.3 Representative samples of the on-site soils were recovered from the exploratory holes. The environmental investigation carried out by AWP was designed to provide an overall assessment of potential contaminants thought likely to be present within the on-site soils. Details of the analytical suite selected are presented in Appendix A, within the AWP Phase II Report.

5 LABORATORY CHEMICAL ANALYSIS

5.1 Preamble

5.1.1 Seven representative environmental samples from within the topsoil, made ground, and near surface soils were recovered from the exploratory holes from across the site and were analysed for the suite of contaminants outlined in the appended AWP Phase II Report (Appendix A). Testing was carried out in order to assess the general degree and nature of contamination within the on-site soils in relation to the sites proposed redevelopment and with due consideration for its known past use.

5.1.2 A summary of the test results are given in the following tables below, whilst a copy of the individual test results are presented in full in the AWP Report in Appendix A.

Metals, Metalloids and Other Inorganic Analytes

5.1.3 Seven soil samples were analysed for a range of inorganic contaminants, as summarised in Table 5.1 and 5.2.

Table 5-1 - Summary of Total Soil Concentrations

Contaminant of Concern	GAC* (mg/kg)	Contaminant Concentrations (mg/kg)		No. of Samples Tested	No. of Samples >GAC	Pass/Fail Tier 1 GAC Screen
		Min	Max			
Metals						
Arsenic (inorganic)	79	4.1	6.7	7	0	PASS
Cadmium	220	<0.2	0.3	7	0	PASS
Chromium (III)	1,500**	28	92	7	0	PASS
Copper	12,000**	13	23	7	0	PASS
Mercury (inorganic)	120**	<0.5		7	0	PASS
Nickel	230**	8.4	18	7	0	PASS
Lead	630	35	94	7	0	PASS
Selenium	1,100**	0.7	5.7	7	0	PASS
Zinc	81,000**	25	78	7	0	PASS

* DEFRA (2014). Development of Category 4 Screening Levels (SP1010)
** LQM/CIEH (2015). S4UL for Human Health Risk Assessment.

Organics (PAH)

5.1.4 Seven samples of soil were analysed for a range of PAHs, the results of which have been summarised in Table 5.2.

Table 5.2 - Summary of Chemical Test Results (PAH)

Contaminant of Concern	GAC* (mg/kg)	Contaminant Concentrations (mg/kg)		No. of Samples Tested	No. of Samples >GAC	Pass/Fail Tier 1 GAC Screen
		Min	Max			
Naphthalene	4,900	<0.02	202.14	7	0	PASS
Acenaphthylene	15,000	<0.02	19.73	7	0	PASS
Acenaphthene	15,000	<0.02	161.01	7	0	PASS
Fluorene	9,900	<0.02	128.54	7	0	PASS
Phenanthrene	3,100	0.04	944.86	7	0	PASS
Anthracene	74,000	<0.02	221.26	7	0	PASS
Fluoranthene	3,100	0.09	811.06	7	0	PASS
Pyrene	7,400	0.07	594.09	7	0	PASS
Benzo(a)anthracene	29	0.05	294.08	7	1	**FAIL**
Chrysene	57	0.03	274.51	7	1	**FAIL**
Benzo(b)fluoranthene	7.2	0.05	273.48	7	1	**FAIL**
Benzo(k)fluoranthene	190	<0.03	109.98	7	0	PASS
Benzo(a)pyrene	5.7	0.04	247.25	7	1	**FAIL**
Dibenzo(a,h)anthracene	0.57	<0.02	37.64	7	1	**FAIL**
Indeno(1,2,3-cd)pyrene	82	0.03	174.88	7	1	**FAIL**
Benzo(g,h,i)perylene	640	0.02	149.13	7	0	PASS

* [CLEA/LQM/CIEH, 2015] Calculated for a public-open space near residential land end-use scenario in CLEA v1.071. GAC range for 2.5% SOM used unless stated otherwise. Values will be more conservative for cohesive soils.

5.1.5 One sample was analysed for Total Petroleum Hydrocarbons (aliphatic / aromatic split) with BTEX. The results are summarised in Table 5.3.

Table 5.3 - Summary of Chemical Test Results (TPH)

Contaminant of Concern	GAC* (mg/kg)	Contaminant Concentrations (mg/kg)		No. of Samples Tested	No. of Samples >GAC	Pass/Fail Tier 1 GAC Screen
		Min	Max			
Aromatic						
TPH >EC5-EC7	56,000	<0.01		1	0	PASS
TPH >EC7-EC8	56,000	<0.01		1	0	PASS
TPH >EC8-EC10	5,000	0.10		1	0	PASS
TPH >EC10-EC12	5,000	254		1	0	PASS
TPH >EC12-EC16	5,100	516		1	0	PASS
TPH >EC16-EC21	3,800	1358		1	0	PASS
TPH >EC21-EC35	3,800	2059		1	0	PASS
TPH >EC35-EC44	3,800	40		1	0	PASS
Aliphatic						
TPH >EC5-EC6	590,000	<0.1		1	0	PASS
TPH >EC6-EC8	610,000	<0.1		1	0	PASS
TPH >EC8-EC10	13,000	0.5		1	0	PASS
TPH >EC10-EC12	13,000	23		1	0	PASS
TPH >EC12-EC16	13,000	21		1	0	PASS
TPH >EC16-EC35	250,000	168		1	0	PASS
TPH >EC35-EC44	250,000	15		1	0	PASS

* [CLEA/LQM/CIEH, 2015] Calculated for a public-open space near residential land end-use scenario in CLEA v1.071. GAC range for 2.5% SOM used unless stated otherwise. Values will be more conservative for cohesive soils.

Metals, Metalloids and Other Inorganic Analytes

5.1.6 A total of seven soil samples were analysed. Assessment of the soils data indicates that there are no elevated concentrations of potential contaminants of concern that exceed relevant GAC criteria.

5.1.7 Potential unacceptable risk to human health in a public open space near residential land end use scenario with respect to metals, metalloids and non-metal inorganics is therefore not anticipated.

Organics (PAH, TPH, BTEX and MTBE)

5.1.8 A total of seven soil samples were analysed for PAH with one of the samples also analysed for TPH. None of the samples analysed for TPH returned concentrations above relevant GAC's, however, elevated concentrations of PAH were recorded in the sample of made ground obtained from WS1 at 0.20m bgl.

5.1.9 There is therefore a potential unacceptable risk to human health in a public open space near residential land end use scenario with respect to organic contaminants.

Asbestos

5.1.10 A total of seven soil samples were analysed. No asbestos fibres were detected in the samples tested.

5.1.11 Risk associated with asbestos containing materials is therefore not anticipated.

6 RISK ASSESSMENT

6.1 Introduction

6.1.1 Current UK legislation on contaminated land is principally contained in Sections 78(A) to (YC) in Part 2A of the Environmental Protection Act 1990, which was retrospectively inserted by Section 57 of the Environment Act 1995. The Contaminated Land Regulations 2000 were amended in 2005. The Environmental Protection Act 1990: Part 2A Contaminated Land, Statutory Guidance, Edition 2, 2006, promulgates the revised statutory guidance with respect to the operation of the Contaminated Land Regime following the implementation of the Contaminated Land Regulations, 2005.

6.1.2 The definition of contaminated land is central to the operation of Part 2A. Legislation adopts the principle of a 'suitable for use' approach for the assessment of contaminated land, the rationale reflected in the site-specific risk assessment and determination of remedial strategy. Action is only required if significant potential risks are posed to human health or to the environment, taking into account the current land use and geo-environmental setting.

6.1.3 The legislation places a responsibility on the Local Authority to determine whether the land under its jurisdiction is contaminated by consideration of whether:

Significant harm is being caused;
There is a significant possibility of significant harm being caused;
Significant pollution of controlled waters is being caused or is likely to be caused.

6.2 Assessment Framework

6.2.1 The statutory guidance describes a risk assessment methodology in terms of ‘significant contaminants’ and ‘contaminant linkages’, using ‘source-pathway-receptor’ scenarios for the site. Contaminant linkages are formed when there is a linkage between a contaminant source and a receptor by means of a pathway. Each element has to be present, or no linkage can be formed.

6.2.2 Risk assessment and the procedure of identifying sources, pathways and receptors is recognised as an approach to determine the extent and significance of contamination either within the context of Part 2A (when assessing current site status or when considering the acquisition of an existing development) or the planning process (for the

redevelopment of an existing site, or when considering the acquisition of a site for redevelopment purposes). Either way, the 'suitable for use' approach is adopted when assessing risk and the source-pathway-receptor assessment defines the conceptual model for the site.

6.2.3 Within the context of this report therefore, the risk assessment has been undertaken on the basis that the 'suitable for use' approach remains aligned with the site being redeveloped for the end uses given above.

6.3 Summary of Identified Contaminant Linkages

6.3.1 On the basis of the ground investigation and laboratory test results, it is evident that the made ground soils locally contain some elevated concentrations of organic contaminants in excess of the adopted GACs. No samples from the natural strata returned concentrations above the adopted GACs.

6.3.2 Risk to human health, the development and the wider environment, with respect to the identified levels of contaminants within the made ground material, is therefore anticipated locally.

7 CONTAMINATION REMEDIATION OPTIONS

7.1 Protection of Human Health Post-Development

7.1.1 Potential contaminant linkages to the site end-user following redevelopment principally comprise exposure to PAH compounds via dermal contact (with soil and soil-derived dust), dust inhalation (indoor and outdoor), vapour inhalation (indoor and outdoor) and ingestion (direct soil ingestion and via home grown crops).

7.1.2 To identify potential remediation options and assess their viability against the potential risks posed to site end users and remediation requirements an options appraisal has been carried out. This study presents an assessment of potentially applicable remediation techniques for the identified contaminant linkages and ascertains (qualitatively) their potential viability for the site.

7.2 Options Appraisal

In accordance with guidelines presented in the Land Contamination Risk Management, Environment Agency 2020 an options appraisal has been carried out.

7.3 Remediation Objectives

7.3.1 There are a number of objectives that the remediation strategy needs to achieve. In this instance, the following pertinent objectives that relate to the reduction/control of the risks associated with one or more of the linkages, have been identified:

Table 7.1 - Remediation Objectives

Objective:	Reason:
1. Reduce the potential hazard and to reduce/control risks	To ensure protection of human health.
2. Practicability of implementing and, where needed, maintaining the strategy	To ensure remediation can be carried out effectively.
3. Technical effectiveness of the strategy in reducing identified risks	To ensure remediation methods employed are suitable for identified risks.
4. Cost effectiveness	To ensure financial viability in terms of risk posed by identified contaminant(s).
5. Compliance	To ensure remediation complies with current legislation.

7.4 Remediation Options

7.4.1 The following section identifies remediation options that could be utilised to effectively manage the identified contamination, given that the site is to be redeveloped for residential properties, with associated garden and car parking.

7.4.2 In determining the most effective remediation option for a site, consideration needs to be given to a number of techniques, stating (where appropriate) the suitability and limitations of each chosen method. On the basis of the identified remediation objectives, the following options have been considered.

Table 7.2 - Summary of Potential Remediation Technologies

Remediation Method	Description	Guidance
Off- Site Disposal	Transportation of contaminated soils to licensed off-site facility	-
Off-Site Soil Treatment	Transportation of contaminated soils to licensed off-site treatment centre	-
Soil Washing	Water-based washing plant to remove contamination in soil	EA (2010), CL:AIRE (2004, 2006)
Engineered Capping	Placement of engineered cover layer above contaminated soils to minimise contaminant migration and exposure to site end users	BRE465 (2004)

Qualitative Assessment

7.4.3 A qualitative assessment of the potential applicability of the identified soil treatment technologies to achieve the specified objectives is given in the following table.

Table 7.3 - Remediation Technologies Options Assessment

Remediation Method	Advantages and Disadvantages	Viable for this scheme?
Off- Site Disposal	Removal of contaminated soils from site achieved. Large numbers of vehicle movements required.	Y
Off-Site Soil Treatment	Removal of contaminated soils from site achieved. Off-site processes return usable materials. Large numbers of vehicle movements required. Very high cost. Time to undertake treatment is long.	N
Soil Washing	Removal of contamination from coarse soil fractions. Can re-use treated soils on site. Major process plant required. Waste streams may be large and difficult to process, particularly when clayey.	N
Engineered Capping	Potential to break exposure pathways effectively. Granular break layer or geotextile to prevent vertical penetration into underlying potentially contaminated soils. Validation and verification required to ensure long-term performance.	Y

7.4.4 It is on this basis that a combination of localised material removal and/or an engineered soil capping is considered to be the most viable option, with respect to the contamination that exists within the on-site made ground soils. The recorded exceedance within WS1 is located within an area proposed to be used for carparking. This material may be removed as part of the site preparation works. Should it be retained on site, it is likely to be capped with hardstanding.

7.4.5 There are no potable water, groundwater and/or surface water abstraction licences within 250m of the site with the underlying bedrock designated as a “Principal Aquifer”. It is considered that post development the risk to controlled waters from the identified contaminants of concern is low due to the presence of a strata identified as having a low leaching potential.

8 REMEDIATION STRATEGY AND VERIFICATION PLAN

8.1 Scope of Works

8.1.1 Although subject to site-specific constraints, it is envisaged that the following works will be undertaken, should removal of the affected soils be undertaken.

NOTE: all proposals will need to be agreed with the Local Authority beforehand.

8.1.2 The removal the existing hard-standing (e.g. tarmac) should be completed.

8.1.3 Further testing shall be required from within the vicinity of WS1 in order to delineate the extent of the PAHs as identified.

8.1.4 The formation shall be inspected by a suitably qualified Engineer to confirm complete removal of made ground materials and verification shall be completed in accordance with the appropriate guidance. Samples of underlying strata shall be recovered where residual made ground exists, and analysed to confirm no residual contaminants are present.

8.1.5 Where natural strata free of significant contaminants are exposed at formation, formal capping is not required, and levels shall be reinstated with clean soils (subsoil and topsoil) which can be either imported or site won, but should be confirmed chemically suitable through appropriate laboratory testing prior to placement for site won material or prior to import for imported soils.

8.1.6 Given that remediation measures are required at the site for the protection of human health, there is the requirement to submit a validation report to show that remediation measures have been completed and that contamination issues have been successfully addressed. Following completion of the remediation works therefore, a validation report will be submitted to the Regulator for approval.

8.1.7 Verification of satisfactory completion of recommended remedial measures will be required to satisfy conditions relating to land quality associated with the planning consent for the development.

9 CONTAMINATION DISCOVERY STRATEGY

9.1 Assessment of Unforeseen Contamination

9.1.1 Upon notification that unforeseen contamination has been discovered, the Engineer shall advise the Contractor of any immediate action to prevent cross contamination of uncontaminated area and minimise risks to construction workers.

9.1.2 The Engineer will attend site to assess the extent and nature of the discovery and, if necessary, recover samples for appropriate testing to assess whether the contamination encountered presents significant risk to end user, the wider environment or construction workers.

9.1.3 The results of analysis of any samples recovered will be assessed in line with current UK guidance and an assessment of required remedial actions undertaken. If remedial works are deemed to be required, an assessment of the most appropriate options, as outlined in Section 7, will be undertaken and agreed with the Client and Local Authority, as required.

9.1.4 It may be that should contamination be encountered within areas deemed to be soft landscaping, suitable capping may be required as per the requirements of the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) Verification Requirements for Cover Systems.

10 GENERAL CONSIDERATIONS

10.1 Site Safety

10.1.1 Over and above the standard health, safety and welfare requirements, specific health and safety requirements will address the issues related to identify contamination hazards.

10.1.2 The Project Manager on site will retain the Health and Safety Documents. The document, 'Protection of workers and the general public during the development of contaminated land' will also be held on site. The guidance, standards and legislation followed will include the CDM Regulation (2015), HSW Act (1974) and COSHH Regulations (2002).

10.2 Hazards Posed by the Principle Contaminants

10.2.1 The principle contaminants of concern that may be encountered in the made ground soils are PAHs.

10.2.2 In acute effects attributed to PAH exposure, such as headache, nausea, respiratory and dermal irritation, are probably caused by other agents. Effects reported from chronic occupational exposure to PAHs include:

Chronic bronchitis,
Chronic cough irritation,
Bronchogenic cancer,
Dermatitis,
Cutaneous photosensitization,
Pilosebaceous reactions,
Diabetes,
Heart Disease.

10.3 Health and Safety

10.3.1 All parties involved in groundworks will be required, as a minimum, to adhere to basic health and hygiene precautions, as groundworks may bring personnel and others into

direct contact with the ground, potentially exposing them to harmful contaminants via the pathways of ingestion, inhalation and skin contact.

10.3.2 The site ground works will, therefore, be inspected by experienced personnel who will ensure that appropriate Health and Safety and good site management procedures are adopted throughout. Such procedures should be based upon published guidance, such as provided within the HSE document "*Protection of Workers and the General Public During the Redevelopment of Contaminated Land*".

10.3.3 All site operatives should be trained in asbestos awareness to the current standards and remain vigilant during ground works. Appropriate personal protective equipment (PPE) should be worn and works should be carried out in accordance with a suitable risk assessment and method statement, and wash down facilities should be made available should asbestos be encountered during the earthworks programme. All work should be carried out in accordance with the relevant current regulations including, but not limited to;

Managing and Working with Asbestos – Approved Code of Practice and Guidance 2012 L143 (Second Edition);
COSHH – Control of Substances Hazardous to Health Regs 2013;
MHSWR – Management of Health & Safety at Work Regs 1999;
The Hazardous Waste (England & Wales) Regs 2005;
Asbestos in Soil and Made Ground Good Practice Site Guide CIRIA C765, 2017;
Control of Asbestos Regulations 2012

10.4 Unsuitable Materials

10.4.1 The Contractor shall ensure that machine drivers and supervisory personnel shall closely observe the formation for unusual materials such as: odorous solids or liquids, friable, fibrous or 'dusty' material, in particular asbestos accumulations or seepages of liquids which are:

Tarry or oily;
Fuming or bubbling;
Coloured materials exhibiting any changes in colouration of the ground materials after exposure or excavation.

10.4.2 Upon discovering any unusual materials work at that position shall stop and the Engineer shall be informed immediately to ensure such discoveries are dealt with appropriately and in accordance with the agreed Remediation Strategy and in line with current legislation and guidance.

11 REGULATORY APPROVAL

11.1.1 The conclusions and recommendations presented in this report are considered reasonable on the basis of available information and the assessment of the site as carried out by Alan Wood and Partners.

11.1.2 It should be noted however that the proposals presented herein cannot be guaranteed to gain approval by the Regulatory Authorities and your Warranty Provider, so copies of this report should be made available to the relevant organisations (as appropriate) for their comment and approval, prior to undertaking any irrecoverable works associated with the site.

12 REFERENCES

1 BRE465 (2004), Cover Systems for Land Regeneration: Thickness Design of Cover Systems for Contaminated Land.
2 BRE 414 (2001), Protective Measures for housing on gas-contaminated land.
3 CIRIA C665 (2007), Assessing risks posed by hazardous ground gases in buildings.
4 BS 8485:2015, Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
5 CIRIA C735 (2014), Good Practice on the testing and verification of protection systems for buildings against hazardous ground gases.
6 Land Contamination Risk Management, Environment Agency October 2020.
7 NHBC R&D 66: 2008, Guidance for the Safe Development of Housing on Land Affected by Contamination.
8 YALPAG Technical Guidance for Developers, Landowners and Consultants; Verification Requirements for Cover Systems Version 3.4 – November 2017

FIGURES

All dimensions must be checked on site and not scaled from this drawing

RESIDUAL DESIGN RISKS- CDM REGS ARE IDENTIFIED WITH THIS SYMBOL SEE DESIGN RISK SHEET OR LAYOUT

REVISION NOTES

-

Vale of York Academy

existing vehicle site entrance

area of new tarmac car park construction

existing car park
resurface existing tarmac

new pedestrian site access max 1 in 20

block paving up to entrance

existing bus stop

3no cycle shelters

existing school access gates retained

existing outbuildings demolished

1800 high paladin weld mesh security fence to boundary

cycle shelter

Clifton Explore Library Learning Centre - see dwg 200043/108 and 109 for floor plans

part demolition of existing building

new vehicle site entrance and crossing

RAWCLIFFE DRIVE

paved terrace area
(extured paving flags)

grassed seating area

new hedge to library side of fence

new pedestrian/cycle access for school

E.V charger

E.V charger

E.V charger

E.V charger

all existing trees retained

new car park
block paving

delivery vehicles

recycling compound

6m x 3m storage unit

landscape and play areas layouts tbc

1200 high paladin fence with gate

store

store

enclosed play area

1200 high paladin fence with gate

2no. 4m x 3m timber boarded sheds on concrete base

1800 high paladin weld mesh security fence to boundary with hedge to new library side

1800 high paladin weld mesh security fence with hedge to new library side

all existing trees retained

FUTURE HOUSING SITE AREA

part demolition of existing building

existing access to site area

existing tree retained

RAWCLIFFE LANE

FAIRWAY

Rev	Date	Revision	By
A	05-04-23	Landscape and play area layouts omitted	AT

CITY OF YORK COUNCIL

Property Services
CBSS
West Offices
Station Rise
York Y01 6GA

Contact
Tel No:
FAX No:
Email:

Job Title
CLIFTON EXPLORE LIBRARY LEARNING CENTRE

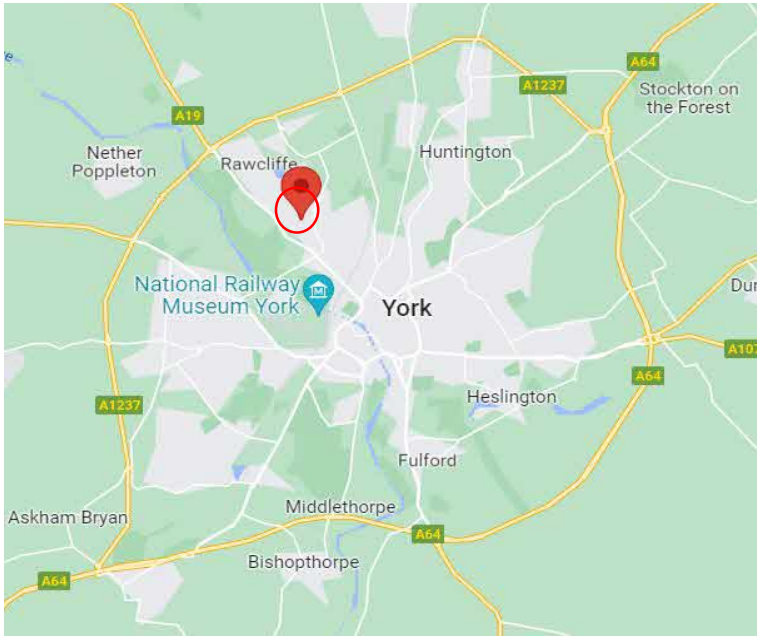
PROPOSED SITE PLAN

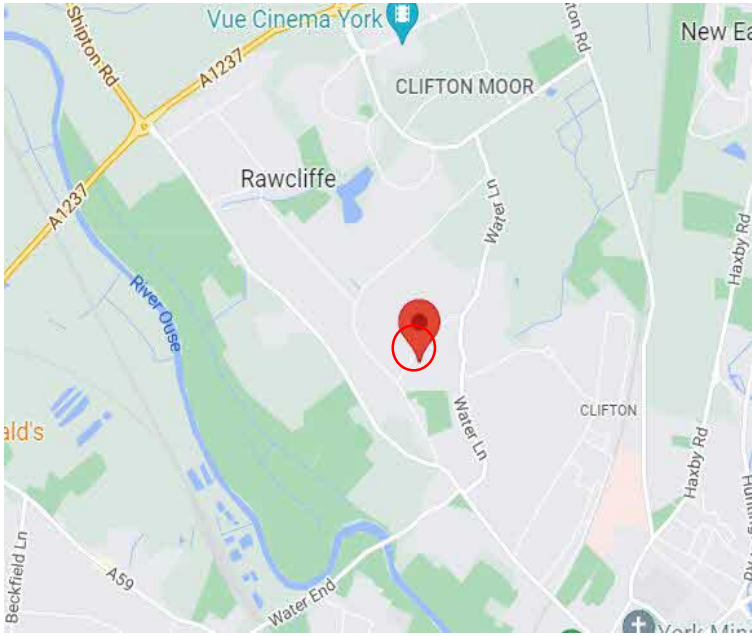
Drawn	Checked	Authorised
MA	AT	

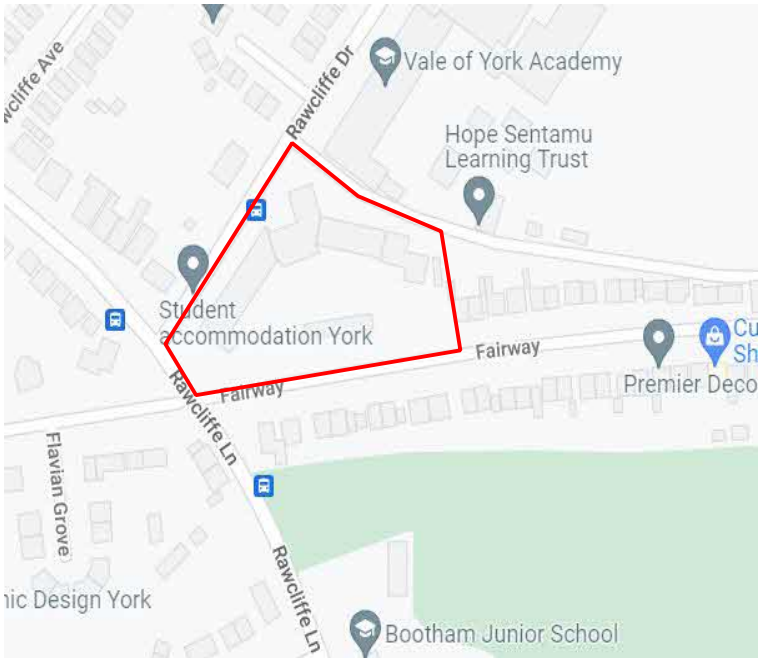
Date	Scale@A1
AUG 2022	1/200

Issue Status:
CONSTRUCTION

Drawing Number	Revision
200043/C106	A







DO NOT SCALE

Approximate Site Location

Approximate Site Boundary

N

Alan Wood & Partners

Client.	City of York Council		
Project.	Clifton Explore Site		
Drawing.	Site Location Plan		
Date. 19.03.22	Scale. NTS		
Drawn by. AHB	Check by. JMS	Approved by. JMS	
Status:	FINAL		
Job no. 46794	Fig. no. 001	Rev.	

DO NOT SCALE

Approximate Red Line Site Boundary

Approximate Windowless Sampler Borehole Location

Approximate Trial Pit Location

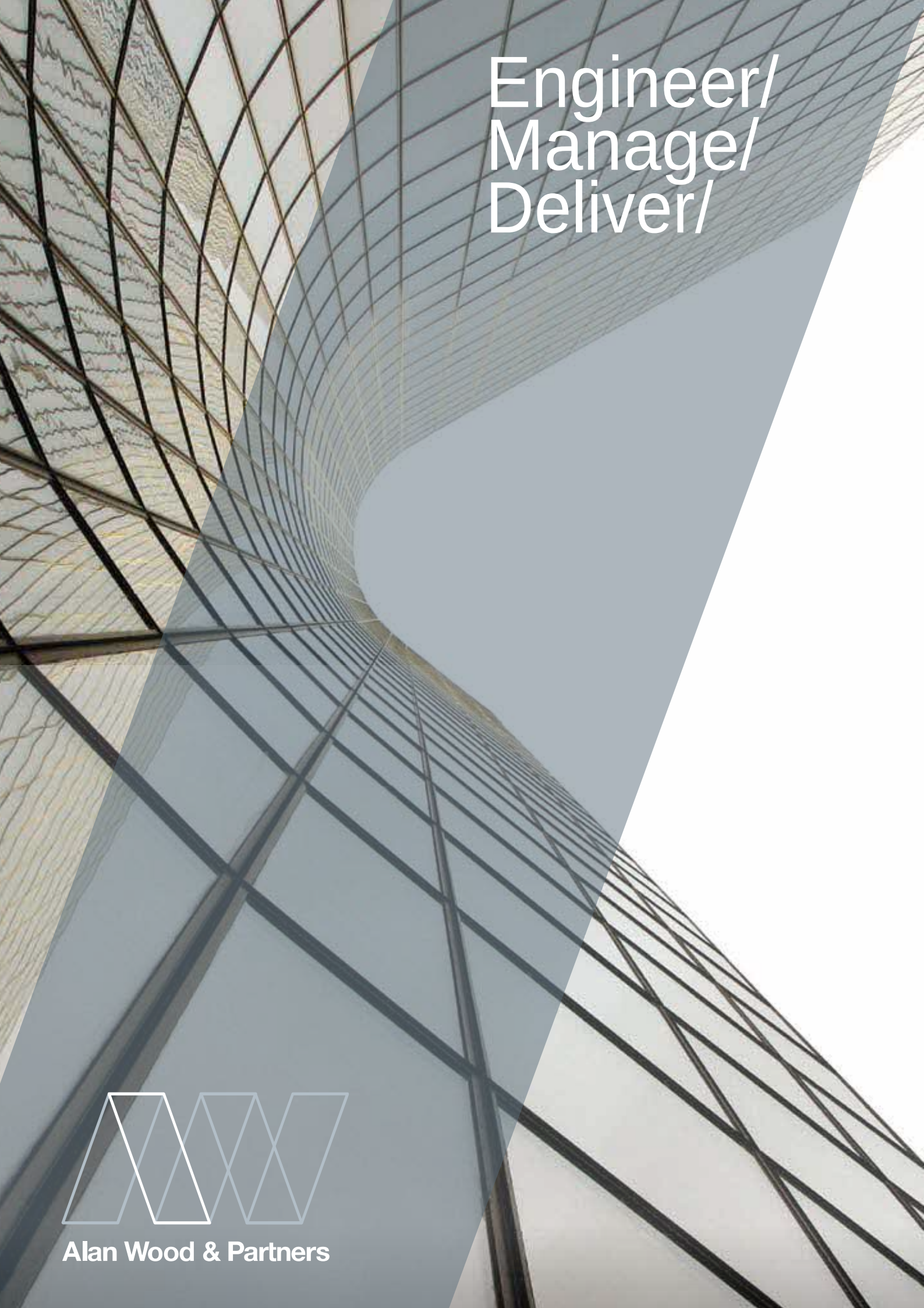
N

Alan Wood & Partners

Client. City of York Council		
Project. Clifton Explore Site		
Drawing. Completed Exploratory Hole Locations		
Date. 09.02.22	Scale. NTS	
Drawn by. AC	Check by. JMS	Approved by. JMS
Status: FINAL		
Job no. 46794	Fig. no. 002	Rev. A

APPENDIX A

ALAN WOOD & PARTNERS PHASE I/II GEO-ENVIRONMENTAL INVESTIGATION REPORT JS/AC/46794-RP-001 REV A, DATED MARCH 2022


Engineer/
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PHASE I/II GEO-ENVIRONMENTAL INVESTIGATION REPORT, CLIFTON EXPLORE SITE, YORK

For

City of York Council

Project Reference: JS/AC/46794-Rp-001 Rev A

Prepared by: **A. Clark** *BSc (Hons) MSc FGS*

[redacted]

Signed:

Date: 18th March 2022

Approved by: **Andy Borthwick** *BSc (Hons), FGS*

[redacted]

Signed:

Date: 18th March 2022

Issue	Revision	Revised by	Approved by	Revised Date
A	Addition of further ground investigation data	AC	AHB	25.04.2022

For the avoidance of doubt, the parties confirm that these conditions of engagement shall not and the parties do not intend that these conditions of engagement shall confer on any party any rights to enforce any term of this Agreement pursuant of the Contracts (Rights of third Parties) Act 1999.
The Appointment of Alan Wood & Partners shall be governed by and construed in all respects in accordance with the laws of England & Wales and each party submits to the exclusive jurisdiction of the Courts of England & Wales.

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EXECUTIVE SUMMARY

Site Location & Description	The site is located to the east of the junction between Rawcliffe Lane and Rawcliffe Drive, approximately 2km to the north of York City Centre, and is centred at approximate National Grid Reference 459031mE, 453620mN. The site area is irregular in shape and covers approximately 0.72 hectares. A derelict former school building is located on the site, with a playground area to the south surfaced with tarmac.
Historical Land Use	The site was developed with the school buildings in the 1930s, with construction and demolition of a number of structures on the southern boundary of the site. The surrounding area underwent residential development from the 1900s, up until the early 2000's, with a school built to the north of the site.
Geology	The majority of the site is shown to be underlain by the Alne Glaciolacustrine Formation (Clay and Silt), with the Sutton Sand Formation present on the north-western boundary of the site. The solid geology underlying the site area is recorded as being the Sherwood Sandstone Group.
Hydrogeology	Aquifer within Superficial Deposits: Alne Glaciolacustrine Formation – Unproductive Sutton Sand Formation – Secondary A Aquifer within Bedrock: Principal - Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale.
Mining Assessment	On the basis of available information risk associated with shallow coal mining subsidence is considered to be negligible.
Geotechnical Assessment	Geotechnical laboratory testing was carried out on 3 samples of cohesive soil. The calculated modified plasticity index (NHBC Chapter 4.2) was found to be between 19% and 33%, which is equivalent to a low to medium volume change potential, according to the NHBC guidelines. The highest recorded worst-case VCP (medium) should be adopted for design purposes however to allow for variation in ground conditions across the development area.
Environmental Assessment	Elevated PAH contaminants were recorded in WS1 at 0.20m bgl in a sample of made ground. The same material was recorded as having a strong TPH odour during the ground investigation. Risk associated with metals, metalloids, non-metal inorganics, TPH, and asbestos is not anticipated.
Foundations	Using the additional ground investigation data from the trial pitting, vibro stone columns are likely to be a suitable foundation solution. An appropriate detailed design should be undertaken by a suitably experienced contractor.
Ground Slabs	It is unlikely that a ground bearing slab will be suitable for us proposed development, given the loose and unstable shallow so encountered during the ground investigation. A suspended floor syste incorporating a sub-floor void, such as beam and block, will be required fc all structures.
Precautions near Trees	There are many trees around the boundaries to the site so precautions are likely to be required where structures lie within influencing distance given the underlying (clay) ground conditions; this will be subject to a tree survey and foundation schedule.

Drainage	Shallow groundwater was encountered across the majority of the site, between depths of 0.90m and 1.80m. As a result of this, the falling head test was unsuccessful, and it is recommended that soakaway drainage is not adopted within the proposed development.
Sulphate	The results of the assessment indicate that a Design Sulphate classification of DS-2 may be adopted along with an ACEC class of AC-2
Potable Water Supplies	Risk to potable water supply pipes is considered to be low. On the basis of available test results it is unlikely that protective measures will be required. Consultation should however be undertaken with the local water authority with respect to any precautions they may require, prior to construction.
Obstruction & Excavations	Shallow hard rock is not anticipated across the majority of the site given the geology encountered during the ground investigation. However, sc obstructions may be present across the southern edge of the site wl previous construction has been removed, as shown on the historical mapping. The proposed redevelopment will require the removal of remnant foundations. The breaking-out of obstructions for either foundations or other construction requirements should be allowed for. Excavation of the materials encountered should be easily achieved using conventional hydraulic excavation techniques.
Roads	No in situ CBR testing has been carried out to date as the final development levels at the site are unknown.
Further Works	A vibro stone column design should be undertaken by a specialist contractor.

NB. The Executive Summary presented above is an overview of the key findings and conclusions of the report. There may be other information contained within the body of the report which puts into context the findings of the Executive Summary. No reliance should therefore be placed on the Executive Summary until the report as a whole has been read in full.

1 INTRODUCTION

1.1 Appointment

1.1.1 Alan Wood and Partners were appointed by City of York Council (the 'Client') to undertake a Phase I/II geoenvironmental investigation of a parcel of land located off Rawcliffe Lane and Rawcliffe Drive, York.

1.1.2 The report has been prepared for the sole use and reliance of City of York Council. No other third party may rely on, reproduce or redistribute any content of this report without the prior written consent of Alan Wood and Partners. Any unauthorised third parties using the information presented in this report do so entirely at their own risk and are duly excluded from any warranty, duty of care or skill.

1.2 Development Proposals

1.2.1 It is understood that the site is to be redeveloped with a new library and community centre with associated infrastructure and outdoor area (soft landscaping and play area). This will include the demolition and reconstruction of one of the buildings on site. A proposed preliminary development layout was provided to Alan Wood and Partners, which is appended to this report.

1.3 Report Status

1.3.1 The geoenvironmental investigation of the site has been carried out in two phases. These works have comprised the completion of a Phase I preliminary assessment (desk based study) and a subsequent Phase II (intrusive) investigation, undertaken over two parts, the results of which are presented in this report.

1.3.2 The Phase I assessment consisted of a study of information surrounding the site's geoenvironmental setting and that provided by Groundsure, the British Geological Survey and the Coal Authority, so that an initial Conceptual Site Model (CSM) and Risk Assessment (RA) could be completed. The scope of the intrusive investigation was formulated on the basis of information obtained from the Phase I assessment.

1.4 Scope of the Investigation

1.4.1 The scope of works undertaken as part of this appraisal was to:

Carry out a physical inspection of the site (walkover survey):

Review any pre-existing documentation relating to ground conditions (geotechnical and environmental);

Investigate the ground conditions present on-site and identify their geotechnical properties in relation to the site's proposed end use;

Investigate the hydrogeological regime beneath the site wherever possible;

Investigate the potential risks to the development from hazardous ground gas sources (to be reported under separate cover);

Identify the nature and concentration of any contamination within the on-site soils and undertake a tiered risk assessment to establish likely risks to sensitive receptors. Defining a Conceptual Site Model of potential contaminant linkages relevant to the proposed redevelopment of the site;

Carry out *in-situ* permeability tests to assess the potential for soakaway use at the site;

Provide preliminary advice in relation to any environmental or geotechnical issues associated with the site including foundation recommendations and other recommendations needed to facilitate the proposed redevelopment, including, where necessary, identifying any additional phases of work or remediation that need to be carried out.

1.5 Limitations of Study

1.5.1 This report presents factual and interpretative geotechnical and environmental information, along with provisional construction proposals and recommendations relevant to the objectives of the investigation for the site end-use given above. The report has been prepared for the titled project and Alan Wood and Partners can accept no responsibility or liability for the consequences of the use of this document, wholly or in part, for any other purpose than that for which it was commissioned.

1.5.2 For the purposes of this report and thus defining risk to the proposed development from an environmental point of view, a 'public open space near residential land' end use scenario has been adopted. Interpretation and recommendations should not be assumed valid for alternate land uses. Where the proposed site usage changes, the findings of this report should be re-assessed to accommodate the change in proposed end-use.

1.5.3 The conclusions and recommendations presented in this report are based on site-specific information obtained during the desk study, ground conditions encountered and laboratory analysis and are considered reasonable on the basis of available information at the time the assessment was carried out. They should not necessarily be relied upon to represent site conditions at a substantially later date.

1.5.4 The findings and opinions provided in this report are given in good faith and are subject to the limitations and constraints imposed by the methods and information sources described. Factual information has been obtained from a variety of sources. Alan Wood and Partners assumes that third party data is reliable, but has not independently confirmed this. The validity and accuracy of this information is therefore outside the control of Alan Wood and Partners. Professional judgement and experience is however used to ensure that uncertainties are reduced to a level appropriate to the site conditions, the purpose of the investigation and the resources devoted to it by the Client.

1.5.5 Whilst every effort has been made to carry out an assessment that enables a realistic characterisation of the geotechnical and environmental parameters at the site, the possibility of significant spatial variation in actual ground, groundwater and environmental (gas and contamination) conditions existing between or beyond exploratory hole locations cannot be discounted. Where information or opinion is given this is for guidance only. Further information, ground investigation, construction activities, change of site use or the passage of time may reveal conditions that were not indicated in the data and therefore could not have been considered in the preparation of this report. Where such information might impact upon stated opinions, Alan Wood and Partners cannot accept responsibility for conditions not encountered and reserves the right to modify or retract the opinions expressed in this report. Where opinions expressed are based on current available guidelines and legislation, no liability can be accepted by AWP for the effects of any future changes to such

guidelines and legislation. New information of improved practices and changes in legislation may require reinterpretation of the report as a whole, or in part.

1.5.6 This report does not constitute an archaeological or ecological assessment, nor does it constitute an asbestos inspection. A suitably qualified consultant should be consulted where these aspects of work are required.

1.5.7 A flood risk assessment in accordance with Planning Policy Statement 25, *Development and Flood Risk* (2010) has not been undertaken as part of this commission.

1.5.8 All ground investigation works and soil descriptions were undertaken in general accordance with BS EN ISO 14688-1 'Geotechnical Investigation and Testing – Identification and Classification of Soil' (2018), BS10175 (2011), BS 5930 (2015) and/or BS EN 1997-1:2004 (Part 1, General Rules) and BS EN 1997-2:2007 (Part 2, Ground Investigation and Testing).

2 SITE DETAILS AND DESCRIPTION

2.1 Introduction

2.1.1 Published environmental, geological and historical data relating to the site area has been reviewed, in conjunction with a walkover survey undertaken on the 4th of February 2022, the findings of which are presented below.

2.2 Site Location & Description

2.2.1 The site is located to the east of the junction between Rawcliffe Lane and Rawcliffe Drive, approximately 2km to the north of York City Centre, and is centred at approximate National Grid Reference 459031mE, 453620mN. A site location plan is presented as Figure 46794/001.

2.2.2 The site area is irregular in shape and covers approximately 0.72 hectares. The topography of the site is flat, at level with the majority of the surrounding area. The only exception to this is the north-western boundary with Rawcliffe Drive, where the road is elevated in comparison to the site.

2.2.3 A derelict former school building is located on the site, with a playground area to the south surfaced with tarmac. A further area of soft landscaping is located along the southern boundary of the site, comprising a grassed area on the eastern half and an area with trees and shrubbery on the western half.

2.2.4 There is no marker to delineate the northern boundary of the site. The site is bounded to the east and south by a hedgerow, and to the west by a metal fence.

2.2.5 The site is used as access for pupils to the Vale of York Academy, located to the north-east.

2.2.6 Overhead cables cross from eastern end of the building to the southern boundary of the site.

2.2.7 A number of mature trees are located on the southern edge of the site, with some additional trees adjacent to the northern boundary.

2.2.8 No evidence of fly tipping was noted on site, however, the landscaping area on the southern boundary of the site contained a number of pieces of old wooden garden furniture.

3 GEO-ENVIRONMENTAL SETTING

3.1 Anticipated Geology, Hydrogeology & Mining

3.1.1 A summary of the available published geological and hydrogeological information is provided in Table 3.1. A review of the following information was undertaken:

British Geological Survey 1:50,000 scale series, Sheet No. 63 - York, Solid & Drift Edition;
British Geological Survey on-shore borehole records database;
Coal Authority database on coal mining reporting areas from the following web pages:
- http://coal.decc.gov.uk/en/coal/cms/publications/data/map;
- http://coal.decc.gov.uk/en/coal/cms/services/planning/strategy;
Emapsite Groundsure Enviro + GeoInsight Data Report Ref. EMS-754233_979848 (Appendix A) dated 1st February 2022.

Table 3.1 - General Geological Information

Made Ground	Information presented in the Groundsure report indicates that there are two areas of artificial/made ground within 500m of the site. These are located 441m and 487m to the south-west referring to infilled ground and made ground respectively. There are two entries in the GeoInsight report that refer to historical surface ground working features within 250m of the site. These are located 191m to the south-west referring to a pond.
Superficial and Solid Geology	The majority of the site is shown to be underlain by the Alne Glaciolacustrine Formation (Clay and Silt), with the Sutton Sand Formation present on the north-western boundary of the site. The solid geology underlying the site area is recorded as being the Sherwood Sandstone Group. There are no available BGS borehole records within 250m of the site boundary.
Discontinuities	Information presented in the Groundsure report indicates that there is a bedrock fault 215m to the north-west of the site.
Hydrogeology	**Aquifer within Superficial Deposits:** Alne Glaciolacustrine Formation – Unproductive - These are drift deposits with low permeability that have negligible significance for water supply or river base flow. Sutton Sand Formation – Secondary A - Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. **Aquifer within Bedrock:** Principal - Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. **Source Protection:** There are no source protection zones within 500m of the site. **Vulnerability & Leaching Potential:** The groundwater vulnerability

	and soil leaching potential for the site is indicated to be low to medium vulnerability and low leaching class.
Hydrology	There is one surface water feature within 250m of the site. This is Bur Dike located 193m to the east of the site.
Radon	The site lies within an area where radon protective measures are not required in construction as less than 1% of properties are above the action level.
Coal Mining	***Historic Underground Working Features*** The Groundsure report does not record any historical underground working features within 1km of the site. ***Coal Mining*** Information presented on the Coal Authority website (www.coal.decc.gov.uk) indicates that the site does not lie within a Coal Mining Reporting area or a Development High Risk Area. There are no known mine entries within, or within 20m of, the boundary of the site and there are no reported areas of potential shallow mine workings on the Coal Authority database. On the basis of available information risk associated with shallow coal mining subsidence is considered to be negligible.
Non-coal Mining	Historical information indicates that there are no non-coal mining areas within 1km of the site.
Natural Cavities	The GroundSure data indicates that there are no natural cavities recorded within 1km of the study site.
Unexploded Ordnance (UXO)	Using Zetica online UXO risk maps, there is a low risk of encountering UXO on site, therefore no further action is required.

Table 3.2 - Environmental Data

Potentially Harmful Discharges (Red List) to Controlled Waters	There are no records of red list discharge consents reported to be within 500m of the site.
Licensed Discharge Consents	There are no records of licensed discharge consents reported to be within 500m of the site.
EA Recorded Pollution Incidents to Controlled Waters	There are no EA recorded pollution incidents within 500m of the site.
Landfill and Other Waste Sites	There are no historic landfill or waste sites, active or recent landfills, or licensed waste sites within 500m of the site boundary. There is one waste exemption recorded within 500m of the site. This is located 421m to the south where non-agricultural waste is being treated through aerobic composting.
Flooding	The Groundsure report indicates that the site does not lie within 50m of an Environment Agency Zone 2 or Zone 3 floodplain. There are three historical flood events recorded within 250m of the site. These are located between 215m and 222m to the east and south-east of the site where flood defences overtopped. There is a moderate risk of groundwater flooding on site.
Abstractions	There are no active groundwater, potable water or surface water abstractions located within 1km of the site.
Invasive Plant Species	Japanese Knotweed was not observed during the site walkover. It would be prudent however to undertake an invasive plant species

	survey to confirm this prior to redevelopment.
Public Register of Contaminated Land: Part 2A (EPA 1990)	There are no sites designated as contaminated land under, Section 78R of the EPA 1990, within 500m of the site.
Dangerous or Hazardous Sites	There are no NIHHS or COMAH sites or high pressure underground pipelines within 500m of the site. The are no active petrol or fuel sites within 500m of the site boundary.
Potentially Contaminative Current Land Uses	There are limited potentially contaminative industrial sites located within 250m of the site. These include an electrical substation, a communications mast, construction services and consumer product manufacturing.

4 HISTORICAL LAND USE

4.1.1 A study of historical Ordnance Survey maps has been undertaken to identify any potentially contaminative former land-uses at the site. The main historical features of the site and surrounding area are summarised in the following table, whilst a copy of the historical maps is presented in Appendix B.

4.1.2 Ordnance Survey map editions may not however be complete, and it is possible, therefore, that additional land uses to those presented in the plans have occurred.

4.1.3 A summary of the historical land use and surrounding area is presented in Table 4.1 and Table 4.2.

Table 4.1 - Historical Land Use (On site)

Date	Map Scale	Feature
1853-1584	1:10,560	The site comprises an open field within a wider area labelled as a 'Nursery'.
1892	1:2,500	Site no longer lies within a nursery. A structure is present on the western most edge of the site.
1893	1:10,560	No significant changes.
1907	1:10,560	
1909	1:2,500	
1928-1932	1:10,560	Extension of the structure on the western most edge of the site towards the north along the boundary of the site.
1931	1:2,500	No significant changes.
1937	1:2,500	Structure on the western edge of the site has been removed. A school has been constructed in the western half of the site.
1938	1:10,560	Extension of the school building to the east.
1950	1:10,560	No significant changes.
1958	1:10,560	
1960	1:1,250	Additional structures have been built on the southern edge of the site.
1961	1:2,500	No significant changes.
1969	1:1,250	Mapping incomplete – full site area not shown.
1969-1972	1:10,000	Removal of some of the structures on the southern boundary of the site.
1980-1983	1:10,000	No significant changes.
1979-1984	1:1,250	Construction on the southern edge of the site
1990-1991	1:10,000	No significant changes.
1988-1993	1:1,250	
1990-1993	1:1,250	Mapping incomplete – majority of site not shown.
1993-1994	1:1,250	Mapping incomplete – majority of site not shown.
1994-1995	1:1,250	Mapping incomplete – majority of site not shown.
1995	1:1,250	Mapping incomplete – majority of site not shown.
2001	1:10,000	No significant changes.
2003	1:1,250	No significant changes.
2010	1:10,000	No significant changes.
2022	1:10,000	No structures present on the southern edge of the site.

Table 4.2 - Historical Land Use (Off site)

Date	Map Scale	Direction	Feature
1853-1584	1:10,560	All Directions	Open fields to within 500m of the site boundary.
1892	1:2,500	North	Pond – 120m
		East	No significant changes
		South	Pond – 50m Pump – 200m
		West	Pump – 90m Pond - 120m
1893	1:10,560	North, East	No significant changes
		South, West	Pumps no longer labelled
1907	1:10,560	North, East, West	No significant changes
		South	Residential development – 250m
1909	1:2,500	All Directions	No significant changes
1928-1932	1:10,560	North, West	Residential development – 10m
		East	No significant changes
		South	Residential development – 50m
1931	1:2,500	All Directions	No significant changes
1937	1:2,500	North	Significant residential development – north of Rawcliffe Drive (20m) Allotment Gardens – 50m
		East	Allotment Gardens – 75m
		South	No significant changes
		West	Significant residential development – 50m Pond no longer present – 120m
1938	1:10,560	North, East	Allotment Gardens no longer present – 50m Pond no longer present – 120m Residential development adjacent to the eastern boundary of the site and within 500m of the site boundary.
		South	Residential development adjacent to the eastern edge of the site. Pond no longer present – 120m
		West	No significant changes
1950	1:10,560	North	School – adjacent to the northern boundary of the site. Further residential development – within 500m
		East	No significant changes
		South, West	No significant changes
1958	1:10,560	All Directions	No significant changes
1960	1:1,250	All Directions	No significant changes
1961	1:2,500	All Directions	No significant changes
1969	1:1,250	-	Mapping incomplete – only area to the west shown. No significant changes recorded.
1969-1972	1:10,000	All Directions	No significant changes
1980-1983	1:10,000	All Directions	No significant changes
1979-1984	1:1,250	North	Construction of additional building associated with the school.
1979-1984	1:1,250	East, South, West	No significant changes.
1990-1991	1:10,000	All Directions	No significant changes
1988-1993	1:1,250	All Directions	No significant changes
1993-1994	1:1,250	All Directions	No significant changes
1994-1995	1:1,250	All Directions	No significant changes
1995	1:1,250	All Directions	No significant changes
2001	1:10,000	All Directions	No significant changes

2003	1:1,250	All Directions	No significant changes
2010	1:10,000	North	Extension of the school – 25m
		East, South, West	No significant changes.
2022	1:10,000	All Directions	No significant changes

4.1.4 In summary, the site was developed with the school buildings in the 1930s, with construction and demolition of a number of structures on the southern boundary of the site.

4.1.5 The surrounding area underwent residential development from the 1900s, up until the early 2000's, with a school built to the north of the site.

5 PHASE I GEOTECHNICAL APPRAISAL

5.1 Made Ground

5.1.1 The site was developed as a school in the 1930s. It is anticipated that some made ground will be present on the site, given the previous development that has taken place, to include construction and demolition of structures on the southern edge of the site.

5.1.2 The presence, type and extent of any made ground soils will need to be established through ground investigation.

5.2 Natural Strata

5.2.1 The near surface superficial deposits are recorded as the Alne Glaciolacustrine Formation (Clay and Silt), with the Sutton Sand Formation present on the north-western boundary of the site.

5.2.2 The solid geology underlying the site area is recorded as being the Sherwood Sandstone Group.

5.3 Groundwater

5.3.1 No significant perched groundwater is anticipated, although some percolating waters may be encountered where more granular soil horizons exist within the overlying deposits. However, this des not take into account seasonal variability and the passage of time.

5.3.2 True groundwater will be present within the underlying sandstone bedrock at depth.

5.4 Stability Issues

5.4.1 The site is relatively flat and level and the area surrounding the site is similar. The only exception to this is that Rawcliffe Drive is at a slightly higher elevation than the site. No particular risk in relation to slope instability should occur on site. Where excavations are proposed close to site boundaries, properties and/or any other existing retaining structures, a risk assessment of the integrity/stability should be undertaken prior to such works being carried out. Designed and engineered temporary/permanent measures should be adopted to ensure their continued stability.

5.4.2 Where changes in gradient result across the site these will need to be adjusted by minor earthworks. It is anticipated that future ground profiles are unlikely to require earth retaining structures; if this changes, further advice may be required when more information is available.

5.4.3 With respect to natural ground subsidence, the site has been classified as having a 'Negligible' risk rating for ground dissolution hazards, a 'Very Low' risk rating for landslides and collapsible deposits, a ‘Low’ risk rating for shrink/swell clay and running sand hazards, and a ‘Moderate’ risk rating for compressible deposits.

5.4.4 Made ground deposits, where present, are anticipated to be unstable. Stability issues should also be anticipated within any near surface natural deposits, particularly where these are soft or weak or have been exposed to periods of heavy rainfall.

5.5 Coal Mining Induced Subsidence

5.5.1 Foundations will not need to be reinforced / strengthened to accommodate any potential movement associated with historic coal mining activity and any ground instability that may occur post development.

5.6 Non-Coal Mining

5.6.1 Should evidence of quarrying be encountered on site during redevelopment this should be brought to the attention of Alan Wood and Partners. Where this is found to affect construction, appropriate precautions may need to be incorporated into the design (e.g. deepened foundations, reinforced superstructure etc). Such risk is considered, at this stage, to be low however.

5.7 Excavation Conditions

5.7.1 No excavation problems are anticipated. Excavation of the materials encountered should be easily achieved using conventional hydraulic excavation techniques.

5.7.2 There is the potential for excavations to be unstable in the short term. Materials such as granular soils and made ground are liable to collapse without warning. This situation is likely to be exacerbated by water ingress. No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA report 97 (1983) should be made to establish suitable means of support, or battering of excavation sides.

5.7.3 It is considered unlikely that dewatering will be required for shallow short-term excavations. Anticipated groundwater conditions suggest that simple dewatering techniques (e.g. sump pumping) are likely to be adequate to control water ingress on a routine basis. However, it is recommended that provision for the drainage of surface water is allowed for to prevent surface water ponding or collection both during and post construction, as this may lead to deterioration of the founding stratum

6 PHASE I ENVIRONMENTAL ASSSESSMENT

6.1 Introduction

6.1.1 The following section summaries the Preliminary Phase I Conceptual Site Model (CSM), which has been produced following the review of available pertinent desk study and third party information. The CSM summarises the understanding of surface and sub-surface features, the potential sources of contamination, pathways and receptors in order to support the identification and assessment of plausible contaminant linkages.

6.2 Initial Conceptual Site Model & Risk Assessment

6.2.1 The risk assessment has been carried out to assess the likelihood of risk to human health and the wider environment, on the basis of information reviewed. The risk assessment is a qualitative *source-pathway-receptor* assessment and its function is to assess the likelihood that each possible linkage exists and to decide whether they pose potentially unacceptable risks to identified receptors (i.e. people, structures, water bodies or ecosystems) that may be harmed.

6.2.2 Risk can be defined as the combination of the consequence of a harmful effect and the probability of its occurrence. The existence of a contaminant linkage is dependent on site use, as well as environmental conditions: **if no contaminant linkage(s) can be proven, then the risk(s) may be discounted**.

6.3 Site Summary & Environmental Sensitivity

6.3.1 A review of available desk study information indicates that the proposed development area was developed for a school in the 1930s. Minor construction and demolition of structures has taken place adjacent to the southern boundary of the site.

6.3.2 The underlying geology is indicated to comprise the Alne Glaciolacustrine Formation (Clay and Silt), with the Sutton Sand Formation present on the north-western boundary of the site. The solid geology underlying the site area is recorded as being the Sherwood Sandstone Group.

6.3.3 Some perched/shallow groundwater may be present within the near surface granular deposits.

6.3.4 It is considered unlikely that elevated concentrations of CO_2 and CH_4 may be present given a lack of potential sources.

6.3.5 Although the likely sources of significant contamination are expected to be limited, there remains the potential for on-site soils to contain naturally elevated concentrations of metals and metalloids (e.g. arsenic), non-metal inorganics and organic contamination (e.g. PAH). Asbestos contaminants may be present where historic made round exists which contains it.

6.3.6 The potential leaching of mobile contaminants of concern to the underlying sandstone aquifer is considered to be low, given the recorded low leaching potential of soils within the vicinity to the site.

6.3.7 In summary, given the site history, the anticipated contaminant load within the on-site soils, its underlying geology, gassing potential and the nature of controlled waters receptors, sensitivity of the site is considered, at this stage, to be **low** to **moderate**. The nature and concentration of any contamination will need to be confirmed through testing.

6.4 Potential Sources

6.4.1 A potential source is defined as 'a contaminant which is in, or under the land and has the potential to cause harm to human health or to cause pollution of controlled waters'.

6.4.2 The following potential contaminants that may be associated with the site are summarised in Table 6.1.

Table 6.1 - Summary of Potential Contaminant Sources

Potential Sources	**Associated Potential Contaminants** (*not limited to*)	
	Metals, inorganics and other contaminants	*Organics*
Potentially contaminated made ground, near surface natural strata / perched groundwater	Heavy metals, metalloids, asbestos, sulphates	PAH

6.5 Summary of Potential Receptors

6.5.1 A receptor is the potential target of the source pollutant, to which either significant harm or deterioration in quality may be caused.

6.5.2 The potential sensitive receptors with respect to the potential contamination hazards identified above are summarised in Table 6.2.

Table 6.2 - Summary of Potential Receptors

Potential Receptor	Comment
Human Health	Site end-users Site operatives (during construction phase only)
Construction	Potable water supply pipes
	Foundations
Underlying natural strata	Near surface soils and/or any perched groundwater
Controlled water	Groundwater – Principal Aquifer

6.6 Plausible Pathways

6.6.1 Migration pathways are routes by which contaminant sources may come into contact with receptors. Potential pathways for different types of contaminants vary depending on the properties of the contaminant, the mechanism of its release and the nature of the receptor. The principal potential pollution pathways by which receptors might become exposed to potential contamination at the site are summarised in Table 6.3.

Table 6.3 - Summary of Plausible Pathways

Potential Source	Pathway
Potentially contaminated made ground, near surface natural strata / perched groundwater	Direct ingestion, dermal contact, dust and/or vapour inhalation
	Direct ingestion and/or dermal contact with liquid contaminants
	Inhalation of asbestos fibres
	Leaching and direct contact with foundations and potable water supply pipes. Lateral migration of contaminants through preferential pathways

6.7 Risk Assessment

6.7.1 The potential contaminant linkages listed above are based on available data and the features noted during the 'walkover'. Therefore, the linkages identified are tentative in nature and are subject to the following uncertainties (to be followed up through ground investigation):

Nature and extent of the made ground at the site;

Nature of the underlying natural strata at the site;

The actual distribution of contaminants within the made ground and underlying natural soils;

The hydrogeological regime beneath the site.

6.7.2 Given the proposed end-use of the site, the environmental assessment presented herein assumes that the site end-use is to be public open space near residential land. The assessment is not valid for other land uses. Should the proposed end-use of the site change, the assessment contained herein would need to be revised to accommodate this.

6.7.3 The identified potential contaminants and receptors have been considered in relation to the pathways that may link them. The risk classification has been estimated in accordance with those methods prescribed in CIRIA publication C552 '*Contaminated Land Risk Assessment: A Guide to Good Practice*', 2001.

6.7.4 Risk is regarded as a combination of the likelihood of an 'event' occurring and its severity: both elements must be taken into account when assessing risk. The method for risk assessment, or evaluation, is purely qualitative. As defined in CIRIA C552:2001, the magnitude of the potential 'severity' of risk occurring may be assessed against:

Severe: short term risk to human health likely to result in significant harm as defined under EPA 1990, Part 2A. Short term risk of pollution to sensitive water receptor;

Medium: significant harm to human health, pollution of sensitive water resource or significant change to an ecosystem or specific organism;

Mild: pollution of non-sensitive water resource but significant damage to crops, buildings, structures and services or the environment;

Minor: harm, which may result in financial loss, or expenditure to resolve. Non-permanent effects to human health. Easily repairable effects of damage to buildings, structures and services.

6.7.5 Similarly, the classification of the magnitude of the 'probability' of the risk occurring may be assessed against:

High Likelihood: a contaminant linkage exists and an event appears very likely in the short term, or almost inevitable in the long term, or pollution is causing harm at the receptor;

Likely: a contaminant linkage exists and it is probable that an event will occur. An event may not occur, but it is possible in the short term and likely over the long term;

Low Likelihood: a contaminant linkage exists and it is possible that an event will occur. It is not certain that an event will occur over time but it is less likely in the short term;

Unlikely: a contaminant linkage exists but it is not possible to say if an event will occur even over a very long time.

6.7.6 Following completion of the severity and probability assessment, classifications can be compared to indicate the actual risk each contaminant linkage presents: this can only be undertaken where there is a possibility of there being an active contaminant linkage.

6.7.7 The risk categories which can be assigned are presented in Table 6.4 and range between 'very high risk' to 'very low risk'; *NB - it is not possible to classify an identified risk as 'no-risk'*.

Table 6.4 - Risk Categories

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**Highly Likely**	Very High	High	Moderate	Moderate / Low
	Likely	High	Moderate	Moderate / Low	Low
	Low Likelihood	Moderate	Moderate / Low	Low	Very Low
	Unlikely	Moderate / Low	Low	Very Low	Very Low

Reproduced from Table 6.5, CIRIA C552/2001

Very High – severe harm could arise to a designated receptor or that severe harm is occurring. Urgent investigation and remediation is likely to be required;

High – harm could occur to a designated receptor and that urgent investigation and remediation may be needed in the short term, but are likely over the longer term;

Moderate – harm could occur. It is unlikely to be severe, most probably relatively mild. Investigation is normally required to clarify the risk with some remedial works being required in the longer term;

Low – possible that harm could occur, but if it did, at worst it would be mild;

Very Low – low possibility of harm arising, and that if it does it is not likely to be severe.

6.7.8 The identified potential contaminants and receptors have been considered in relation to the pathways that may link them. The resulting contaminant linkages are presented in Table 6.5.

Table 6.5 - Summary of Phase I Conceptual Site Model & Risk Assessment

Potential Source	Potential Receptor	Plausible Pathway	Probability	Severity	Initial Risk Rating	Provisional Solution
Potentially contaminated made ground, near surface natural strata / perched groundwater	Human Health Site end-users, inc. maintenance and site workers (short term risk during construction)	Direct ingestion or dermal contact with soil, dust and/or vapour inhalation	Low likelihood	Medium	**Moderate/Low**	Soil capping or removal of contaminated soils where necessary
		Direct ingestion and/or dermal contact with liquid contaminants	Unlikely	Mild	**Very Low**	
		Inhalation of asbestos fibres	Low likelihood	Severe	**Moderate**	Appropriate removal and disposal, burial at depth or soil capping where necessary
	Construction (Potable Water Supply Pipes)	Direct contact/leaching (tainting)	Low likelihood	Mild	**Low**	Upgraded water pipes/clean backfill material where necessary
	Construction (Foundations)	Direct contact/leaching	Low likelihood	Mild	**Low**	Appropriate concrete specification
	Controlled Waters	Surface run-off / lateral migration	Low likelihood	Mild	**Low**	Low risk anticipated given reported low leaching potential of soils

6.7.9 The preliminary conceptual site model (CSM) presented above has indicated that several potential contaminant linkages may exist on-site.

6.7.10 In order to investigate any possible risk presented by these, intrusive investigation is required. The intrusive works will provide information on actual contaminants present on-site and plausible pathways to potentially sensitive receptors.

7 GROUND INVESTIGATION FIELDWORK

7.1 Introduction

7.1.1 The investigation requirements at the site were twofold: to undertake a geotechnical investigation and an environmental investigation. A ground investigation was therefore carried out in areas of the site accessible and free from services and other obstructions to identify geotechnical and environmental liabilities in relation to the proposed development work at the site.

7.1.2 The positions of the exploratory locations are limited to areas of the site, within the site boundary, that were accessible during the works.

7.1.3 Alan Wood and Partners scoped the intrusive investigation on the basis of information submitted in the desk study report and in general accordance with guidance given in BS5930:1999+A2:2010, BS10175:2011+A1:2013 and BS EN 1997:2004 and 2007.

7.2 Site Works

7.2.1 The findings and recommendations given in this report are based on fieldwork undertaken on the 5th of February and the 13th of April 2022.

7.2.2 The positions of the exploratory holes for both phases of ground investigation are shown on the appended ground investigation plan, Figure 46794/002 Rev A. They were positioned on the basis of the findings of the site conceptual model and distributed in general accordance with the requirements of BS10175:2011+A1:2013 and the working site conditions at the time each phase of investigation was completed.

7.2.3 No specific areas of interest were targeted from either a geotechnical or environmental point of view within the first phase of investigation, with the additional trial pits used to target areas adjacent to new foundations.

7.3 Geotechnical Investigation

7.3.1 The scope of works undertaken is outlined in Table 7.1.

Table 7.1 - Summary of Works

Method of Investigation	No.	Maximum Recorded Depth (m bgl)
Windowless Sampler Boreholes	5	5.00
In situ permeability testing	1	2.00
Mechanically excavated trial pits	4	3.20

7.3.2 A development-wide geotechnical investigation was carried out to identify liabilities in relation to the proposed construction works at the site and aid the design of appropriate foundation solutions. The following objectives of the ground investigation were therefore to:

Confirm the lateral and vertical extent of any made ground soils, the nature of the underlying natural ground and the depth to bedrock at selected positions across the area under investigation;

Determine the depth to groundwater and the stability of excavation;

Recover bulk samples for geotechnical testing where necessary;

Undertake *in situ* Standard Penetration Testing (SPT) in the boreholes to determine soil strength and that of the underlying bedrock (where present);

Assess the potential for soakaway use as a means of surface water disposal through *in situ* permeability testing.

7.3.3 Standard strata descriptions of the soils encountered are in general compliance with BS EN 1997:2004, BS EN 1997:2007, BS EN ISO 14688-1:2018, BS EN ISO 14688-2:2018 and BS EN ISO 14689:2003. The individual strata depths recorded on each borehole log are those from existing ground levels.

7.3.4 Geotechnical laboratory testing was undertaken on a selection of soil samples in accordance with those techniques outlined in BS 1377:1990 'Methods of Test for Soils for Civil Engineering Purposes' at the laboratory of Professional Soils Laboratory in Doncaster. This laboratory is a fully UKAS compliant laboratory.

7.4 Environmental Investigation

7.4.1 The environmental investigation was designed so that site-specific data could be obtained with respect to any potential soil and groundwater contamination associated with the site so that risks could be quantified in relation to the *source-pathway-receptor* scenarios and plausible contaminant linkages postulated in the initial Conceptual Site Model summarised previously.

7.4.2 Given the potentially historic contaminative nature of the on-site soils, it was considered possible that, when considered within the context of proposed end-use, the on-site soils may present a potential risk to human health and/or the wider environment.

7.4.3 The scope of works undertaken, were therefore to:

Inspect and identify the general soil conditions that prevail across the site;
Assess the potential for soil contamination within any made ground, the underlying natural strata or groundwater;
Recover soil samples to test for heavy metals, metalloids, non-metal inorganics, organics and asbestos fibres.

7.4.4 Representative samples of the on-site soils were therefore recovered from the boreholes that were positioned to provide coverage of the site area under investigation. Sampling was undertaken in accordance with those guidelines prescribed in BS 10175:2011. All environmental samples were collected in 500ml plastic tubs with sealable lids, 250ml glass amber jars or vials (subject to analytical requirements). Care was taken to minimise cross contamination (i.e. wiping of equipment) between sampling. Environmental samples were packed into cool boxes with ice packs and transported by courier an MCERTS and UKAS accredited laboratory for analysis and subsequent storage.

7.4.5 The analytical strategy adopted for the environmental investigation was designed to provide an overall assessment of potential contaminants thought to likely be present within the on-site soils. Whilst no specific contaminants of concern were anticipated in significant concentrations, the soil testing undertaken was for a suite of contaminants in general accordance with NHBC Standards Chapter 4.1 'Land Quality – Managing Ground Conditions' and CLR 8 'Potential Contaminants for the Assessment of Land'

(withdrawn but used for reference purposes where applicable). The testing of the following analytes was scheduled on selected samples:

Heavy metals suite (including As, Cd, Cr, Cu, Hg, Pb, Ni, Zn);
Speciated Polycyclic Aromatic Hydrocarbons;
Speciated Total Petroleum Hydrocarbons (TPHCWG);
BTEX and MTBE;
Cyanide (free and total) and Thiocyanate;
Phenol (total);
Sulphates (Total and Water Soluble);
Asbestos fibres;
Soil leachate;
Sulphide; and
pH.

8 PHASE II GEOTECHNICAL APPRAISAL

8.1 Ground Conditions

8.1.1 The ground conditions encountered in the exploratory holes completed at the site have been summarised in Table 8.1, while discussion about each one is given in the following paragraphs.

8.1.2 A copy of the exploratory hole logs is presented in Appendix C.

Table 8.1 - Summary of Ground Conditions

Lithology	Exploration Location	Approximate proven depth (m) to base from existing ground level	Approximate Thickness (m)	Approximate Safe Bearing Capacity (kN/m^2)
Topsoil	WS4, WS6	0.35 - 0.50		N/A
Tarmac/Concrete	WS1, WS2, WS3, TP1, TP2, TP3, TP4	0.14 – 0.21		N/A
Made Ground	WS1, WS2, WS3, WS6, TP1, TP2 , TP3, TP4	0.30 - 0.50	0.14 - 0.36	Nil
Clay Deposits	WS1, WS2, WS3, WS4, WS6, TP1, TP2, TP3 , TP4	2.00 – 5.00	0.05 – 2.30	75
Silt Deposits	WS1, WS6	1.00 – 1.95	0.50 – 0.75	0
Sand Deposits	WS1, WS2, WS3, WS4, WS6, TP1, TP2, TP3 , TP4	1.20 – 5.00	0.25 – 2.40	40
Groundwater	WS1 – 0.95m bgl WS2 – 1.80m bgl WS3 – 1.00m bgl WS6 – 1.20m bgl TP1 – 1.80m bgl TP2 – 1.80m bgl TP3 – 1.80m bgl			

8.1.3 **Topsoil**: Topsoil was recorded to a maximum of 0.50mbgl in WS4 on the southern edge of the site. Further topsoil was recorded in WS6 to the north of the existing building.

8.1.4 **Made Ground**: Granular made ground was recorded below the former playground area, thought to be a subbase material, with further made ground below the topsoil to the north of the existing building.

8.1.5 Both cohesive and granular superficial deposits, comprising clays, silts and sands, were recorded below the site with groundwater recorded in all exploratory holes with the exception of WS4 and TP4.

8.1.6 In accordance with Table 8 of BS EN ISO 14688-2:2004+A1:2013 the consistency index (I_C) of the underlying cohesive soils may be described as firm to stiff.

8.1.7 **Groundwater**: Shallow groundwater was recorded in WS1 (0.95m), WS3 (1.00m) and WS6 (1.20m), with slightly deeper groundwater recorded in WS2, TP1, TP2 and TP3 (1.80m).

8.2 Visual & Olfactory Evidence of Contamination

8.2.1 Visual and olfactory evidence of contamination was recorded during the investigation within WS1. A strong hydrocarbon odour was noted between 0.14 and 0.50m below ground level.

8.3 Geotechnical Testing & Material Properties

Standard Penetration Testing

8.3.1 *In situ* standard penetration testing was undertaken in four of the windowless sampler boreholes so that an assessment on material strength and an approximate safe bearing capacity of the ground could be ascertained.

8.3.2 The field test is useful for comparing variability of backfill materials as well as undisturbed natural soils to check for possible differential settlement problems. SPT tests were carried out at 1.0m centres throughout the vertical profile of each borehole.

8.3.3 A summary of the test results is given in Table 8.2.

Table 8.2 - Summary of *In-Situ* Standard Penetration Test (SPT) Results

Depth in m bgl	Borehole 'N' Value				
	WS2	WS3	WS4	WS6	Average N_{60} Value
1.2m	11	11	9	0	10
2m	13	13	21	-	16
3m	17	11	21	-	16

Depth in m bgl	Borehole 'N' Value				
	WS2	WS3	WS4	WS6	Average N_{60} Value
4m	16	26	17	-	20
5m	28	26	-	-	27
	N60 = (Er / 60) x N Value = $1.32E_r$ Energy Ratio (79%)				

Atterbergs, Moisture Content & Volume Change Potential

8.3.4 The geotechnical laboratory testing was carried out on 3 samples of cohesive soil by PSL LTD. A copy of the test results are presented in Appendix D but are summarised in Table 8.3.

Table 8.3 - Plasticity Index Test Results

Borehole Number	Depth (m)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Volume Change Potential*
WS2	2.10	57	24	33	98	Medium
WS3	2.10	53	24	29	97	Medium
WS4	2.50	34	15	19	96	Low

* VCP: 10-19% = Low, 20-39% = Medium, 40% and greater = High (after NHBC:2022).

8.3.5 The Plasticity Index (Ip) of a soil is a measure of its Volume Change Potential (VCP) and is determined by Atterberg Limits tests, the results of which are given in the above table. All tests to determine the liquid limit (w_L) and plastic limit (w_p) were also performed by PSL LTD. A Modified Plasticity Index (I'p) has been calculated for the samples tested, which is defined as the Plasticity Index multiplied by the percentage of particles less than 425µm. The conversion factor applied is presented in NHBC Standards (2022), Chapter 4.2.

8.3.6 The calculated modified plasticity index (NHBC Chapter 4.2) was found to be between 19% and 33%, which is equivalent to a **low** to **medium** volume change potential, according to the NHBC guidelines. The highest recorded worst-case VCP (**medium**) should be adopted for design purposes however to allow for variation in ground conditions across the development area.

Contamination and Performance of Building Materials (Cementitious Products)

8.3.7 Seven soil samples were analysed for a suite of contaminants consistent with BRE Special Digest 1 'Concrete in Aggressive Ground' (2005). A copy of the individual test results is given in the appended laboratory certificates in Appendix F.

8.3.8 The pH values recorded for the soil samples ranged between 7.7 and 9.3 (pH units) with an average of 8.1 indicating slightly alkaline conditions prevail within the on-site soils.

8.3.9 Water soluble sulphate analysis of the soils yielded concentrations between <0.01g/l and 1.189g/l in the samples (0.421g/l on average). An assessment of the data was carried out in accordance with Section C4 '*Site Investigation for Aggressive Ground Conditions'* and the procedure prescribed in Section C5 '*Classification of Site Locations for Chemicals Aggressive to Concrete'* of BRE SD1 (2005) to assess whether ground conditions at the site are potentially aggressive to buried concrete products. The results of the assessment indicate that a Design Sulphate classification of DS-2 may be adopted along with an ACEC class of AC-2.

8.3.10 Mobile groundwater conditions have been assumed in this assessment.

9 LABORATORY CHEMICAL TESTING

9.1 Preamble

9.1.1 Seven representative samples of soil from within the near surface and at depth were analysed for the suite of contaminants outlined in Section 7.4.5 above. This was in order to assess the general degree and nature of contamination within the on-site soils in relation to the site's proposed redevelopment.

9.2 Guidance for Analytical Results - Assessment Criteria

Soil

9.2.1 With reference to the proposed end use of the site, the results of the chemical testing were assessed as part of an environmental risk assessment against a number of potential receptors, considering risks to human health, environmental quality and the built environment. Such risk assessment comprises the initial comparison of the measured soil concentrations with Generic Assessment Criteria (GAC), which in this instance are considered protective of a 'public open space near residential land' end use.

9.2.2 In line with current best practice in the UK, initial screening of contaminant concentrations is carried out against appropriate published generic assessment criteria. Currently the authoritative generic assessment criteria are considered to be DEFRAs SGVs, DEFRAs Category 4 Screening Levels (2014) and the LQM/CIEH Suitable 4 Use Levels (2015). The assessment criteria have been derived on the basis of currently widely accepted assumptions relating to the modelling of human exposure to soil contaminants for the standard land uses: residential (with and without home-grown produce), allotments, commercial and public open spaces (close to residential properties and parks).

9.2.3 The general consensus between contaminated land practitioners is that the C4SL values, which are based on the low level of toxicological concern (LLTC), are less cautious than the GAC values published by LQM/CIEH and may not, therefore, be wholly applicable for use outside the context of Part 2A Statutory Guidance. Although both publications in no way undermine the validity of existing Environment Agency guidance presented in, for example, SR2, SR3 and the existing CLEA software, we are of the mind that the LQM/CIEH S4UL values, which are based on Health Criteria

that represents minimal or tolerable levels of risks to health (as described in the Environment Agency's SR2 guidance) but incorporates the current exposure assumptions presented in DEFRAs C4SL guidance, provide a better starting point from which to generate determine assessment criteria that can be applied to brownfield development sites and are 'suitable for use' under the planning system.

9.2.4 It should be noted that all approaches are based on sandy loam soil with 6% soil organic matter (SOM). Whilst this does not affect metal contaminants, as they are not dependent on soil type or SOM, the algorithms used to model plant uptake and volatilisation for organic contaminants do take account of SOM content in the soil. The GAC values for metals in the standard land uses may therefore be directly applied, whether these are SGVs, C4SL or S4UL derived, whilst independent GAC values for organics (e.g. PAH, TPH) have been generated using CLEA Version 1.071 and the toxicological updates presented in the aforementioned documents. These have also been adjusted for soil type and are calculated for SOM contents at 1%, 2.5% and 6% for a sandy soil.

9.2.5 A summary of the generic assessment criteria values is presented in Appendix F.

9.3 Test Results

9.3.1 The chemical analysis results and screening criteria are summarised in Tables 9.1 to 9.3.

Table 9.1 - Summary of Total Soil Concentrations

Contaminant of Concern	GAC* (mg/kg)	Contaminant Concentrations (mg/kg)		No. of Samples Tested	No. of Samples >GAC	Pass/Fail Tier 1 GAC Screen
		Min	Max			
Metals						
Arsenic (inorganic)	79	4.1	6.7	7	0	PASS
Cadmium	220	<0.2	0.3	7	0	PASS
Chromium (III)	1,500**	28	92	7	0	PASS
Copper	12,000**	13	23	7	0	PASS
Mercury (inorganic)	120**	<0.5		7	0	PASS
Nickel	230**	8.4	18	7	0	PASS
Lead	630	35	94	7	0	PASS
Selenium	1,100**	0.7	5.7	7	0	PASS
Zinc	81,000**	25	78	7	0	PASS

* DEFRA (2014). Development of Category 4 Screening Levels (SP1010);
** LQM/CIEH (2015). S4UL for Human Health Risk Assessment.

Table 9.2 - Summary of Chemical Test Results (PAH)

Contaminant of Concern	GAC* (mg/kg)	Contaminant Concentrations (mg/kg)		No. of Samples Tested	No. of Samples >GAC	Pass/Fail Tier 1 GAC Screen
		Min	Max			
Naphthalene	4,900	<0.02	202.14	7	0	PASS
Acenaphthylene	15,000	<0.02	19.73	7	0	PASS
Acenaphthene	15,000	<0.02	161.01	7	0	PASS
Fluorene	9,900	<0.02	128.54	7	0	PASS
Phenanthrene	3,100	0.04	944.86	7	0	PASS
Anthracene	74,000	<0.02	221.26	7	0	PASS
Fluoranthene	3,100	0.09	811.06	7	0	PASS
Pyrene	7,400	0.07	594.09	7	0	PASS
Benzo(a)anthracene	29	0.05	294.08	7	1	**FAIL**
Chrysene	57	0.03	274.51	7	1	**FAIL**
Benzo(b)fluoranthene	7.2	0.05	273.48	7	1	**FAIL**
Benzo(k)fluoranthene	190	<0.03	109.98	7	0	PASS
Benzo(a)pyrene	5.7	0.04	247.25	7	1	**FAIL**

Contaminant of Concern	GAC* (mg/kg)	Contaminant Concentrations (mg/kg)		No. of Samples Tested	No. of Samples >GAC	Pass/Fail Tier 1 GAC Screen
Dibenzo(a,h)anthracene	0.57	<0.02	37.64	7	1	**FAIL**
Indeno(1,2,3-cd)pyrene	82	0.03	174.88	7	1	**FAIL**
Benzo(g,h,i)perylene	640	0.02	149.13	7	0	PASS

* [CLEA/LQM/CIEH, 2015] Calculated for a public-open space near residential land end-use scenario in CLEA v1.071. GAC range for 2.5% SOM used unless stated otherwise. Values will be more conservative for cohesive soils.

Table 9.3 - Summary of Chemical Test Results (TPH)

Contaminant of Concern	GAC* (mg/kg)	Contaminant Concentrations (mg/kg)		No. of Samples Tested	No. of Samples >GAC	Pass/Fail Tier 1 GAC Screen
		Min	Max			
Aromatic						
TPH >EC5-EC7	56,000	<0.01		1	0	PASS
TPH >EC7-EC8	56,000	<0.01		1	0	PASS
TPH >EC8-EC10	5,000	0.10		1	0	PASS
TPH >EC10-EC12	5,000	254		1	0	PASS
TPH >EC12-EC16	5,100	516		1	0	PASS
TPH >EC16-EC21	3,800	1358		1	0	PASS
TPH >EC21-EC35	3,800	2059		1	0	PASS
TPH >EC35-EC44	3,800	40		1	0	PASS
Aliphatic						
TPH >EC5-EC6	590,000	<0.1		1	0	PASS
TPH >EC6-EC8	610,000	<0.1		1	0	PASS
TPH >EC8-EC10	13,000	0.5		1	0	PASS
TPH >EC10-EC12	13,000	23		1	0	PASS
TPH >EC12-EC16	13,000	21		1	0	PASS
TPH >EC16-EC35	250,000	168		1	0	PASS
TPH >EC35-EC44	250,000	15		1	0	PASS

* [CLEA/LQM/CIEH, 2015] Calculated for a public-open space near residential land end-use scenario in CLEA v1.071. GAC range for 2.5% SOM used unless stated otherwise. Values will be more conservative for cohesive soils.

Metals, Metalloids and Other Inorganic Analytes

9.3.2 A total of seven soil samples were analysed. Assessment of the soils data indicates that there are no elevated concentrations of potential contaminants of concern that exceed relevant GAC criteria.

9.3.3 Potential unacceptable risk to human health in a public open space near residential land end use scenario with respect to metals, metalloids and non-metal inorganics is therefore not anticipated.

Organics (PAH, TPH, BTEX and MTBE)

9.3.4 A total of seven soil samples were analysed for PAH with one of the samples also analysed for TPH. None of the samples analysed for TPH returned concentrations above relevant GAC's, however, elevated concentrations of PAH were recorded in the sample of made ground obtained from WS1 at 0.20m bgl.

9.3.5 There is therefore a potential unacceptable risk to human health in a public open space near residential land end use scenario with respect to organic contaminants.

Asbestos

9.3.6 A total of seven soil samples were analysed. No asbestos fibres were detected in the samples tested.

9.3.7 Risk associated with asbestos containing materials is therefore not anticipated.

UKWIR

9.3.8 Note that the use of barrier pipe is applicable for all brownfield sites according to the UKWIR guidelines. It is recommended that consultation be held with the water authority to confirm any specific requirements they may have.

10 PHASE II ENVIRONMENTAL APPRAISAL

10.1 Introduction

10.1.1 The preliminary CSM given above presented our initial understanding of the site, being based on available geological information, site location, likely contamination status and the overall risk it presented to the identified receptors through various exposure pathways.

10.1.2 This section revises the initial CSM in light of the ground investigation findings and chemical analysis results presented above.

10.1.3 The revised conceptual site model has been developed for the proposed development. This summarises our understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors assuming that no remediation has been undertaken at the site.

10.2 Ground Conditions - Summary

10.2.1 Made Ground - Granular made ground was recorded below the former playground area, thought to be a subbase material, with further made ground below the topsoil to the north of the existing building.

10.2.2 Natural Strata – Both cohesive and granular superficial deposits, comprising clay, silt and sand were recorded below the site.

10.2.3 Groundwater was recorded in all boreholes with the exception of WS4.

10.2.4 Elevated PAH contaminants were recorded in WS1 at 0.20m bgl in a sample of made ground. The same material was recorded as having a strong TPH odour during the ground investigation.

10.3 Qualitative Contaminated Land Risk Assessment

10.3.1 Current UK legislation on contaminated land is principally contained in Sections 78(A) to (YC) in Part 2A of the Environmental Protection Act 1990, which was retrospectively inserted by Section 57 of the Environment Act 1995. The Contaminated Land Regulations 2000 were amended in 2005. The Environmental Protection Act 1990: Part IIA Contaminated Land, Statutory Guidance, Edition 2, 2006, promulgates the

revised statutory guidance with respect to the operation of the Contaminated Land Regime following the implementation of the Contaminated Land Regulations, 2005.

10.3.2 The definition of contaminated land is central to the operation of Part 2A. Legislation adopts the principle of a 'suitable for use' approach for the assessment of contaminated land, the rationale reflected in the site-specific risk assessment and determination of remedial strategy. Action is only required if unacceptable risks are posed to human health or to the environment, taking into account the current land use and geo-environmental setting.

10.3.3 The legislation places a responsibility on the Local Authority to determine whether the land under its jurisdiction is contaminated by consideration of whether:

Significant harm is being caused;
There is a significant possibility of significant harm being caused;
Significant pollution of controlled waters is being caused or is likely to be caused.

10.4 Assessment Framework

10.4.1 The statutory guidance describes a risk assessment methodology in terms of ‘significant pollutants’ and ‘contaminant linkages’, using ‘source-pathway-receptor’ scenarios for the site. Contaminant linkages are formed when there is a linkage between a contaminant source and a receptor by means of a pathway. Each element has to be present, or no linkage can be formed.

10.4.2 Risk assessment and the procedure of identifying sources, pathways and receptors is recognised as an approach to determine the extent and significance of contamination either within the context of Part 2A (when assessing current site status or when considering the acquisition of an existing development) or the planning process (for the redevelopment of an existing site, or when considering the acquisition of a site for redevelopment purposes). Either way, the ‘suitable for use’ approach is adopted when assessing risk and the source-pathway-receptor assessment defines the conceptual model for the site.

10.4.3 Within the context of this report therefore, the revised risk assessment has been undertaken on the basis that the ‘suitable for use’ approach remains aligned with the site being redeveloped for the end use given above.

10.5 Summary of Identified Contaminant Linkages

10.5.1 On the basis of the ground investigation and laboratory test results, it is evident that the on-site soils do not contain elevated concentrations of inorganic and/or organic contaminants in excess of the adopted GACs.

10.5.2 Risk to human health, the development and the wider environment, with respect to the identified levels of contaminants within the on-site soils, is therefore not anticipated to be significant.

10.5.3 A summary of the revised risk assessment is given in Table 10.1.

Table 10.1 - Summary of Revised Conceptual Site Model & Risk Assessment

Potential Source	Potential Receptor	Plausible Pathway	Initial Risk Rating	Probability	Severity	Revised Risk Rating	Solution
Potentially contaminated made ground, near surface natural strata / perched groundwater	Human Health Site end-users, inc. maintenance and site workers (short term risk during construction)	Direct ingestion or dermal contact with soil, dust and/or vapour inhalation	**Moderate/Low**	Low likelihood	Mild	**Low**	Appropriate PPE to be worn by construction workers when working in the area of impacted soils.
		Direct ingestion and/or dermal contact with liquid contaminants	**Very Low**	Unlikely	Mild	**Very Low**	No risk anticipated
		Inhalation of asbestos fibres	**Moderate**	Unlikely	Severe	**Moderate/Low**	No risk anticipated. *Revised risk rating cannot be downgraded given severity*
	Construction (Potable Water Supply Pipes)	Direct contact/leaching (tainting)	**Low**	Low likelihood	Mild	**Low**	No significant risk anticipated. Localised PAH in made ground soils. Excavate and dispose.
	Construction (Foundations)	Direct contact/leaching	**Low**	Unlikely	Mild	**Very Low**	No risk anticipated. Appropriate concrete specification
	Controlled Waters	Surface run-off / lateral migration	**Low**	Unlikely	Mild	**Very Low**	No risk anticipated

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 General

11.1.1 This geo-environmental appraisal has been carried out in relation to the redevelopment of the Former Clifton Without Junior School, located on the junction of Rawcliffe Lane and Rawcliffe Drive, York.

11.1.2 It has been assumed in the production of this report that the site is to be redeveloped for a new community centre and library, with associated outdoor space to include a play area and soft landscaping.

11.2 Soil Contamination - Risk Evaluation

11.2.1 The revised Conceptual Site Model confirms that a small number of potential contaminant linkages exist at the site in relation to existing on-site soils.

Human Health Receptors

11.2.2 No elevated concentrations of potential contaminants of concern above relevant commercial GAC values were measured within the on-site soils in relation to inorganic contaminants. Risk to future end users of the site is considered to be low.

11.2.3 A risk to construction workers from PAH contamination is likely where localised made ground soils are present on the western edge of the site.

11.2.4 Any potential risks to construction workers must be specifically assessed as part of the health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g. HSE, 1991; CIRIA, 1996).

Controlled Waters Receptors

11.2.5 No sources of potentially significant mobile contamination have been identified which could present a risk to controlled waters (underlying aquifer) receptors.

Ecological Receptors

11.2.6 There are no known ecological receptors at the site.

Utilities

11.2.7 It is recommended that the results of the chemical testing and details of the proposed redevelopment of the site are provided to the appropriate utility companies to determine the necessity for service protection.

Potable Water Supplies

11.2.8 Risk to potable water supply pipes is considered to be low. On the basis of available test results it is unlikely that protective measures will be required. Consultation should however be undertaken with the local water authority with respect to any precautions they may require, prior to construction.

Ground Gas Risk

11.2.9 A lack of potential ground gas sources was identified within the Phase I element of this report, therefore, ground gas monitoring was not warranted.

Asbestos Containing Materials

11.2.10 No asbestos fibres were identified in the samples near surface soils analysed by the laboratory. Risks to construction workers and site end users are considered to be low.

Radon Precautions

11.2.11 No radon protection measures are required in construction.

11.3 Construction - Risk Evaluation

Site Preparation

11.3.1 The effected soils on the western edge of the site, impacted by PAH contamination, require a remediation strategy to ensure complete removal.

Sulphate Attack

11.3.2 Soil sulphate concentrations measured during the investigations have been compared to levels within the BRE Special Paper SD1:2005. In considering the sulphate values, the site has been assessed as 'brownfield'.

11.3.3 The on-site soils are not considered to be at risk from containing pyrite.

11.3.4 Design Sulphate classification of DS-2 should be suitable along with an ACEC class of AC-2. However, this does not make any necessary allowance for the requirements of structural strength, or requirements for durability of concrete. Further consultation should be made with the designing engineer with respect to the site specific sulphate resistant concrete to be used.

Mining Risk

11.3.5 On the basis of the available information, the potential for there to be shallow mine workings beneath the site is considered to be negligible.

Foundations

11.3.6 Made ground soils of any type are **not** suitable founding stratum.

11.3.7 A shallow foundation solution, such as strips or trench fill, is not recommended given the shallow groundwater encountered. In addition to this, the requirement to remove the historical and remnant below ground structures will lead to disturbance of the ground below the site, resulting in a reduction in bearing capacity of the already low strength granular near surface deposits.

11.3.8 As the proposed new construction is required to tie in with existing buildings on site, a raft foundation may not be the most appropriate foundation solution given that a granular subbase will be required (typically 450mm) and the requirement to tie in the new foundation against the existing building.

11.3.9 Using the additional ground investigation data from the trial pitting, vibro stone columns are likely to be a suitable foundation solution. An appropriate detailed design should be undertaken by a suitably experienced contractor.

11.3.10 The widening, strengthening and reinforcement of foundations in accordance with NHBC Standards would be required where footings are found to straddle strata of different type (e.g. sand, clay, silt) or where soft and/or where locally unstable ground is encountered at founding depth.

11.3.11 Where ground disturbance is encountered during construction, an assessment of the ground and its implication on foundation design will need to be undertaken. In this instance it is envisaged that some ground improvement may be required with foundations being suitably strengthened/reinforced or an alternate foundation solution

being implemented. This risk is likely to be low, but a watching brief should be undertaken during construction.

Floor Slabs

11.3.12 It is unlikely that a ground bearing slab will be suitable for use in the proposed development, given the loose and unstable shallow soils encountered during the ground investigation.

11.3.13 A suspended floor system incorporating a sub-floor void, such as beam and block, will be required for all structures where the foundations lie within the heave zone of trees as defined by NHBC Standards (Chapter 4.2), or where seasonally desiccated soils are present at the time of construction. Suspended floor slabs would also be needed where in excess of 600mm of unsuitable material is present below floor slabs following site preparation/regrading.

Precautions Near Trees

11.3.14 There are many trees around the boundaries to the site so precautions are likely to be required where structures lie within influencing distance given the underlying (clay) ground conditions; this will be subject to a tree survey and foundation schedule.

11.3.15 In addition, precautions would be required where trees are to be removed or where new planting is proposed. All foundations should be constructed in accordance with NHBC Standards (i.e. Chapter 4.2).

Drainage and Soakaways

11.3.16 *In situ* permeability testing was carried out in in WS1 within the superficial sand deposits. The location of the tests is shown on Figure 46794/002.

11.3.17 Shallow groundwater was encountered across the majority of the site, between depths of 0.90m and 1.80m. As a result of this, the falling head test was unsuccessful, and it is recommended that soakaway drainage is not adopted within the proposed development.

11.3.18 It should be noted that the groundwater levels recorded within the exploratory holes will vary with seasonal changes and with the passage of time.

Roads and Car Parks

11.3.19 No *in situ* CBR testing has been carried out to date as the final development levels at the site are unknown.

11.3.20 On the basis of visual observation, it is considered that the near surface soils are likely to have a CBR value of <2%, but this should be confirmed where new roads/car parking are required as part of the development.

11.3.21 Highways Agency document CD225 (2020) states that where a subgrade has a CBR lower than 2.5%, it is considered unsuitable support for a pavement foundation since it would tend to deform under construction traffic and must be improved. All road design should be discussed with the local authority if highways are to be subject to a Section 38 agreement.

11.3.22 It should be noted that CBR values are sensitive to different soil moisture contents which, in turn, are influenced by seasonal changes and the passage of time.

G*round Stability*

11.3.23 Some ground instability should be anticipated within the near surface if granular or weak strata are present, or where excavations are left open during prolonged periods of wet weather (e.g. in service trenches). The underlying sand was found to be water bearing relatively shallow. This situation is likely to be exacerbated by water ingress. Allowance for instability in this material should be made where necessary.

11.3.24 An adequate drainage system for surface water may need to be installed by a competent contractor in order to prevent surface water ponding or collection, both during and post construction, as this may lead to deterioration and weakening of the founding stratum.

11.3.25 Where excavations are proposed close to site boundaries and there is the possibility of weak/unstable ground passing across that boundary and beneath adjacent structures, a risk assessment of the integrity/stability should be undertaken prior to such works being carried out. Designed and engineered temporary/permanent measures should be adopted to ensure their continued stability where necessary.

Excavations

11.3.26 Shallow hard rock is not anticipated across the majority of the site given the geology encountered during the ground investigation. However, some obstructions may be present across the southern edge of the site where previous construction has been removed, as shown on the historical mapping.

11.3.27 The proposed redevelopment will require the removal of remnant foundations. The breaking-out of obstructions for either foundations or other construction requirements should be allowed for. Excavation of the materials encountered should be easily achieved using conventional hydraulic excavation techniques.

11.3.28 No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA report 97 (1983) should be made to establish suitable means of support, or battering of excavation sides.

Outline Remediation Requirements

11.3.29 On the basis of available information, it is considered that delineation and removal of PAH contamination on the western side of the site is required.

11.3.30 The chemical properties of any materials brought to site, where required, should be confirmed prior to importation.

Disposal of Soils

11.3.31 Should brightly coloured or odorous soil be encountered during the proposed construction works, Alan Wood and Partners should be notified immediately. An experienced geo-environmental engineer will visit site for further sampling, analysis and risk assessment, where required.

11.3.32 Any materials removed from site should be undertaken in accordance with the Duty of Care Regulations 1991 and the Hazardous Waste Regulations 2005. There will also be a requirement to classify the waste in accordance with the European Waste Catalogue. The waste should also be subject to Waste Acceptance Criteria (WAC) testing.

11.4 Further Works

11.4.1 A vibro stone column design should be undertaken by a specialist contractor.

12 REGULATORY APPROVAL

12.1.1 The conclusions and recommendations presented in this report are considered reasonable on the basis of available information and the assessment of the site as carried out by Alan Wood and Partners.

12.1.2 It should be noted however that the works undertaken cannot be guaranteed to gain approval by the Regulatory Authorities and your Warranty Provider, so copies of this report should be made available to the relevant organisations (as appropriate) for their comment and approval, prior to undertaking any irrecoverable works associated with the site.

13 INFORMATION SOURCES

In addition to the specific references cited in the text, the following references have been referred to in the production of this report, where relevant to the defined project objectives.

1 BRE *BR211* (2015) *Radon: guidance on protective measures for new dwellings*;

2 BRE GBG 75 (2015), '*Radon Protection For New Large Buildings';*

3 BS5930 (2015), *Code of practice for site investigations*;

4 BS:8576 (2013), *Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOCs)*;

5 BSEN 1997-1 (2004), *Geotechnical Design Part 1 – General Rules*;

6 BSEN 1997-2 (2007), *Geotechnical Design Part 2 – Ground investigation and testing*;

7 Chartered Institute of Environmental Health (CIEH): *Professional Practice Note: Reviewing human health risk assessment reports invoking contaminant oral bioavailability measurements or estimates* (2009);

8 CIRIA C552 (2001), *Contaminated Land Risk Assessment, A Guide to Good Practice*;

9 CIRIA C665 (2007), *Assessing risks posed by hazardous ground gases to buildings*;

10 CL:AIRE / EIC / AGS: *Soil Generic Assessment Criteria for Human Health Risk Assessment* (updated January 2010 version);

11 Coal Authority, *www.coal.decc.gov.uk*;

12 DEFRA SP1010: *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Policy Companion Document*, December 2014;

13 DETR Circular 02/2000 (2000). *Environmental Protection Act 1990 Part IIA. Contaminated Land.* Department of the Environment, Transport and the Regions, Circular 02/2000, Dated 20th March 2000;

14 Emapsite GroundSure Enviro + GeoInsight Report, report ref. EMS-754233_979848, dated 1st February 2022;

15 Environment Agency (EA) & DEFRA: Model Procedures for the Management of Land Contamination – Contaminated Land Report 11 (CLR11) (2004);

16 Environment Agency, *www.environment-agency.org.uk*;

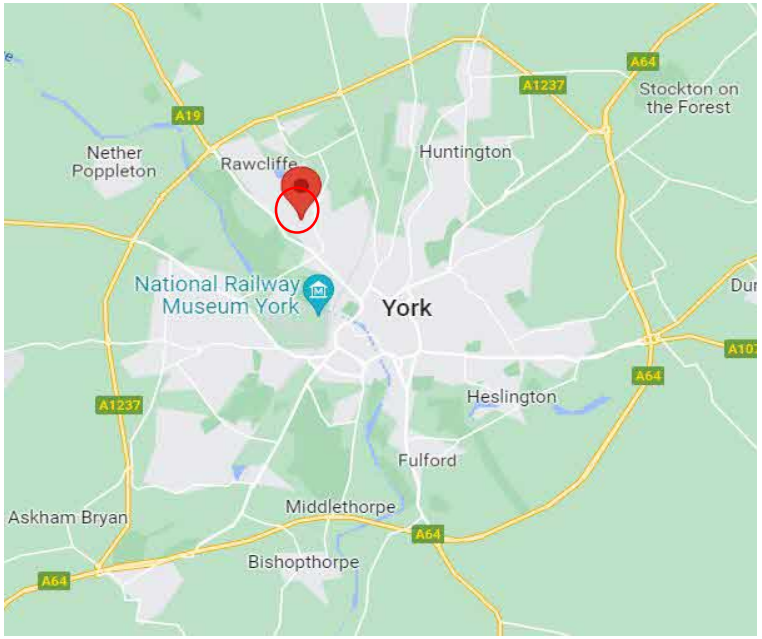
17 Environment Agency (2009). *Human Health Toxicological Assessment of Contaminants in Soil*, Science Report SC050021/SR2;

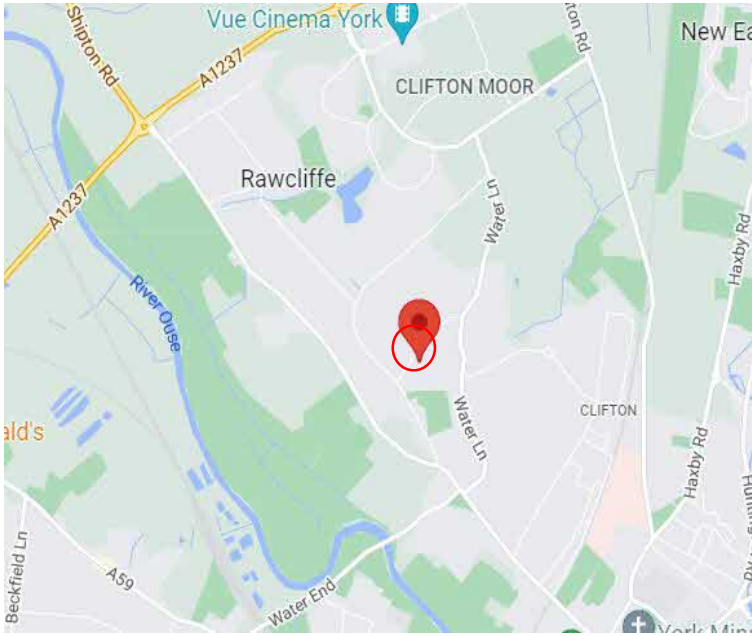
18 Environment Agency (2009).*Updated Technical Background to the CLEA Model*, Science Report SC050021/SR3;

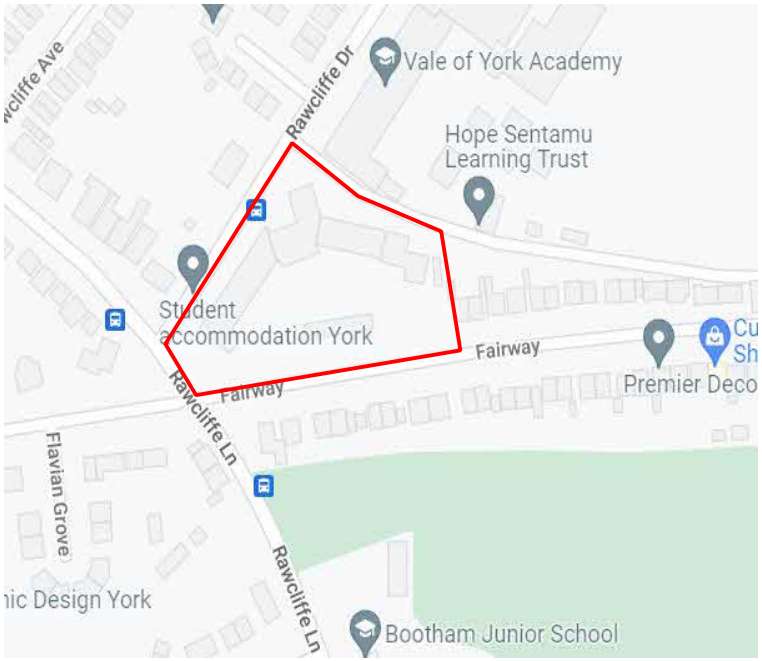
19 Land Quality Management / CIEH: *The LQM/CIEH S4UL's for Human Health Risk Assessment*, Land Quality Press, Nottingham, 2015. Publication Number S4UL3286;

20 NHBC Chapter 4.2 (2022), *Building near trees,* NHBC Publication, 2022.

FIGURES & DRAWINGS







DO NOT SCALE

Approximate Site Location

Approximate Site Boundary

N

Alan Wood & Partners

Client.	City of York Council		
Project.	Clifton Explore Site		
Drawing.	Site Location Plan		
Date. 19.03.22	Scale. NTS		
Drawn by. AHB	Check by. JMS	Approved by. JMS	
Status:	FINAL		
Job no. 46794	Fig. no. 001	Rev.	

DO NOT SCALE

Approximate Red Line Site Boundary

Approximate Windowless Sampler Borehole Location

Approximate Trial Pit Location

N

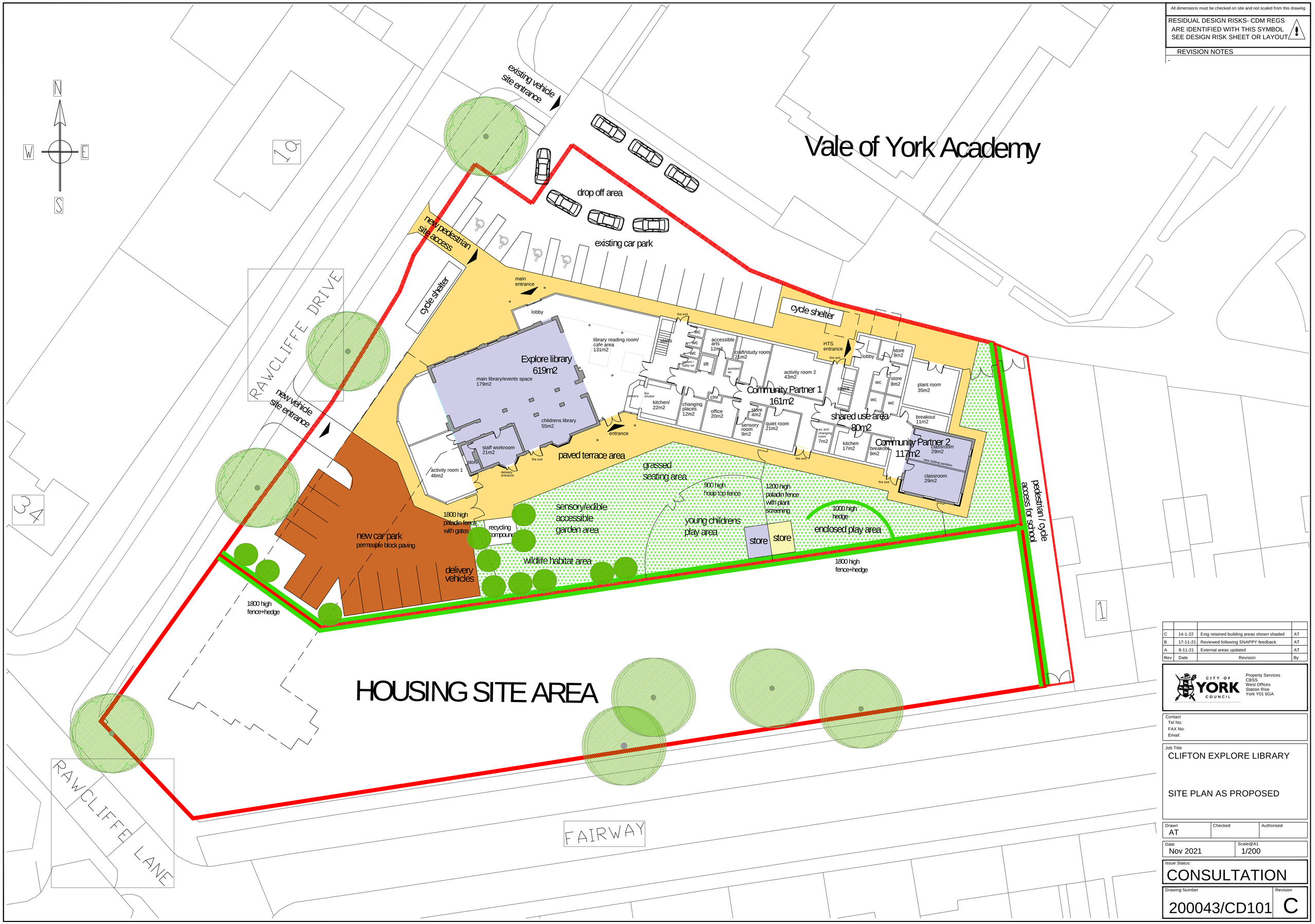
Alan Wood & Partners

Client. City of York Council		
Project. Clifton Explore Site		
Drawing. Completed Exploratory Hole Locations		
Date. 09.02.22	Scale. NTS	
Drawn by. AC	Check by. JMS	Approved by. JMS
Status: FINAL		
Job no. 46794	Fig. no. 002	Rev. A

All dimensions must be checked on site and not scaled from this drawing

RESIDUAL DESIGN RISKS- CDM REGS ARE IDENTIFIED WITH THIS SYMBOL SEE DESIGN RISK SHEET OR LAYOUT

REVISION NOTES
-



Rev	Date	Revision	By
C	14-1-22	Extg retained building areas shown shaded	AT
B	17-11-21	Reviewed following SNAPPY feedback	AT
A	8-11-21	External areas updated	AT

CITY OF YORK COUNCIL

Property Services
CBSS
West Offices
Station Rise
York Y01 6GA

Contact
Tel No:
FAX No:
Email:

Job Title
CLIFTON EXPLORE LIBRARY

SITE PLAN AS PROPOSED

Drawn	Checked	Authorised
AT		

Date	Scale@A1
Nov 2021	1/200

Issue Status:
CONSULTATION

Drawing Number	Revision
200043/CD101	C

APPENDIX A

GROUNDSURE ENVIRO + GEOINSIGHT REPORT

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

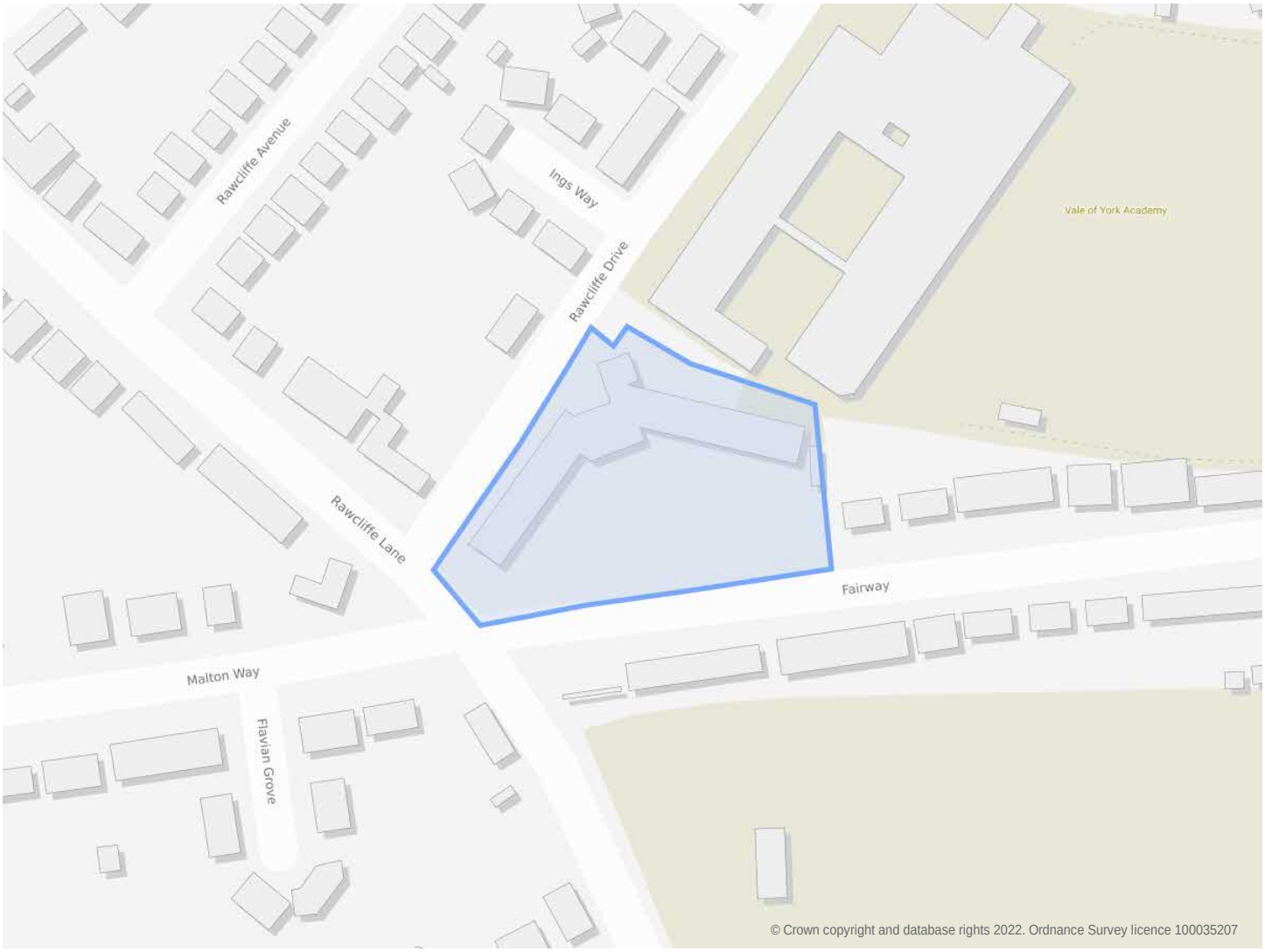
459031 453620

Order Details

Date:	01/02/2022
Your ref:	EM S_754233_979848
Our Ref:	EM S-754233_979848
Client:	emapsite

Site Details

Location:	459031 453620
Area:	0.72 ha
Authority:	City of York Council



Summary of findings p. 2
OS MasterMap site plan p.12
Aerial image p. 8
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Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	0	0	1	11	-
14	1.2	Historical tanks	0	1	0	1	-
15	1.3	Historical energy features	0	0	1	8	-
15	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	Historical garages	0	0	0	0	-
16	1.6	Historical military land	0	0	0	0	-
Page	**Section**	**Past land use - un-grouped**	**On site**	**0-50m**	**50-250m**	**250-500m**	**500-2000m**
17	2.1	Historical industrial land uses	0	0	2	12	-
18	2.2	Historical tanks	0	2	0	1	-
19	2.3	Historical energy features	0	0	2	17	-
20	2.4	Historical petrol stations	0	0	0	0	-
20	2.5	Historical garages	0	0	0	0	-
Page	**Section**	**Waste and landfill**	**On site**	**0-50m**	**50-250m**	**250-500m**	**500-2000m**
21	3.1	Active or recent landfill	0	0	0	0	-
21	3.2	Historical landfill (BGS records)	0	0	0	0	-
22	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
22	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
22	3.5	Historical waste sites	0	0	0	0	-
22	3.6	Licensed waste sites	0	0	0	0	-
22	3.7	Waste exemptions	0	0	0	1	-
Page	**Section**	**Current industrial land use**	**On site**	**0-50m**	**50-250m**	**250-500m**	**500-2000m**
24	4.1	Recent industrial land uses	0	0	5	-	-
25	4.2	Current or recent petrol stations	0	0	0	0	-
25	4.3	Electricity cables	0	0	0	0	-
25	4.4	Gas pipelines	0	0	0	0	-
25	4.5	Sites determined as Contaminated Land	0	0	0	0	-

26	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
26	4.7	Regulated explosive sites	0	0	0	0	-
26	4.8	Hazardous substance storage/usage	0	0	0	0	-
26	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
26	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
27	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
27	4.12	Radioactive Substance Authorisations	0	0	0	0	-
27	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
27	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
27	4.15	Pollutant release to public sewer	0	0	0	0	-
28	4.16	List 1 Dangerous Substances	0	0	0	0	-
28	4.17	List 2 Dangerous Substances	0	0	0	0	-
28	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
28	4.19	Pollution inventory substances	0	0	0	0	-
28	4.20	Pollution inventory waste transfers	0	0	0	0	-
29	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
30	5.1	Superficial aquifer	Identified (within 500m)				
32	5.2	Bedrock aquifer	Identified (within 500m)				
33	5.3	Groundwater vulnerability	Identified (within 50m)				
34	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
34	5.5	Groundwater vulnerability- local information	None (within 0m)				
35	5.6	Groundwater abstractions	0	0	0	0	2
36	5.7	Surface water abstractions	0	0	0	0	16
40	5.8	Potable abstractions	0	0	0	0	15
43	5.9	Source Protection Zones	0	0	0	0	-
43	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
44	6.1	Water Network (OS MasterMap)	0	0	1	-	-

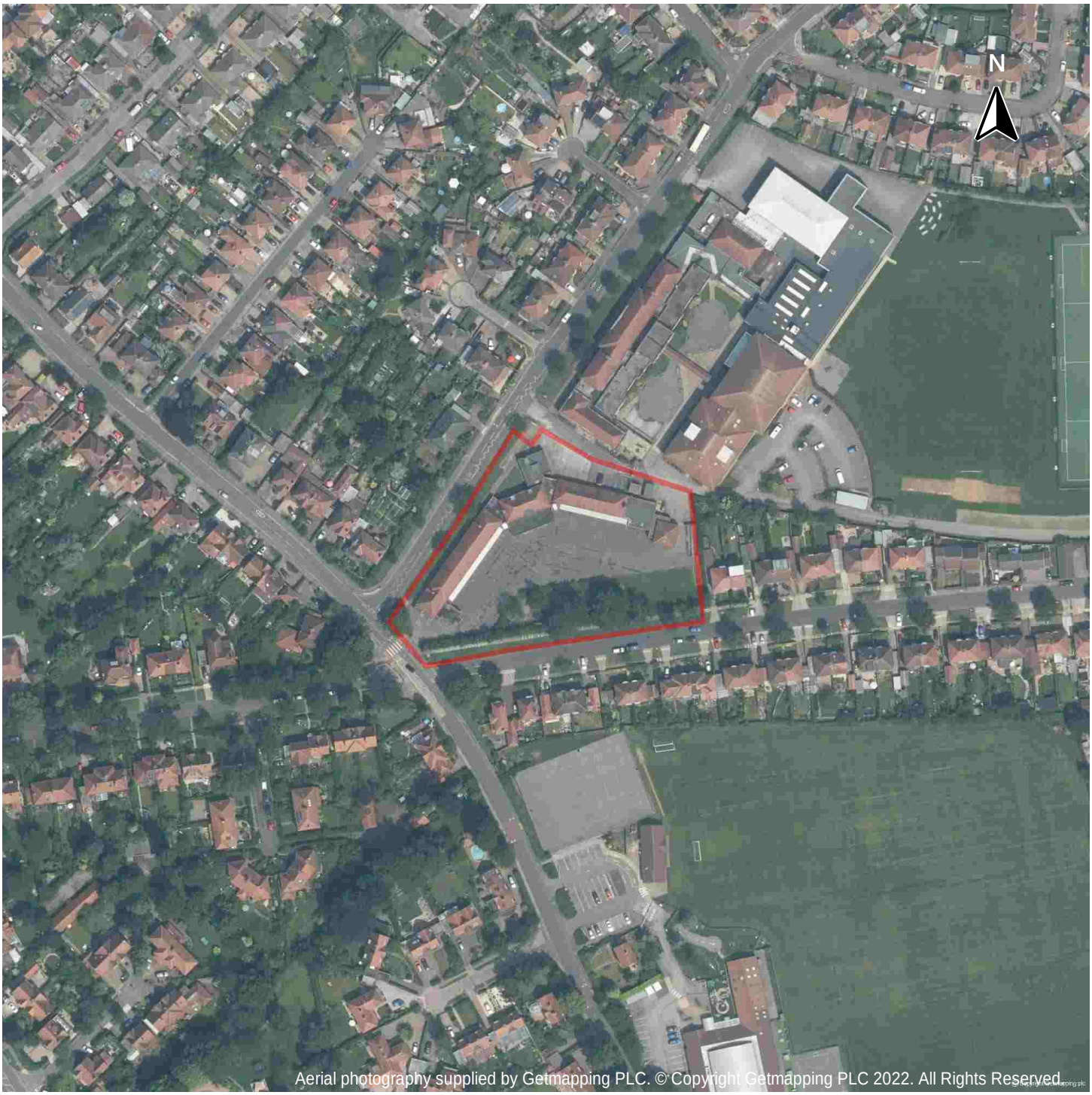
45	6.2	Surface water features	0	0	0	-	-
45	6.3	WFD Surface water body catchments	1	-	-	-	-
45	6.4	WFD Surface water bodies	0	0	0	-	-
46	6.5	WFD Groundwater bodies	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
47	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
48	7.2	Historical Flood Events	0	0	3	-	-
48	7.3	Flood Defences	0	0	0	-	-
48	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
49	7.5	Flood Storage Areas	0	0	0	-	-
50	7.6	Flood Zone 2	None (within 50m)				
50	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
51	8.1	Surface water flooding	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
53	9.1	Groundwater flooding	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
54	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	1
55	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
55	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
55	10.4	Special Protection Areas (SPA)	0	0	0	0	0
55	10.5	National Nature Reserves (NNR)	0	0	0	0	0
56	10.6	Local Nature Reserves (LNR)	0	0	0	0	1
56	10.7	Designated Ancient Woodland	0	0	0	0	0
56	10.8	Biosphere Reserves	0	0	0	0	0
56	10.9	Forest Parks	0	0	0	0	0
57	10.10	Marine Conservation Zones	0	0	0	0	0
57	10.11	Green Belt	0	0	1	0	0
57	10.12	Proposed Ramsar sites	0	0	0	0	0

57	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
58	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
58	10.15	Nitrate Sensitive Areas	0	0	0	0	0
58	10.16	Nitrate Vulnerable Zones	0	0	0	1	0
59	10.17	SSSI Impact Risk Zones	1	-	-	-	-
60	10.18	SSSI Units	0	0	0	0	2
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
62	11.1	World Heritage Sites	0	0	0	-	-
63	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
63	11.3	National Parks	0	0	0	-	-
63	11.4	Listed Buildings	0	0	0	-	-
63	11.5	Conservation Areas	0	2	0	-	-
64	11.6	Scheduled Ancient Monuments	0	0	0	-	-
64	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
65	12.1	Agricultural Land Classification	None (within 250m)				
65	12.2	Open Access Land	0	0	0	-	-
65	12.3	Tree Felling Licences	0	0	0	-	-
65	12.4	Environmental Stewardship Schemes	0	0	0	-	-
66	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
67	13.1	Priority Habitat Inventory	0	0	2	-	-
68	13.2	Habitat Networks	0	0	0	-	-
68	13.3	Open Mosaic Habitat	0	0	0	-	-
68	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
69	14.1	10k Availability	Identified (within 500m)				
70	14.2	Artificial and made ground (10k)	0	0	0	2	-
71	14.3	Superficial geology (10k)	0	0	0	0	-

71	14.4	Landslip (10k)	0	0	0	0	-
72	14.5	Bedrock geology (10k)	1	0	0	0	-
73	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
74	15.1	50k Availability	Identified (within 500m)				
75	15.2	Artificial and made ground (50k)	0	0	0	0	-
75	15.3	Artificial ground permeability (50k)	0	0	-	-	-
76	15.4	Superficial geology (50k)	2	0	0	3	-
77	15.5	Superficial permeability (50k)	Identified (within 50m)				
77	15.6	Landslip (50k)	0	0	0	0	-
77	15.7	Landslip permeability (50k)	None (within 50m)				
78	15.8	Bedrock geology (50k)	1	0	0	0	-
79	15.9	Bedrock permeability (50k)	Identified (within 50m)				
79	15.10	Bedrock faults and other linear features (50k)	0	0	1	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
80	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence					
81	17.1	Shrink swell clays	Low (within 50m)				
82	17.2	Running sands	Low (within 50m)				
84	17.3	Compressible deposits	Moderate (within 50m)				
86	17.4	Collapsible deposits	Very low (within 50m)				
87	17.5	Landslides	Very low (within 50m)				
88	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
90	18.1	Natural cavities	0	0	0	0	-
91	18.2	BritPits	0	0	0	0	-
91	18.3	Surface ground workings	0	0	2	-	-
91	18.4	Underground workings	0	0	0	0	0
91	18.5	Historical Mineral Planning Areas	0	0	0	0	-

92	18.6	Non-coal mining	0	0	0	0	0
92	18.7	Mining cavities	0	0	0	0	0
92	18.8	JPB mining areas	None (within 0m)				
92	18.9	Coal mining	None (within 0m)				
92	18.10	Brine areas	None (within 0m)				
93	18.11	Gypsum areas	None (within 0m)				
93	18.12	Tin mining	None (within 0m)				
93	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
94	19.1	Radon	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
95	20.1	BGS Estimated Background Soil Chemistry	3	0	-	-	-
95	20.2	BGS Estimated Urban Soil Chemistry	4	4	-	-	-
96	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
97	21.1	Underground railways (London)	0	0	0	-	-
97	21.2	Underground railways (Non-London)	0	0	0	-	-
97	21.3	Railway tunnels	0	0	0	-	-
97	21.4	Historical railway and tunnel features	0	0	0	-	-
97	21.5	Royal Mail tunnels	0	0	0	-	-
98	21.6	Historical railways	0	0	0	-	-
98	21.7	Railways	0	0	0	-	-
98	21.8	Crossrail 1	0	0	0	0	-
98	21.9	Crossrail 2	0	0	0	0	-
98	21.10	HS2	0	0	0	0	-

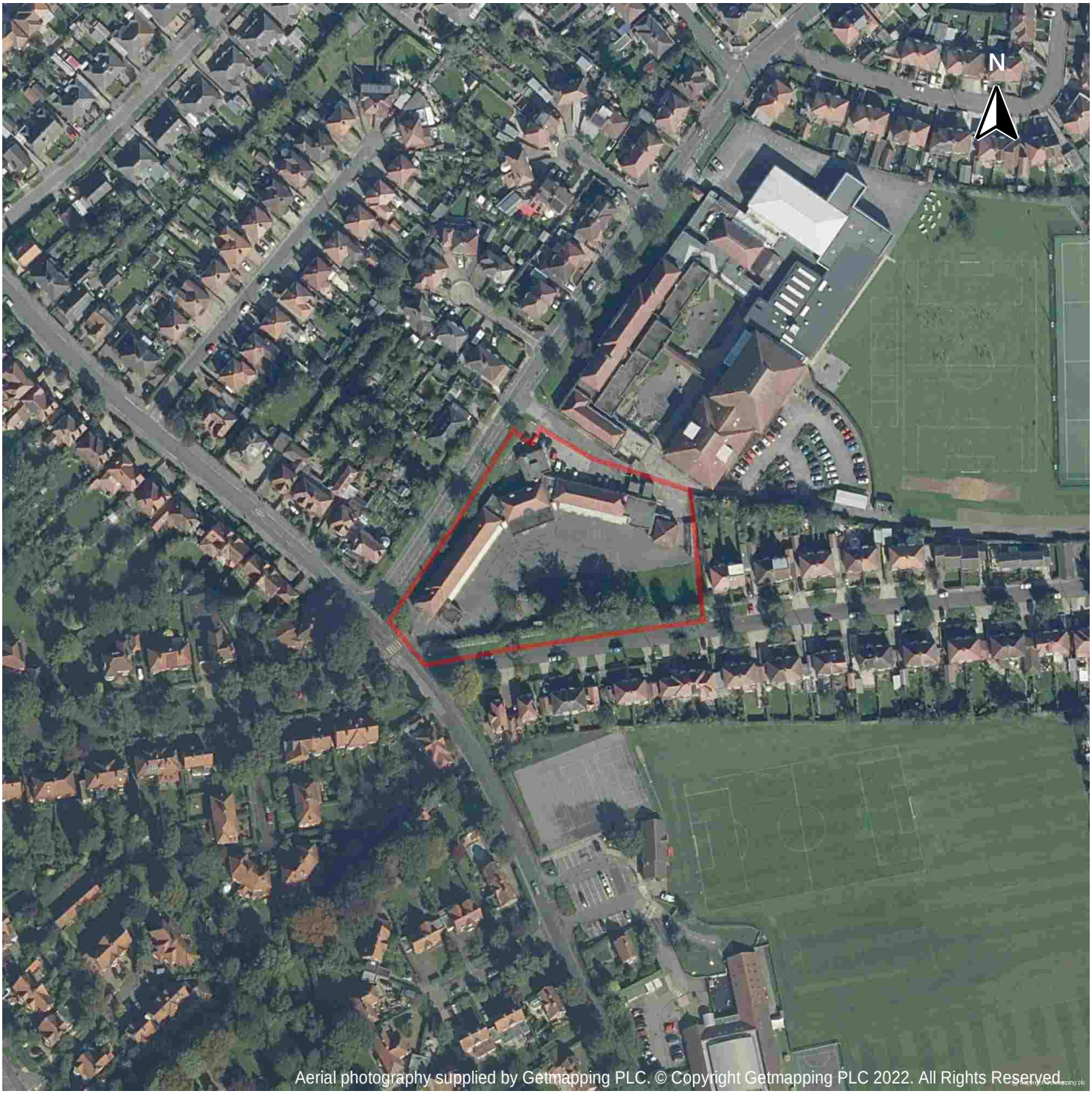
Recent aerial photograph



Capture Date: 24/06/2020

Site Area: 0.72ha

Recent site history - 2017 aerial photograph



Capture Date: 19/09/2017

Site Area: 0.72ha

Recent site history - 2014 aerial photograph

Capture Date: 16/04/2014

Site Area: 0.72ha

Recent site history - 1999 aerial photograph

Capture Date: 18/05/1999

Site Area: 0.72ha

OS MasterMap site plan

Site Area: 0.72ha

1 Past land use

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

1.1 Historical industrial land uses

Records within 500m	12

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
3	153m NW	Nursery	1950 - 1957	1512375

ID	Location	Land use	Dates present	Group ID
B	298m S	Unspecified Tank	1957	1467889
B	300m S	Unspecified Tank	1950	1551439
B	300m S	Unspecified Tank	1929	1556949
C	347m S	Nursery	1972	1504649
D	354m W	Mental Hospital	1929	1539260
D	354m W	Mental Hospital	1950	1553654
C	377m S	Nursery	1929	1501570
C	377m S	Nursery	1950	1509669
C	392m S	Nursery	1957	1524413
F	494m NW	Disused Airfield	1957	1457951
F	494m NW	Disused Airfield	1972 - 1983	1499951

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	2

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
1	37m NE	Unspecified Tank	1984 - 1996	240721
7	458m S	Unspecified Tank	1891	226819

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	9

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
2	98m NE	Electricity Substation	1984 - 1996	143410
4	255m SW	Electricity Substation	1990 - 1993	137548
A	266m S	Electricity Substation	1990 - 1994	143180
A	267m S	Electricity Substation	1979	143438
5	287m NW	Electricity Substation	1995	130323
6	418m NW	Gas Governor	1990 - 1995	142926
8	470m N	Electricity Substation	1980 - 1997	146591
E	483m S	Electricity Substation	1979 - 1990	135250
E	486m S	Electricity Substation	1994	141747

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

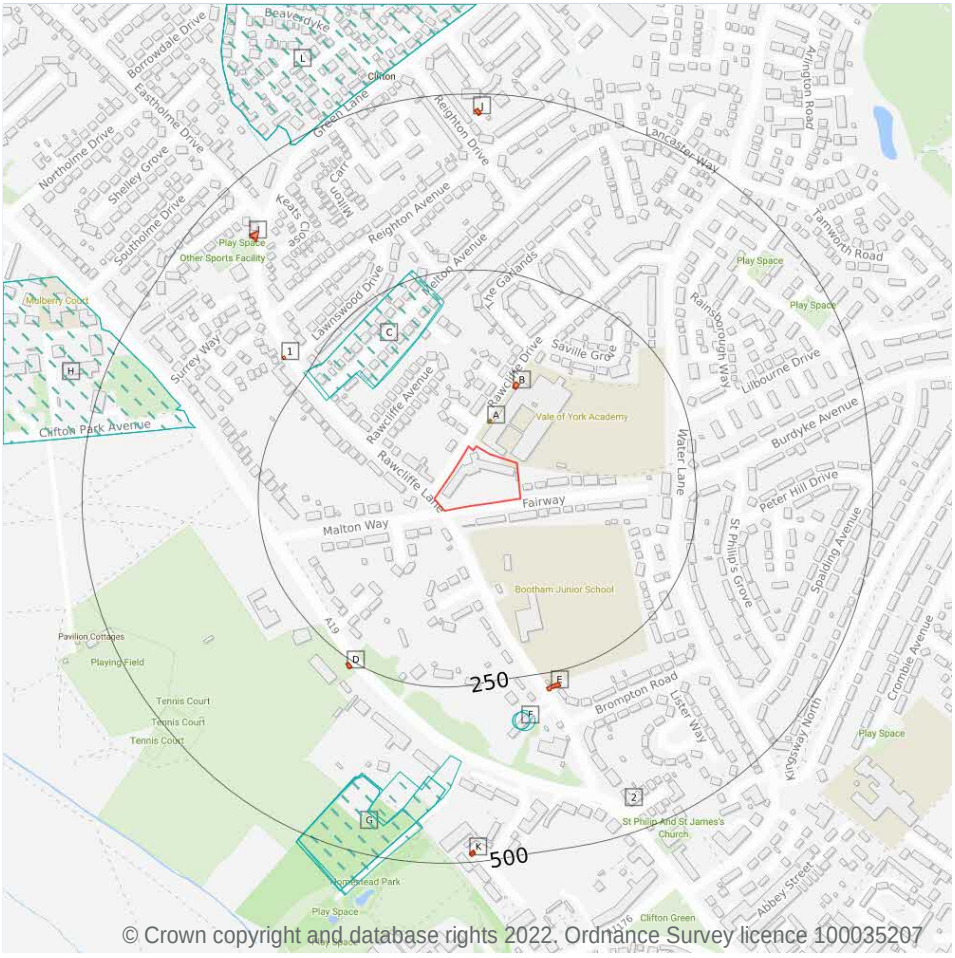
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

2.1 Historical industrial land uses

Records within 500m	14

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
C	153m NW	Nursery	1957	1512375
C	156m NW	Nursery	1950	1512375
F	298m S	Unspecified Tank	1957	1467889

ID	Location	Land Use	Date	Group ID
F	300m S	Unspecified Tank	1950	1551439
F	300m S	Unspecified Tank	1929	1556949
G	347m S	Nursery	1972	1504649
H	354m W	Mental Hospital	1950	1553654
H	354m W	Mental Hospital	1929	1539260
G	377m S	Nursery	1950	1509669
G	377m S	Nursery	1929	1501570
G	392m S	Nursery	1957	1524413
L	494m NW	Disused Airfield	1972	1499951
L	494m NW	Disused Airfield	1983	1499951
L	494m NW	Disused Airfield	1957	1457951

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	3

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
A	37m NE	Unspecified Tank	1984	240721
A	38m NE	Unspecified Tank	1996	240721
2	458m S	Unspecified Tank	1891	226819

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	19

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
B	98m NE	Electricity Substation	1996	143410
B	99m NE	Electricity Substation	1984	143410
D	255m SW	Electricity Substation	1993	137548
D	255m SW	Electricity Substation	1990	137548
E	266m S	Electricity Substation	1994	143180
E	267m S	Electricity Substation	1979	143438
E	267m S	Electricity Substation	1990	143180
1	287m NW	Electricity Substation	1995	130323
I	418m NW	Gas Governor	1990	142926
I	419m NW	Gas Governor	1995	142926
J	470m N	Electricity Substation	1985	146591
J	470m N	Electricity Substation	1990	146591
J	470m N	Electricity Substation	1980	146591
J	470m N	Electricity Substation	1994	146591
J	470m N	Electricity Substation	1993	146591
J	470m N	Electricity Substation	1997	146591
K	483m S	Electricity Substation	1990	135250
K	483m S	Electricity Substation	1979	135250
K	486m S	Electricity Substation	1994	141747

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill

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Site Outline

Search buffers in metres (m)

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	1

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 21**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	421m S	The Homestead 40 Water End YORK YO30 6WP	EPR/MF0609GX/A001	Treating waste exemption	Non-Agricultural Waste Only	Aerobic composting and associated prior treatment

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use

Site Outline

Search buffers in metres (m)

Recent industrial land uses

4.1 Recent industrial land uses

Records within 250m	5

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 24**

ID	Location	Company	Address	Activity	Category
1	107m NE	Electricity Sub Station	North Yorkshire, YO30	Electrical Features	Infrastructure and Facilities
A	122m E	Curtains by Sharon Forrest	44, Fairway, York, North Yorkshire, YO30 5QA	Curtains and Blinds	Consumer Products

ID	Location	Company	Address	Activity	Category
A	150m E	Northern Lights	50, Fairway, York, North Yorkshire, YO30 5QA	Construction Completion Services	Construction Services
2	231m N	Dave Hartas	7, Green Close, York, North Yorkshire, YO30 6PB	Construction Completion Services	Construction Services
3	235m NE	Mast	North Yorkshire, YO30	Telecommunications Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	0

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	0

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

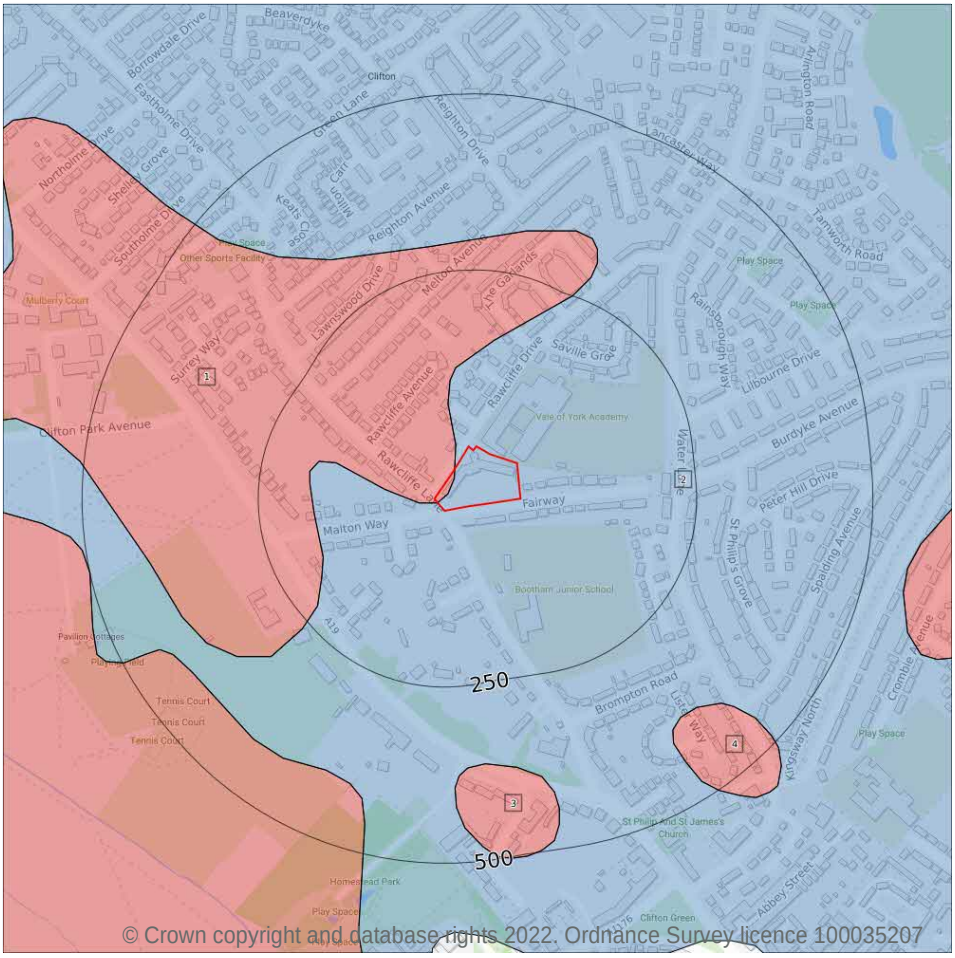
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	4

Aquifer status of groundwater held within superficial geology.

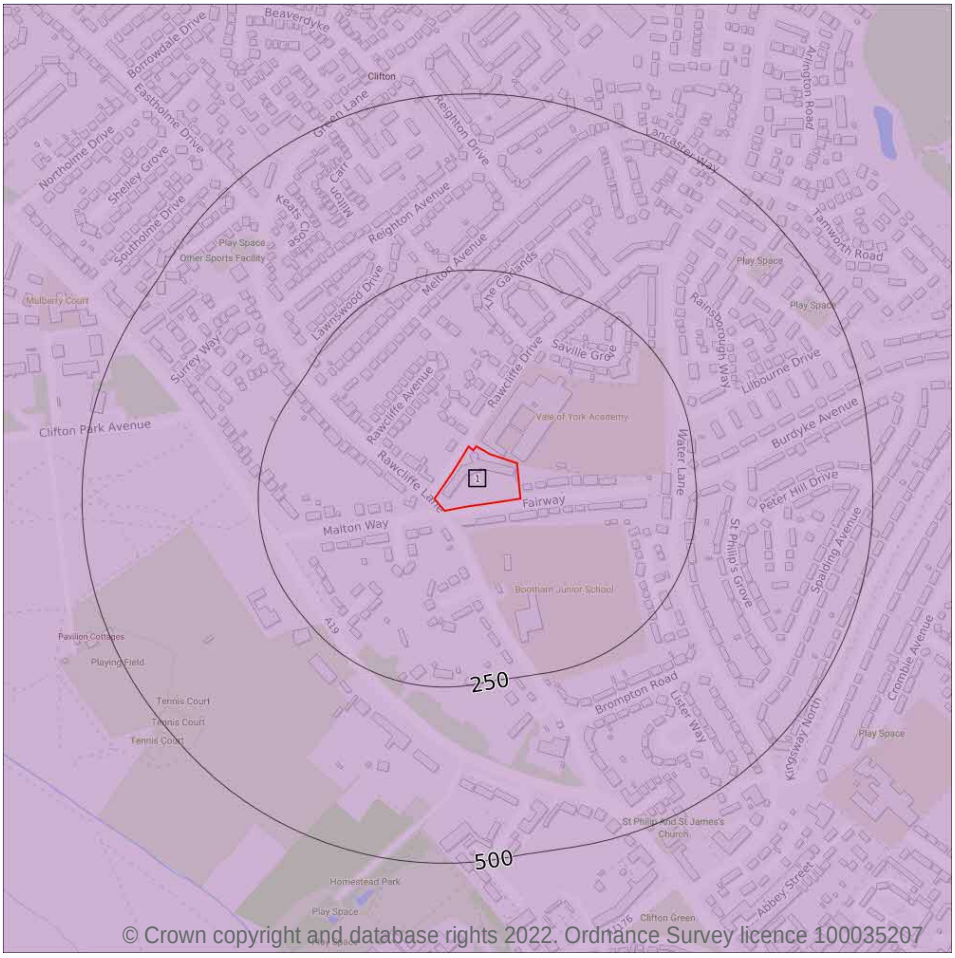
Features are displayed on the Hydrogeology map on **page 30**

ID	Location	Designation	Description
1	On site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	On site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

ID	Location	Designation	Description
3	364m S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	384m SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	1

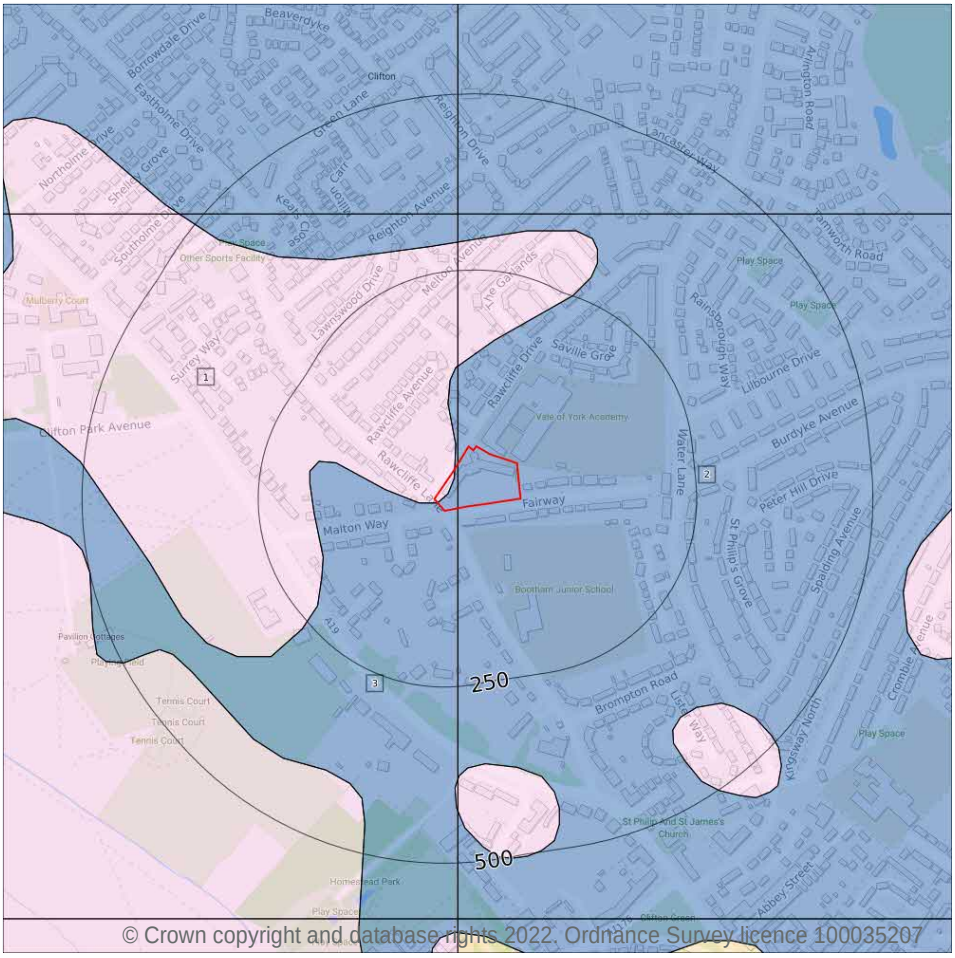
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 32**

ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



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Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulr
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	3

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 33**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Mixed
2	On site	Summary Classification: Principal bedrock aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Unproductive Superficial Aquifer	Leaching class: Low Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Unproductive Aquifer type: Unproductive Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Principal Flow mechanism: Mixed
3	On site	Summary Classification: Principal bedrock aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Unproductive Superficial Aquifer	Leaching class: Low Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Unproductive Aquifer type: Unproductive Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Mixed

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones

Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	2

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 35**

ID	Location	Details	
-	1399m SW	Status: Historical Licence No: 2/27/24/028 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE 1 - SHERWOOD SANDSTONE - YORK Data Type: Point Name: BRITISH SUGAR PLC Easting: 457700 Northing: 453000	Annual Volume (m^3): 795550 Max Daily Volume (m^3): 3818 Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 101 Version Start Date: 26/02/2001 Version End Date: -
-	1399m SW	Status: Historical Licence No: 2/27/24/028 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE 2 - SHERWOOD SANDSTONE - YORK Data Type: Point Name: BRITISH SUGAR PLC Easting: 457700 Northing: 453000	Annual Volume (m^3): 795550 Max Daily Volume (m^3): 3818 Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 101 Version Start Date: 26/02/2001 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	16

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 35**

ID	Location	Details	
-	1086m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 458000 Northing: 453100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -

ID	Location	Details	
-	1086m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 458000 Northing: 453100	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1086m SW	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 458000 Northing: 453100	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -
-	1111m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 458100 Northing: 452900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1111m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 458100 Northing: 452900	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1111m SW	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 458100 Northing: 452900	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -

ID	Location	Details	
-	1175m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 458200 Northing: 452700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1175m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 458200 Northing: 452700	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1175m SW	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 458200 Northing: 452700	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -
-	1192m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 458300 Northing: 452600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1192m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 458300 Northing: 452600	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -

ID	Location	Details	
-	1192m SW	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 458300 Northing: 452600	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -
-	1400m W	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 457600 Northing: 453900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1400m W	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 457600 Northing: 453900	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1400m W	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 457600 Northing: 453900	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -
-	1969m SE	Status: Active Licence No: NE/027/0024/061 Details: Heat Pump Direct Source: SURFACE WATER Point: RIVER OUSE AT YORK GUILDHALL Data Type: Point Name: Canal and River Trust Easting: 460061 Northing: 451883	Annual Volume (m^3): 273,500 Max Daily Volume (m^3): 848 Original Application No: - Original Start Date: 28/08/2020 Expiry Date: 31/03/2029 Issue No: 1 Version Start Date: 28/08/2020 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	15

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on page 35

ID	Location	Details	
-	1086m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 458000 Northing: 453100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1086m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 458000 Northing: 453100	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1086m SW	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 458000 Northing: 453100	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -
-	1111m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 458100 Northing: 452900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -

ID	Location	Details	
-	1111m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 458100 Northing: 452900	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1111m SW	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 458100 Northing: 452900	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -
-	1175m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 458200 Northing: 452700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1175m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 458200 Northing: 452700	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1175m SW	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 458200 Northing: 452700	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -

ID	Location	Details	
-	1192m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 458300 Northing: 452600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1192m SW	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 458300 Northing: 452600	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1192m SW	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 458300 Northing: 452600	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -
-	1400m W	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE Data Type: Point Name: YORK WATERWORKS CO Easting: 457600 Northing: 453900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -
-	1400m W	Status: Historical Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - YORK Data Type: Point Name: YORK WATERWORKS CO Easting: 457600 Northing: 453900	Annual Volume (m^3): 35000000 Max Daily Volume (m^3): 130000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/03/1994 Version End Date: -

ID	Location	Details	
-	1400m W	Status: Active Licence No: 2/27/24/078 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: RIVER OUSE - CLIFTON INGS Data Type: Point Name: Yorkshire Water Services Ltd Easting: 457600 Northing: 453900	Annual Volume (m^3): 35,000,000 Max Daily Volume (m^3): 130,000 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 31/10/2008 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology

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Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	1

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 44**

ID	Location	Type of water feature	Ground level	Permanence	Name
1	193m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Bur Dike

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	0

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 44**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	On site	River	Ouse from River Nidd to Stillingfleet Beck	GB104027069593	Ouse Upper Yorkshire	Swale Ure Nidd and Ouse Upper

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 44**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	642m SW	River	Ouse from River Nidd to Stillingfleet Beck	GB104027069593	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 44**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**SUNO Sherwood Sandstone**	**GB40401G702100**	**Poor**	**Poor**	**Good**	**2019**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

Site Outline

Search buffers in metres (m)

River and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	3

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

Features are displayed on the River and coastal flooding map on **page 47**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
A	215m E	Autumn 2000 Event	2000-10-30 2000-11-15	Unknown	Overtopping of defences	Fluvial
D	219m SE	January 1982 Event	1982-01-03 1982-01-16	Unknown	Overtopping of defences	Fluvial
3	222m E	Autumn 2000 Event	2000-10-30 2000-11-15	Unknown	Overtopping of defences	Fluvial

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding

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Site Outline

Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	1 in 30 year, 0.1m - 0.3m
Highest risk within 50m	1 in 30 year, 0.1m - 0.3m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 51**

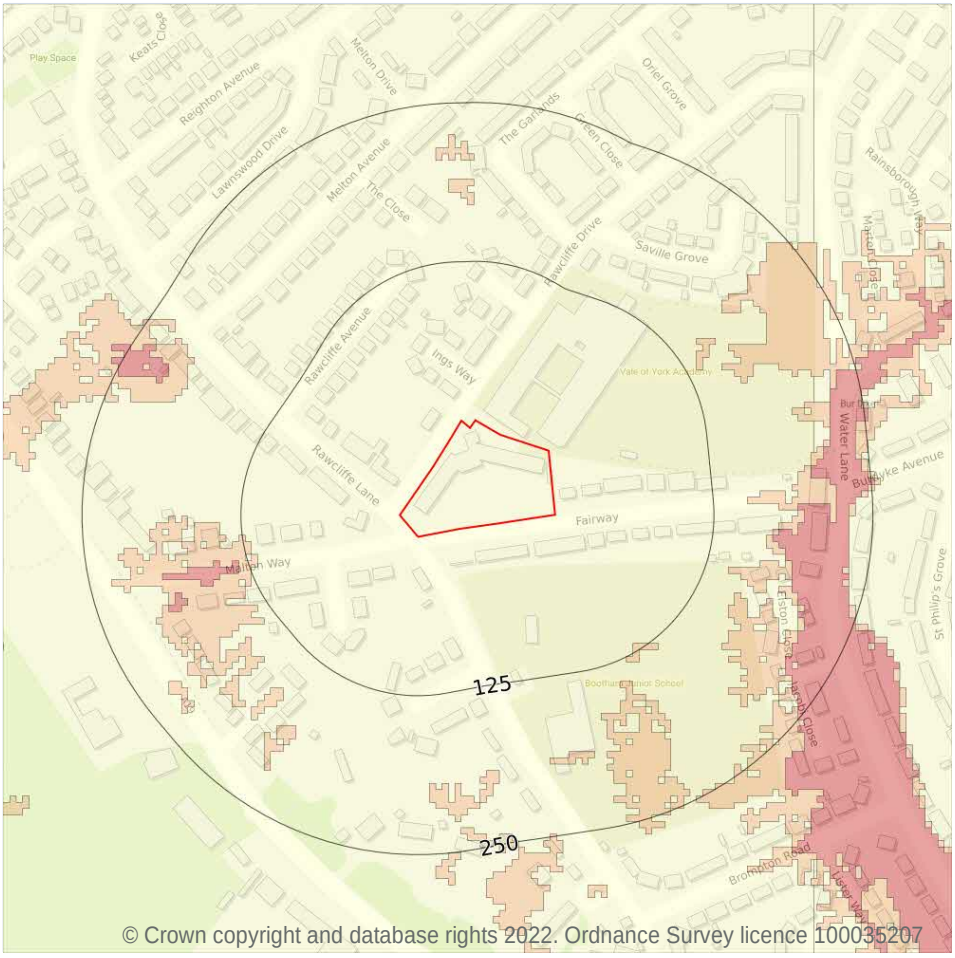
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on

a site. The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

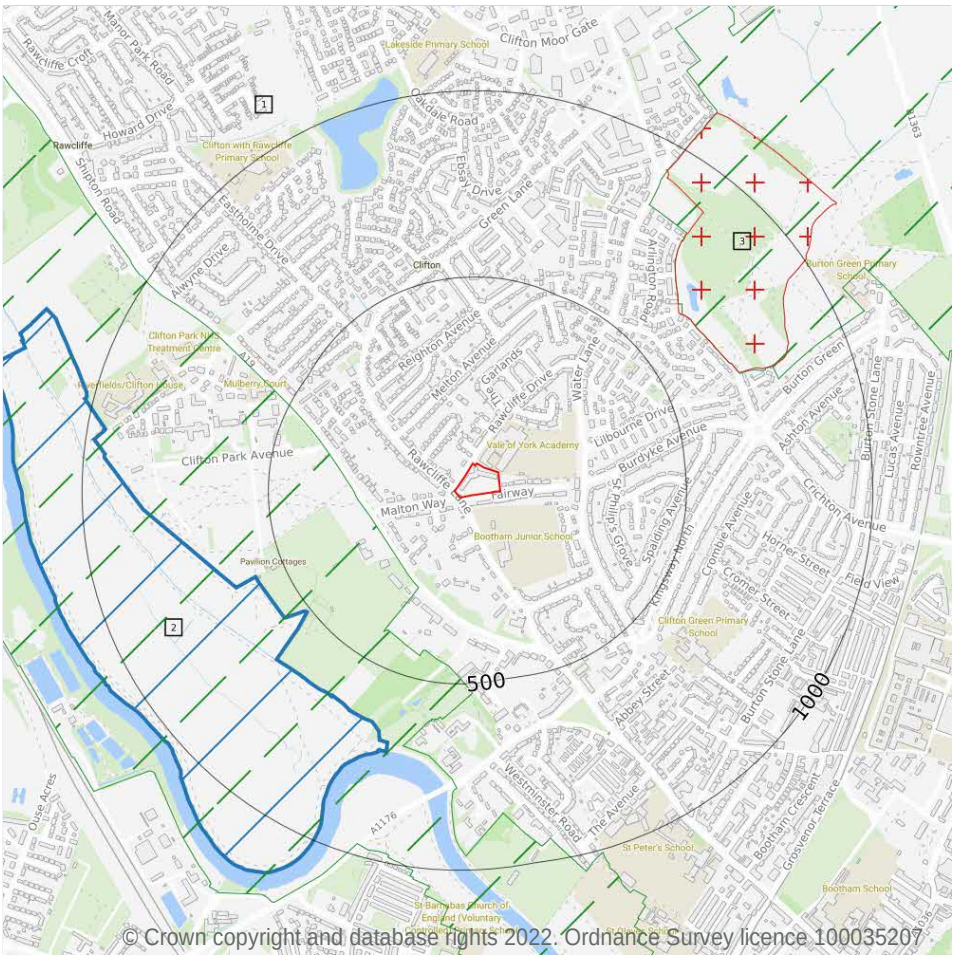
Highest risk on site	Moderate
Highest risk within 50m	Moderate

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 53**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



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Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SS

Local Nature Reserves (LNR)

Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	1

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 54**

ID	Location	Name	Data source
2	512m SW	Clifton Ings And Rawcliffe Meadows	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	1

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

Features are displayed on the Environmental designations map on **page 54**

ID	Location	Name	Data source
3	646m NE	Clifton Backies	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	1

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 54**

ID	Location	Name	Local Authority name
1	227m SW	York	York

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

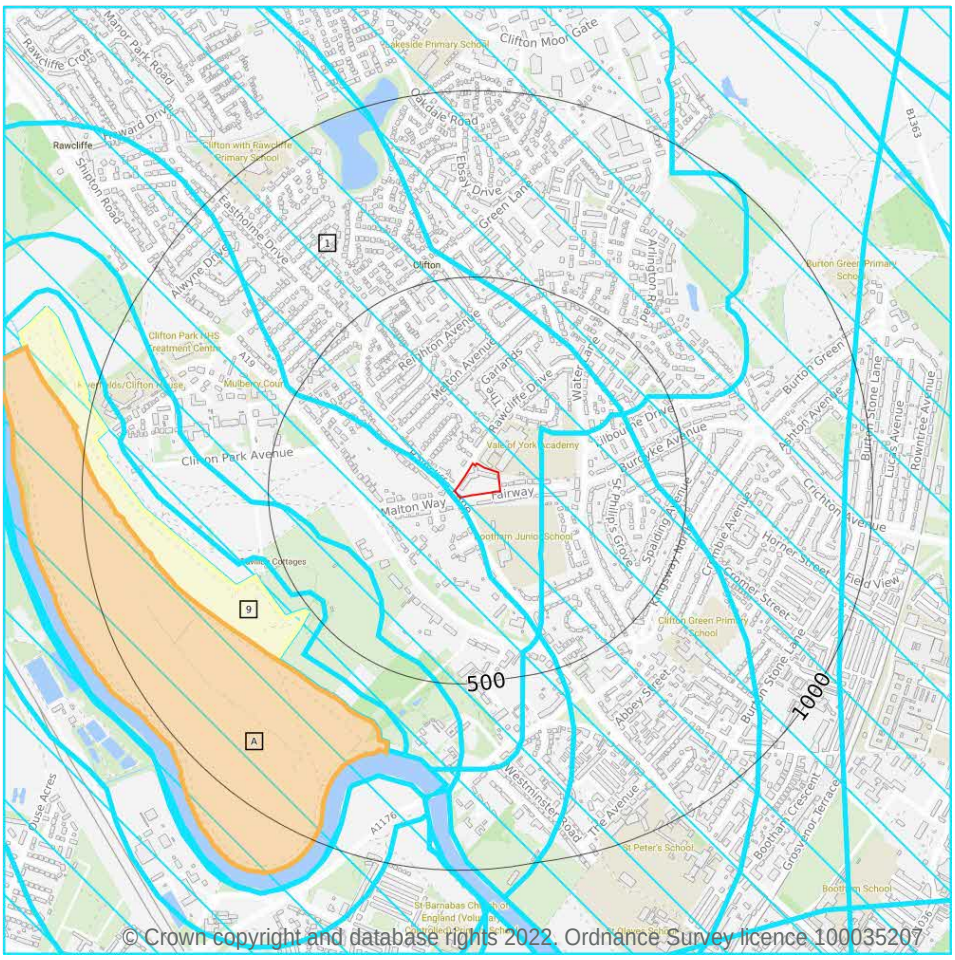
Records within 2000m	1

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
265m E	River Foss from the Syke to the River Ouse NVZ	Surface Water	284	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 59**

ID	Location	Type of developments requiring consultation
1	On site	Infrastructure - Pipelines, pylons and overhead cables. any transport proposal including road, rail and by water (excluding routine maintenance). airports, helipads and other aviation proposals. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha. Residential - Residential development of 100 units or more. Rural residential - Any residential development of 50 or more houses outside existing settlements/urban areas. Air pollution - Any industrial/agricultural development that could cause air pollution (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 200m², manure stores > 250t). Combustion - General combustion processes >20mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion. Waste - Landfill. incl: inert landfill, non-hazardous landfill, hazardous landfill. Composting - Any composting proposal with more than 500 tonnes maximum annual operational throughput. incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management. Discharges - Any discharge of water or liquid waste of more than 2m³/day to ground (ie to seep away) or to surface water, such as a beck or stream. Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	2

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

Features are displayed on the SSSI Impact Zones and Units map on **page 59**

ID: 9
Location: 512m SW
SSSI name: Clifton Ings And Rawcliffe Meadows
Unit name: Rawcliffe Meadows
Broad habitat: Neutral Grassland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland neutral grassland (MG4)	Unfavourable - Recovering	26/06/2012

Feature name	Feature condition	Date of assessment
Population of critically endangered beetle - Chrysolina graminis, Tansy Beetle	Favourable	26/06/2012

ID: A
Location: 632m SW
SSSI name: Clifton Ings And Rawcliffe Meadows
Unit name: Clifton Ings
Broad habitat: Neutral Grassland - Lowland
Condition: Unfavourable - Declining
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland neutral grassland (MG4)	Unfavourable - Declining	26/06/2012
Lowland neutral grassland (MG8)	Unfavourable - Declining	26/06/2012
Population of critically endangered beetle - Chrysolina graminis, Tansy Beetle	Favourable	26/06/2012

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

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Site Outline

Search buffers in metres (m)

- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	2

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

Features are displayed on the Visual and cultural designations map on **page 62**

ID	Location	Name	District	Date of designation
1	8m SW	Clifton (Malton Way and Shipton Road)	York	1975
2	38m S	Clifton	York	1968

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations

12.1 Agricultural Land Classification

Records within 250m	0

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations

Site Outline

Search buffers in metres (m)

- Priority Habitat Inventory
- Open Mosaic Habitat
- Limestone Pavement Orders

Habitat Networks

- Primary Habitat
- Restorable Habitat
- Associated Habitats
- Habitat Restoration-Creation
- Network Enhancement Zone 1
- Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	2

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 67**

ID	Location	Main Habitat	Other habitats
1	153m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
2	216m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

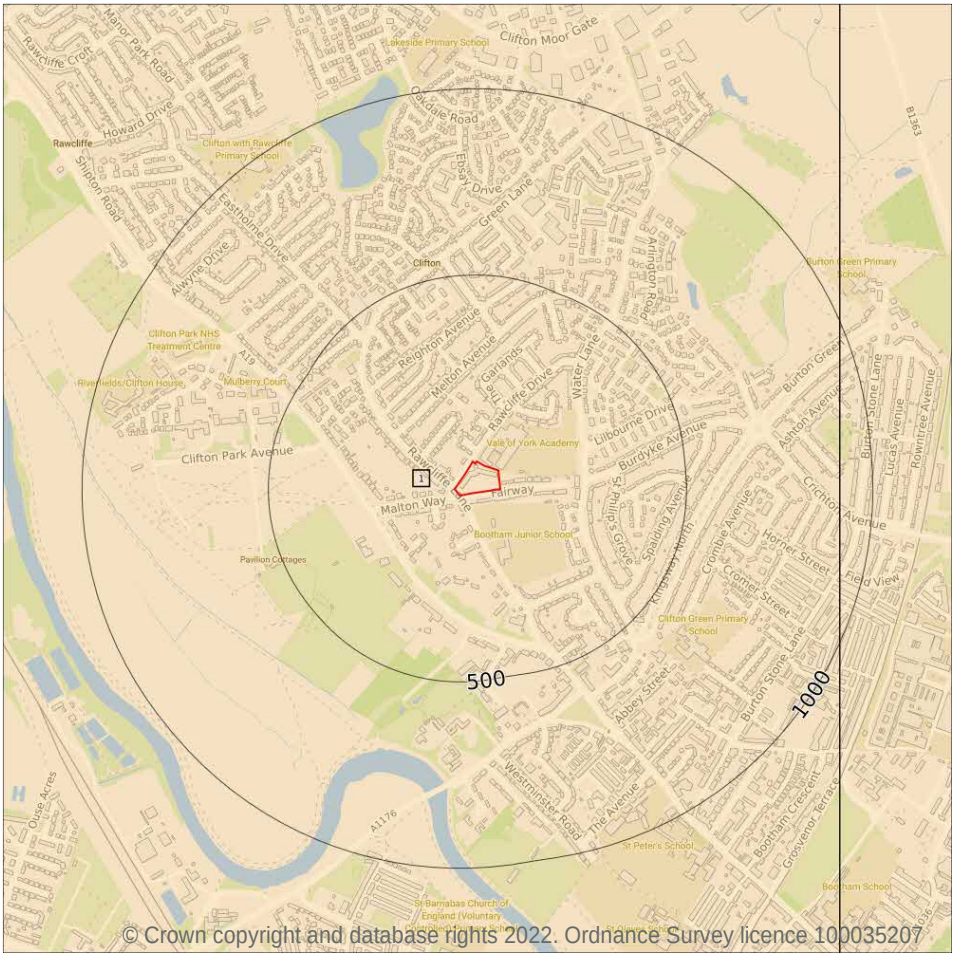
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m	1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 69**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Partial	Full	No coverage	SE55SE

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

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Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	2

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 70**

ID	Location	LEX Code	Description	Rock description
A	441m SW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
1	487m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial

14.3 Superficial geology (10k)

Records within 500m	0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

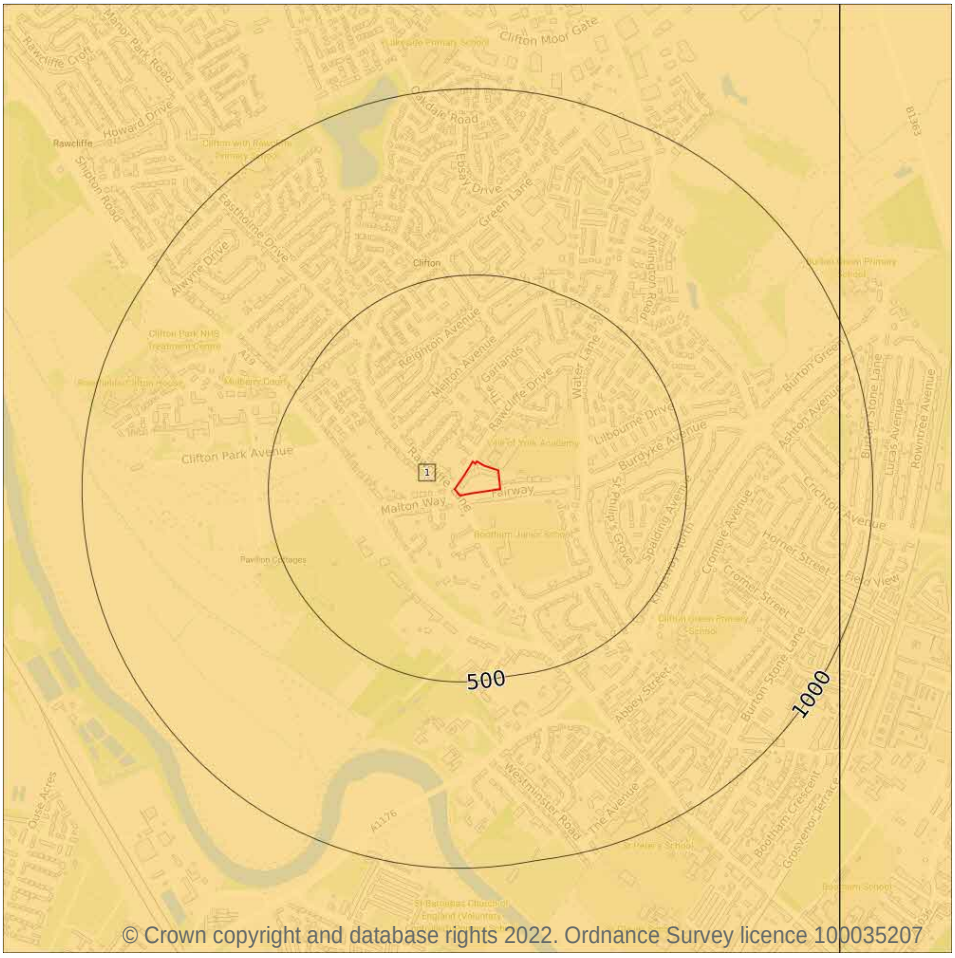
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m	1

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 72**

ID	Location	LEX Code	Description	Rock age
1	On site	SSG-SDST	Sherwood Sandstone Group - Sandstone	Ladinian Age - Late Permian Epoch [Obsolete name]

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability

Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 74**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	EW063_york_v4

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

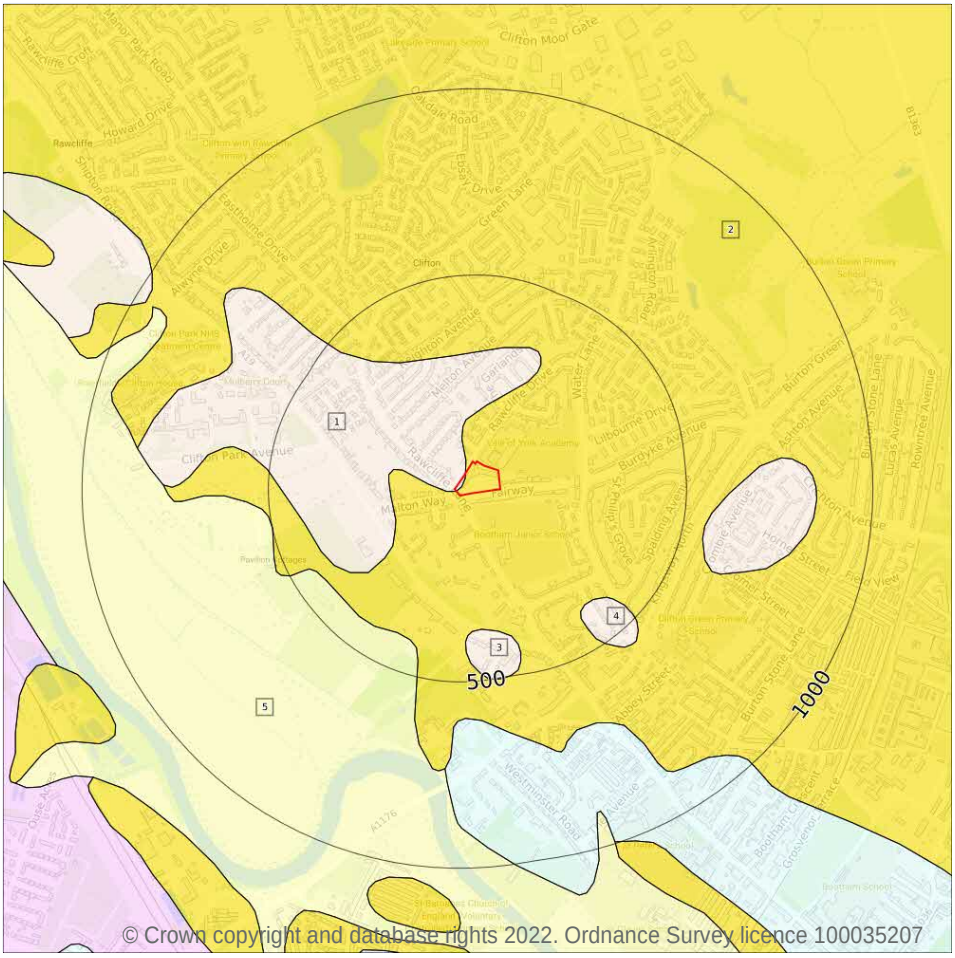
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



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Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m	5

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 76**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**SUTN-S**	**SUTTON SAND FORMATION**	**SAND**
2	**On site**	**ALNE-CZ**	**ALNE GLACIOLACUSTRINE FORMATION**	**CLAY, SILTY**
3	364m S	SUTN-S	SUTTON SAND FORMATION	SAND
4	384m SE	SUTN-S	SUTTON SAND FORMATION	SAND

ID	Location	LEX Code	Description	Rock description
5	404m SW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	2

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Intergranular	High	High
On site	Mixed	Low	Very Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

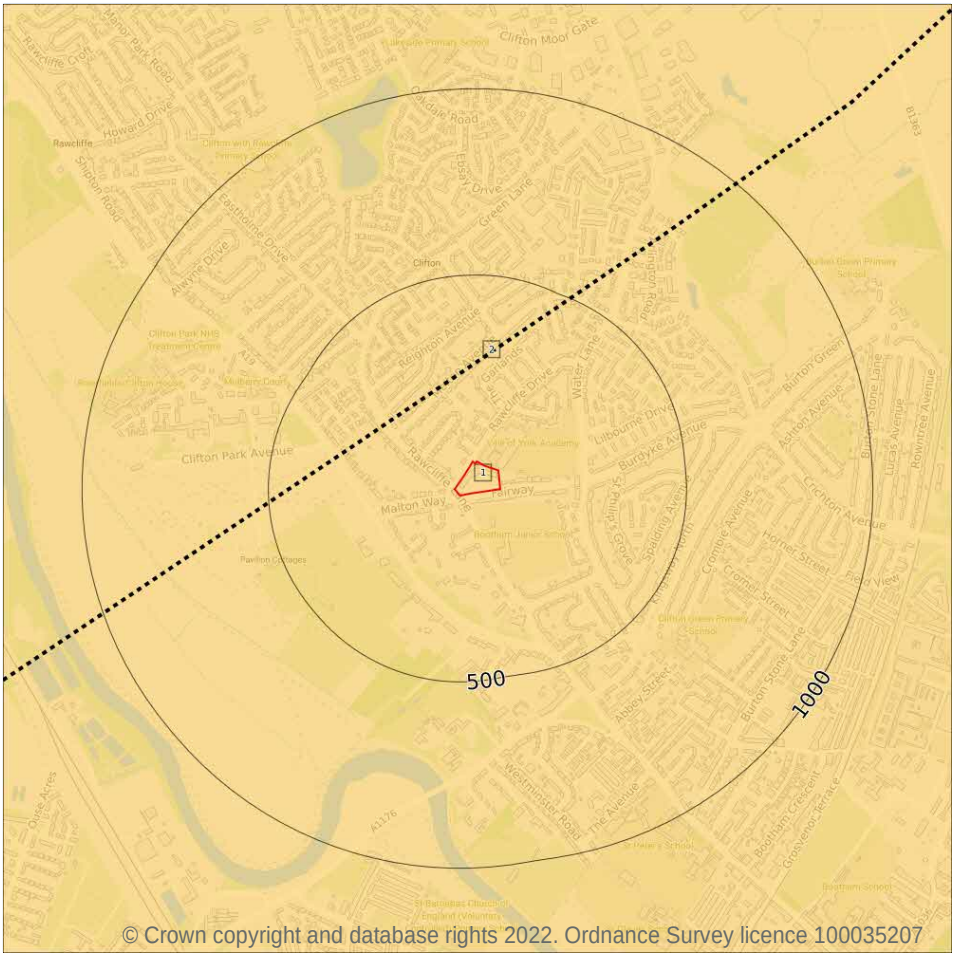
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	1

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 78**

ID	Location	LEX Code	Description	Rock age
1	On site	SSG-SDST	SHERWOOD SANDSTONE GROUP - SANDSTONE	-

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	High

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	1

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 78**

ID	Location	Category	Description
2	215m NW	FAULT	Fault, inferred

This data is sourced from the British Geological Survey.

16 Boreholes

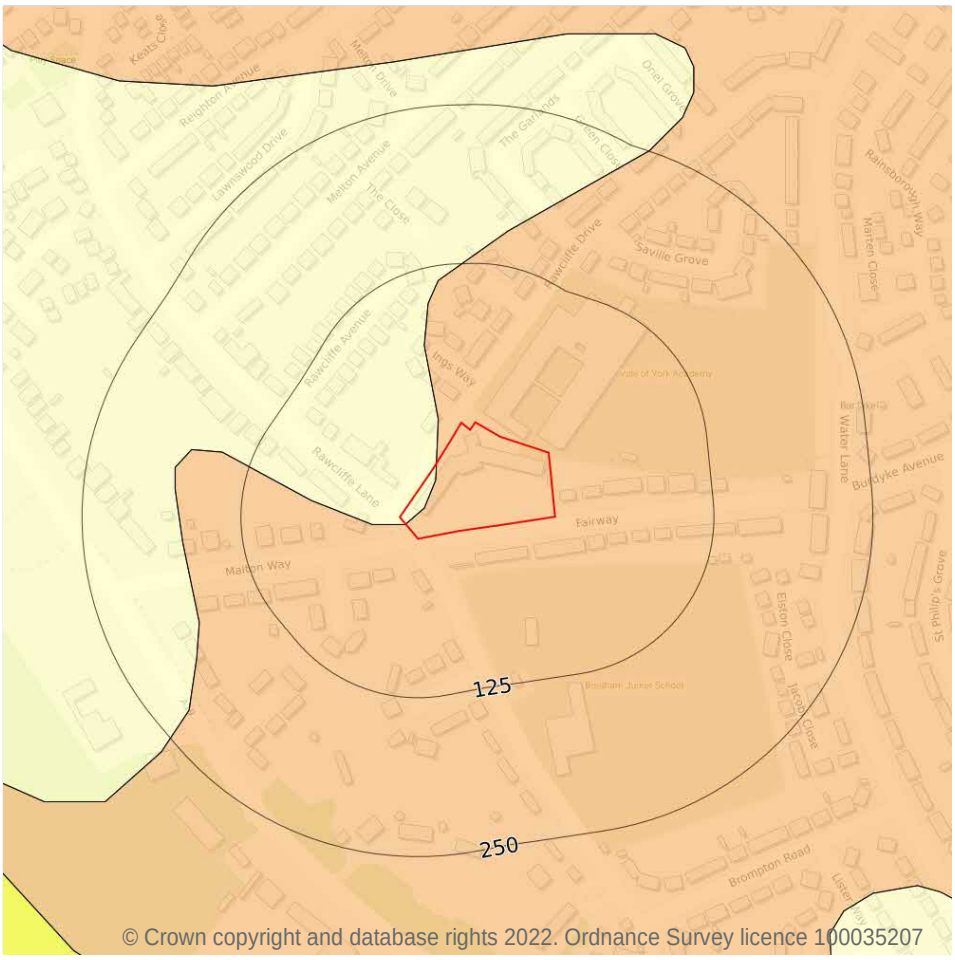
16.1 BGS Boreholes

Records within 250m	0

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	2

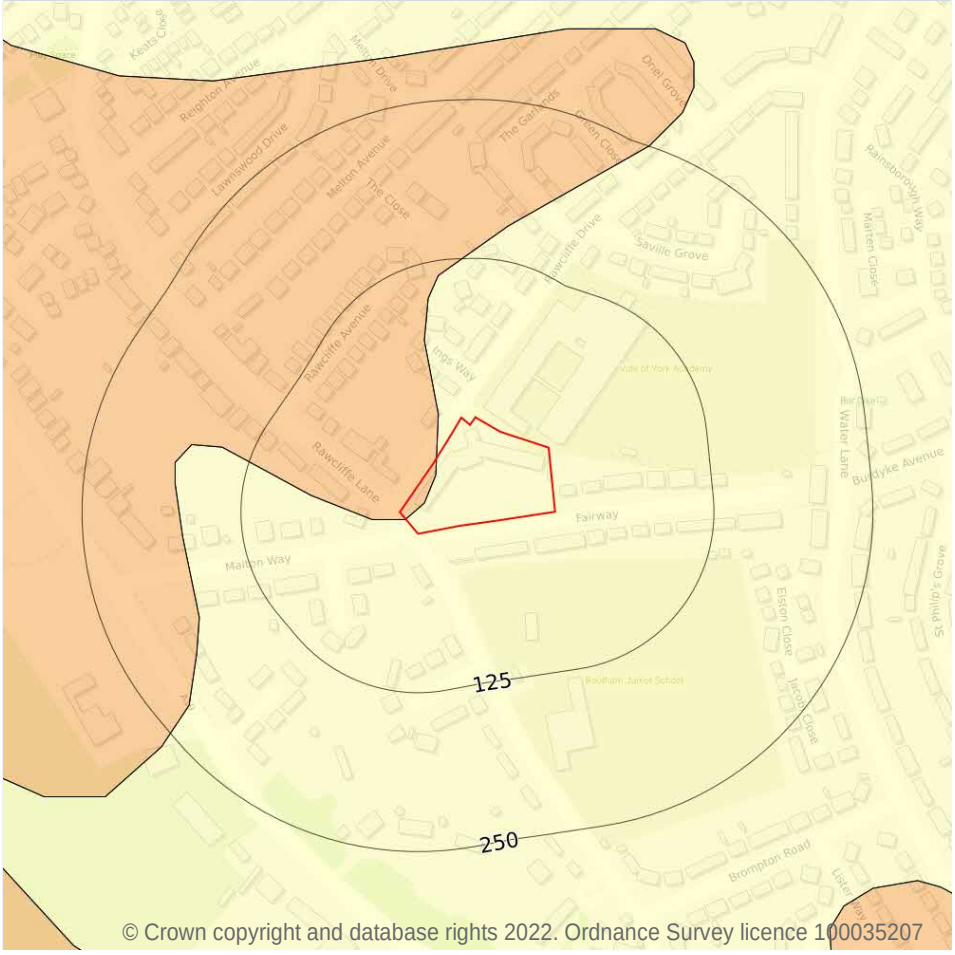
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 81**

Location	Hazard rating	Details
On site	Negligible	Ground conditions predominantly non-plastic.
On site	Low	Ground conditions predominantly medium plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

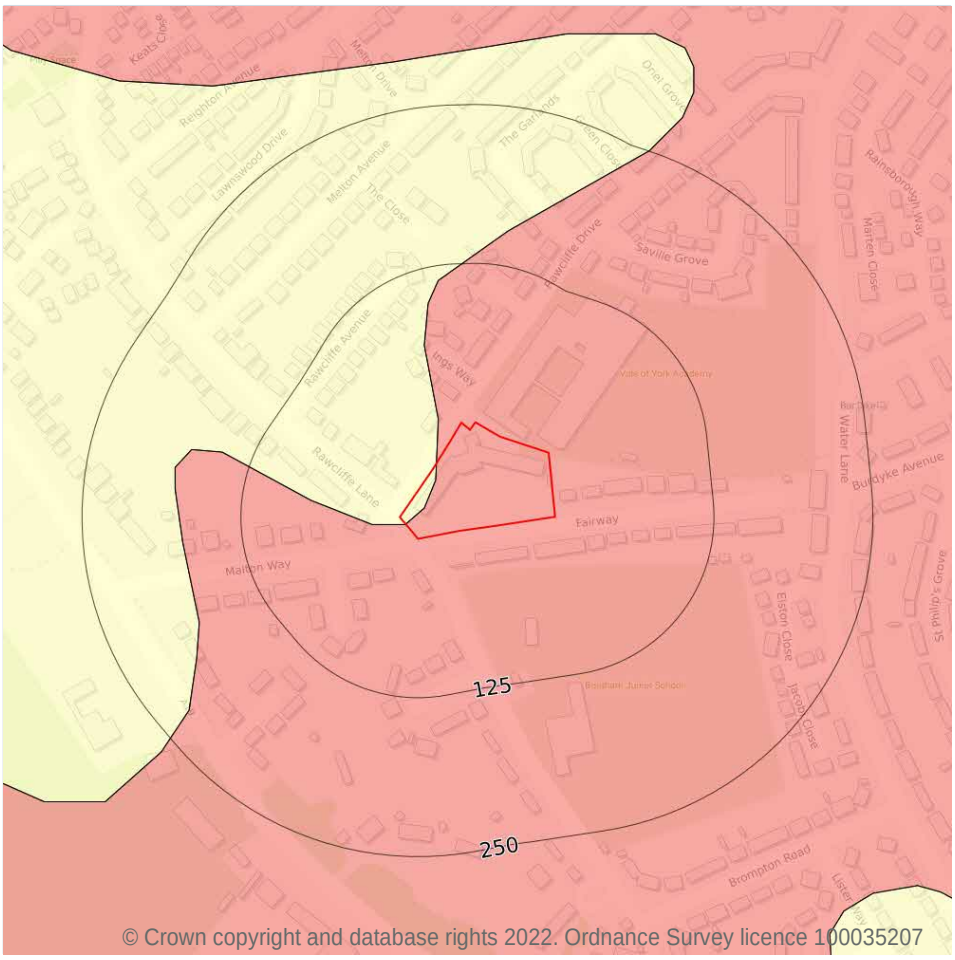
Features are displayed on the Natural ground subsidence - Running sands map on **page 82**

Location	Hazard rating	Details
On site	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

Location	Hazard rating	Details
On site	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	2

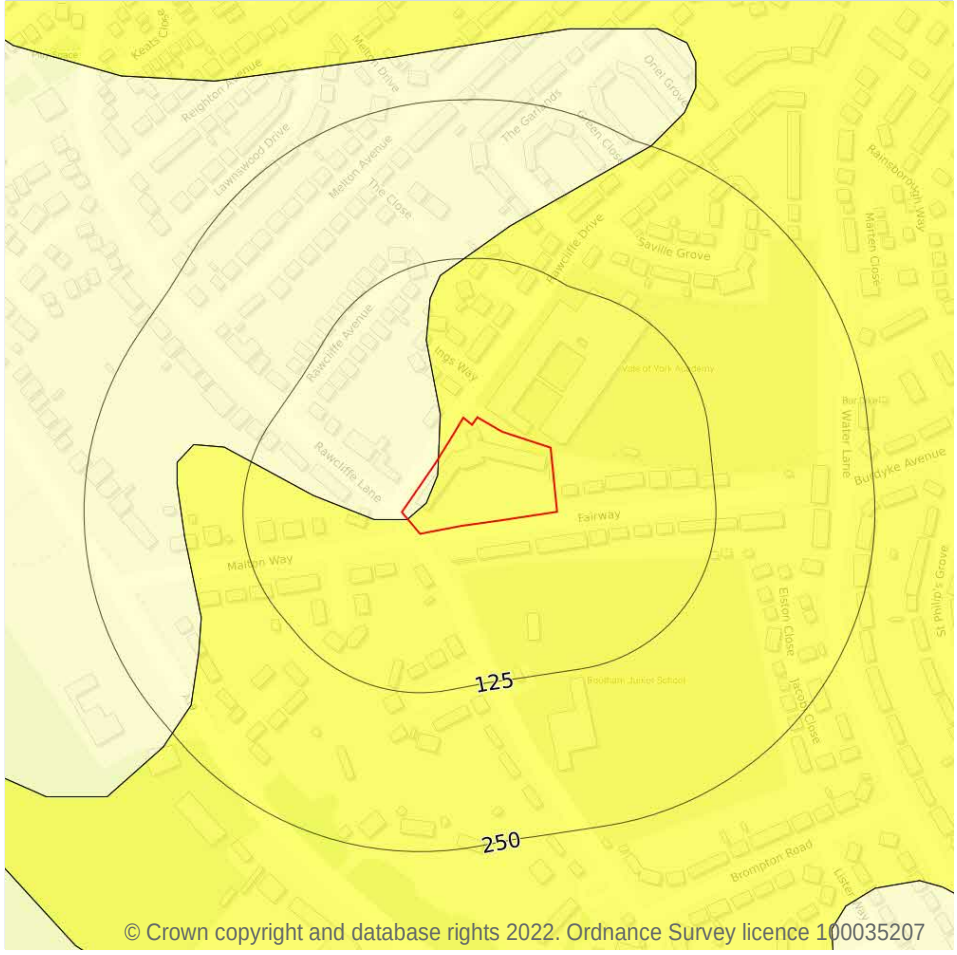
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 84**

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.
On site	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	2

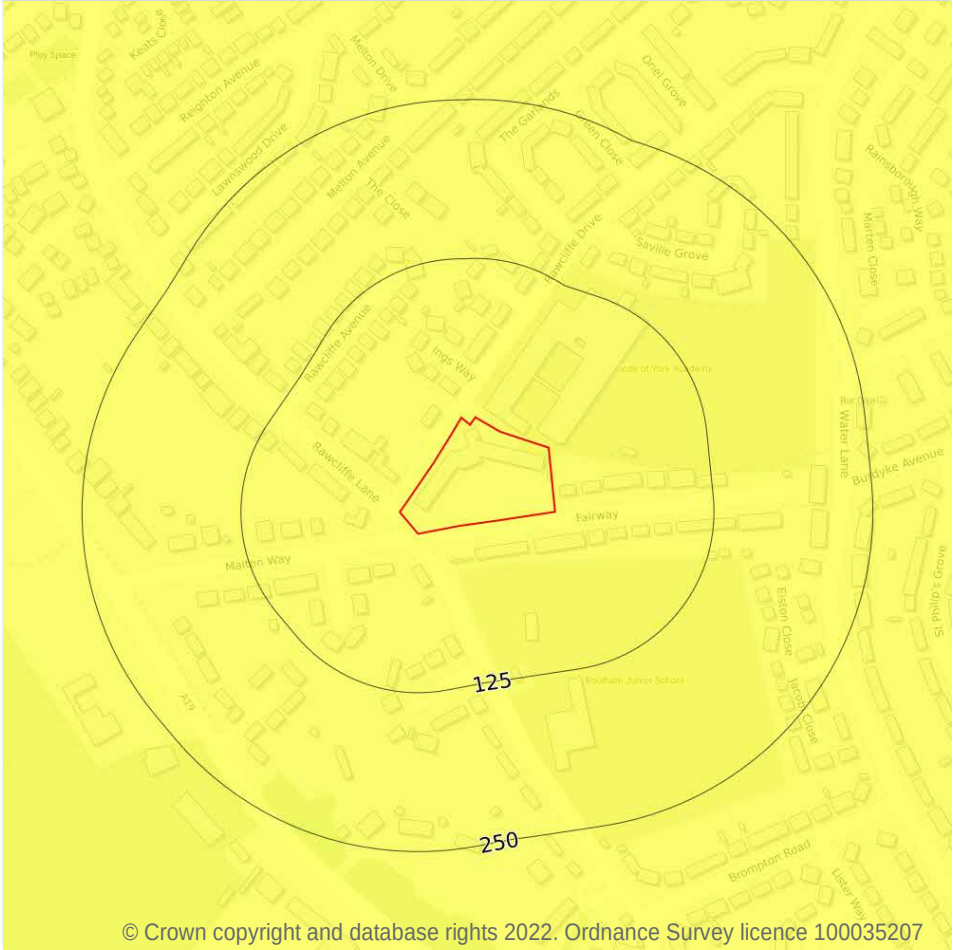
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 86**

Location	Hazard rating	Details
On site	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

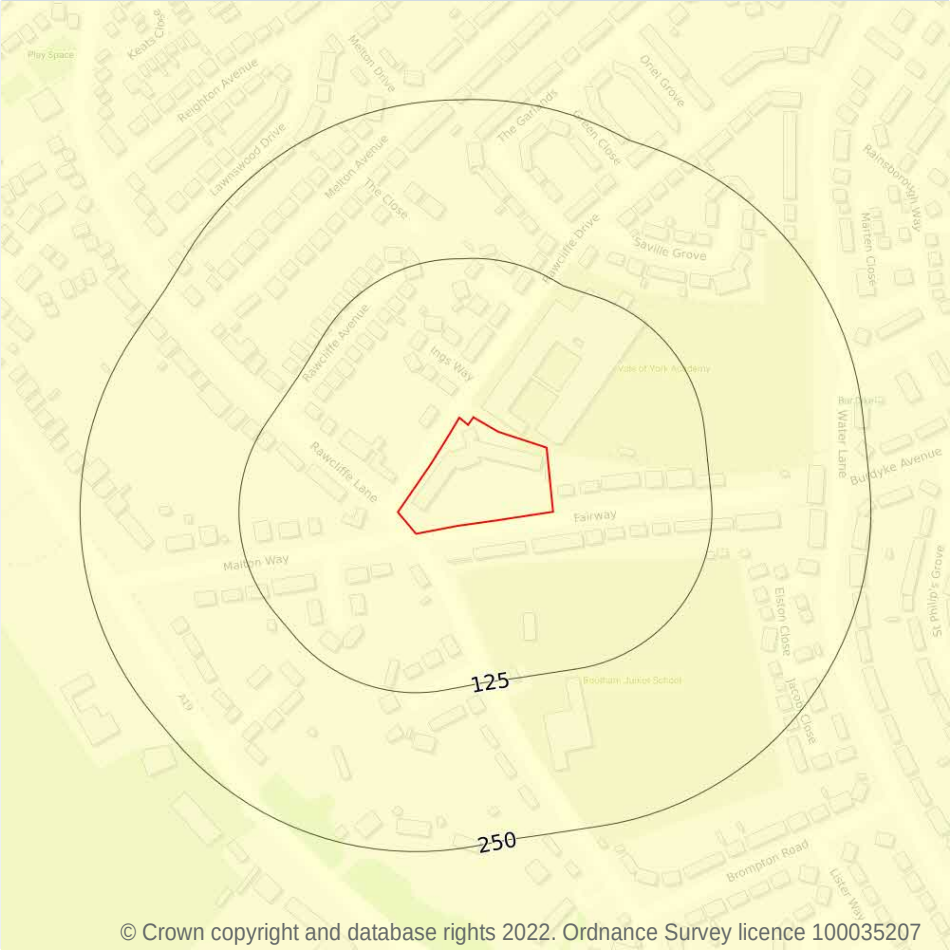
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 87**

Location	Hazard rating	Details
On site	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.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 88**

Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities

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Site Outline

Search buffers in metres (m)

- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities

Non Coal Mining

- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	2

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 90**

ID	Location	Land Use	Year of mapping	Mapping scale
A	191m SW	Pond	1950	1:10560
A	191m SW	Pond	1929	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

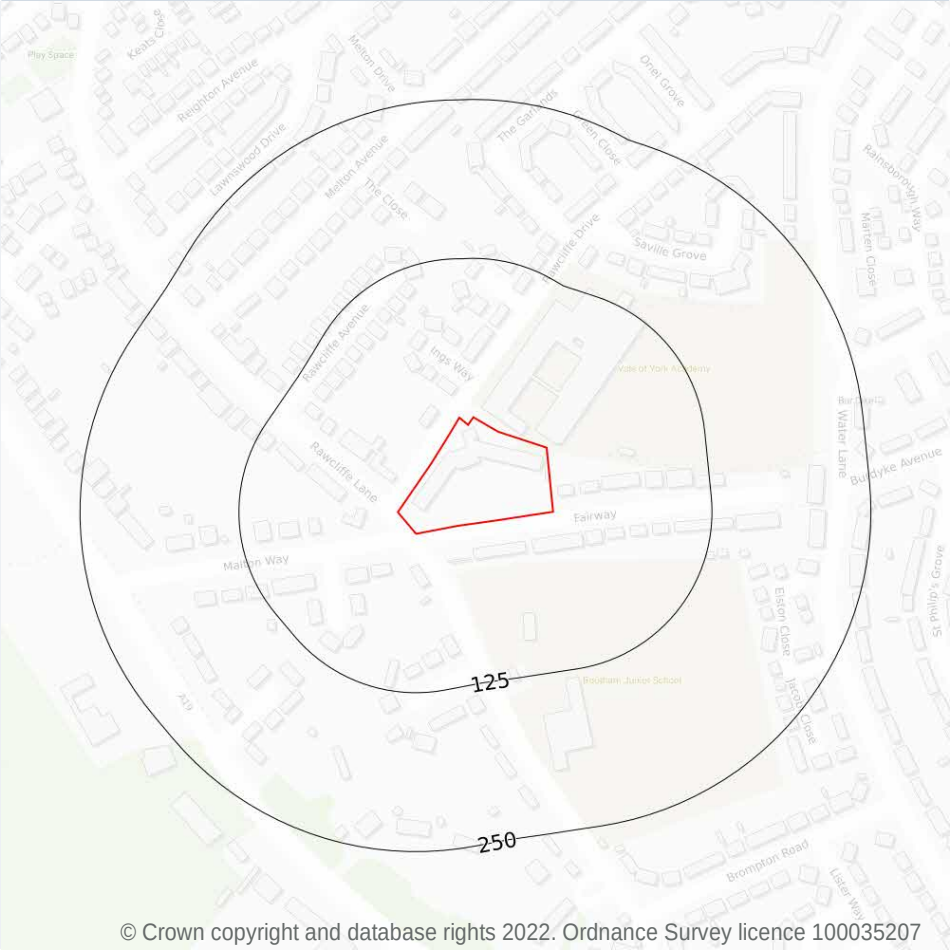
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



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Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 94**

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None**

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	3

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	No data	300 - 600 mg/kg	240 - 360 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	200 - 300 mg/kg	120 - 240 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	300 - 600 mg/kg	240 - 360 mg/kg	1.8 mg/kg	20 - 40 mg/kg	15 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	8

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
On site	8	1.4	92	63	0.3	36	23	12	6
On site	8	1.4	97	67	0.3	36	24	13	6
On site	8	1.4	98	67	0.2	35	24	12	5
On site	8	1.4	95	65	0.2	35	23	12	5

Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
11m E	8	1.4	88	60	0.4	36	23	12	6
11m SE	8	1.4	95	65	0.3	36	24	13	6
30m N	8	1.4	103	71	0.4	40	27	14	7
33m NW	8	1.4	90	62	0.2	36	23	12	5

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

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APPENDIX B

HISTORICAL ORDNANCE SURVEY PLANS

County Series 1:10,560 scale

VEGETATION

- Fir Wood
- Deciduous Wood
- Mixed Wood
- Brushwood
- Orchard
- Reeds
- Rough Pasture
- Furze
- Marsh
- Osiers

ROADS

- Railway over Road
- Road over Railway
- Road over River or Canal
- Level Crossing
- Railway over River
- Road over Stream
- Road over Stream
- Sunken Road
- Raised Road

RAILWAYS

- Double Lines of Railway
- Single Lines of Railway and Tramway

GENERAL FEATURES

- Gravel Pit
- Sand Pit
- Quarry
- Shingle
- Other Pits
- Antiquities, Site of
- Arrow, showing direction of flow of water
- Trigonometrical Station

BOUNDARIES

- County Boundary
- Parliamentary Division Boundary
- Parish Boundary
- Union Boundary
- Contours
- Rural District Boundary

National Grid 1:10,000 scale

HEIGHTS (METRES)

Values are given in metres above mean sea level at Newlyn.

Surface heights determined by: ground survey • 163m; air survey

Bench marks and their values are shown on large scale maps, and bench mark lists containing fuller and possibly later levelling information are obtainable from the Director General, Ordnance Survey.

Contours are at 5 metres vertical interval.

ROCK FEATURES

Loose rock; Boulders; Outcrop; Scree; Vertical face

CONVERSION SCALE

Metres - Feet

2000 Metres – 6500 Feet; 6000; 5000; 1500; 4000

ABBREVIATIONS

BP,BS	Boundary Post or Stone	PO	Post Office
Ch	Church	PC	Public Convenience
CH	Club House	PH	Public House
F Sta	Fire Station	S	Stone
FB	Foot Bridge	Spr	Spring
Fn	Fountain	TCB	Telephone Call Box
GP	Guide Post	TCP	Telephone Call Post
MP,MS	Mile Post or Stone	TH	Town Hall
P	Pole or Post	W	Well
Pol Sta	Police Station	Y	Youth hostel

ROADS

- Road
- Track (Where unfenced shown by pecked lines.)
- Path

RAILWAYS

Cutting; Embankment; Road over; Road under; Level crossing; Foot Bridge

- Multiple track
- Single track
- Siding, tramway or mineral line
- Standard gauge
- Narrow gauge

GENERAL FEATURES

- Antiquity, (site of)
- Lake, loch or pond
- Boulders
- Sloping masonry
- Building
- Chalk pit, clay pit or quarry
- Pylon / Pole – Electricity transmission line
- Gravel pit
- Glasshouse
- Sand pit
- Triangulation station
- Refuse or slag heap
- Direction of flow of water
- Shingle
- Sand

VEGETATION

- Bracken, rough grassland
- Marsh
- Coppice
- Orchard
- Scrub
- Saltings
- Coniferous trees
- Heath
- Reeds
- Non-coniferous trees

In some areas bracken ( ) and rough grassland ( ) are shown separately.

GroundSure

Historical Map Pack Legend

County Series & National Grid

1:10,560 scale

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Technical Helpline

Tel 08444159000

groundsureinsight@groundsure.com
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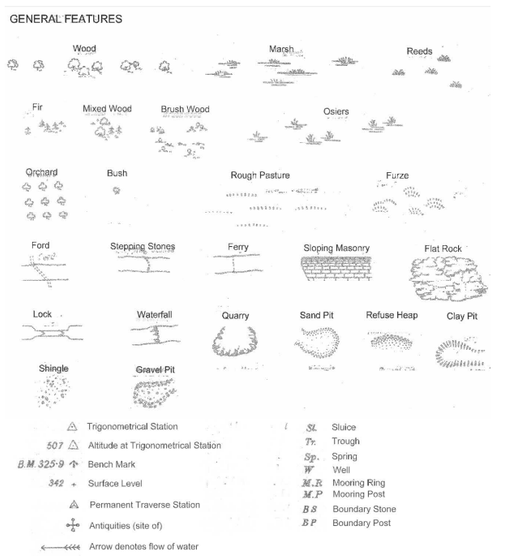
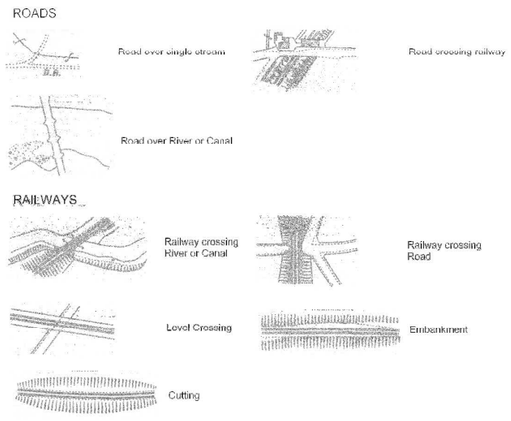
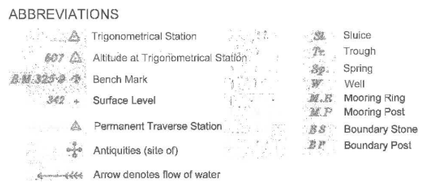
Historical Map Pack Legend

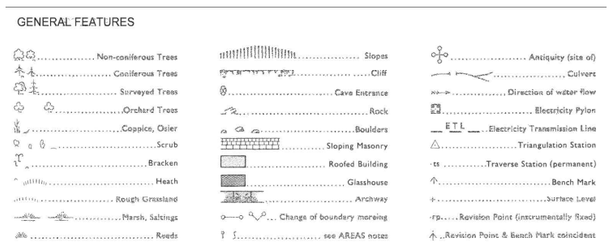
County Series 1:2,500 scale

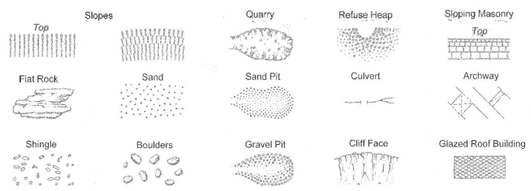


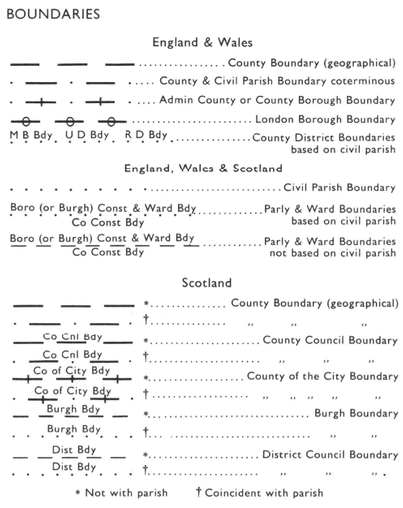


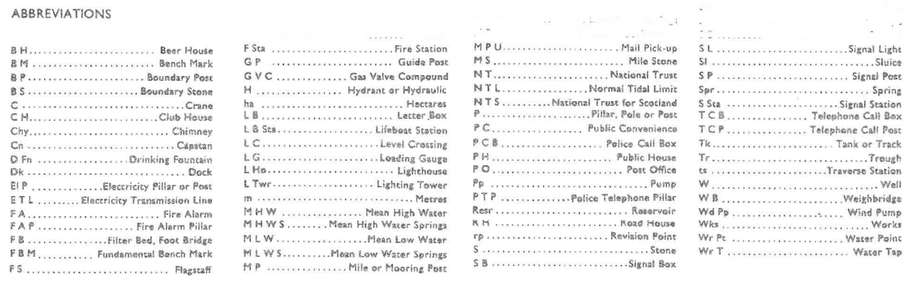


National Grid 1:2,500 / 1:1,250 scale









County Series

1:1,250 scale

~

County Series & National Grid

1:2,500 scale

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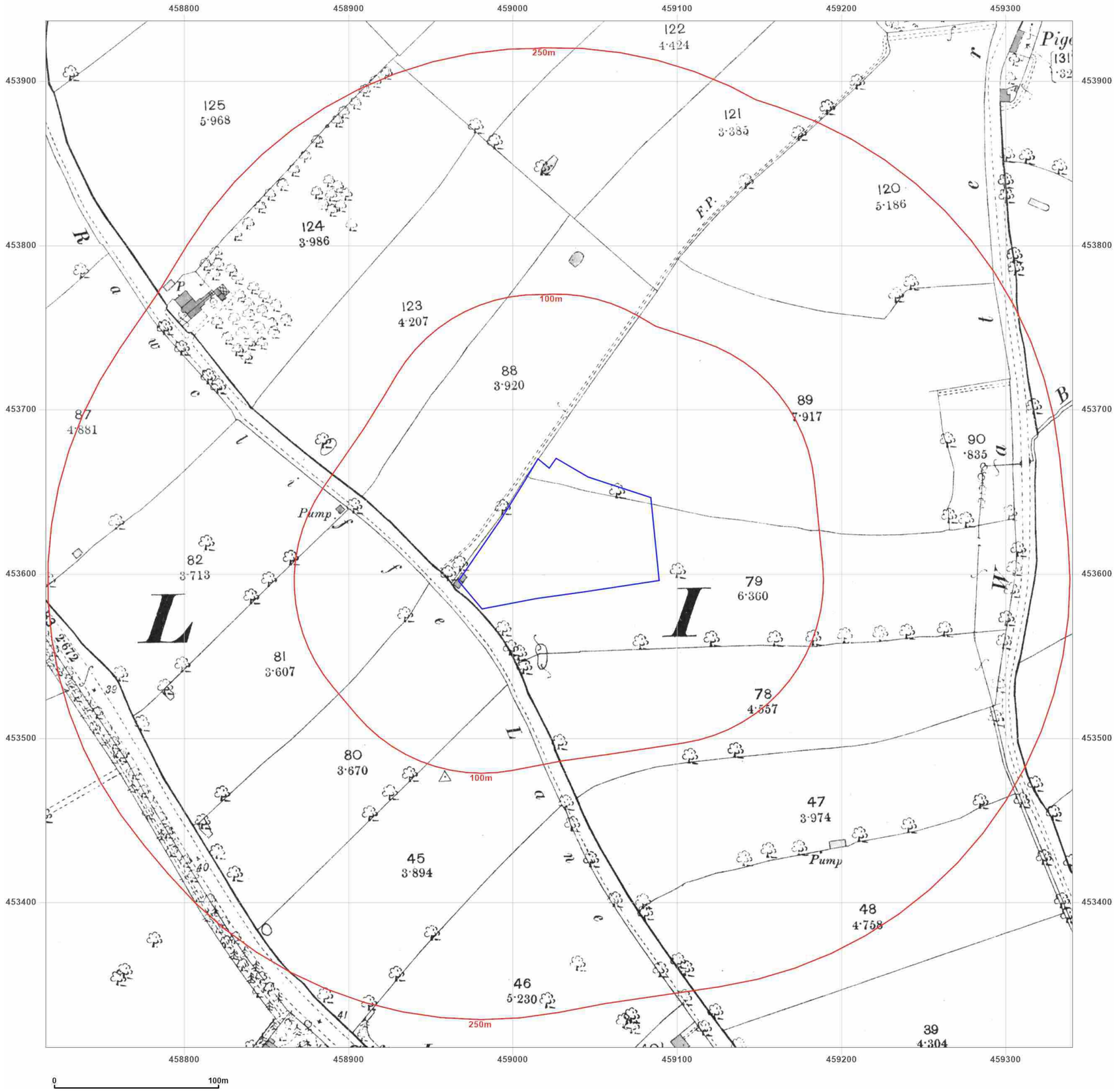

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1892**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1892
Revised 1892
Edition N/A
Copyright N/A
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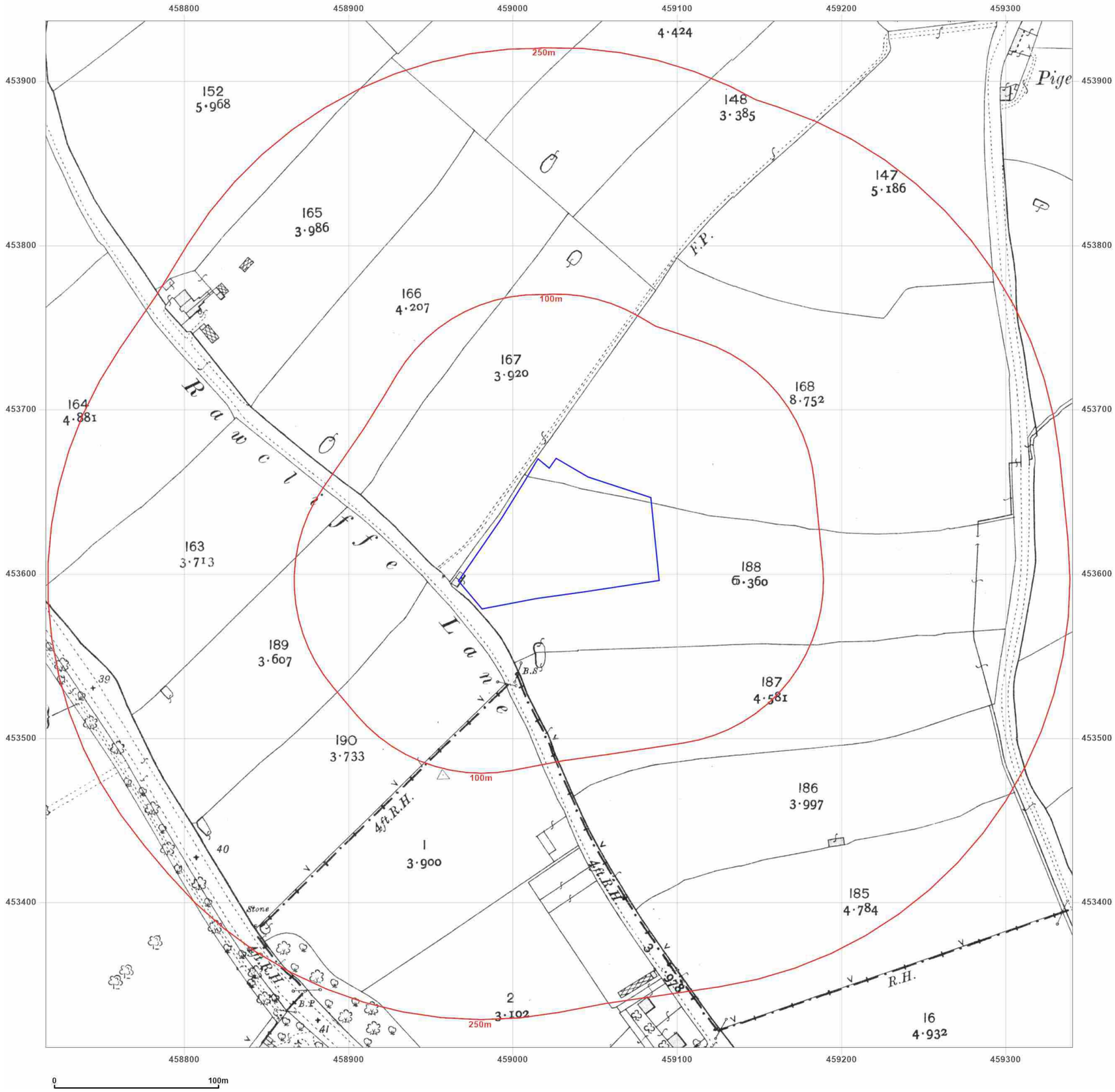

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1909**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1909
Edition N/A
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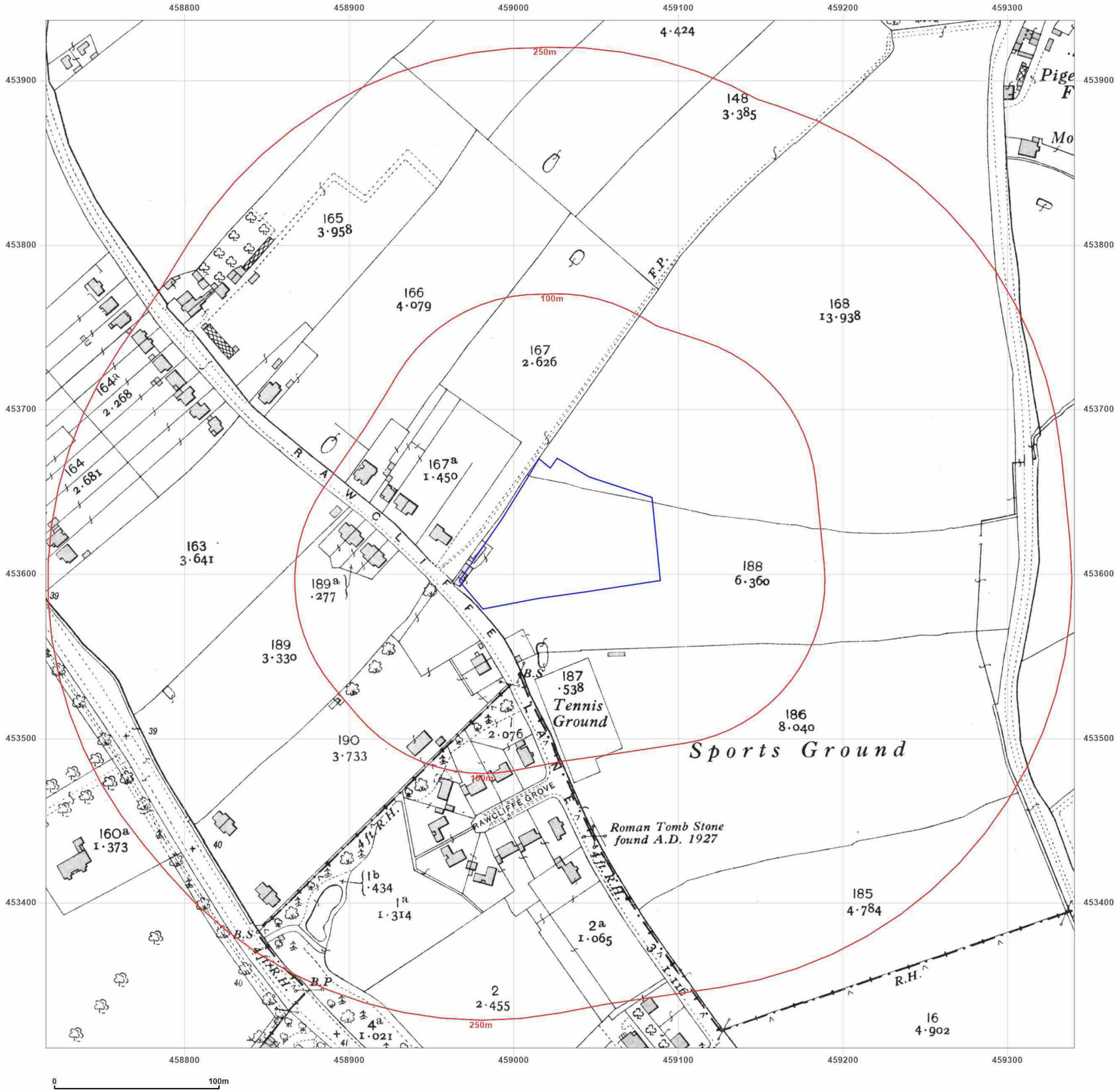

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1931**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1931
Revised 1931
Edition N/A
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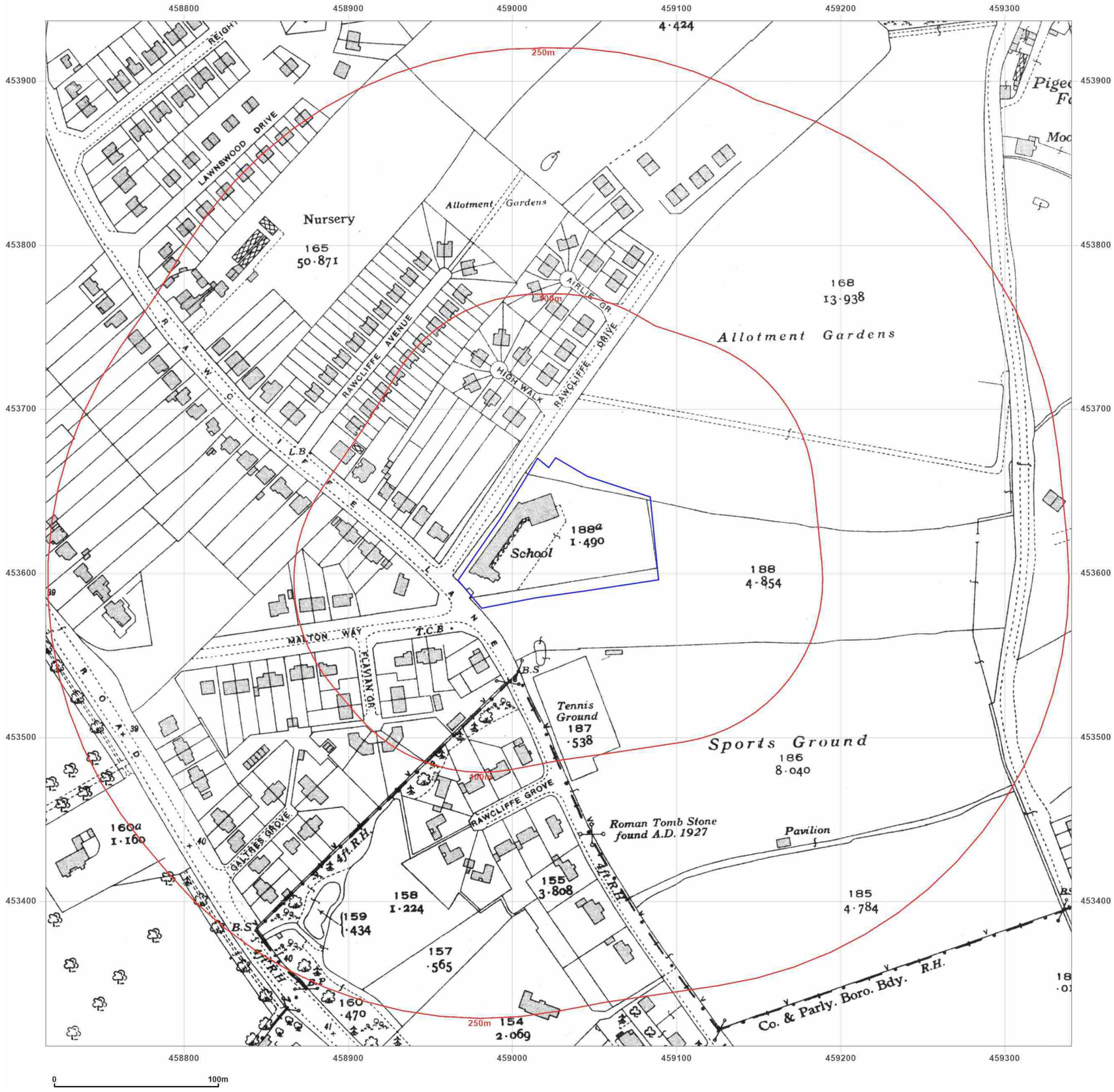

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1937**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1937
Revised 1937
Edition N/A
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Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1960**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1959 Revised 1959 Edition N/A Copyright 1960 Levelled 1927		Surveyed 1960 Revised 1960 Edition N/A Copyright 1960 Levelled 1927
Surveyed 1959 Revised 1959 Edition N/A Copyright 1960 Levelled 1927		Surveyed 1960 Revised 1960 Edition N/A Copyright 1960 Levelled 1927

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1961**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1960
Revised 1960
Edition 1961
Copyright 1961
Levelled 1927

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Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1969**

Scale: 1:1,250

Printed at: 1:2,000

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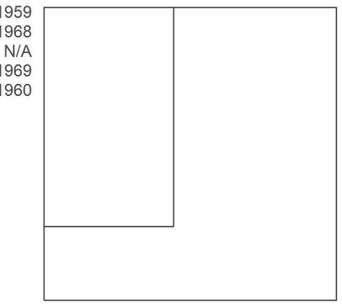
Surveyed 1959
Revised 1968
Edition N/A
Copyright 1969
Levelled 1960



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Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1979-1984**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1960
Revised 1983
Edition N/A
Copyright 1984
Levelled 1960

Surveyed 1959
Revised 1977
Edition N/A
Copyright 1979
Levelled 1960

Surveyed 1960
Revised 1977
Edition N/A
Copyright 1979
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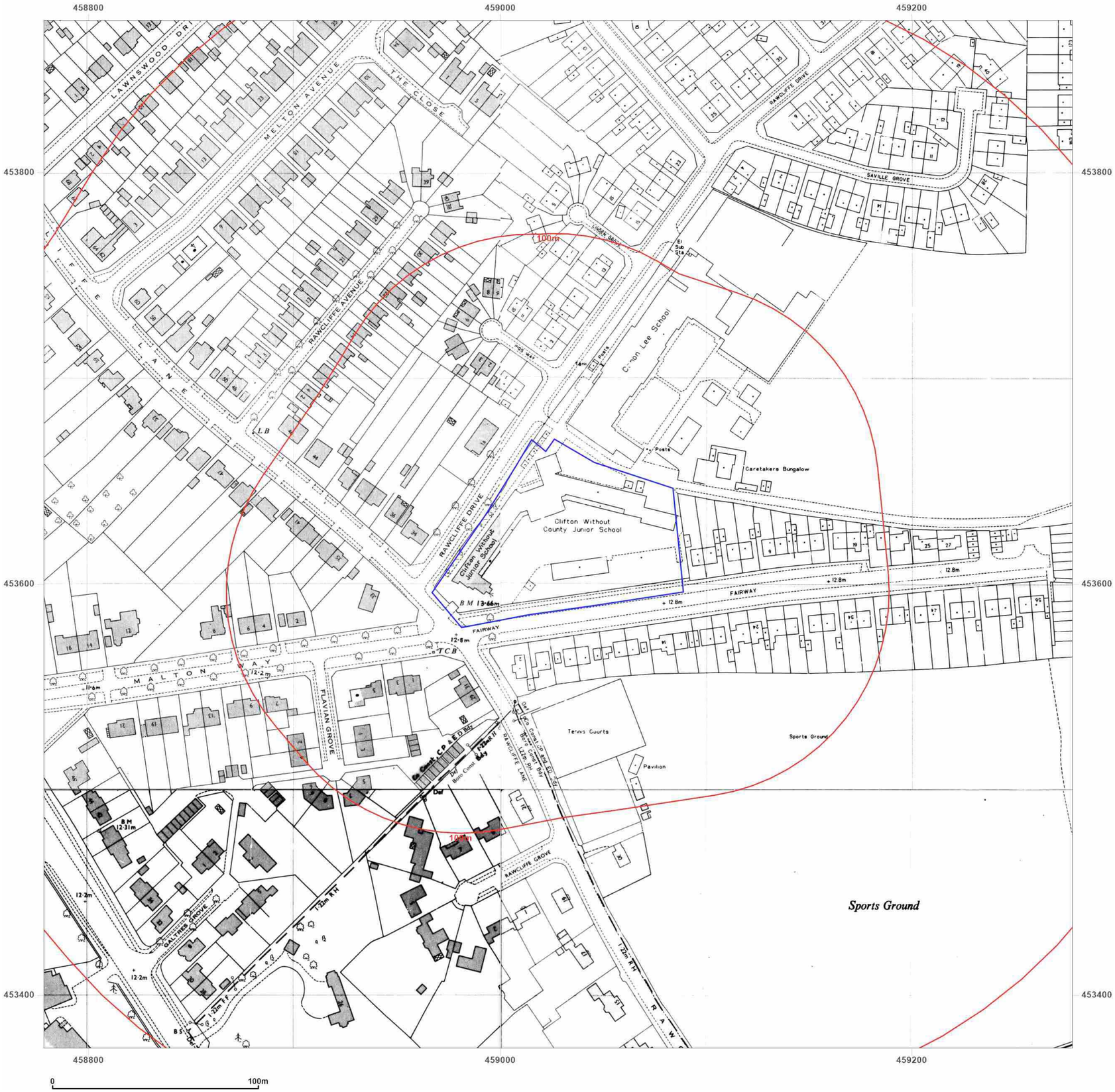

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1988-1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1960 Revised 1988 Edition N/A Copyright 1988 Levelled 1960	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A
Surveyed 1960 Revised 1990 Edition N/A Copyright 1990 Levelled 1960	Surveyed 1960 Revised 1990 Edition N/A Copyright 1990 Levelled 1960

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Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1990-1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1960
Revised 1990
Edition N/A
Copyright 1990
Levelled 1960

Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
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Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1993-1994**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

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Edition N/A
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Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
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Surveyed 1994
Revised 1994
Edition N/A
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Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1995
Revised 1995
Edition N/A
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Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: LandLine

Map date: **2003**

Scale: 1:1,250

Printed at: 1:1,250

N
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2003

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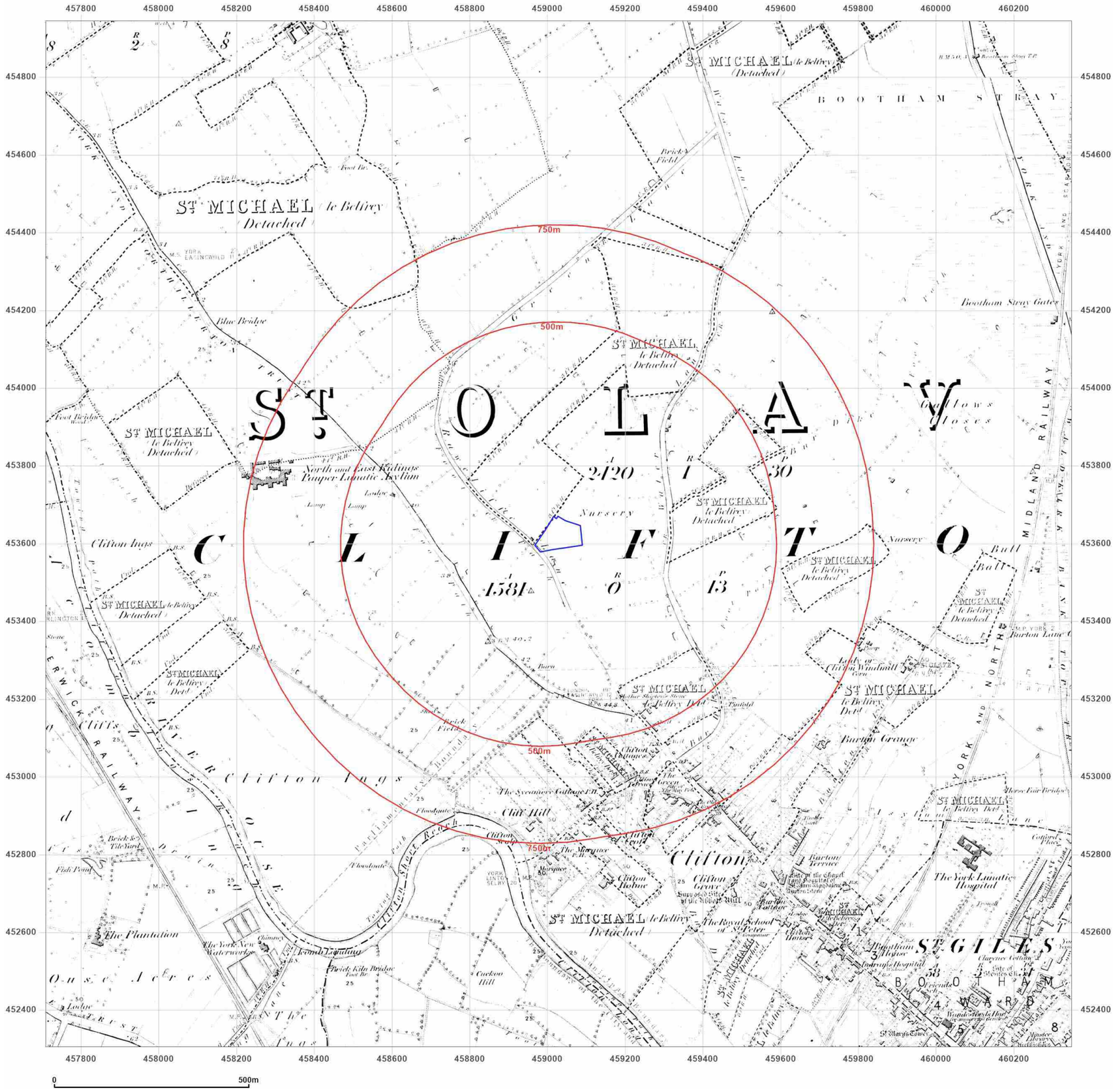

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1853-1854**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1852
Revised N/A
Edition 1854
Copyright N/A
Levelled N/A

Surveyed 1852
Revised N/A
Edition 1853
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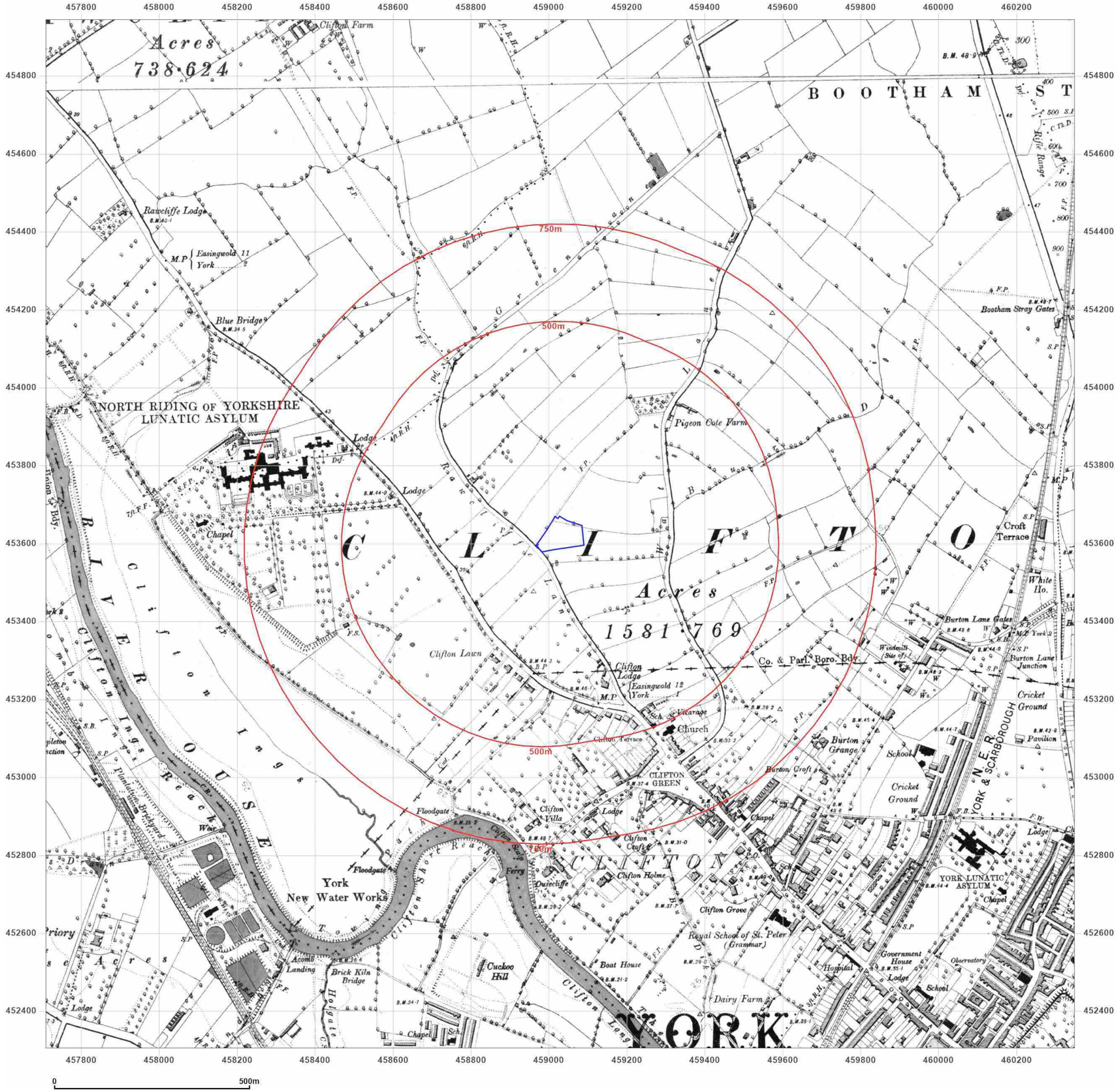

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1893**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1891
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Edition 1893
Copyright N/A
Levelled N/A

Surveyed 1851
Revised N/A
Edition 1893
Copyright N/A
Levelled N/A

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Map legend available at:
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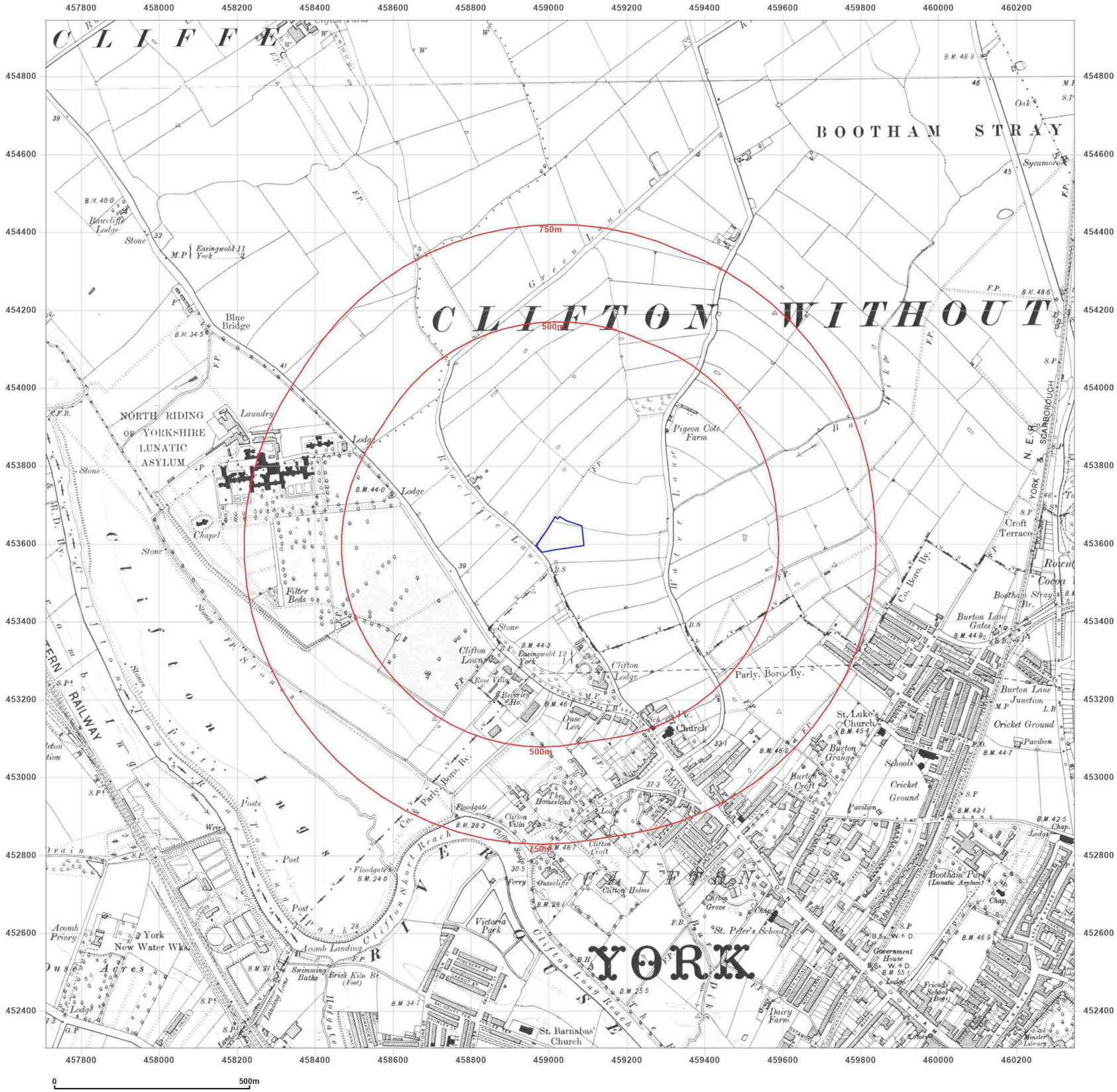

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1907**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1848
Revised 1907
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1851
Revised 1907
Edition N/A
Copyright N/A
Levelled N/A

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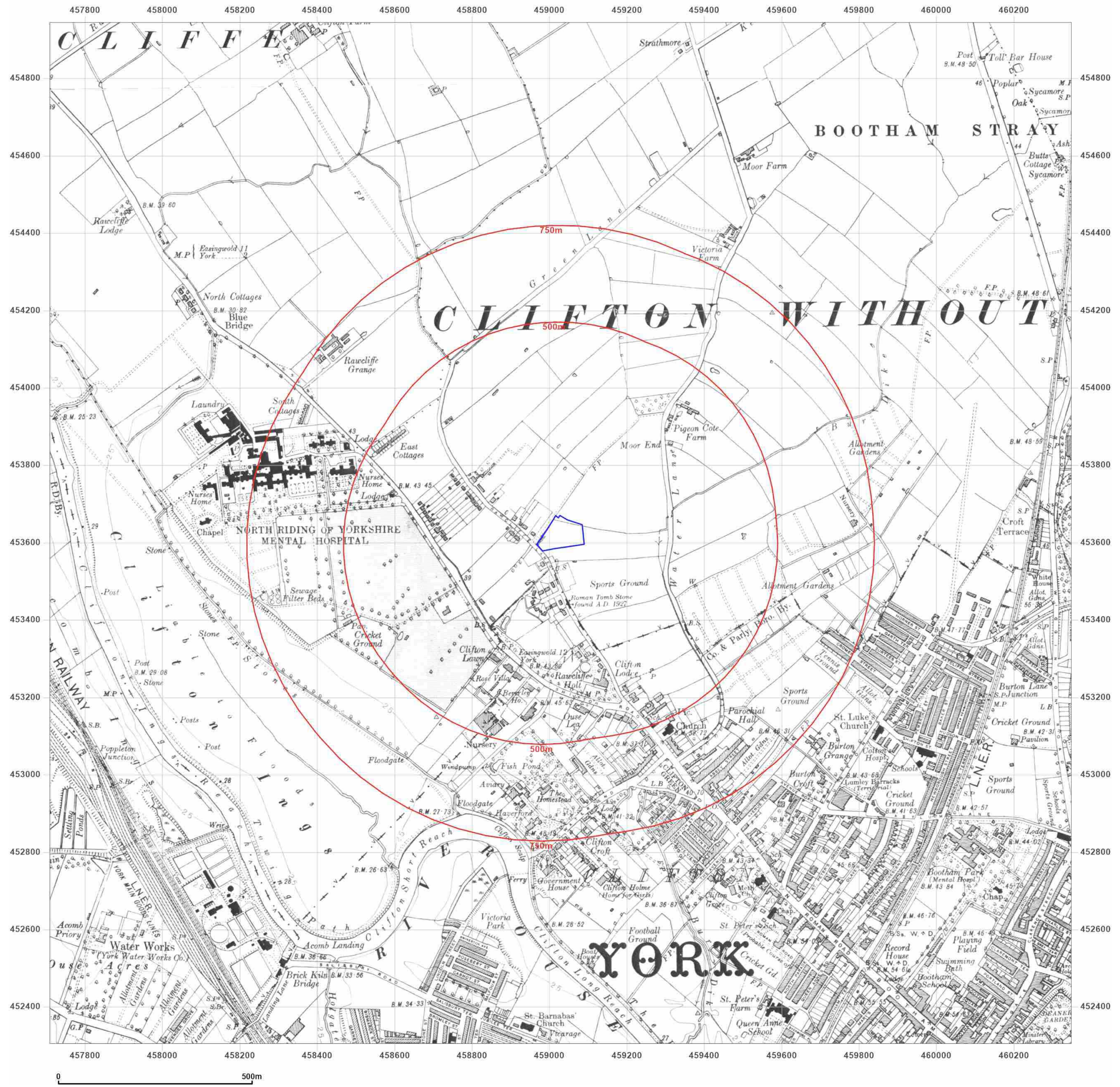

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: 1928-1932

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1848
Revised 1928
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1851
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

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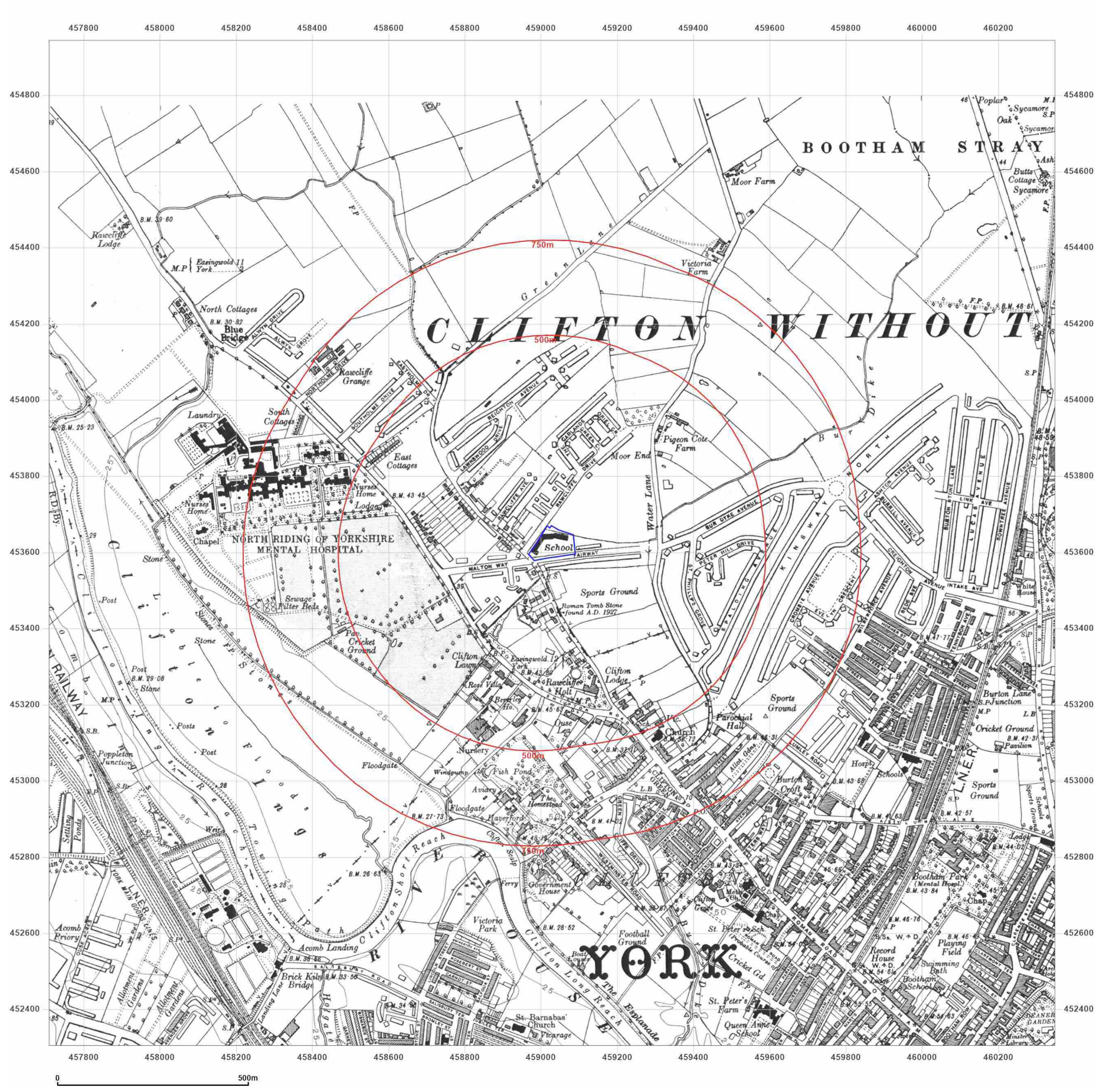

emapsite™

Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1851
Revised 1929
Edition N/A
Copyright N/A
Levelled N/A

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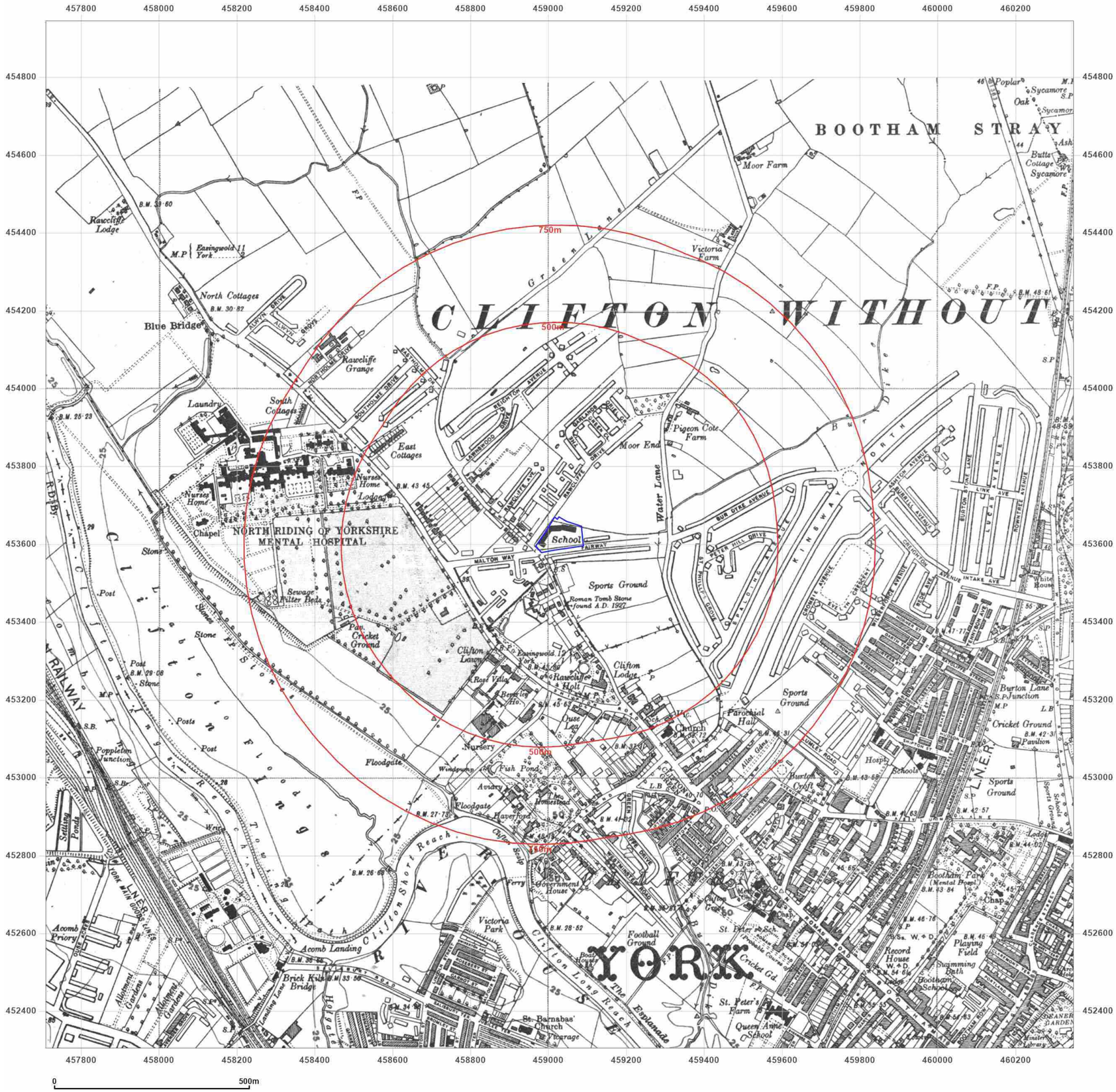

emapsite™

Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1851
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: County Series

Map date: **1950**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1891
Revised 1950
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1851
Revised 1950
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: Provisional

Map date: **1958**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed N/A
Revised 1957
Edition 1958
Copyright N/A
Levelled N/A

Surveyed N/A
Revised 1957
Edition 1958
Copyright N/A
Levelled N/A

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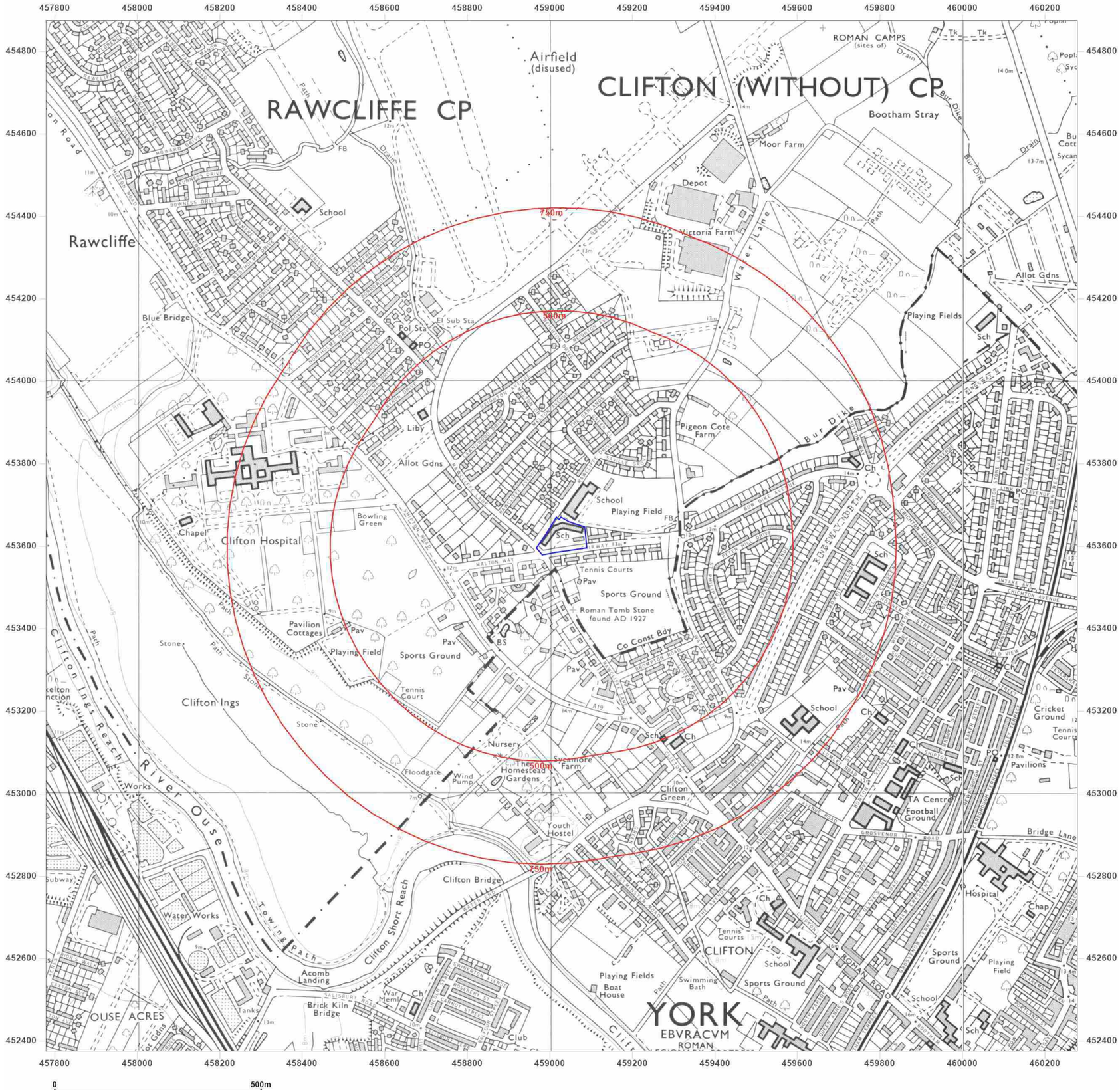

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1969-1972**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1972
Revised 1972
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1969
Revised 1969
Edition N/A
Copyright N/A
Levelled N/A

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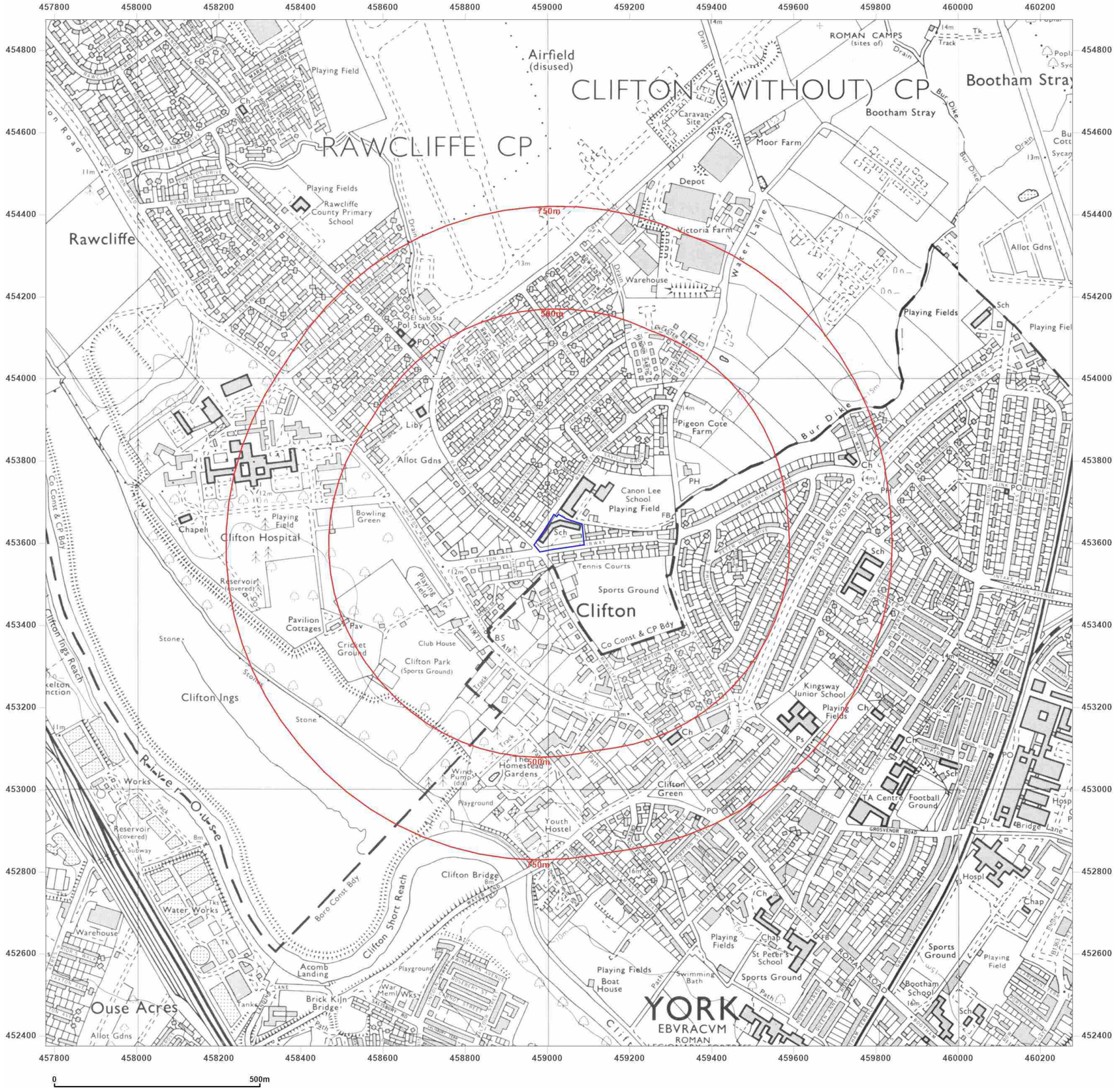

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1980-1983**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1983
Revised 1983
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1978
Revised 1980
Edition N/A
Copyright N/A
Levelled N/A

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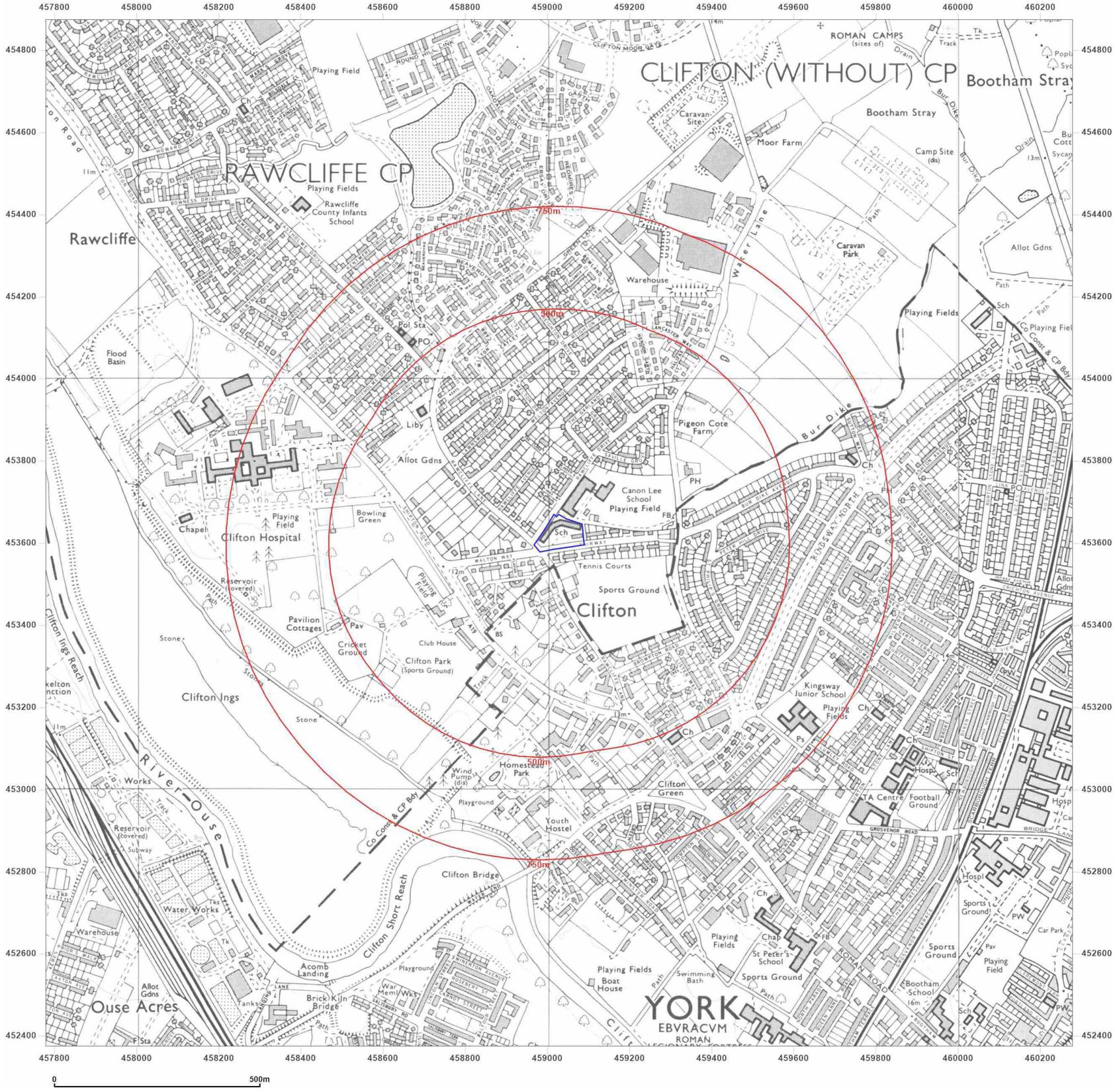

emapsite™

Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **1990-1991**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1983
Revised 1991
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1989
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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2001

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Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2010

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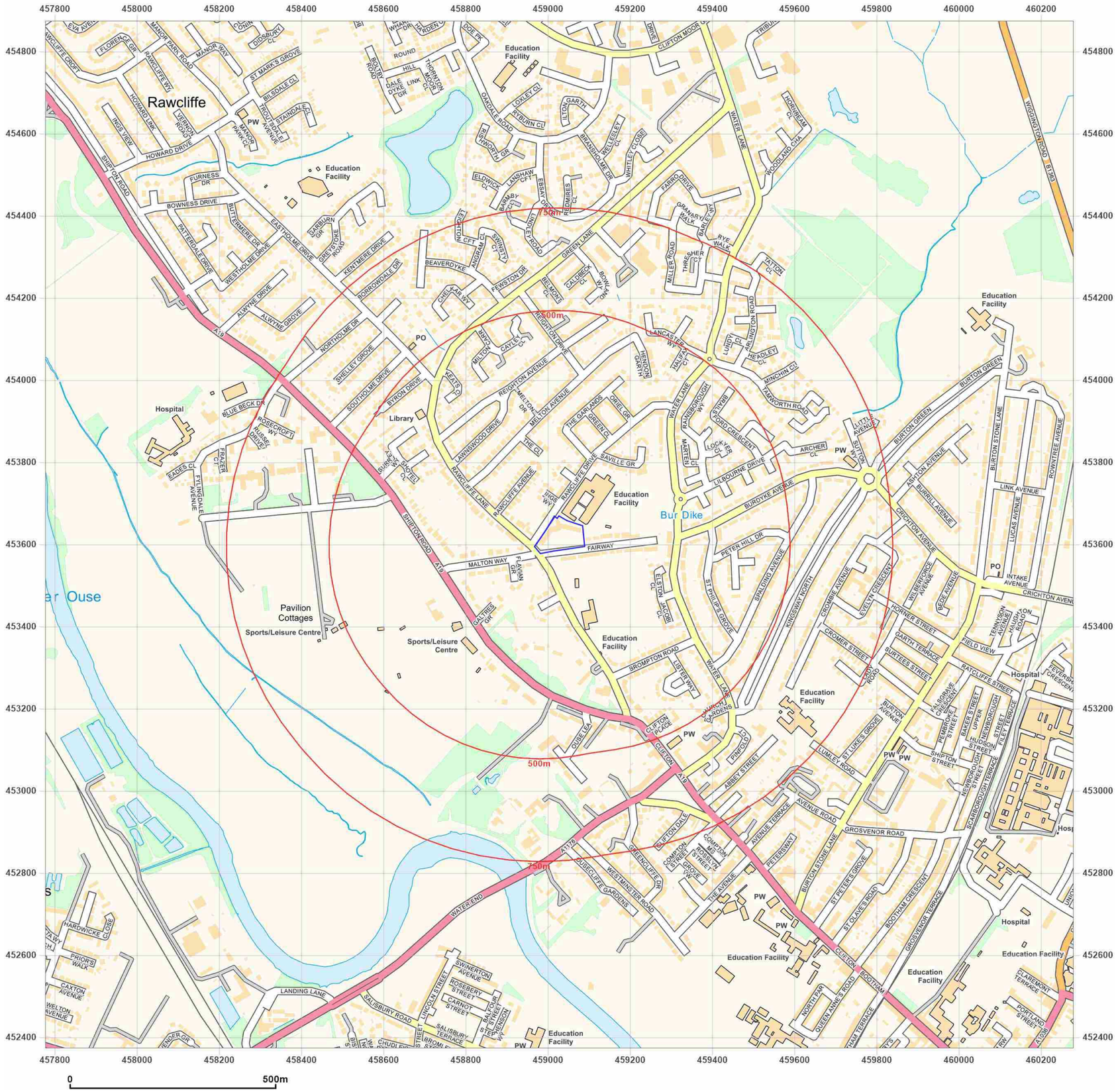

emapsite™

Site Details:

Client Ref: EMS_754233_979847
Report Ref: EMS-754233_979847
Grid Ref: 459028, 453624

Map Name: National Grid

Map date: **2022**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2022

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APPENDIX C

GROUND INVESTIGATION LOGS

Alan Wood & Partners	Borehole Log			Borehole No. **WS1** Sheet 1 of 1
Project Name:	Clifton Expore Site	Project No. 46794	Co-ords: 459010.24 - 453616.43	Hole Type WLS
Location:	Rawcliffe, York		Level: 13.11	Scale 1:50
Client:	City of York Council		Dates: 04/02/2022 - 04/02/2022	Logged By AC

Well

Remarks
Borehole terminated to conduct failing head test at 2.00m bgl.

AGS

Alan Wood & Partners	Borehole Log			Borehole No. **WS2** Sheet 1 of 1
Project Name:	Clifton Expore Site	Project No. 46794	Co-ords: 459041.61 - 453634.91	Hole Type WLS
Location:	Rawcliffe, York		Level: 13.24	Scale 1:50
Client:	City of York Council		Dates: 04/02/2022 - 04/02/2022	Logged By AC

Well

Remarks
Poor recovery 4.00m to 5.00m bgl due to water ingress.

AGS

Alan Wood & Partners	Borehole Log			Borehole No. **WS3** Sheet 1 of 1
Project Name:	Clifton Expore Site	Project No. 46794	Co-ords: 459065.28 - 453626.88	Hole Type WLS
Location:	Rawcliffe, York		Level: 13.23	Scale 1:50
Client:	City of York Council		Dates: 04/02/2022 - 04/02/2022	Logged By AC

Well

Remarks

AGS

Alan Wood & Partners	Borehole Log			Borehole No. **WS4** Sheet 1 of 1
Project Name:	Clifton Expore Site	Project No. 46794	Co-ords: 459068.84 - 453609.16	Hole Type WLS
Location:	Rawcliffe, York		Level: 12.98	Scale 1:50
Client:	City of York Council		Dates: 04/02/2022 - 04/02/2022	Logged By AC

Well

Remarks

AGS

Alan Wood & Partners	Borehole Log			Borehole No. **WS6** Sheet 1 of 1
Project Name:	Clifton Expore Site	Project No. 46794	Co-ords: 459015.35 - 453650.57	Hole Type WLS
Location:	Rawcliffe, York		Level: 13.28	Scale 1:50
Client:	City of York Council		Dates: 04/02/2022 - 04/02/2022	Logged By AC

Well

Remarks
Borehole terminated at 2.00m bgl due to very hard concrete obstruction,.

AGS

Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Dynamic sampling
Unit 8
Victory parkway
Victory rd
Derby
DE24 8ZF

Hammer Ref:	110..90
Test Date:	09/09/2021
Report Date:	09/09/2021
File Name:	110..90.spt
Test Operator:	B HUNTER

Instrumented Rod Data

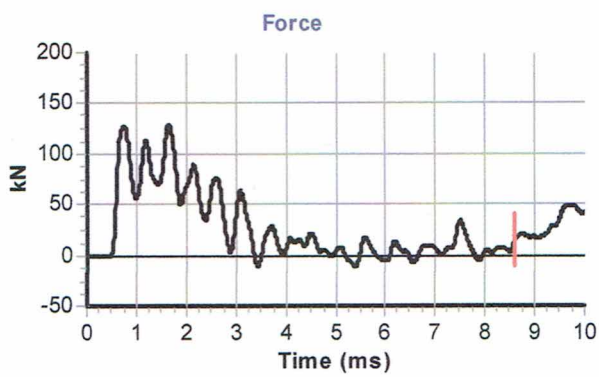
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	62901
Accelerometer No.2:	62902

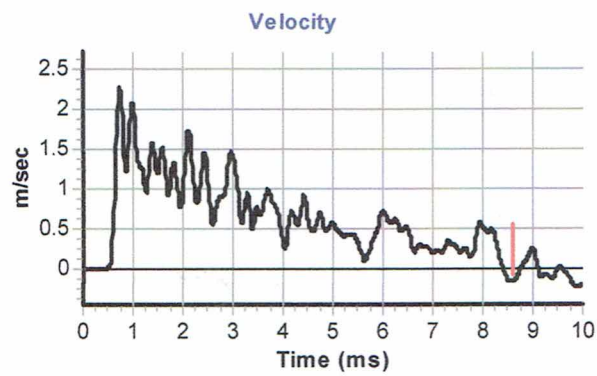
Hammer Information

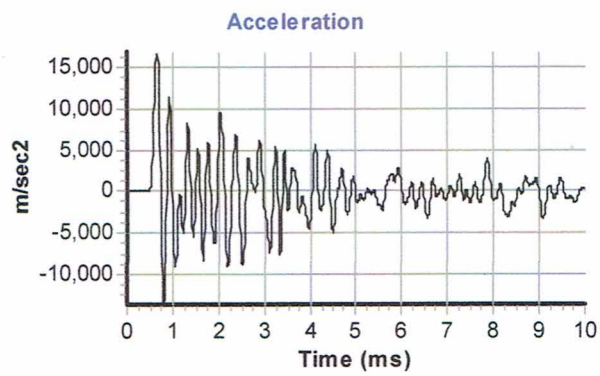
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
String Length L (m):	15.0

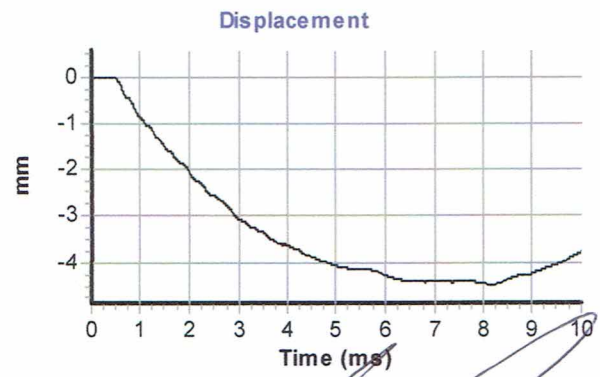
Comments / Location

Hammer tested at Dynamic samplings yard.









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	375

Energy Ratio E_r (%): **79**

Signed: A.parker
Title: Associate director

The recommended calibration interval is 12 months

SPTMAN ver.Hammer Energy ver. 1.93 All rights reserved, Testconsult ©2010

Trial Pit Log

Alan Wood & Partners

Trialpit No **TP1** Sheet 1 of 2			
Project Name: Clifton Expore Site	Project No. 46794	Co-ords: 459009.61 - 453626.11 Level: 13.36	Date 13/04/2022
Location: Rawcliffe, York		Dimensions (m): 3 × 0.6 Depth 3.10	Scale 1:10
Client: City of York Council			Logged LAF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend
	Depth	Type	Results			
				0.05	13.31	
				0.15	13.21	
				0.40	12.96	
				1.10	12.26	
▼				1.80	11.56	

Remarks: Back filled with arisings. Water ingress at 1.8m bgl.

Stability: Collapse of both walls once excavated past 1.2m bgl.

AGS

Trial Pit Log

Alan Wood & Partners

Trialpit No **TP1** Sheet 2 of 2			
Project Name: Clifton Expore Site	Project No. 46794	Co-ords: 459009.61 - 453626.11 Level: 13.36	Date 13/04/2022
Location: Rawcliffe, York		Dimensions (m): 3 × 0.6 Depth 3.10	Scale 1:10
Client: City of York Council			Logged LAF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend
	Depth	Type	Results			
				3.10	10.26	

Remarks: Back filled with arisings. Water ingress at 1.8m bgl.

Stability: Collapse of both walls once excavated past 1.2m bgl.

AGS

Trial Pit Log

Alan Wood & Partners

Trialpit No **TP2** Sheet 1 of 2			
Project Name: Clifton Expore Site	Project No. 46794	Co-ords: 459034.73 - 453637.81 Level: 13.40	Date 13/04/2022
Location: Rawcliffe, York		Dimensions (m): 3 × 0.6 Depth 2.70	Scale 1:10
Client: City of York Council			Logged LAF

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend
				0.05	13.35	
				0.17	13.23	
				0.40	13.00	
				1.10	12.30	
▼				1.80	11.60	

Remarks: Back filled with arisings. Water ingress at 1.8m bgl.

Stability: Collapsed of both walls once excavated past 1.5m bgl.

AGS

Trial Pit Log

Alan Wood & Partners

Trialpit No **TP2** Sheet 2 of 2			
Project Name: Clifton Expore Site	Project No. 46794	Co-ords: 459034.73 - 453637.81 Level: 13.40	Date 13/04/2022
Location: Rawcliffe, York		Dimensions (m): 3 × 0.6	Scale 1:10
Client: City of York Council		Depth 2.70	Logged LAF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend
	Depth	Type	Results			
				2.70	10.70	

Remarks: Back filled with arisings. Water ingress at 1.8m bgl.

Stability: Collapsed of both walls once excavated past 1.5m bgl.

AGS

Trial Pit Log

Alan Wood & Partners

Trialpit No **TP3** Sheet 1 of 2			
Project Name: Clifton Expore Site	Project No. 46794	Co-ords: 459047.28 - 453633.73 Level: 13.45	Date 13/04/2022
Location: Rawcliffe, York		Dimensions (m): 3 × 0.6 Depth 3.20	Scale 1:10
Client: City of York Council			Logged LAF

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend
				0.05	13.40	
				0.15	13.30	
				0.30	13.15	
				0.90	12.55	
▼				1.80	11.65	

Remarks: Back filled with arisings. Water ingress at 1.8m bgl.

Stability: Collapse of both walls once excavated past 1.6m bgl.

AGS

Trial Pit Log

Alan Wood & Partners

Trialpit No **TP3** Sheet 2 of 2			
Project Name: Clifton Expore Site	Project No. 46794	Co-ords: 459047.28 - 453633.73 Level: 13.45	Date 13/04/2022
Location: Rawcliffe, York		Dimensions (m): 3 × 0.6 Depth 3.20	Scale 1:10
Client: City of York Council			Logged LAF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend
	Depth	Type	Results			
				3.20	10.25	

Remarks: Back filled with arisings. Water ingress at 1.8m bgl.

Stability: Collapse of both walls once excavated past 1.6m bgl.

AGS

Trial Pit Log

Alan Wood & Partners

Trialpit No **TP4** Sheet 1 of 2			
Project Name: Clifton Expore Site	Project No. 46794	Co-ords: 459062.51 - 453630.61 Level: 13.36	Date 13/04/2022
Location: Rawcliffe, York		Dimensions (m): 3 × 0.6 Depth 2.90	Scale 1:10
Client: City of York Council			Logged LAF

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend
				0.05	13.31	
				0.15	13.21	
				0.20	13.16	
				0.30	13.06	
				1.10	12.26	
				1.90	11.46	

Remarks: Back filled with arisings. No groundwater witnessed.

Stability: Collapse of both walls once excavated past 2.0m bgl.

AGS

Trial Pit Log

Alan Wood & Partners

Trialpit No **TP4** Sheet 2 of 2			
Project Name: Clifton Expore Site	Project No. 46794	Co-ords: 459062.51 - 453630.61 Level: 13.36	Date 13/04/2022
Location: Rawcliffe, York		Dimensions (m): 3 × 0.6 Depth 2.90	Scale 1:10
Client: City of York Council			Logged LAF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend
	Depth	Type	Results			
				2.90	10.46	

Remarks: Back filled with arisings. No groundwater witnessed.

Stability: Collapse of both walls once excavated past 2.0m bgl.

AGS

APPENDIX D

LABORATORY TEST RESULTS: GEOTECHNICAL

LABORATORY REPORT

4043

Contract Number: PSL22/0943

Report Date: 01 March 2022

Client's Reference: 46794/S4500

Client Name: Alan Wood & Partners
Hallamshire House
Meadow Court
Hayland Street
Sheffield
S9 1BY

For the attention of: Antonia Clark

Contract Title: Clifton Explore Site

Date Received: 7/2/2022
Date Commenced: 7/2/2022
Date Completed: 01/03/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins (Director)

R Berriman (Quality Manager)

S Royle (Laboratory Manager)

[redacted]

L Knight (Assistant Laboratory Manager)

S Eyre (Senior Technician)

M Fennell (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
[redacted]

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS2		D	2.10		Brown slightly gravelly slightly sandy CLAY.
WS3		D	2.10		Brown slightly gravelly slightly sandy CLAY.
WS4		D	2.50		Brown slightly gravelly sandy CLAY.

UKAS TESTING 4043	PSL Professional Soils Laboratory	Clifton Explore Site	Contract No: PSL22/0943 Client Ref: S4500

SUMMARY OF SOIL CLASSIFICATION TESTS

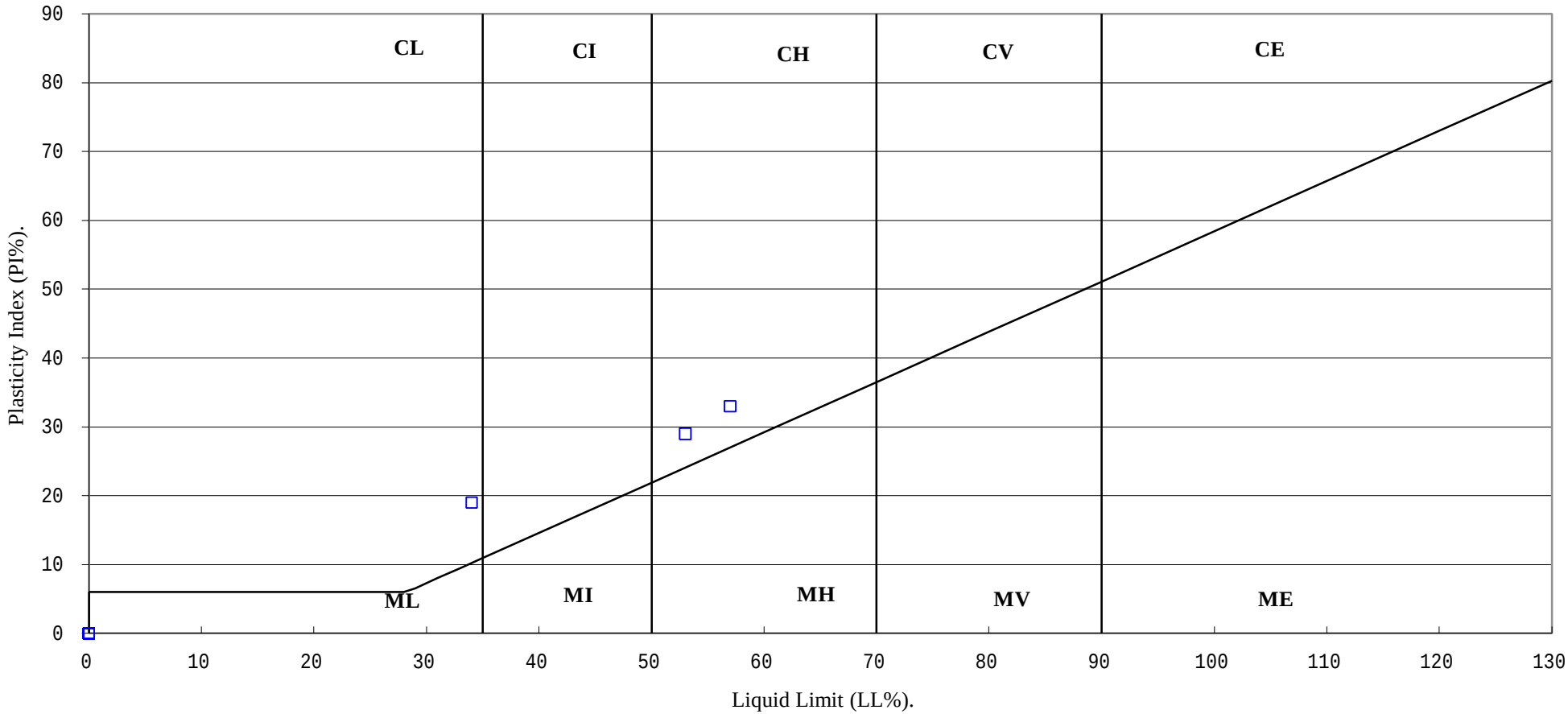
(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS2		D	2.10		24			57	24	33	98	High Plasticity CH
WS3		D	2.10		34			53	24	29	97	High Plasticity CH
WS4		D	2.50		15			34	15	19	96	Low Plasticity CL

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043	PSL Professional Soils Laboratory	Clifton Explore Site	Contract No: PSL22/0943
			Client Ref: S4500

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Clifton Explore Site	Contract No:
			PSL22/0943
			Client Ref:
			S4500

APPENDIX E

LABORATORY TEST RESULTS: CHEMICAL

ANALYTICAL TEST REPORT

Contract no: 105608

Contract name: Clifton Explore Site

Client reference: -

Clients name: Alan Wood & Partners

Clients address: Hallamshire House
Hayland Street
Sheffield
S9 1BY

Samples received: 08 February 2022

Analysis started: 08 February 2022

Analysis completed: 18 February 2022

Report issued: 18 February 2022

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by: [redacted]

Rachael Burton

Reporting Team Lead

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
105608-1	WS1	0.20	Sandy Loam with Gravel	-	-	7.5
105608-2	WS2	0.45	Loamy Sandy Clay	-	-	15.3
105608-3	WS3	0.50	Sandy Clayey Loam with Gravel	-	-	16.6
105608-4	WS3	1.30	Loamy Sandy Clay	-	-	15.4
105608-5	WS4	0.15	Sandy Clayey Loam with Gravel & Roots	-	-	13.5
105608-6	WS6	0.15	Sandy Clayey Loam with Gravel & Roots	-	-	13.5
105608-7	WS6	0.75	Loamy Sandy Clay	-	-	17.8

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SOILS

Lab number			105608-1	105608-2	105608-3	105608-4	105608-5	105608-6
Sample id			WS1	WS2	WS3	WS3	WS4	WS6
Depth (m)			0.20	0.45	0.50	1.30	0.15	0.15
Date sampled			04/02/2022	04/02/2022	04/02/2022	04/02/2022	04/02/2022	04/02/2022
Test	Method	Units						
Arsenic (total)	CE127 M	mg/kg As	6.7	4.5	4.1	4.1	4.9	6.0
Boron (water soluble)	CE063 M	mg/kg B	6.6	3.0	0.6	<0.5	<0.5	<0.5
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	<0.2	<0.2	<0.2	0.2	0.3
Chromium (total)	CE127 M	mg/kg Cr	28	59	80	85	51	92
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	15	13	15	16	15	23
Lead (total)	CE127 M	mg/kg Pb	94	35	42	38	59	86
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel (total)	CE127 M	mg/kg Ni	8.9	8.4	11	10	10	18
Selenium (total)	CE127 M	mg/kg Se	5.7	2.6	0.9	0.9	0.7	0.9
Zinc (total)	CE127 M	mg/kg Zn	25	30	36	39	55	78
pH	CE004 M	units	9.3	8.0	7.8	7.8	7.7	8.0
Sulphate (2:1 water soluble)	CE061 U	mg/l SO_4	1189	726	154	21	16	<10
Sulphate (total)	CE062 M	mg/kg SO_4	4913	2033	566	219	528	281
Sulphide	CE016	mg/kg S^{2-}	72	24	<10	<10	<10	<10
Cyanide (free)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Thiocyanate	CE145 M	mg/kg SCN	4.2	1.7	1.1	<1	<1	2.8
Phenols (total)	CE078	mg/kg PhOH	1.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	3.3	1.5	1.4	0.7	1.6	1.1
Estimate of OMC (calculated from TOC)	CE197	% w/w	5.6	2.5	2.4	1.2	2.8	1.9
PAH								
Naphthalene	CE087 M	mg/kg	202.14	0.08	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	CE087 M	mg/kg	19.73	0.05	<0.02	<0.02	0.05	<0.02
Acenaphthene	CE087 M	mg/kg	161.01	0.55	<0.02	0.02	0.28	0.02
Fluorene	CE087 U	mg/kg	128.54	0.55	<0.02	<0.02	0.48	0.03
Phenanthrene	CE087 M	mg/kg	944.86	6.34	0.18	0.27	6.77	0.55
Anthracene	CE087 U	mg/kg	221.26	1.13	0.06	0.09	1.41	0.06
Fluoranthene	CE087 M	mg/kg	811.06	5.88	0.54	0.96	9.90	0.79
Pyrene	CE087 M	mg/kg	594.09	4.02	0.40	0.72	7.12	0.57
Benzo(a)anthracene	CE087 U	mg/kg	294.08	1.76	0.22	0.37	3.73	0.26
Chrysene	CE087 M	mg/kg	274.51	1.47	0.17	0.30	2.85	0.27
Benzo(b)fluoranthene	CE087 M	mg/kg	273.48	1.62	0.21	0.37	3.49	0.31
Benzo(k)fluoranthene	CE087 M	mg/kg	109.98	0.71	0.08	0.15	1.56	0.14
Benzo(a)pyrene	CE087 U	mg/kg	247.25	1.38	0.17	0.31	3.08	0.25
Indeno(123cd)pyrene	CE087 M	mg/kg	174.88	1.12	0.11	0.21	2.39	0.21
Dibenz(ah)anthracene	CE087 M	mg/kg	37.64	0.17	<0.02	<0.02	0.50	0.03
Benzo(ghi)perylene	CE087 M	mg/kg	149.13	0.87	0.06	0.15	1.93	0.17
PAH (total of USEPA 16)	CE087	mg/kg	4644	27.7	2.20	3.93	45.6	3.67
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	-	-	-	-	-

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SOILS

Lab number			105608-1	105608-2	105608-3	105608-4	105608-5	105608-6
Sample id			WS1	WS2	WS3	WS3	WS4	WS6
Depth (m)			0.20	0.45	0.50	1.30	0.15	0.15
Date sampled			04/02/2022	04/02/2022	04/02/2022	04/02/2022	04/02/2022	04/02/2022
Test	Method	Units						
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	-	-	-	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	0.10	-	-	-	-	-
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	254	-	-	-	-	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	516	-	-	-	-	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	1358	-	-	-	-	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	2059	-	-	-	-	-
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	40	-	-	-	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	-	-	-	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	-	-	-	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	0.5	-	-	-	-	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	23	-	-	-	-	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	21	-	-	-	-	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	168	-	-	-	-	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	15	-	-	-	-	-
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

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SOILS

Lab number			105608-7
Sample id			WS6
Depth (m)			0.75
Date sampled			04/02/2022
Test	Method	Units	
Arsenic (total)	CE127 M	mg/kg As	5.0
Boron (water soluble)	CE063 M	mg/kg B	<0.5
Cadmium (total)	CE127 M	mg/kg Cd	0.2
Chromium (total)	CE127 M	mg/kg Cr	72
Chromium (VI)	CE146	mg/kg CrVI	<1
Copper (total)	CE127 M	mg/kg Cu	18
Lead (total)	CE127 M	mg/kg Pb	38
Mercury (total)	CE127 M	mg/kg Hg	<0.5
Nickel (total)	CE127 M	mg/kg Ni	17
Selenium (total)	CE127 M	mg/kg Se	0.9
Zinc (total)	CE127 M	mg/kg Zn	59
pH	CE004 M	units	7.8
Sulphate (2:1 water soluble)	CE061 U	mg/l SO_4	<10
Sulphate (total)	CE062 M	mg/kg SO_4	133
Sulphide	CE016	mg/kg S^{2-}	<10
Cyanide (free)	CE077	mg/kg CN	<1
Cyanide (total)	CE077	mg/kg CN	<1
Thiocyanate	CE145 M	mg/kg SCN	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	0.6
Estimate of OMC (calculated from TOC)	CE197	% w/w	1.1
PAH			
Naphthalene	CE087 M	mg/kg	<0.02
Acenaphthylene	CE087 M	mg/kg	<0.02
Acenaphthene	CE087 M	mg/kg	<0.02
Fluorene	CE087 U	mg/kg	<0.02
Phenanthrene	CE087 M	mg/kg	0.04
Anthracene	CE087 U	mg/kg	<0.02
Fluoranthene	CE087 M	mg/kg	0.09
Pyrene	CE087 M	mg/kg	0.07
Benzo(a)anthracene	CE087 U	mg/kg	0.05
Chrysene	CE087 M	mg/kg	0.03
Benzo(b)fluoranthene	CE087 M	mg/kg	0.05
Benzo(k)fluoranthene	CE087 M	mg/kg	<0.03
Benzo(a)pyrene	CE087 U	mg/kg	0.04
Indeno(123cd)pyrene	CE087 M	mg/kg	0.03
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02
Benzo(ghi)perylene	CE087 M	mg/kg	0.02
PAH (total of USEPA 16)	CE087	mg/kg	0.41
TPH			
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-

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SOILS

Lab number			105608-7
Sample id			WS6
Depth (m)			0.75
Date sampled			04/02/2022
Test	Method	Units	
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-
Subcontracted analysis			
Asbestos (qualitative)	$	-	NAD

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	M	0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO_4
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry	M	100	mg/kg SO_4
CE016	Sulphide	Distillation, Titration	As received		10	mg/kg S^{2-}
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE145	Thiocyanate	Weak acid extraction, Colorimetry	Dry	M	1	mg/kg SCN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		15	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		10	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
105608-1	WS1	0.20	N	
105608-2	WS2	0.45	N	
105608-3	WS3	0.50	N	
105608-4	WS3	1.30	N	
105608-5	WS4	0.15	N	
105608-6	WS6	0.15	N	
105608-7	WS6	0.75	N	

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

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

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

APPENDIX F

AWP GENERIC ASSESSMENT CRITERIA

Alan Wood & Partners
Generic Assessment Criteria for Soils

Revision Version: V.8 - September 2018

Parameter	Residential		Commercial	Allotment	Public Open Space near Residential land (POS_{resi})	Public Park Land (POS_{park})	Source
	With Plant Uptake	Without Plant Uptake					
	1-6% SOM	1-6% SOM	1-6% SOM	1-6% SOM	1-6% SOM	1-6% SOM	
Metals/Metalloids [a]							
Arsenic (inorganic)	37	40	640	49	79	170	DEFRA C4SL [b]
Beryllium	1.7	1.7	12	35	22	63	LQM/CIEH [c]
Boron	290	11,000	240,000	45	21,000	46,000	LQM/CIEH [c]
Cadmium [d]	22	150	410	3.9	220	880	DEFRA C4SL [b]
Chromium (III)	910	910	8,600	18,000	1,500	33,000	LQM/CIEH [c]
Chromium (VI) [e]	21	21	49	170	21	250	DEFRA C4SL [b]
Copper	2,400	7,100	68,000	520	12,000	44,000	LQM/CIEH [c]
Lead [f]	200	310	2,300	80	630	1,300	DEFRA C4SL [b]
Mercury (inorganic)	40	56	1,100	19	120	240	LQM/CIEH [c]
Nickel	130	180	980	53	230	800	LQM/CIEH [c]
Selenium	250	430	12,000	88	1,100	1,800	LQM/CIEH [c]
Vanadium	410	1,200	9,000	91	2,000	5,000	LQM/CIEH [c]
Zinc	3,700	40,000	730,000	620	81,000	170,000	LQM/CIEH [c]
Other Inorganics							
pH	<5	<5	<5	<5	<5	<5	-
Total Sulphate	2400	2400	2400	2400	2400	2400	BRE (2005) [g]
Water-Soluble Sulphate	0.5g/l	0.5g/l	0.5g/l	0.5g/l	0.5g/l	0.5g/l	BRE (2005)

Parameter	Residential						Commercial [i]			Allotment			Public Open Space near Residential land (POS_{resi})			Public Park Land (POS_{park})			Source
	With Plant Uptake			Without Plant Uptake															
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	
Organics [h]																			
Acenaphthene	200	490	1,080	2,000	3,600	5,200	75,000	92,000	100,000	34	85	202	15,000	15,000	15,000	29,000	30,000	30,000	CLEA/LQM/CIEH
Acenaphthylene	170	400	900	2,000	3,600	5,200	76,000	92,000	100,000	28	68	163	15,000	15,000	15,000	29,000	30,000	30,000	CLEA/LQM/CIEH
Anthracene	2,300	5,400	10,700	30,000	34,000	36,000	520,000	530,000	540,000	380	947	2,230	74,000	74,000	74,000	150,000	150,000	150,000	CLEA/LQM/CIEH
Benzo(a)anthracene	7.5	11	13	12	14	15	170	170	180	2.9	6.5	13	29	29	29	49	56	62	CLEA/LQM/CIEH
Benzo(a)pyrene	2.2	2.7	3	3.2	3.2	3.2	35	35	36	3.6	3.7	3.7	5.7	5.7	5.7	11	12	13	CLEA/LQM/CIEH
Benzo(b)fluoranthene	2.6	3.3	3.7	3.9	4	4	44	45	45	1	2.2	3.9	7.1	7.2	7.2	13	15	16	CLEA/LQM/CIEH
Benzo(g,h,i)perylene	315	340	350	360	360	360	3,900	4,000	4,000	290	480	646	640	640	640	1,400	1,500	1,600	CLEA/LQM/CIEH
Benzo(k)fluoranthene	77	93	100	110	110	110	1,200	1,200	1,200	37	76	129	190	190	190	370	410	440	CLEA/LQM/CIEH
Chrysene	15	22	27	30	31	32	350	350	350	4.1	9.5	19	57	57	57	93	110	120	CLEA/LQM/CIEH
Dibenz(a,h)anthracene	0.24	0.28	0.30	0.31	0.32	0.32	3.5	3.6	3.6	0.14	0.27	0.44	0.57	0.57	0.58	1.1	1.3	1.4	CLEA/LQM/CIEH
Fluoranthene	280	560	890	1,500	1,600	1,600	23,000	23,000	23,000	52	127	288	3,100	3,100	3,100	6,300	6,300	6,400	CLEA/LQM/CIEH
Fluorene	165	390	850	2,200	3,400	4,200	60,000	67,000	70,000	27	67	158	9,900	9,900	9,900	20,000	20,000	20,000	CLEA/LQM/CIEH
Indeno(1,2,3-cd)pyrene	27	36	41	45	46	46	500	510	510	9.5	21	40	82	82	82	150	170	180	CLEA/LQM/CIEH
Naphthalene	1	2.3	5.5	1	2.4	6	100	260	600	4	9.8	23	4900	4900	4900	1200	1900	3000	CLEA/LQM/CIEH
Phenanthrene	95.0	220	440	1,300	1,400	1,500	22,000	22,000	23,000	15	38	90	3,100	3,100	3,100	6,200	6,200	6,300	CLEA/LQM/CIEH
Pyrene	620	1,200	2,000	3,700	3,800	3,800	54,000	54,000	55,000	111	271	620	7,400	7,400	7,400	15,000	15,000	15,000	CLEA/LQM/CIEH
Aliphatic EC 5-6 (benzene)	24	40	80	24	40	80	2,400	4,000	8,000	752	1,730	3,900	570,000	590,000	600,000	95,000	130,000	180,000	CLEA/LQM/CIEH
Aliphatic EC >6-8 (toluene)	52	110	250	52	110	250	5,200	11,000	25,000	2,304	5,580	13,000	600,000	610,000	620,000	150,000	220,000	320,000	CLEA/LQM/CIEH
Aliphatic EC >8-10	13	30	70	13	30	70	1,300	3,000	7,000	321	770	1,700	13,000	13,000	13,000	14,000	18,000	21,000	CLEA/LQM/CIEH
Aliphatic EC >10-12	60	150	360	60	150	360	6,000	15,000	32,000	2,153	4,300	7,150	13,000	13,000	13,000	21,000	23,000	24,000	CLEA/LQM/CIEH
Aliphatic EC >12-16	500	1,200	2,600	500	1,200	2,600	42,000	72,000	90,000	10,800	12,400	13,200	13,000	13,000	13,000	25,000	25,000	26,000	CLEA/LQM/CIEH
Aliphatic EC >16-35	41,000	69,000	94,000	41,000	69,000	94,000	140,000	160,000	180,000	240,000	260,000	260,000	250,000	250,000	250,000	450,000	480,000	490,000	CLEA/LQM/CIEH
Aliphatic EC >35-44	41,000	69,000	94,000	41,000	69,000	94,000	140,000	160,000	180,000	240,000	260,000	260,000	250,000	250,000	250,000	450,000	480,000	490,000	CLEA/LQM/CIEH

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Generic Assessment Criteria for Soils

Revision Version: V.8 - Septmeber 2018

Parameter	Residential						Commercial [i]			Allotment			Public Open Space near Residential land (POS_{resi})			Public Park Land (POS_{park})			
	With Plant Uptake			Without Plant Uptake															
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	
Organics contd./ [h]																			
Aromatic EC >5-7	50	110	240	155	300	630	15,000	28,000	55,000	12	25	57	56,000	56,000	56,000	76,000	84,000	92,000	CLEA/LQM/CIEH
Aromatic EC >7-8	100	240	550	370	800	1,800	33,000	68,000	130,000	21	50	117	56,000	56,000	56,000	87,000	95,000	100,000	CLEA/LQM/CIEH
Aromatic EC >8-10	20	50	110	20	53	125	2,000	5,000	120,000	8.6	21	50	5,000.0	5,000	5,000	7,200.0	8,500	9,300	CLEA/LQM/CIEH
Aromatic EC >10-12	63	150	340	120	280	650	11,000	22,000	31,000	12.5	31	74	5,000.0	5,000	5,000	9,200.0	9,700	10,000	CLEA/LQM/CIEH
Aromatic EC >12-16	140	320	660	1,100	1,900	2,300	35,000	37,000	38,000	23	57	134	5,100	5,100	5,000	10,000	10,000	10,000	CLEA/LQM/CIEH
Aromatic EC >16-21	260	540	930	1,800	1,900	1,900	28,000	28,000	28,000	47	112	260	3,800	3,800	3,800	7,600	7,700	7,800	CLEA/LQM/CIEH
Aromatic EC >21-35	1,100	1,400	1,700	1,900	1,900	1,900	28,000	28,000	28,000	370	820	1,500	3,800	3,800	3,800	7,800	7,800	7,900	CLEA/LQM/CIEH
Aromatic EC >35-44	1,100	1,400	1,700	1,900	1,900	1,900	28,000	28,000	28,000	370	820	1,500	3,800	3,800	3,800	7,800	7,800	7,900	CLEA/LQM/CIEH
Benzene	0.06	0.13	0.30	0.16	0.30	0.64	15	28	57	0.016	0.033	0.073	72	72	73	90	100	110	CLEA/LQM/CIEH
Toluene	104	240	550	370	830	1800	33,000	68,000	130,000	22	50	117	56,000	56,000	56,000	87,000	95,000	100,000	CLEA/LQM/CIEH
Ethylbenzene	30	62	150	34	81	190	3,200	7,000	16,000	16	38	91	24,000	24,000	25,000	1,700	22,000	27,000	CLEA/LQM/CIEH
o-xylene	30	70	170	40	90	200	3,700	8,000	19,000	28	67	160	41,000	42,000	43,000	17,000	24,000	33,000	CLEA/LQM/CIEH
m-xylene	30	70	160	34	80	190	3,400	8,000	18,000	30	74	170	41,000	42,000	43,000	17,000	24,000	32,000	CLEA/LQM/CIEH
p-xylene	30	70	160	33	80	180	3,200	8,000	17,000	28	69	160	41,000	42,000	43,000	17,000	23,000	31,000	CLEA/LQM/CIEH

NOTES

- All values are rounded to 1 or 2 significant figures. All values mg/kg unless otherwise stated.

(a) Generic Assessment Criteria presented by DEFRA (2014) and LQM/CIEH (2015) for metals are not sensitive to Soil Organic Matter content and may be applied directly across the SOM range 1-6% for the land uses given.

(b) Final Category 4 Screening Levels given in DEFRA SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Policy Companion Document, December 2014. Calculated for sandy loam soils with 6% SOM.

(c) Nathanial, C.P., McCaffrey, C., Gillett, A.C., Ogden, R.C. And Nathanial, J.F. (2015). The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. Publication Number **S4UL3286**.

(d) GAC for cadmium are calculated for soils with pH values between 6 and 8. Care should be applied when using the GAC values outside this range and particularly below 5.

(e) Additional site specific risk assessment may be required where elevated concentrations of Chromium (VI) are measured on site.

(f) DEFRA (2014) indicate that the BGS have derived 'normal' background lead concentrations for England & Wales. In England normal background concentrations are 180mg/kg for the principal domain, 2400mg/kg for the mineralisation domain and 820mg/kg for the urban domain (DEFRA, 2012). Calculated C4SL values to be adopted for residential, allotment and POS_{resi} are lower therefore than the 'normal' background concentration of lead in urban areas.

(g) BRE (2005) Special Digest 1, 3rd Edition 'Concrete in Aggressive Ground'. GAC is the upper limit for DS-1 sulphate class concrete.

(h) Organic contaminant GAC values calculated using CLEA v1.06 for sandy soil with SOM of 1%, 2.5% and 6%. Sandy soil type is considered to be conservative for the majority of soils, including brownfield soils on (potentially contaminated) sites. Changes made to default CLEA exposure parameters as per updated information given in DEFRA (2014) (C4SL Tables 3.2 and 3.5) and LQM/CIEH (2015).

(i) GAC derived for pre-1970 office buildings using default commercial CLEA model with adjustment to CLEA exposure parameters as per DEFRA (2014) (C4SL Tables 3.2 and 3.5).

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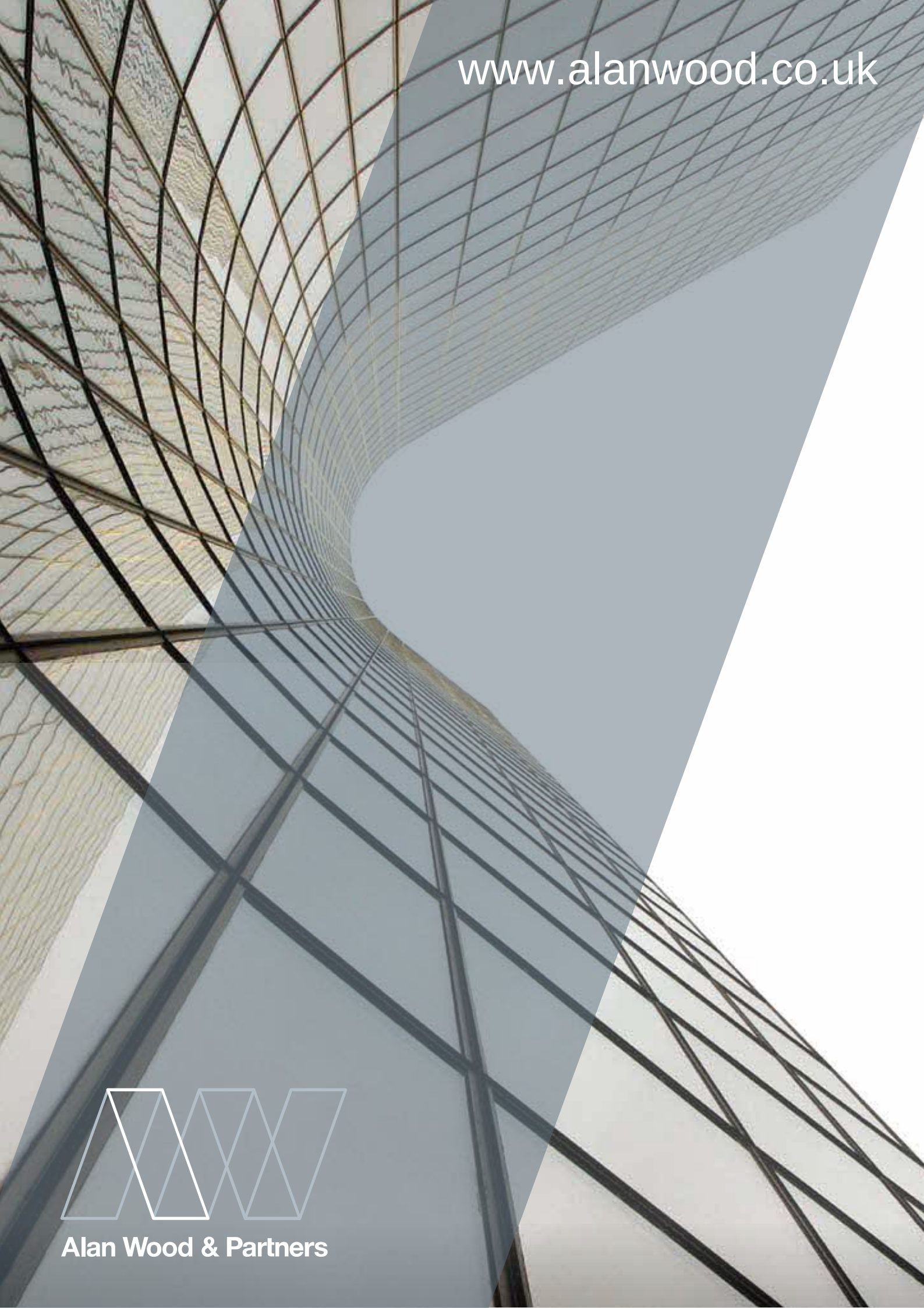
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APPENDIX B

YALPAG TECHNICAL GUIDANCE FOR DEVELOPERS, LANDOWNERS AND CONSULTANTS "VERIFICATION REQUIREMENTS FOR COVER SYSTEMS"

VERIFICATION REQUIREMENTS FOR COVER SYSTEMS

Technical Guidance for Developers, Landowners and Consultants

Yorkshire and Lincolnshire Pollution Advisory Group

Version 4.1 – June 2021

The purpose of this guidance is to promote consistency and good practice for development on land affected by contamination. The Local Authorities in Yorkshire, Lincolnshire, the North East of England, East Anglia, Greater Manchester and St Helens who have adopted this guidance are shown below:

Barnsley Metropolitan Borough Council
Great Yarmouth
North Kesteven District Council
Sheffield City Council
Blackburn with Darwen
Public Protection Partnership
North Lincolnshire Council
Boston Borough Council
Hambleton District Council
North Norfolk District Council
South Norfolk Council
City of Bradford Metropolitan District Council
Harrogate Borough Council
North Tyneside Council
South Tyneside Council
Breckland Council
Hartlepool Borough Council
Northumberland County Council
St Helens Council
Broadland District Council — Community at heart
Hull City Council
Norwich City Council
Stockport Metropolitan Borough Council
Calderdale Council
Borough Council of King's Lynn & West Norfolk
Oldham Council
Stockton-on-Tees Borough Council
Craven District
Kirklees Council
Sunderland City Council
Darlington Borough Council
Leeds City Council
Richmondshire District Council
Tameside Metropolitan Borough
Doncaster Metropolitan Borough Council
City of Lincoln Council
Rossendale Borough Council
Wakefield Council — working for you
Durham County Council
Middlesbrough — moving forward
Rotherham Metropolitan Borough Council — Where Everyone Matters
West Lindsey District Council
East Lindsey District Council
Newcastle City Council
Ryedale District Council
East Riding of Yorkshire Council
Newark & Sherwood District Council
Salford City Council
Wigan Council
Gedling Borough Council
North East Lincolnshire Council
Selby District Council
City of York Council

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Disclaimer

This guidance is intended to serve as an informative and helpful source of advice. YALPAG will review this guidance every three years, but readers must note that legislation, guidance and practical methods are inevitably subject to change and therefore should be aware of current UK policy and best practice. This note should be read in conjunction with prevailing legislation and guidance, as amended, whether mentioned here or not. Where legislation and documents are summarised this is for general advice and convenience, and must not be relied upon as a comprehensive or authoritative interpretation. Ultimately it is the responsibility of the person/company involved in the development or assessment of land to apply up-to-date working practices to determine the contamination status of a site and the remediation and verification requirements.

Acknowledgments

YALPAG would like to thank North Lincolnshire Council, Leeds City Council, City of Bradford Metropolitan District Council, Barnsley Metropolitan Borough Council, Rotherham Metropolitan Borough Council, Wakefield Council, and Tameside Metropolitan Borough Council, for producing this guidance.

YALPAG would also like to acknowledge Liverpool City Council's Contaminated Land Team, Coopers Consulting Engineers for allowing us to use their guidance document and photographs and WSP Environmental Ltd for also donating photographs.

Consultation

39 Local Authorities and 6 Environmental Consultants were consulted over a four week period in 2010 during the production of the initial guidance. At that time, consultation comments were considered by the review panel and a number of revisions were made to the guidance to reflect these comments.

49 Local Authorities and 25 Environmental Consultants were consulted in 2021, during the production of this version [4.1] of the guidance. Consultation comments were considered by the review panel and a number of revisions were made to the guidance to reflect these comments.

Introduction

This guidance has been produced to help developers ensure that they can demonstrate that material brought onto a development site for gardens or areas of soft landscaping are suitable for use and do not present harm to people, the environment and/or property. It is intended to improve the quality of reports submitted to Local Authorities on this matter and to give contractors/consultants a point of reference to obtain approval for such work from their client. This guidance does not cover the geotechnical suitability of soils or materials, chemical suitability that does not affect human health e.g. sulphates, or importing soils contaminated with invasive (or injurious) plants.

The verification of cover systems should be an integral part of the remediation project and agreed between developers and regulators at an early stage in the project.

UK guidelines for remediation verification are set out within Land Contamination Risk Management[1] (LCRM) and the document on Verification of Remediation of Land Contamination[2]. This guidance note should be considered as supplementary advice in conjunction with these documents.

This guidance relates to the remediation of land contamination by using cover systems; however, the verification of the quality of imported material is equally important in other situations, such as raising levels for flood prevention or general landscaping works. This guidance could also be used in such instances.

The Process of Verification

Implementation plans for remedial works should always be site specific. Where a cover system and potentially, excavation, is the main remedial method or a component of an overall site remediation, specific goals will need to be set that are linked directly to the risk management strategy for the site in question.

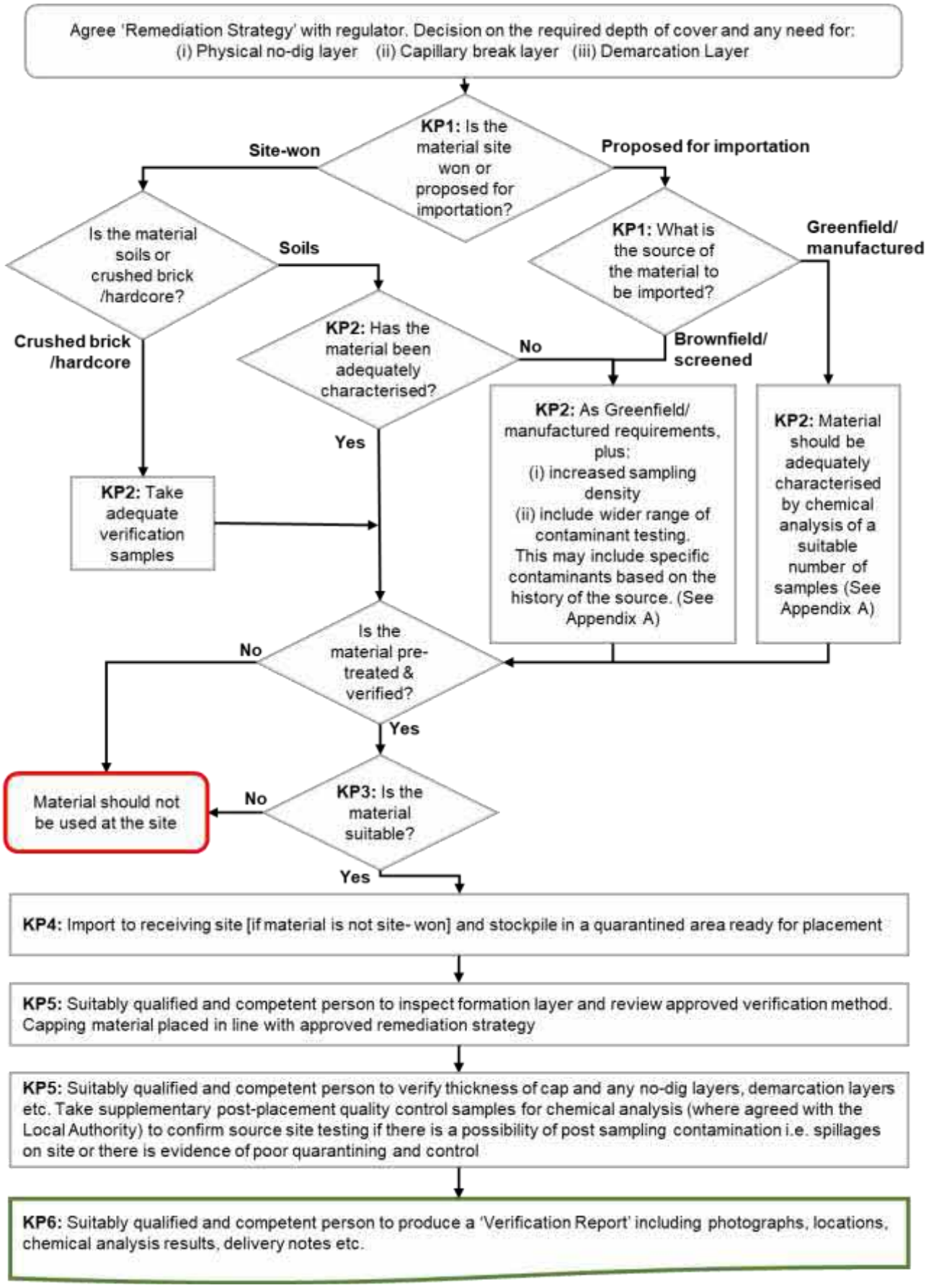
For cover and containment systems, verification will normally depend upon the provision of defensible measurements, observations and records. Critical factors to be considered are:

- What should be measured?
- When should they be measured?
- Where measurements need to be taken, what is the appropriate monitoring regime i.e. number and frequency of samples?
- Statistical constraints on sampling.

National Planning Policy Framework (NPPF) states that “planning policies and decisions should ensure that after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990”. The Verification Report is a key document to demonstrate compliance with NPPF, and the responsibility rests with the developer/applicant to submit the required Verification Report to complete the remediation and to discharge any planning conditions.

[1] Land Contamination Risk Management, Environment Agency, Oct 2020
[2] Verification of Remediation of Land Contamination. Environment Agency, Feb 2010

Overview Flowchart



Key Points

KP1: Source of Material

Material can be sourced from site won material i.e. crushed brick/hardcore or site-won soils from existing open or landscaped areas. In the interest of sustainability, Local Authorities promote the use of such site-won material providing that they are suitable for the intended end use of the site.

Alternatively, material can be sourced from other developments and commercial companies. Dependent on the source of the material it can be classified as either from a 'Greenfield/Manufactured' or 'Brownfield/Screened' source.

Broadly speaking material can be classified as follows:

Greenfield – Where documentary evidence is provided confirming that the source site has not been developed and that no past contaminative uses have occurred. Should evidence not be provided or approved by the Local Authority, please note that the source would be expected to be assessed as though it were a brownfield source.

Manufactured – from a commercial company who manufacture material by mixing or blending mineral soils (subsoil or sand) with an organic amendment (compost). If other soil component sources are used, documentary evidence should be provided confirming that the source site has not been developed and that no past contaminative uses have occurred. Should documentary evidence not be provided or approved by the Local Authority, please note that the source would be expected to be assessed as though it were a brownfield source.

Brownfield – material from a donor site that has previously been developed

Screened – material from a company who deal with skip/demolition waste which is screened for unsuitable material i.e. bricks, wood, plastic etc.

KP2: Characterisation of Material

It is essential that material is suitable for its intended use. Documentary evidence of the source of the material should be provided to the Local Authority. This may include desk study or site investigation reports. A defensible method is required to ensure the verification proposals are site specific and that the level of sampling reflects the need to ensure that imported material are suitable for their intended use.

Due to the diminishing supply of suitable Greenfield topsoil sources it has been found that the chemical quality of Greenfield sources is less reliable in certain areas. As a result the recommended analytical rate for the intended use of the development may vary between Local Authorities [see **Appendix 1a**].

When should this be done?

Sampling of material should be undertaken as early as possible i.e. prior to placement [for site won material] and prior to importation [for imported material]. This is to avoid the costly exercise of re-excavating unsuitable material and the possibility of cross contamination. Where the assessor has confidence that the material is of sufficient quality (i.e. tested by supplier, used previously) it is acceptable to test the material on site. Although, if it is deemed unsuitable it would have to be either removed off site or pre-treated at the cost and time of the developer. It is recommended that some verification samples are also taken once this material has been delivered to site to confirm suitability for use. Soils can become contaminated during transportation or when stockpiled on site.

What about certificates from commercial suppliers?

Where the material is provided by a commercial company, certificates or other industry Quality Protocol compliance i.e. WRAP, DoWCoP, will normally be accepted. This is on the proviso that it: (i) relates to the actual material being imported to the site and the type and amount of analysis is in line with what is prescribed in Appendix 1a; and, (ii) the certificates are less than two months old.

It is recommended that some additional verification samples are taken once this material has been delivered to site. Soils can become contaminated during transportation or when stockpiled on site.

Extreme caution should be given to importing material that has been recycled from demolition or skip waste as they could easily be contaminated e.g. asbestos containing materials. Please refer to "questions you should be asking your supplier" in **Appendix 1b** and include the responses in your report.

British Standard

Imported soils should be as specified in BS 3882:2015 for topsoil and BS8601:2013 for subsoil as 'suitable for their intended purpose'. Both British Standards relate mostly to nutrient content of topsoil and phytotoxic contamination and they do not consider contaminants that pose a risk specifically to human health. Soils should be tested for contaminants that are considered to pose a risk to human health in addition to those specified in the relevant British Standards to ensure that they are suitable for their intended use.

Initial screening

A visual / olfactory inspection of the material should be carried out by a suitably qualified and competent person to ensure that:

- It is a suitable growing medium;
- It is free from obvious contamination i.e. staining/free product etc.;
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants, as specified by the Environment Agency, are suspected to have been growing;
- It is not odorous (could be considered a statutory nuisance);
- It is free from unsuitable material i.e. bricks, brick ties, timber and glass etc.); and,
- There are no visible signs of asbestos containing material (ACMs).

Testing schedule & number of samples

Chemical testing will normally be required on any materials that are to be used as cover material, even where this includes first generation quarried material. This should be carried out by a suitably qualified and competent person.

Appendix 1a explains in detail the sampling and testing requirements for a typical residential development. These are only guidelines and it may be necessary to deviate away from them depending on local and site-specific factors. It is recommended that the developer discusses any deviation with the Local Authority.

The following criteria sets out the requirements for sampling and testing:

- **Virgin Quarried Material** sampling needs to be 1 or 2 samples depending on the type of stone utilised, to confirm the inert nature of the material. Testing to include standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn).

- **Crushed Hardcore, Stone, Brick (excluding asphalt)** a minimum of 1 sample per 500m^3. Testing to include standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).

- **Greenfield/ Manufactured Soils** a minimum of 3 samples or, dependent on source and receptor, between 1 per 50m^3 and 1 per 250m^3. Testing to include standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).

- **Brownfield/ Screened Soils** a minimum of 6 samples or dependent on source and receptor, between 1 per 50m^3 and 1 per 100m^3. Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).

The assessment criteria need to be UK based, e.g. LQM S4ULs, Defra C4SLs or other similarly derived GACs.

KP3: Suitability of Material

Based on the characterisation of material above, the material should be either deemed suitable or unsuitable. Obviously unsuitable material should not be used (unless it is treated to reduce levels of contaminants below agreed target levels i.e. bioremediation – this would have to be agreed and included within the Remediation Strategy) and an alternative source of material should be sought by the developer. If the material is considered suitable it can be imported (if not site won) and stockpiled in a suitably quarantined area [refer to **KP4**].

KP4: Stockpiling & Quarantining of Material

It is essential that the ‘suitable’ material is either placed in its intended area straight away i.e. soft/landscaped areas or stockpiled in a suitable quarantine area to prevent on-site contamination.

In the event that an assessor finds material has been stored in an unsuitable area, samples should be taken to confirm that no cross contamination has occurred (including a visual/olfactory check of the material). The material should then be suitably quarantined or placed at its intended location immediately.

KP5: Verification of Required Depth

In line with the agreed Remediation Strategy, it is important to establish that the required depth has been achieved and is consistent across the site. There are two main ways to achieve this:

Depth testing in situ – small trial pit excavated to allow measurement of its depth by standardised tape measure or measuring staff.

Topographical surveys – accurate survey of the base and final formation layer height to establish the depth of cover.

Specific Local Authority Policy

Please check with the local Contaminated Land Officer to establish:

- Which type of method for testing depth is accepted; and,
- The number of verification areas per property, plot, landscaped area or garden area (some Local Authorities recommend at least 2 per plot for residential developments).

Important Note: Where demarcation, physical no-dig and capillary break layers exist they should be verified for their thickness and presence during the time of their installation. Details of the demarcation layer should be agreed with the Contaminated Land Officer prior to placement. This will include the design, type and strength of the geotextile separator or visual warning membrane. The verification of depth and confirmation of such layers should be carried out by a suitably qualified and competent person.

KP6: Reporting

The purpose of verification documentation is to provide transparent reasoning why the remediation was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken and to provide confirmation that the site is "suitable for its intended use".

The document is utilised not only to satisfy conditions of planning permissions but also is to be kept on record by the Local Authority should queries be raised during the lifetime of the development and to confirm to future purchasers that the site is suitable for use.

National Planning Policy Framework (NPPF) states that "planning policies and decisions should ensure that after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990". The Verification Report is a key document to demonstrate compliance with NPPF, and the responsibility rests with the developer/applicant to submit the required Verification Report to complete the remediation and to discharge any planning conditions.

It is also essential that other supporting documentation is included within a report carried out by a suitably qualified and competent person e.g. laboratory analysis results, delivery tickets for material, certificates for imported material (or if unavailable, documented evidence of the source of the Greenfield material), trial pit logs etc. A checklist has been included in **Appendix 2** to give an idea on what information should be recorded.

Additionally, any reporting should include details of any measures required to maintain the cover system integrity in the future e.g. successive construction phases (management plans) and longer term (restrictive covenants on title deeds).

Photographic evidence for validating the depth of cover

The Local Authority ideally would recommend the following programme of photographs to be taken of the placement of inert cover:

- Photographs of any stockpiles and quarantine areas
- Proof that the depth of inert cover has been installed
- Proof of the quality of the material to be used as inert cover
- Proof there is a geotextile separator and visual warning membranes if used between the underlying material and suitable for use soils.
- Proof of the method of placement and different layers if appropriate
- Proof of the completed project
- Inclusion of background features which will aid locating the photograph
- Inclusion of site identification boards within the photos which show the date, position taken i.e. corner of plot 3 and the site name.
- Inclusion of photographs of site stockpiles and quarantine areas.

The presence of good quality photographs is essential to prove beyond doubt that the remediation has been done as specified both by method and position, and that the images have been taken from the specific area stated.

Refer to **Appendix 3** for examples of good photographic evidence.

Appendix 1a – Sampling & Testing Matrix

Type	Number of Samples	Testing Schedule	Assessment Criteria
	Please note that these guidelines apply to a typical residential development, and relaxation of the guidelines or more stringent requirements may apply dependent on local and site specific factors. Therefore, <u>all parameters need to be agreed with the Local Authority</u>.		
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)	The assessment criteria need to be UK based, e.g. LQM S4ULs, Defra C4SLs or other similarly derived GACs.
Crushed Hardcore, Stone, Brick (excluding asphalt)	Minimum 1 per 500m^3	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	
Greenfield/ Manufactured Soils	Minimum 3 Dependent on source and receptor, between 1 per 50m^3 and 1 per 250m^3	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).	
Brownfield/ Screened Soils	Minimum 6 Dependent on source and receptor, between 1 per 50m^3 and 1 per 100m^3	Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	

Appendix 1b – Questions to Ask Your Soil Supplier Relating to Soil Quality

- What is the source of the material (refer to KP1)? If the source is Greenfield, can they provide evidence of this?
- Will all of the material be coming from the same source?
- Are you satisfied that the material is a suitable growing medium for the proposed end use?
- Has the supplier used an appropriate sampling protocol to ensure a representative sample is analysed? What volume of soil is represented by the analysis and does it comply with Appendix 1a?
- Does the testing include analysis of contaminants identified in Appendix 1a?
- Does the laboratory conducting the analysis have UKAS and MCERTS accreditation for the tests they are carrying out?
- Does the material comply with relevant waste regulations?
- Can I have a copy of the whole analysts report and does it include an interpretive section?
- Will the provided certificate be dated within the last 2 months?

Appendix 2 – Checklist for Verification Reports

Example only. Not to be considered as typical minimum requirements. Additional information should be included for non-cover systems aspects of the remediation i.e. gas protection measures etc.

Site Details	
Site Name / location	
Developer name	
Development use	
Plot No / description of landscaped area (inc plan of inspection areas)	
National Grid Reference	
Inspection visit date	
Supporting Evidence	
Description of remediation (as per agreed Remediation Method Statement including depths / thickness checks, topographical readings)	
Material tracking information (including way tickets etc.)	
Name of groundwork's remediation contractor	
Name of supervising environmental consultant	
Site Specific chemical analysis results	
Verification Photographs (inc. remarks)	
Recommendations	
Pass/fail	
If material fails, how will this be managed i.e. removed, treated	
Detail any further remedial works and/or inspection	
Signed off	

Failure to provide any of the above information may prevent planning conditions from being discharged.

Appendix 3 – Examples of Good Quality Photographs

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Photograph 1:
Depth check of inert cover within area of public open space. Physical break layer and topsoil visible.

© WSP

Photograph 2:
Depth check of inert cover with Site & Location Information Board.

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Photograph 3:
Depth check of inert cover within areas of front gardens.

© Coopers Consulting Engineers

Photograph 4:
Depth check of inert cover within areas of front gardens.

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Photograph 5:
Depth check of inert cover within rear gardens. Taut string line spans across excavation.

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Photograph 6: Depth check of inert cover within rear gardens. Taut string line spans across excavation.

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Photograph 7: Shows the spatial location of the verification pit.

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Photograph 8: Excavation within public open space and verification pit showing the presence of a remediation break layer at the base, a crushed sandstone inert fill overlain by topsoil.

© Coopers Consulting Engineers

Photograph 9: Inert crushed sandstone being delivered. The spatial area of the remediation can be observed from these photographs (old terrace housing).

© Coopers Consulting Engineers

Photograph 10: Inert crushed sandstone being delivered with visible remediation break layer. The spatial area of the remediation can be observed from these photographs (traffic lights).

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Photograph 11:
Shows the remediation of the rear garden, with a significant depth (1.0m) of inert cover. This photograph has been stitched to form a panoramic photograph and hence there is slight distortion

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Photograph 12:
Shows the remediation of the rear garden, with a significant depth (1.0m) of inert cover. Remediation break layer visible at the base of the excavation.

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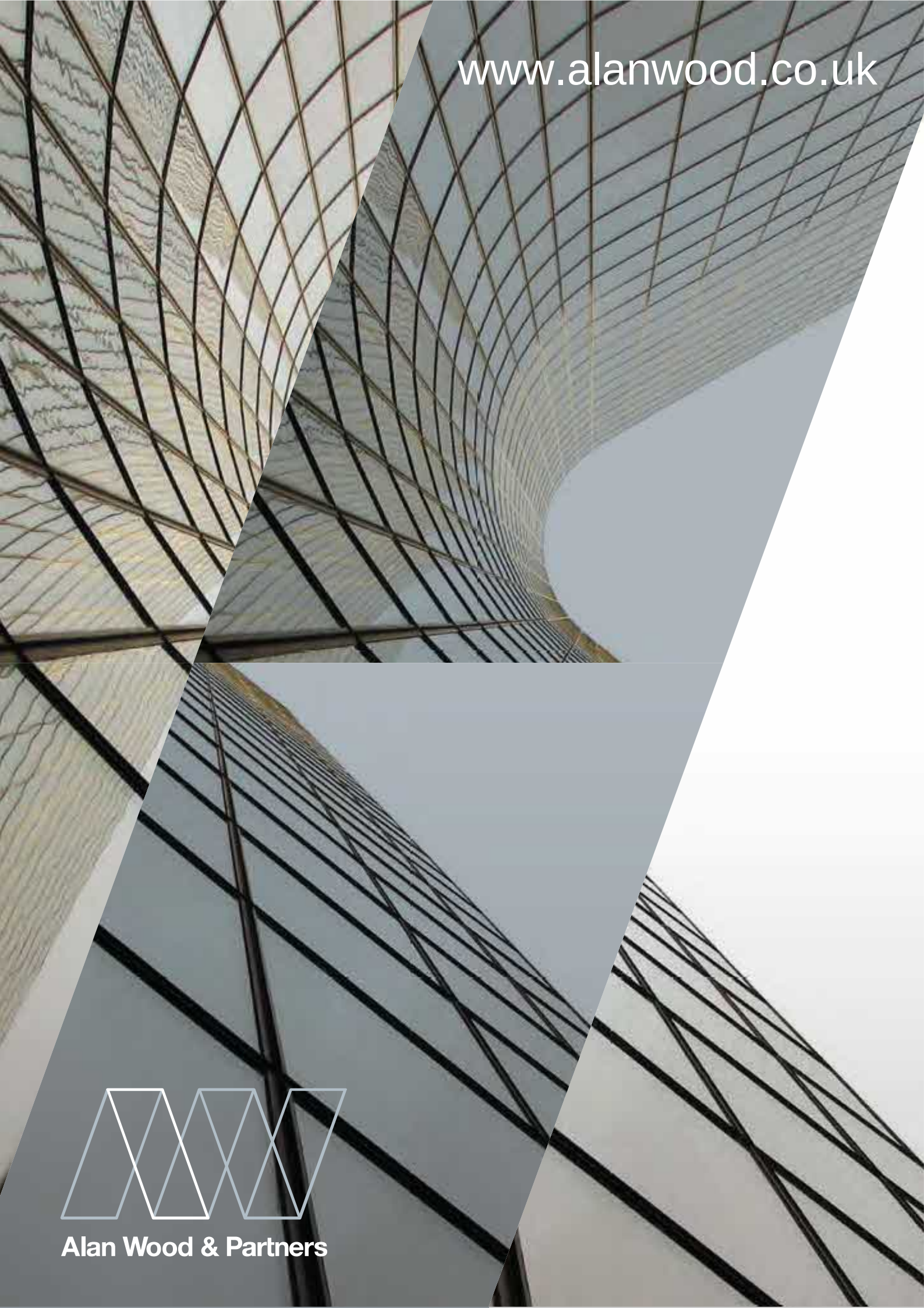
Temporary Works
Topographic & Measured Surveys
Traffic Assessments

Quality Assurance Accreditation
ISO 9001 Registered firm
Certificate no. GB.02/07

Environmental Accreditation
ISO 14001Registered firm
Certificate no. GB.09/277b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