EXETER COLLEGE OXFORD

A New Quad at Walton Street

Ground Investigation Report

March 2013

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EXECUTIVE SUMMARY

This executive summary contains an overview of the key findings and conclusions. No reliance should be placed on any part of the executive summary until the whole of the report has been read. Other sections of the report may contain information that puts into context the findings that are summarised in the executive summary.

BRIEF

This report describes the findings of a site investigation carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Stockley, on behalf of Exeter College, with respect to the demolition of the existing buildings and construction of a new college which will deepen and extend the existing basement and provide new teaching and accommodation buildings, which will be up to five storeys high. The purpose of the investigation has been to research the history of the site with respect to possible contaminative uses, to determine the ground conditions, to assess the extent of any contamination and to provide information to assist with the design of foundations and suitable retaining walls.

DESK STUDY FINDINGS

The earliest map studied, dated 1876, shows several houses in the west of the site and a number of buildings in the east of the site which is later labelled as a Timber Yard on the 1878 map. The surrounding area to the north, east and west of the site was mainly occupied by houses, whilst the area to the south is shown to be occupied by gardens associated with Worcester College. An internet search has indicated the timber yard to have been demolished or replaced with Ruskin College around 1903 and the College was replaced with the existing Ruskin building in 1912. Some of the houses in the centre of the site appeared to change layout between 1900 and 1921, and were later demolished between 1938 and 1958, with four houses remaining in the west of the site. The Ruskin College building was extended towards the centre of the site between 1961 and 1971. Although the maps show no significant change to the site since 1971, a building has been constructed in the southwest, but this is not shown on the maps.

GROUND CONDITIONS

The investigation has encountered a limited thickness of made ground over the Northmoor Sand and Gravel which is underlain by the Oxford Clay Formation. Made ground extended to depths of between 0.48 m (58.52 m OD) and greater than 2.0 m and generally comprised orang-brown and greyish brown sandy gravelly clay or a clayey gravelly sand with fragments of brick, concrete, ash and coal. The underlying Northmoor Sand and Gravel Formation initially comprised soft orange light brown silty sandy gravelly clay which extended to a depth of 3.0 m (56.00 m OD). Soft low strength grey silty gravelly clay with some plant remains extended to a depth of 6.20 m (52.80 m OD) and was in turn underlain by a grey sand and gravel which extended to a depth of 6.8 m (52.20 m OD). The Oxford Clay Formation initially comprised soft fissured medium strength grey silty clay and gradually become very stiff fissured very high strength silty occasionally sandy and fine gravelly clay to the maximum depth investigated, of 20.00 m (39.00 m OD. A fast inflow of groundwater was encountered in Borehole No 1 at a depth of 6.2 m (52.80 m OD) and rose to 3.1 m after a rest period of 20 minutes. Fast inflows of groundwater were also encountered in the trial pits excavated within the basements, at depths as shallow as 0.1 m but at a highest level of 57.80 m OD. Statistical analysis of samples of made ground tested for contamination indicates no elevated concentrations.

RECOMMENDATIONS

Formation level for the proposed basements will be within the soft clay of the Northmoor Sand and Gravel. Given the anticipated relatively high loads of the four-storey and six-storey buildings, piled foundations may be required.

Groundwater is likely to be present in the made ground and granular deposits of the Northmoor Sand and Gravel; inflows are expected to be fast and consideration will need to be given to the use of secant bored piled walls to maintain stability and control groundwater. There should not be a requirement for remediation with respect to ground contamination.

Further investigation would be prudent once access is available to confirm ground conditions across the site, especially if spread foundations are preferred. The additional investigation should install groundwater standpipes to allow monitoring of groundwater level.

Part 1: INVESTIGATION REPORT

This section of the report details the objectives of the investigation, the work that has been carried out to meet these objectives and the results of the investigation. Interpretation of the findings is presented in Part 2.

1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been commissioned by Stockley, on behalf of Exeter College, to carry out a site investigation at Ruskin College, Walton Street, Oxford, OX1 2HE.

1.1 Proposed Development

Consideration is being given to the demolition of the existing buildings, whilst retaining the original Ruskin Building facades onto Walton Street and Worcester Place and subsequent construction of new four-storey and six-storey buildings including a basement level. The lower floors will be used as teaching spaces while upper floors will provide student accommodation. The existing basement will be deepened and will also be extended across the majority of the site. There will be two areas of open space.

This report is specific to the proposed development and the advice herein should be reviewed if the development proposals are amended.

1.2 Purpose of Work

The principal technical objectives of the work carried out were as follows.

- to check the history of the site with respect to previous contaminative uses;
- to determine the ground conditions and their engineering properties;
- to determine the depth and design of the existing foundations;
- to provide advice with respect to the design of foundations and retaining walls;
- to provide an indication of the degree of soil contamination present; and
- to assess the risk that any such contamination may pose to the proposed development, its users or the wider environment.

1.3 Scope of Work

In order to meet the above objectives, a desk study was carried out, followed by a ground investigation. The desk study comprised:

- a review of readily available geological maps;
- a review of historical Ordnance Survey (OS) maps and environmental searches sourced from the Envirocheck database; and
- a walkover survey of the site during the site investigation phase.

In the light of this desk study an intrusive ground investigation was carried out which comprised, in summary, the following activities:

- a single cable percussion borehole advanced to a depth of 20.0 m;
- standard penetration tests (SPTs), carried out at regular intervals in the borehole; to provide quantitative data on the strength of the soils;
- 20 trial pits excavated by hand to expose the existing footings;
- laboratory testing of selected soil samples for geotechnical purposes and for the presence of contamination;
- testing of tree roots to identify the species of roots within the site; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

The report includes a contaminated land assessment which has been undertaken in accordance with the methodology presented in Contaminated Land Report (CLR) 11[1] and involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the United Kingdom. The risk assessment is thus divided into three stages comprising Preliminary Risk Assessment, Generic Quantitative Risk Assessment, and Site-Specific Risk Assessment.

The original scope of works included two more deep boreholes and five further trial pits; however restricted access at the time of the investigation meant that these were omitted.

1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted, the number of locations where the ground was sampled and the number of soil, gas or groundwater samples tested; no liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

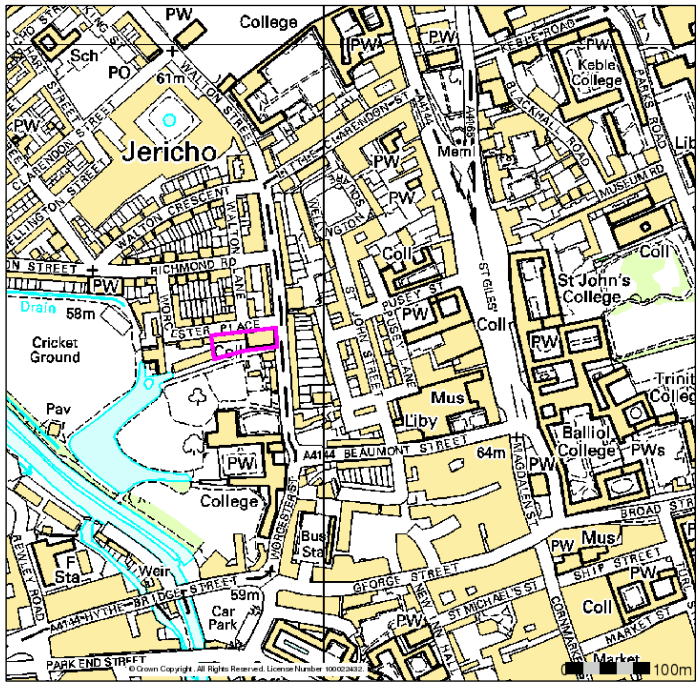
2.0 THE SITE

2.1 Site Description

The site is located approximately 550 m northeast of Oxford railway station and fronts onto Walton Street to the east, Worcester Place and gardens associated with Worcester College border the site the north and south respectively, while residential properties and other buildings possibly associated with Worcester College border the site to the west.

1 *Model Procedures for the Management of Land Contamination* issued jointly by the Environment Agency and the Department for Environment, Food and Rural Affairs (DEFRA) Sept 2004

The site may additionally be located by National Grid Reference 450923, 206645 and is shown on the map below.



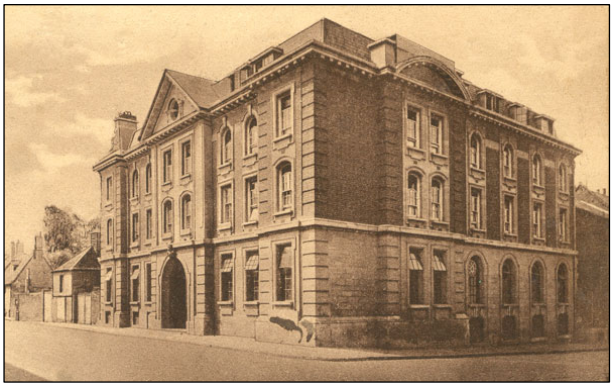
The site forms a roughly rectangular area measuring approximately 75 m by 25 m and is occupied by Ruskin College. The original Ruskin College building is located in the east of the site and comprises a five-storey building with a basement. A more modern five-storey building with a basement is present along the northern boundary of the site and several garages are present at ground level adjacent to the northern boundary of the site. The latter buildings are connected by a single storey building in the centre of the site and there is a two-storey building, including a basement, in the west. The college provides residential accommodation but also has lecture rooms, seminar rooms and a library.

There are two courtyard areas; one is relatively small and totally covered in paving slabs while the other has an area of lawn and some small shrubs.

The eastern side of the site is at a level of approximately 60.50 m OD and is higher than the western side, which is at an approximate level of 58.50 m OD; the site gently slopes downward toward the west but within the site the slope is broken up by steps giving different levels. There are several mature deciduous trees adjacent to the site along the southern boundary.

2.2 Site History

The site history has been researched by reference to historical Ordnance Survey (OS) maps, and publicly available data by the Envirocheck database.



The earliest Ordnance Survey (OS) map studied, dated 1876, shows several houses in the west of the site and a number of buildings in the east of the site which is later labelled as a Timber Yard on the 1878 map. The surrounding area to the north, east and west of the site was mainly occupied by houses, while the area to the south is shown to be occupied by gardens associated with Worcester College. Between 1900 and 1921 the timber yard was demolished

and replaced with the existing building, Ruskin College, in the east of the site. An internet search[2] indicated the Ruskin College to be present on the site from 1903, but was replaced with the existing building in 1912 which is shown in the photograph above. Some of the houses in the centre of the site appeared to change layout between 1900 and 1921, and were later demolished between 1938 and 1958, with four houses remaining in the west of the site. The Ruskin College building was extended towards the centre of the site between 1961 and 1971. Although the maps show no significant change to the site since 1971, a building has been constructed in the southwest, but this is not shown on the maps.

2.3 Other Information

A search of public registers and databases has been made via the Envirocheck database and relevant extracts from the search are appended. Full results of the search can be provided if required.

The search has revealed no records of any landfills, waste treatment, management or disposal sites within 250 m of the site.

There have been four pollution incidents to controlled waters within 250 m of the site, however all were minor and do not represent a risk to the site.

The superficial deposits underlying the site are classified as a Secondary A aquifer, the Environment Agency (EA) defines these as 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. The underlying Oxford Clay is classified as Unproductive strata, the EA define these as rock layers or drift deposits with low permeability that have negligible significance for water or river base flow.

The site is not within a source protection zone as defined by the EA but the west of the site is shown to be at risk of flooding.

Reference to the National Radiological Protection Agency (NRPB, now part of the Health Protection Agency) Radon Atlas of England and Wales, indicates that the site falls within an area where less than 1% of homes are affected by radon emissions and therefore basic radon protective measures should not be necessary.

The Geological Survey map of the area indicates that the site is underlain by the Northmore Sand and Gravel overlying the Oxford Clay Formation and the West Walton Clay Formation (undifferentiated).

2.4 Preliminary Risk Assessment

Part IIA of the Environmental Protection Act 1990, which was inserted into that Act by Section 57 of the Environment Act 1995, provides the main regulatory regime for the identification and remediation of contaminated land. The determination of contaminated sites is based on a "suitable for use" approach which involves managing the risks posed by contaminated land by making risk-based decisions. This risk assessment is carried out on the basis of a source-pathway-receptor approach.

2.4.1 Source

The historical usage of the site that has been established by the desk study indicates that a

2 http://www.headington.org.uk/oxon/old_oxford/walton_street/ruskin.html

timber yard was historically present on the eastern part of the site, with houses on the western part until the college gradually spread over the entire site from around 1903 onward. Given that the site has been occupied by residential houses and a college for about 110 years contamination associated with the timber yard is considered unlikely to remain, however there may be small amounts of primitive glues or resins at the site. The houses and college do not represent a source of contamination.

2.4.2 Receptor

The most significant receptor of the proposed redeveloped college will be the residents which will present a relatively high sensitivity end-use, as is the existing situation. Buried services are likely to come into contact with any contaminants present within the soils through which they pass and site workers are likely to come into contact with any contaminants present in the soils during demolition and construction works. Being underlain by a Secondary A aquifer, groundwater is likely to be considered as a moderately sensitive receptor.

2.4.3 Pathway

The redevelopment of the site will not create any new pathways for end users to come into contact with the soil. The site will predominantly be covered by the buildings and the only feasible pathways to end users will be in areas of public open space which is limited. The Oxford Clay Formation is a non-aquifer, and there is no pathway to deeper groundwater from potential contaminants in made ground deposits. Shallow perched groundwater may however provide a pathway for contaminants to migrate off site.

2.4.4 Preliminary Risk Appraisal

On the basis of the above it is considered that there is a very low risk of there being a significant contaminant linkage at this site which would result in a requirement for any remediation work. Furthermore as there is no evidence of filled ground within the vicinity of the site and there is not considered to be a significant potential for hazardous soil gas to be present on or migrating towards the site: there should thus be no need to consider soil gas exclusion systems.

3.0 EXPLORATORY WORK

In order to meet the objectives described in Section 1.2, a single cable percussion borehole was advanced to a depth of 20.0 m using a cable percussive drilling rig set up to the north of the site in the pavement adjacent to Worcester Place as access into the site was only possible on foot. Standard Penetration Tests (SPTs) were carried out in the borehole at regular intervals and disturbed and undisturbed samples were recovered for subsequent laboratory examination and testing.

In addition, 20 trial pits were excavated by hand in order to investigate the existing footings of structural and boundary walls. The field work was carried out under the part time supervision of a geotechnical engineer from GEA.

A selection of samples was submitted to a soil mechanics laboratory for a programme of geotechnical testing and an analytical laboratory for a programme of contamination testing. Additionally, root samples were collected from trial pits along the southern boundary of the site, Trial Pit Nos 19, 21 and 23; these were sent to a specialist to determine the species of the roots encountered in the trial pits.

The bulk of the site was only accessible by pedestrian doors into the building from Walton Street and Worcester Place and as a result the drilling rig was set up in the pavement with

permission from Oxfordshire County Council. It was originally proposed to install a standpipe in the borehole, but as it was positioned in the public highway it was not possible.

The investigation had to be completed during the College's holiday period, giving a limited period for completing the work. As ten of the trial pits encountered fast inflows of water which caused collapse during excavation and necessitated pumping it was not possible to complete all of the pits in the time available.

In addition, CBR testing by means of a MEXE probe was carried out at a number of locations.

The levels shown on the borehole and trial pit records have been interpolated from spot heights shown on a drawing provided by Stockley, titled Existing Plan at 59.5, Basement Level, Drawing No (EX)001 rev P02 dated March 2012.

3.1 Sampling Strategy

Eight soil samples representative of made ground were subjected to analysis for a range of common industrial contaminants and contamination indicative parameters. For this investigation the analytical suite for the soil included a range of metals, speciation of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), total cyanide and monohydric phenols. Four samples were also scheduled for WAC testing.

The soil samples were selected to provide a general view of the chemical conditions of the soils that are likely to be involved in a human exposure or groundwater pathway and to provide advice in respect of re-use or for waste disposal classification. The contamination analyses were carried out at an MCERTs accredited laboratory with the majority of the testing suite accredited to MCERTS standards. Details of the MCERTs accreditation and test methods are included in the Appendix together with the analytical results.

4.0 GROUND CONDITIONS

The investigation has generally confirmed the expected ground conditions in that, below a limited thickness of made ground the Northmoor Sand and Gravel was found to be underlain by the Oxford Clay Formation.

4.1 Made Ground

The made ground extended to a depth of 1.0 m (58.00 m OD) in the borehole and between 0.48 m (58.52 m OD) and greater than 2.0 m in the trial pits and generally comprised dark brown to orangish brown and grey sandy gravelly clay or a clayey gravelly sand with fragments of brick, concrete and occasionally whole bricks, ash and coal.

No visual or olfactory evidence of contamination was observed within these soils, although fragments of brick, concrete, ash and coal were noted within the made ground. Eight samples of the made ground have been analysed for a range of contaminants and the results are summarised in Section 4.5.

4.2 Northmoor Sand and Gravel

This stratum initially comprised soft orange light brown silty sandy gravelly clay which was encountered in the borehole to a depth of 3.0 m (56.00 m OD). Soft low strength silty grey clay with occasional fine flint gravel with some plant remains extended to a depth of 6.20 m (52.8 m OD). It is though this represents flood plain material from within the Northmoor Sand and Gravel. Grey sand and gravel was then encountered to a depth of 6.8 m (52.2 m OD).

This stratum was encountered in several trial pits and typically comprised greyish orange and brown clayey silty sand and gravel which is significantly different to the findings in the borehole.

Laboratory tests indicate the clay to be of low shrinkability.

These soils were observed to be free of any evidence of soil contamination.

4.3 Oxford Clay Formation

This stratum initially comprised soft fissured medium strength grey silty clay, which gradually became very stiff fissured high to very high strength silty clay with occasional sandy partings to the maximum depth investigated of 20.00 m (39.00 m OD).

A claystone was encountered between 18.2 m and 18.3 m.

Laboratory tests indicate the clay to be of medium shrinkability.

These soils were observed to be free of any evidence of soil contamination.

4.4 Groundwater

A fast inflow of groundwater was encountered in Borehole No 1 at a depth of 6.2 m (52.80 m OD) and rose to 3.1 m (55.90 m OD) after a rest period of 20 minutes.

Groundwater was also encountered as moderate to fast inflows in Trial Pit Nos 1, 2, 3, 5, 6, 7, 8, 9 and 10, which were dug from basement level. Groundwater was measured in these pits between depths of 0.10 m (57.70 m OD) and 1.20 m (57.80 m OD).

A pump was used to complete some of the trial pits but it was not possible to control the inflows in Trial Pit Nos 5, 6 and 7. The pump was used to complete Trial Pit No 9 but Nos 8 and 10 were not completed as the water in these pits was found to have risen to near basement floor level and pumping was not feasible.

4.5 Soil Contamination

The table below sets out the values measured within eight samples of made ground analysed; all concentrations are in mg/kg unless otherwise stated.

Determinant	Maximum concentration recorded (mg/kg)	Minimum concentration recorded (mg/kg)	Number of samples below detection limit	Normalised upper bound US_{95}
Arsenic	**34**	8.1	none	30
Cadmium	0.17	<0.1	7	0.1

Determinant	Maximum concentration recorded (mg/kg)	Minimum concentration recorded (mg/kg)	Number of samples below detection limit	Normalised upper bound US_{95}
Chromium	31	8.8	none	25.4
Copper	50	<5	1	26.5
Mercury	1.1	<0.1	3	0.5
Nickel	31	12	none	23
Lead	360	40	none	212.2
Selenium	<0.2	<0.2	8	0.2
Zinc	230	27	none	123
Total Cyanide	<0.5	<0.5	8	0.5
Total Phenols	<0.3	<0.3	8	0.3
Sulphide	22	2.2	none	10.7
Total PAH	**11**	<2	7	5.3
Benzo(a)pyrene	**1.1**	<0.1	7	0.5
Naphthalene	<0.1	<0.1	8	0.1
TPH	36	<10	7	19.4
Total Organic Carbon %	4.0	1.3	none	3.4

Note: The use of the normalised upper bound for 95th percentile confidence aims to remove some of the uncertainty associated with calculation of an arithmetic sample mean of a relatively small number of samples. The US95 value is the upper bound of the range within which it can be stated with 95% confidence that the true mean concentration of the data set will fall.
Figure in bold indicates concentration in excess of risk-based soil guideline values, as discussed in Part 2 of this report

WAC leachate testing was carried out on four samples of made ground and generally indicated made ground samples to be inert, with the exception of total organic carbon concentrations which classify two of the samples as non hazardous waste.

4.5.1 Generic Quantitative Risk Assessment

The use of a risk-based approach has been adopted to provide an initial screening of the test results to assess the need for subsequent site-specific risk assessments. To this end the contaminants of concern are those that have values in excess of a generic human health risk based guideline values which are either that of the CLEA[3] Soil Guideline Value where available, or is a Generic Guideline Value calculated using the CLEA UK Version 1.06 software assuming a residential end use.

The key generic assumptions for this end use are as follows:

- that groundwater is not a critical risk receptor;
- that the critical receptor for human health will be young female child (aged zero to six years old);

3 *Updated Technical Background to the CLEA Model (Science Report SC050021/SR3) Jan 2009* and Soil Guideline Value reports for specific contaminants; all DEFRA and Environment Agency.

- that the exposure duration will be six years;
- that the critical exposure pathways will be direct soil and indoor dust ingestion, skin contact with soils and dust, and inhalation of dust and vapours; and
- that the building type equates to a two-storey terraced house.

It is considered that these assumptions are acceptable for this generic assessment of this site, however are very conservative given that students will only be at the college for three years, and only during term time in that period. The tables of generic screening values derived by GEA and an explanation of how each value has been derived are included in the Appendix.

Where contaminant concentrations are measured at concentrations below the generic screening value it is considered that they pose an acceptable level of risk and thus further consideration of these contaminant concentrations is not required. However, where concentrations are measured in excess of these generic screening values there is considered to be a potential that they could pose an unacceptable risk and thus further action will be required which could include;

- additional testing to zone the extent of the contaminated material and thus reduce the uncertainty with regard to its potential risk;
- site specific risk assessment to refine the assessment criteria and allow an assessment to be made as to whether the concentration present would pose an unacceptable risk at this site; or
- soil remediation or risk management to mitigate the risk posed by the contaminant to a degree that it poses an acceptable risk.

When comparing the results from the contamination testing to those in the Soil Guideline Values and Generic Guideline Values, the analyses revealed elevated concentrations of arsenic, benzo(a)pyrene and total polycyclic aromatic hydrocarbons (PAH). Statistical analysis has however showed that these concentrations do not represent the site as a whole.

The significance of these results is considered further in Part 2 of the report.

4.6 Existing Foundations

Trial Pit Nos 1, 2, and 3 were excavated at basement level and typically found brick corbels supported by a concrete foundation which was founding on both made ground and sand and gravel at depths of between 1.24 m to 1.40 m, the concrete foundation stepped out from the wall by between 0.14 m and 0.72 m.

Trial Pit No 14 was excavated on the northern boundary wall of the Ruskin Building and showed the wall to be supported by a concrete foundation at a depth of 0.90 m which was bearing on made ground. The wall was not found locally in the pit due to the presence of a cast iron sewer pipe. Trial Pit 7 was excavated along the same wall but was not completed due to groundwater inflow; however a brick corbel was noted to step out from the wall but the depth and distance could not be measured. Trial Pit Nos 5 and 6 were broken out however water and time restrictions prevented their completion.

Trial Pit Nos 8, 9 and 10 were located in the same basement area and encountered reinforced concrete approximately 0.70 m thick which was bearing on made ground. Due to time

constraints only the base of the foundation was proved in Trial Pit No 9; the concrete was broken out in the other locations and found to be a similar thickness.

Trial Pit No 11 indicated the buildings in the northwest of the site to be supported by a concrete foundation that was flush with the brick work founding on made ground at a depth of 0.43 m.

Trial Pit Nos 12, 13 and 16 provided details on foundations for concrete columns; which were all bearing in made ground at depths of between 1.45 m and 2.00 m.

Trial Pit No 15 showed a brick wall in the centre of the site to be supported by a concrete foundation founding in made ground at a depth of 0.20 m.

The foundation to the southern boundary wall was investigated by Trial Pit Nos 19, 21 and 23 which showed the wall to be supported by a concrete foundation bearing on made ground and sand and gravel at depths of between 0.63 m and 1.58 m. The concrete stepped out from the wall between 0.17 m to 0.70 m.

Trial Pit Nos 24 and 25 showed the circa1960's extension building in the centre of the site to have deep concrete foundations which extended to depths beyond 1.40 m and 0.90 m respectively.

4.7 Root Analysis

The roots that were encountered in Trial Pit Nos 21 and 23 extended to depths of 0.7 m and 0.8 m respectively, and were generally 5 mm to 10 mm in diameter. Roots in Trial Pit No 19 were up to 10 mm in diameter and typically extended to a depth of 0.4 m, although rootlets extended to the whole depth of the pit and were wrapping around the concrete foundation. No roots were noted to be entering the site from under the foundation as they all generally appeared to be running parallel to the wall investigated. Roots encountered in Trial Pit Nos 19, 21 and 23 were sent to a specialist who examined the samples to determine their species. The results show roots in Trial Pit 19 to belong to Sambucus (elder). Roots in Trial Pit No 21 belong to a shrub and not a tree and roots in Trial Pit No 23 are related to Fatsia, another shrub.

Part 2: DESIGN BASIS REPORT

This section of the report provides an interpretation of the findings detailed in Part 1, in the form of a ground model, and then provides advice and recommendations with respect to foundation options and contamination issues.

5.0 INTRODUCTION

It is proposed to develop the site by demolishing the existing buildings, with the exception of the original Ruskin Building facades fronting onto Walton Street and Worcester Place. New four-storey and six-storey buildings with single level basements will then be constructed. The lower floors will be used as teaching spaces while upper floors will provide student accommodation, there will also be two areas of open space.

The new basement level will be formed by deepening existing basements by between 0.2 m and 1.2 m across the site whilst in other areas new basement excavations will be required, extending to a maximum depth of 2.5 m below ground level.

It is understood that a secant bored pile wall is currently being considered to be the preferred foundation solution and the maximum column loads are expected to be in the region of 3211 kN.

6.0 GROUND MODEL

The desk study revealed that the site was previously developed with houses and a timber yard until the early 20th Century when Ruskin College was built, since this time the college has been extended across the site. On the basis of the fieldwork, the ground conditions at this site can be characterised as follows.

- A limited thickness of made ground is present over the Northmoor Sand and Gravel which is underlain by the Oxford Clay Formation;
- made ground extends to depths of between 0.48 m (58.52 m OD) and greater than 2.0 m and generally comprised orange and greyish brown sandy gravelly clay or a clayey gravelly sand with fragments of brick, concrete, ash and coal;
- the Northmoor Sand and Gravel initially comprises soft orange light brown silty sandy gravelly clay and a soft low strength grey silty gravelly clay with some plant remains which extended to a depth of 6.20 m (52.80 m OD). Grey sand and gravel was then encountered to a depth of 6.8 m (52.20 m OD);
- the Oxford Clay Formation initially comprises soft fissured medium strength grey silty clay which gradually becomes very stiff fissured very high strength silty occasionally sandy and fine gravelly clay to the maximum depth investigated, of 20.00 m (39.00 m OD).
- a fast inflow of groundwater was encountered in a granular layer of the Northmoor Sand and Gravel in Borehole No 1 at a depth of 6.2 m (52.80 m OD); fast inflows were also encountered within the trial pits excavated from basement level indicating water at

an approximate level of 57.80 m OD within made ground and sand and gravel soils; and

- statistical analysis of eight samples of made ground indicate no elevated concentrations at the site.

7.0 ADVICE AND RECOMMENDATIONS

Formation level for the proposed basements will be within the soft clay of the Northmoor Sand and Gravel and in view of the magnitude of the proposed loads piled foundations are likely to be required.

Groundwater is likely to be present in the made ground and granular deposits of the Northmoor Sand and Gravel and inflows are expected to be fast such that groundwater control will be required to complete the basement excavations.

There should not be a requirement for remediation with respect to ground contamination.

Further investigation would be prudent once access is available to confirm ground conditions across the site, especially if spread foundations are preferred. The additional investigation should include installation of standpipes to allow monitoring of groundwater levels.

7.1 Basement Excavation

The proposed basement excavations will extend to a maximum depth of around 2.5 m (56.40 m OD). The investigation has indicated groundwater to be present at a level of 57.80 m OD and thus inflows are likely to be encountered in excavations.

It would ideally be prudent to carry out a number of trial excavations, to depths as close to the full basement depth as possible to provide an indication of the likely groundwater conditions and to assess inflow rates as it is likely to be important at this site.

The design of basement support in the temporary and permanent conditions needs to take account of the need to maintain the stability of the excavation and surrounding structures, and to protect against groundwater inflows. In view of the likely level of the groundwater table, and the high inflow rates that have been indicated, it is apparent that bored pile walls will be required and at this stage it is considered that a secant bored pile walls should be used.

If further investigation indicates that groundwater inflows could be satisfactorily controlled then the existing foundations could be underpinned to form a retaining wall using a traditional 'hit and miss' approach. However, the use of this form of underpinning will require the soils being underpinned to stand unsupported, and difficulties are likely to be encountered with unsupported excavations, particularly if any perched groundwater is encountered. It is therefore essential that the groundworks contractor has a contingency plan in place to deal with any such instability if this method is carried out. Trial excavations would be prudent to provide an assessment of the stability of the clayey Northmoor Sand and Gravel such that the feasibility of underpinning could be confirmed.

The ground movements associated with the basement excavation will depend on the method of excavation and support and the overall stiffness of the basement structure in the temporary condition. Thus, a suitable amount of propping will be required to provide the necessary rigidity. The stability of existing structures will need to be ensured at all times and the retaining walls may need to be designed to accommodate the loads from these foundations.

7.1.1 Basement Retaining Walls

The following parameters are suggested for the design of the permanent basement retaining walls.

Stratum	Bulk Density (kg/m^3)	Effective Cohesion (c' – kN/m^2)	Effective Friction Angle (ϕ' – degrees)
Made ground	1700	Zero	27
Northmoor Sand and Gravel (clay)	1900	Zero	27
Northmoor Sand and Gravel (gravel)	1900	Zero	32
Oxford Clay	2050	Zero	25

The investigation has indicated that groundwater is likely to be present within the basement excavation. Trial excavations should be carried out to determine the equilibrium groundwater levels, or further investigation could install standpipes to determine groundwater levels. At this stage, it is recommended that the basement is designed with a water level assumed to be two-thirds of the basement depth, unless a fully effective drainage system can be ensured. It may however be possible to review this requirement following additional investigation by means of trial excavations and monitoring and the advice in BS8102:2009[4] should be followed in this respect.

7.1.2 Basement Heave

The excavation of the proposed basement will result in a maximum unloading of approximately 45 kN/m^2.

The heave will comprise an "immediate" elastic component that may be expected to occur within the construction period, together with long term swelling movement that would theoretically occur over a period of many years. The effects of heave are likely to be mitigated to some extent by the loads applied by the by the new building. It would be prudent to conduct further analysis once loads and proposals have been finalised.

7.1.3 Basement Floor Slab

Following the excavation of the basement it should be possible to adopt a ground bearing floor slab, bearing on the natural soils. It would be prudent to proof roll the stratum, with any soft spots revealed being removed and replaced with suitably compacted granular fill.

Where the floor slab will be replacing an existing slab an assessment should be made of the existing slab and if the loading is the same and if the existing slab has performed satisfactorily then a slab could be placed at the same level. The slabs will need to be suitably reinforced to cope with any movements associated with heave of the underlying clay soils. It may therefore be necessary to incorporate a void below the slab to accommodate these movements. The slab may also need to incorporate some water proofing if groundwater levels are high.

4 BS8102 (2009) *Code of practice for protection of below ground structures against water from the ground*

7.2 Spread Foundations

Spread foundations bearing in the soft clays of the Northmoor Sand and Gravel may be designed to apply a net allowable bearing pressure of 75 kN/m^2 at a minimum depth of 0.75 m assuming that restrictions are applied on planting of shrubs in the vicinity of foundations, or at a depth of 1.0 m if there is unrestricted planting of shrubs in the new development, subject also to the further restrictions on new tree planting as detailed in the NHBC guidelines. This value incorporates an adequate factor of safety to ensure that settlement remains within normal tolerable limits.

It may be possible to increase the bearing pressure if firm clays or granular deposits are encountered at shallow depths however further investigation would be required to determine this.

Within the zone of influence of trees, foundations in clay will need to be deepened and National House Building Council (NHBC) guidelines should be followed in this respect. Low shrinkability clays should be used in calculations within the clayey deposits of the Northmoor Sand and Gravel. If the Oxford Clay is found at shallow depth, however unlikely, then medium shrinkability clays should be used in calculations. Deepening of foundations will not be required once granular soil has been encountered. Where trees are to be removed the required founding depth should be determined on the basis of the existing tree height if it is less than 50% of the mature height and on the basis of full mature height if the current height is more than 50% of the mature height. Where a tree is to be retained the final mature height should be adopted. Notwithstanding NHBC guidelines, all foundations should extend beyond the zone of desiccation. Due allowance should be made for future growth of the trees.

The requirement for compressible material alongside foundations should be determined by reference to the NHBC guidelines.

7.3 Piled Foundations

For the ground conditions at this site, driven or bored piles could be adopted. Driven piles would have the advantage of minimising the spoil that is generated, but consideration would need to be given to the effects of noise and vibrations on neighbouring sites. Some form of bored pile will therefore be more appropriate. A conventional rotary augered pile could be considered, but temporary casing installed into the Oxford Clay would be required to protect against groundwater inflows and instability from the Northmoor Sand and Gravel. Therefore, to avoid the requirement for casing, bored piles installed using continuous flight auger (cfa) techniques are most suitable.

The following table of ultimate coefficients may be used for the preliminary design of bored piles based on the measured SPT and Cohesion / level graph in the appendix. For the purposes of preliminary design, groundwater has been assumed to be at a level of 57.80 m OD) and all depths are shown relative to ground level at Borehole No 1, which is at a level of 59.00 m OD.

Ultimate Skin Friction		***kN/m²***
Made ground and Northmoor Sand and Gravel	Ground level (59.0 m OD) to 2.5 m (56.5 m OD)	Ignore – basement excavation
Northmoor Sand and Gravel ($\alpha = 0.4$)	2.5 m (56.5 m OD) to 6.8 m (52.2 m OD)	Increasing linearly from 10 to 60
Oxford Clay Formation ($\alpha = 0.5$)	6.8 m (52.2 m OD) to 20.0 m (39.0 m OD)	Increasing Linearly 60 to 115

Ultimate End Bearing		***kN/m²***
Oxford Clay	10.0 m (46.5 m OD) to 20.0 m (39.0 m OD)	Increasing linearly from 1170 to 2070

In the absence of pile tests, we have applied a factor of safety of 3.0 to the above coefficients to calculate the safe theoretical working loads.

On the basis of the above coefficients, applying a factor of safety of 3.0, it has been estimated that a 450 mm diameter pile extending to a depth of 18 m (41.00 m OD) below ground level, or 15.5 m below the proposed basement, should provide a safe working load of about 470 kN. A similar diameter pile extending to a depth of 20 m (39.00 m OD), or 17.5 m below the proposed basement should provide a safe working load of approximately 590 kN.

The above examples are not intended to constitute any form of recommendation with regard to pile size or type, but merely serve to illustrate the use of the above coefficients. Specialist piling contractors should be consulted with regard to the design of an appropriate piling scheme and their attention should be drawn to the presence of groundwater within the made ground, Northmoor Sand and Gravel and the claystone with the Oxford Clay.

7.4 Excavations

On the basis of the borehole and trial pit findings it is considered that shallow excavations for foundations and services that extend through the made ground or the clayey soils of the Northmoor Sand and Gravel should remain generally stable in the short term, although some instability may occur. Instabilities will occur where excavations extend below the groundwater level and the contractor should be careful not to over dig excavations.

Where personnel are required to enter excavations, a risk assessment should be carried out and temporary lateral support or battering of the excavation sides considered in order to comply with normal safety requirements.

7.5 Pavement Design

In-situ California Bearing Ratio (CBR) tests have been carried out using a MEXE Probe at locations adjacent to Trial Pit Nos, 15, 21 and 23 at depths of between 0.0 m and 0.60 m in the made ground. The results have indicated that the made ground initially has a CBR value

generally in the region of 2% but increasing to greater than 10%.

7.6 Effect of Sulphates

Chemical analyses have revealed concentrations of soluble sulphate and near-neutral pH in samples of the soil, corresponding to Class DS-2 and AC-1 of Table 2 of BRE Special Digest 1 Part C (2005), assuming mobile groundwater conditions.

The guidelines contained in the above digest should be followed in the design of foundation concrete.

7.7 Contamination Risk Assessment

With the exception of a timber yard, the desk study did not identify any significant sources of contamination as the site has been occupied by residential properties and an education facility for over 110 years. Statistical analysis of concentrations recorded in eight samples of made ground tested indicate that all US95 concentrations fall below respected guideline values. Therefore with specific sources of contamination and none recorded at the site it is considered that there is a low risk to end users.

Consideration should however be given to the protection of ground workers handling the soil.

7.7.1 Site Workers

Site workers should be made aware of the possible presence of contamination and a programme of working should be identified to protect workers handling any soil. The method of site working should be in accordance with guidelines set out by HSE[5] and CIRIA[6] and the requirements of the Local Authority Environmental Health Officer.

7.8 Waste Disposal

Any spoil arising from excavations or landscaping works will need to be disposed of to a licensed tip. Under the European Waste Directive landfills are classified as accepting inert, non-hazardous or hazardous wastes in accordance with the EU waste Directive.

Based upon on the technical guidance provided by the Environment Agency[7] it is considered likely that the made ground from this site, as represented by the eight chemical analyses carried out, would be generally classified as a Non-hazardous waste, whilst the natural soils may be classified as an Inert waste. Four WAC tests generally indicate the made ground soils however to be inert with the exception of total organic carbon concentrations in two of the samples tested. The information should be shown to the receiving landfill who will confirm the classification.

However, this classification should be confirmed by the receiving landfill once the soils to be discarded have been identified. In order to finalise this classification it will probably be necessary to carry out further analyses including WAC CEN method bulk leaching tests. Such tests should be carried out upon representative samples from the waste stream once the extent of the materials to be discarded has been established.

5 HSE (1992) HS(G)66 *Protection of workers and the general public during the development of contaminated land* HMSO

6 CIRIA (1996) *A guide for safe working on contaminated sites* Report 132, Construction Industry Research and Information Association

7 Environment Agency May 2008. Hazardous Waste: Interpretation of the definition and classification of hazardous waste. Technical Guidance WM2 Second Edition Version 2.2

Under the requirements of the European Waste Directive all waste needs to be pre-treated prior to disposal. The pre-treatment process must be physical, thermal, chemical or biological, including sorting. It must change the characteristics of the waste in order to reduce its volume, hazardous nature, facilitate handling or enhance recovery. The waste producer can carry out the treatment but they will need to provide documentation to prove that this has been carried out. Alternatively, the treatment can be carried out by an approved contractor. The Environment Agency has issued a position paper[8] which states that in certain circumstances, segregation at source may be considered as pre-treatment and thus excavated material may not have to be treated prior to landfilling if the soils can be segregated onsite by sufficiently characterising the soils insitu prior to excavation.

The above opinion with regard to the classification of the excavated soils is provided for guidance only and should be confirmed by the receiving landfill once the soils to be discarded have been identified. The local waste regulation department of the Environment Agency (EA) should be contacted to obtain details of tips that are licensed to accept the soil represented by the test results. The tips will be able to provide costs for disposing of this material but may require further testing.

8.0 OUTSTANDING RISKS AND ISSUES

This section of the report aims to highlight areas where further work is required as a result of limitations on the scope of this investigation, or where issues have been identified by this investigation that warrant further consideration. The scope of risks and issues discussed in this section is by no means exhaustive, but covers the main areas where additional work may be required.

The ground is a heterogeneous natural material and variations will inevitably arise between the locations at which it is investigated. This report provides an assessment of the ground conditions based on the discrete points at which the ground was sampled, but the ground conditions should be subject to review as the work proceeds to ensure that any variations from the Ground Model are properly assessed by a suitably qualified person.

An issue that requires careful consideration at this site is the extent to which groundwater will affect the basement excavation in the temporary condition and the groundwater level to be adopted in the permanent design. Recommendations have been made to carry out trial excavations and to install groundwater monitoring pipes to address these issues, but it is important that the contractor is able to deal with inflows of groundwater that may be locally more significant than anticipated.

Soft clays were encountered in Borehole No 1 to a depth of 6.20 m, and the recommended bearing pressure for spread foundations has been limited to prevent overstressing of the soft clay. When access becomes available or prior to finalising the design further investigation should be carried out to confirm the ground conditions across the site because only one deep borehole has been advanced for the site, which was located outside the site boundary. The investigation should confirm the ground model and geotechnical recommendations given in this report and will provide an opportunity to install groundwater monitoring standpipes.

8 *Regulatory Position Statement 'Treating non-hazardous waste for landfill - Enforcing the new requirement' Environment Agency 23 Oct 2007*

APPENDIX

Borehole Records

Trial Pit Records

Insitu CBR Test Results

Laboratory Geotechnical Test Results

SPT & Cohesion Level Graph

Chemical Analyses

Generic Guideline Values

Tree Root Analysis Results

Envirocheck Summary

Historical Maps

Site Plan

Geotechnical & Environmental Associates	Tyttenhanger House, Coursers Road, St Albans, AL4 0PG	Site: Ruskin College, Oxford, OX1 2HE	Borehole Number: BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm to 7.50m	59.00	Exeter College	J12073
	Location	**Dates** 11/04/2012	**Engineer** Stockley	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					58.90	(0.10) 0.10	Concrete with reinforcement		
0.40	D1					(0.90)	MADE GROUND (orangish brown sandy gravelly clay with occasional brick fragments)		
0.80	D2				58.00	1.00			
1.20	D3						Soft orangish light brown mottled silty sandy gravelly CLAY		
1.40-1.85	SPT N=6		DRY	1,0/1,1,1,3					
1.40	S1								
1.90	D4					(2.00)			
2.10-2.55	SPT N=2	2.10	DRY	1,0/0,1,0,1					
2.10	S2								
2.80	D5								
3.00-3.45	SPT N=4	3.00	DRY	1,0/0,1,1,2	56.00	3.00	Soft low strength silty grey CLAY with occasional fine gravel and some plant remains		▼1
3.00	S3								
3.80	D6								
4.00-4.45	U1								
4.50	D7					(3.20)			
5.00-5.45	SPT N=6	5.00	DRY	1,0/1,1,2,2					
5.00	S4								
6.00-6.45	SPT N=9	6.00	3.10	2,4/3,2,2,2					
6.00	S5			fast(1) at 6.20m, rose to 3.10m in 20 mins, sealed at 7.20m.	52.80	6.20	Grey SAND and GRAVEL		▽1
						(0.60)			
					52.20	6.80	Soft medium strength fissured grey silty CLAY		
7.50	U2					(1.20)			
8.00	D8				51.00	8.00	Firm grey fissured CLAY		
9.00-9.45	SPT N=25	7.50	DRY	3,4/5,6,7,7		(1.50)			
9.00	S6								
					49.50	9.50	Stiff grey fissured CLAY		

Remarks
Services pit excavated to 1.2 m, 1 hr 30 mins
Chiselling between 18.2 m and 18.3 m, 15 mins
Tidying position and cleaning road markings, 1 hr 30 mins

Scale (approx)	Logged By
1:50	ME

Figure No. J12073.BH1

Geotechnical & Environmental Associates	Tyttenhanger House, Coursers Road, St Albans, AL4 0PG	Site: Ruskin College, Oxford, OX1 2HE	Borehole Number: BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm to 7.50m	59.00	Exeter College	J12073
	Location	**Dates** 11/04/2012	**Engineer** Stockley	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(1.00)			
10.50-10.95	U3				48.50	10.50	Very stiff high becoming very high strength fissured silty occasionally sandy and fine gravelly CLAY. Claystone between 18.2 m and 18.3 m		
11.00	D9								
12.00-12.45 12.00	SPT N=26 S7	7.50	DRY	3,5/5,6,7,8					
13.50-13.95	U4								
14.00	D10								
15.00-15.45 15.00	SPT N=33 S8	7.50	DRY	5,6/7,8,8,10		(9.50)			
16.50-16.95	U5								
17.00	D11								
18.00-18.45 18.00 18.30	SPT N=58 S9 D13	7.50	DRY	8,19/16,16,13,13					
19.50	U6								
20.00	D12				39.00	20.00			

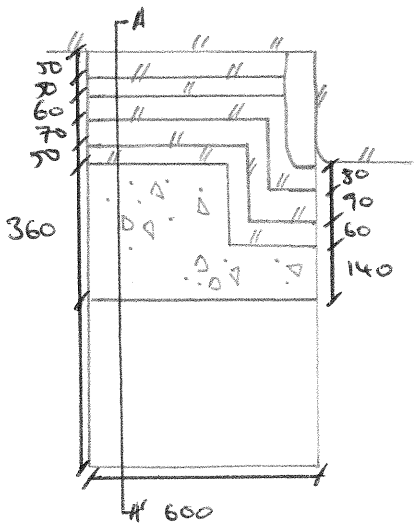
Remarks

Scale (approx)	Logged By
1:50	ME

Figure No. J12073.BH1

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 1
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 59.00	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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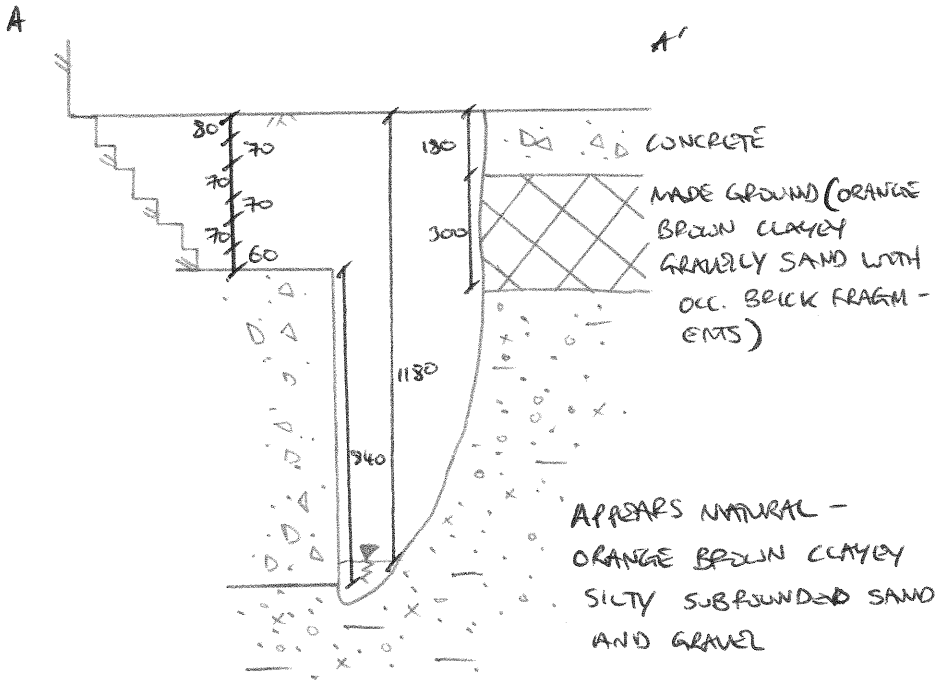
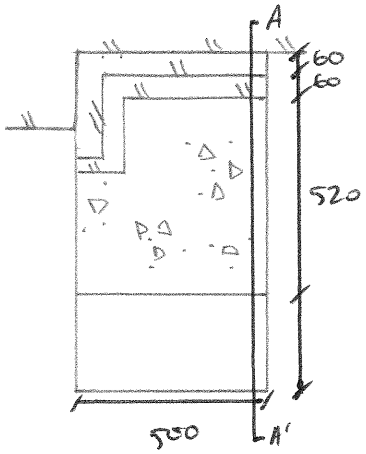


Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by: ME

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 2

Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 59.00	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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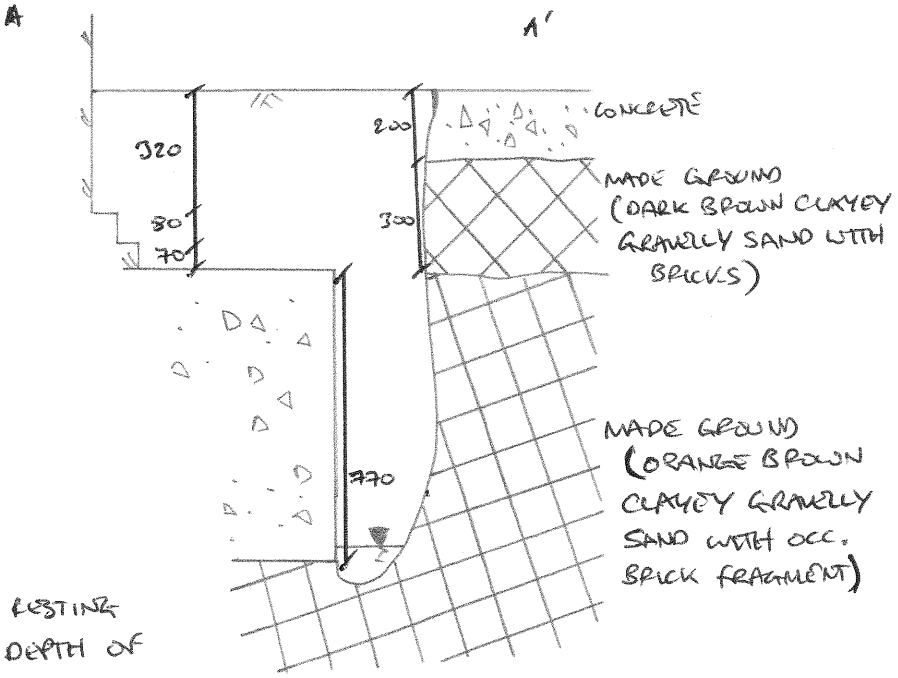
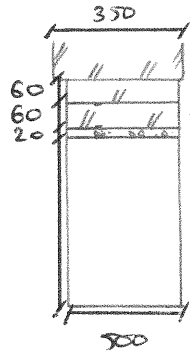


WATER RESTING AT A DEPTH OF 1·2M

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20
	Logged by: ME

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 3
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 59.00	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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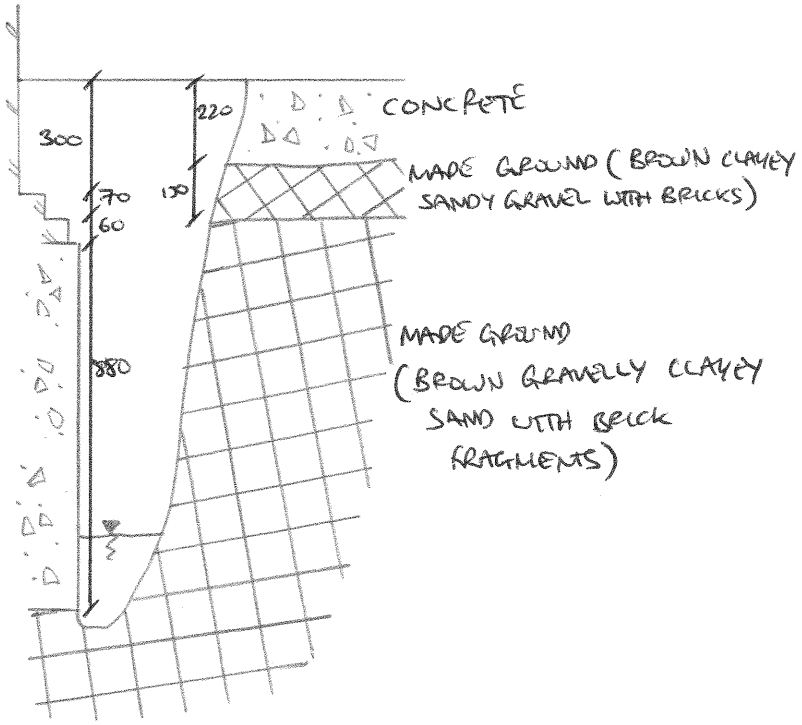


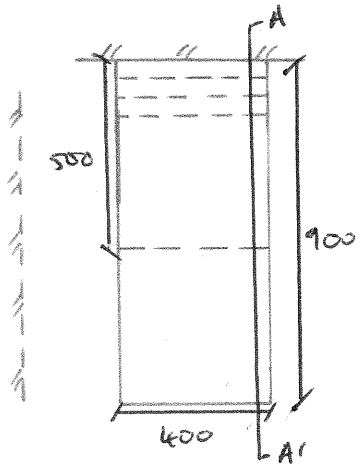
WATER RESTING AT A DEPTH OF 1.19m

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20
	Logged by: ME

GEA Geotechnical & Environmental Associates Tyttenhanger House Coursers Road St Albans Herts AL4 0PG			**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 5
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 58.21	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN

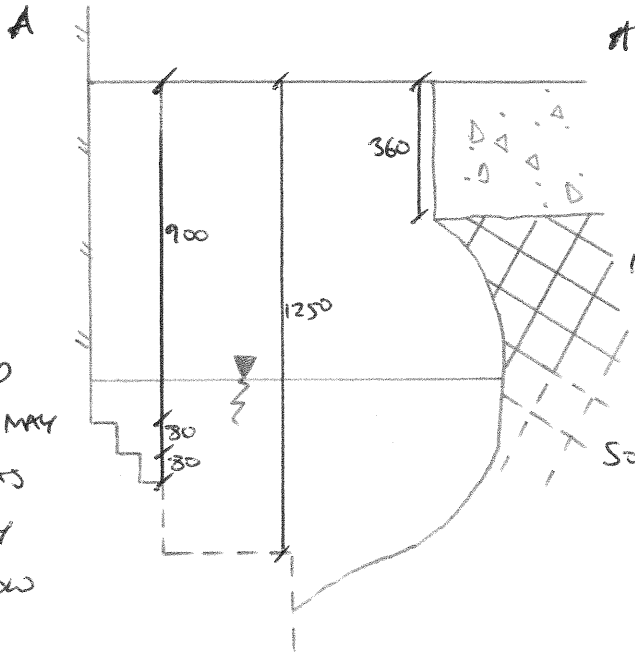
BRICK WORK BELOW GROUND - IN APPROX AREA TO WALL ABOVE GROUND



N

DISTANCES / MEASUREMENTS APPROXIMATE AS FELT BY PROBING.

SECTION.



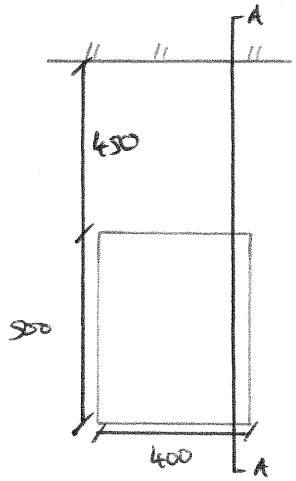
DEPTHS ARE APPROXIMATE AND REAL SITUATION MAY BE DIFFERENT AS INFO GAINED BY PROBING BELOW WATER LEVEL.

WATER RESTING AT 0.8M AFTER PUMPING AND BAILING.

Remarks: All dimensions in millimetres Sides of trial pit unstable during excavation	Scale: 1:20 Logged by: ME

GEA Geotechnical & Environmental Associates Tyttenhanger House Coursers Road St Albans Herts AL4 0PG			**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 6
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 58.20	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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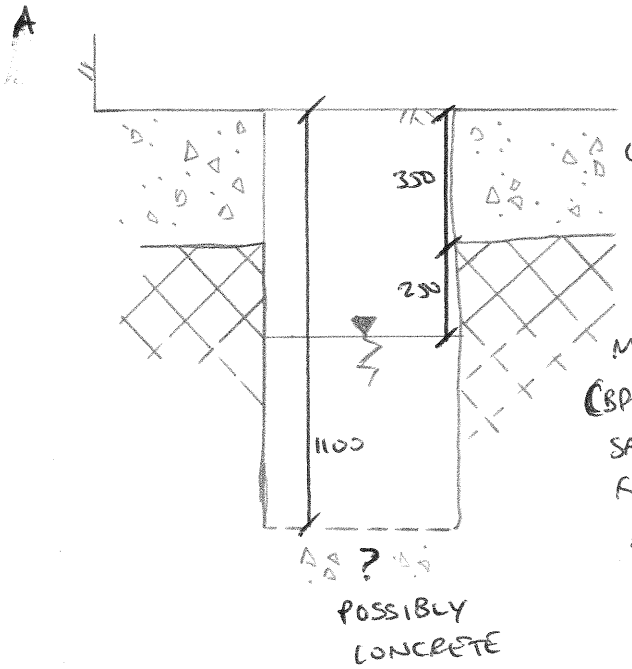


CONCRETE

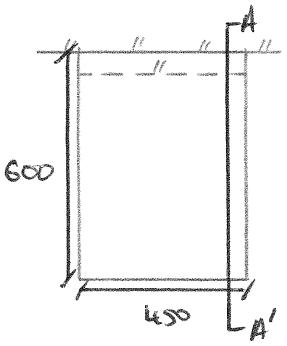
MADE GROUND (BROWN CLAYEY GRAVELLY SAND WITH OCCASIONAL FRAGMENTS OF BRICKS AND CONCRETE)

POSSIBLY CONCRETE

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20 Logged by: ME

GEA Geotechnical & Environmental Associates		Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 7
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 58.71	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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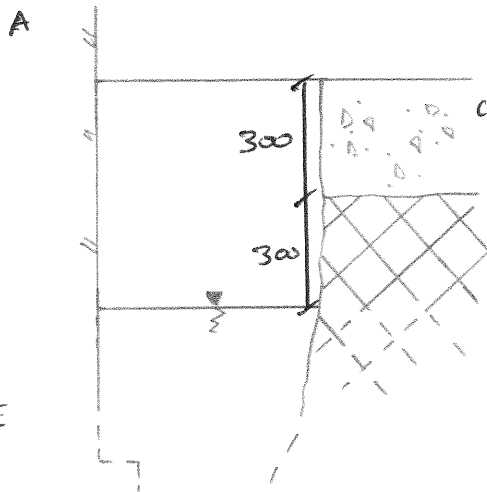
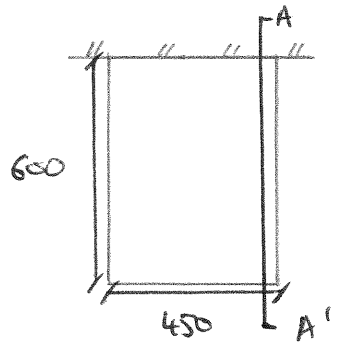


AT LEAST ONE BRICK CORBEL NOTED BUT NO DETAILS GAINED

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20 Logged by: ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 9
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 57-80	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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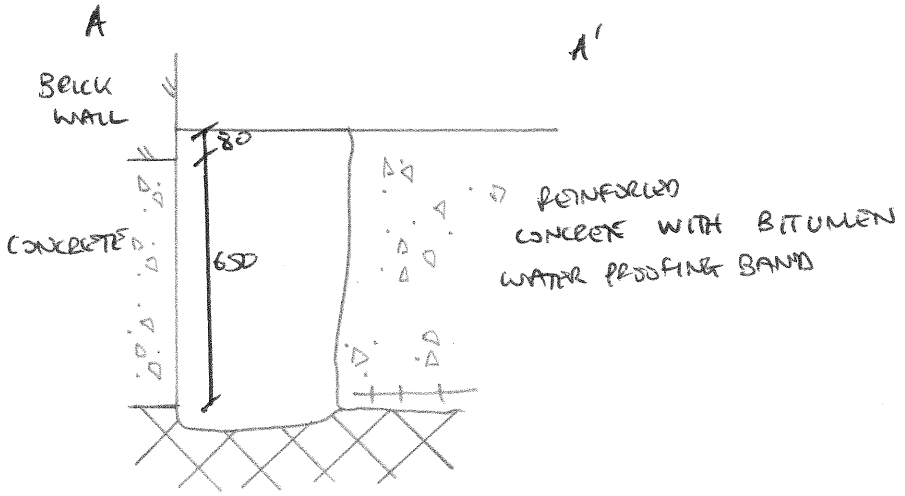
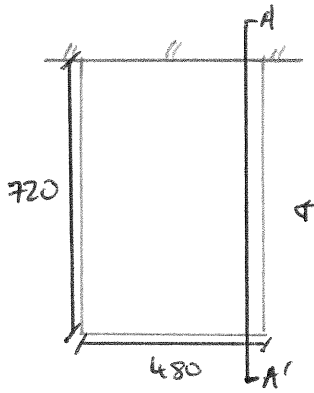


Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20 Logged by: ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	Site Ruskin College, Oxford, OX1 2HE	Trial Pit Number 11

Excavation Method	Dimensions (mm)	Ground Level (mOD)	Client	Job Number
Manual		58.60	Exeter College	J12073
	Location	**Dates**	**Engineer**	**Sheet**
		4-14/4/2012	Stockley	1 / 1

PLAN



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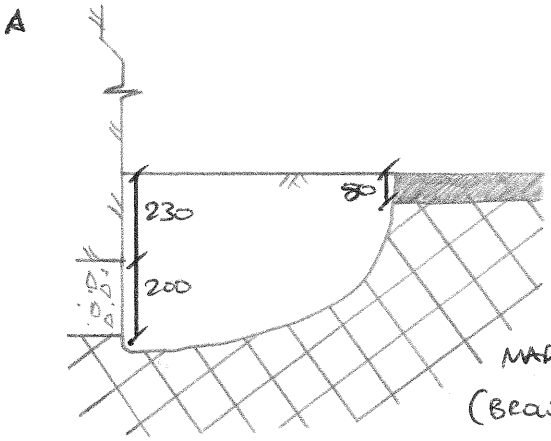
CONCRETE IN SIDE OF TRIAL PIT LOCALLY 350 - 400 MM DEEP - POSSIBLY PROTECTING SERVICES

SECTION



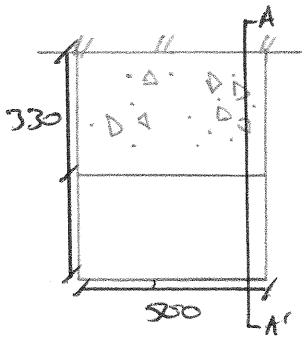
(BROWN SILTY GRAVELLY SAND WITH WHOLE BRICKS, LOOSE AND EASY DIGGING)

Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater not encountered	ME

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 12

Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 58.78	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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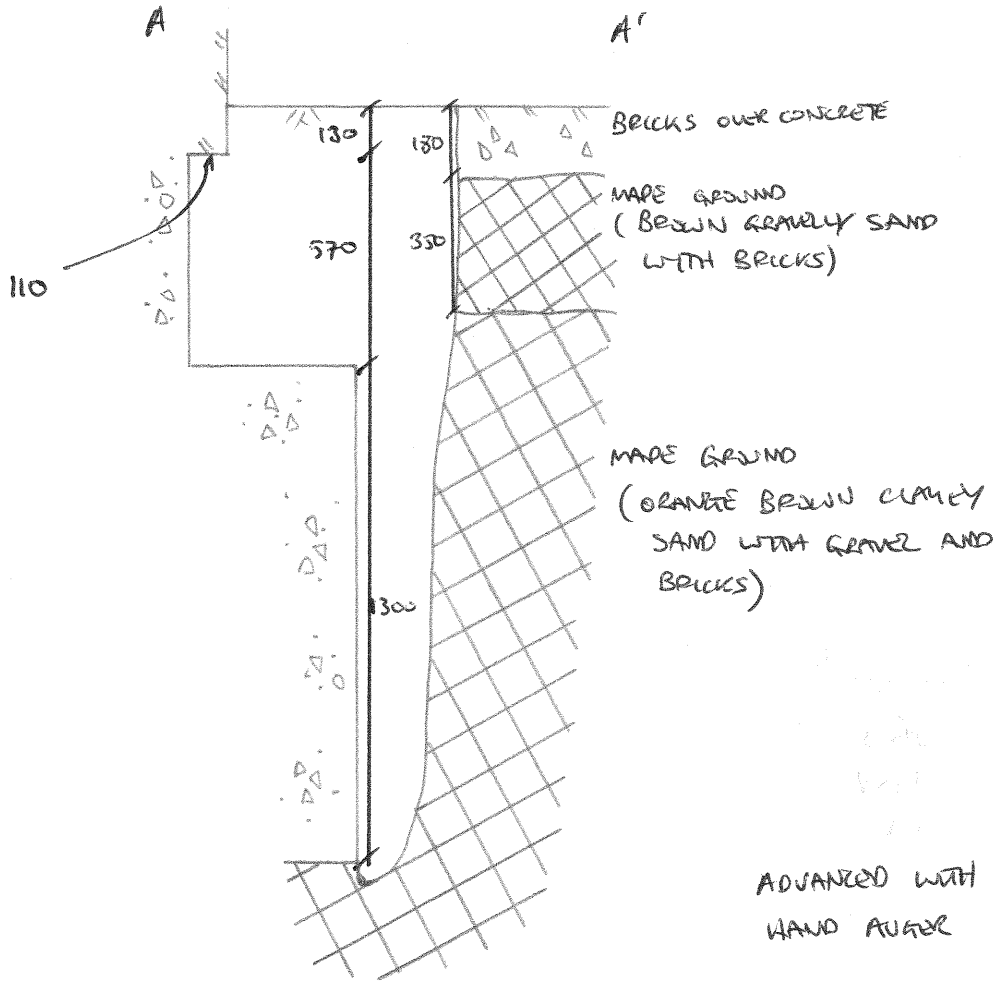
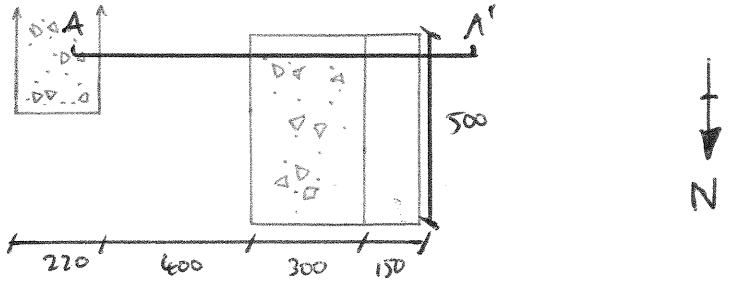


Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater not encountered	Scale: 1:20 Logged by: ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	Site Ruskin College, Oxford, OX1 2HE	Trial Pit Number 13
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 59.00	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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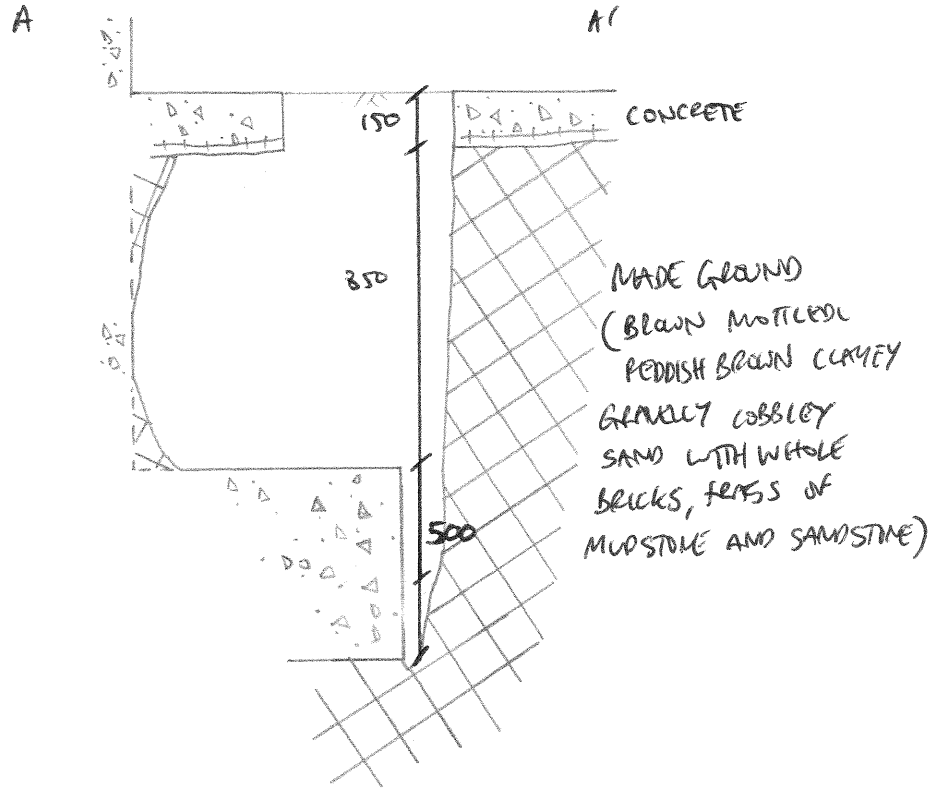
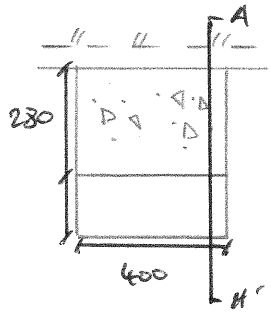


Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit unstable during excavation	Logged by:
Groundwaer not encountered	ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	Site Ruskin College, Oxford, OX1 2HE	Trial Pit Number 14

Excavation Method Manual	Dimensions (mm)	Ground Level (mOD) 58·66	Client Exeter College	Job Number J12073
	Location	Dates 4-14/4/2012	Engineer Stockley	Sheet 1 / 1

PLAN



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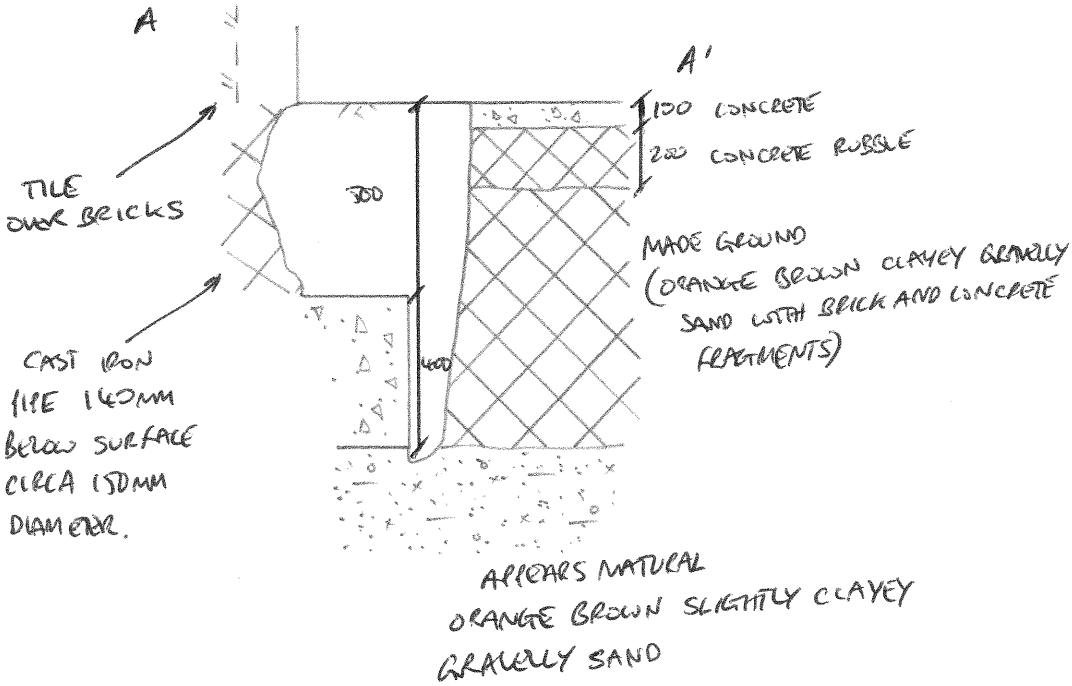
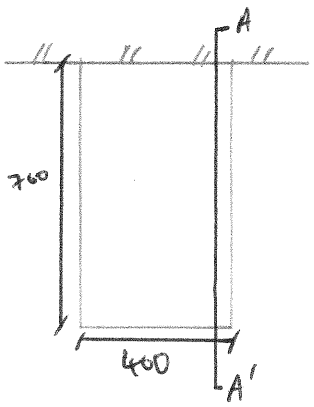


Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater not encountered	ME

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 15

Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 58.90	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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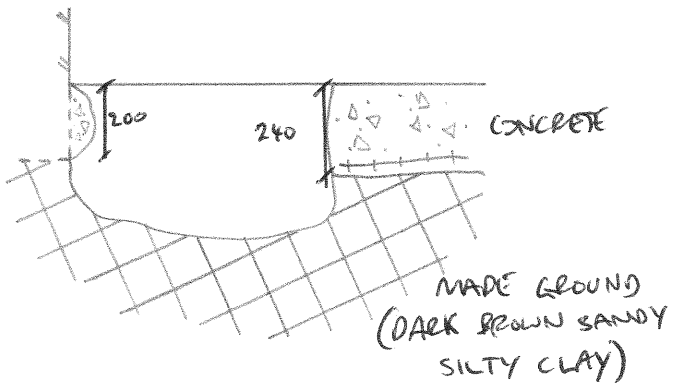
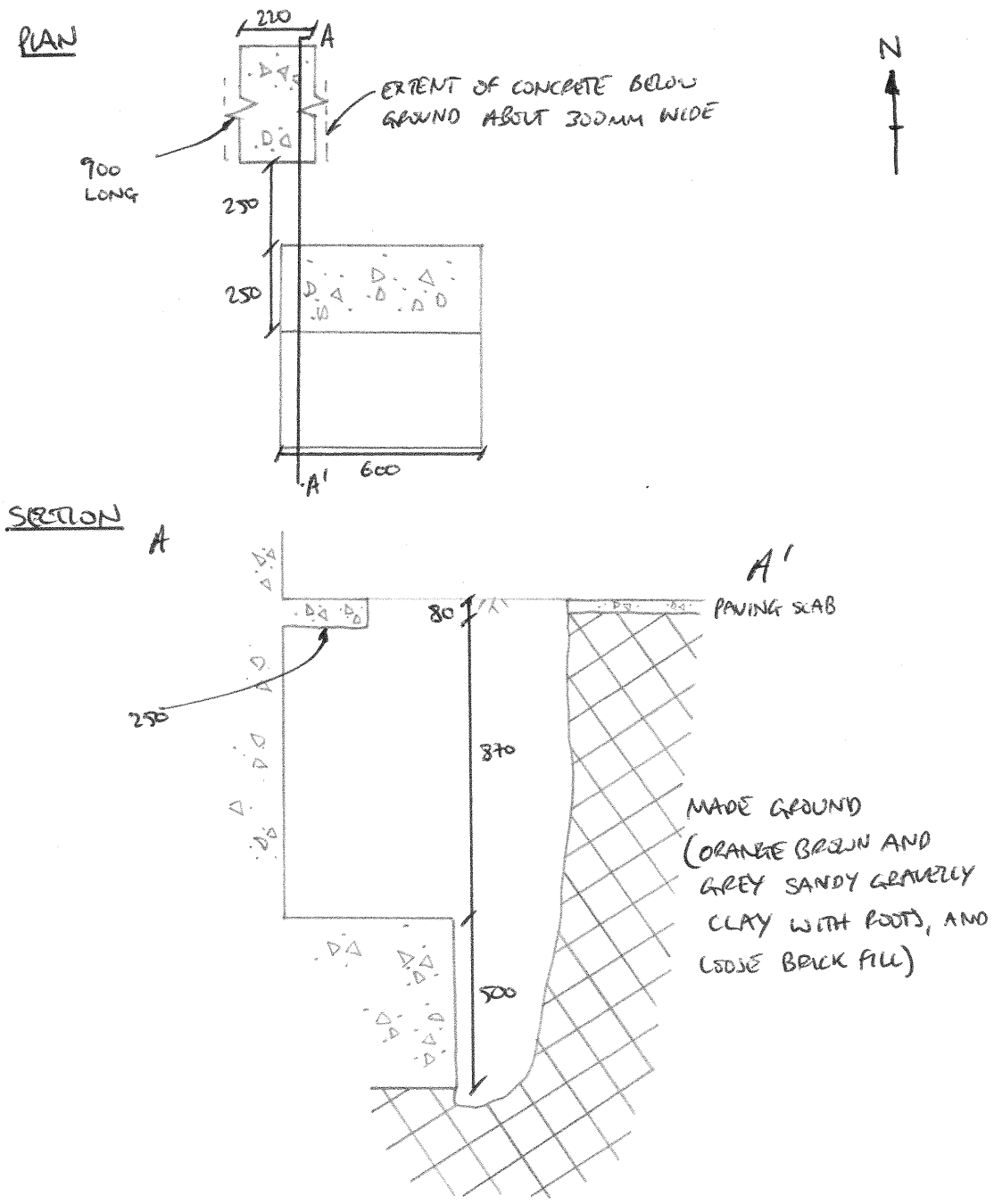


Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater not encountered	Scale: 1:20 Logged by: ME

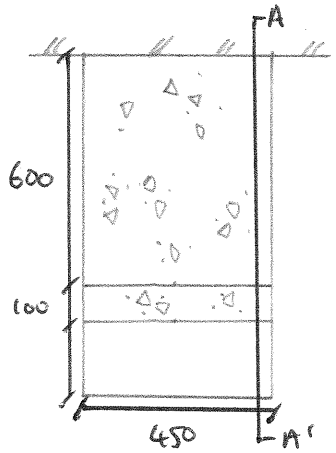
GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 16
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 58.94	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1



Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20
	Logged by: ME

GEA Geotechnical & Environmental Associates Tyttenhanger House Coursers Road St Albans Herts AL4 0PG			**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 19
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 57.63	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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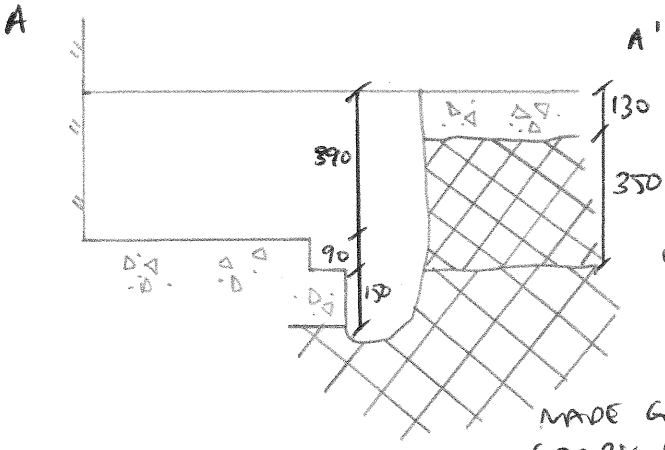


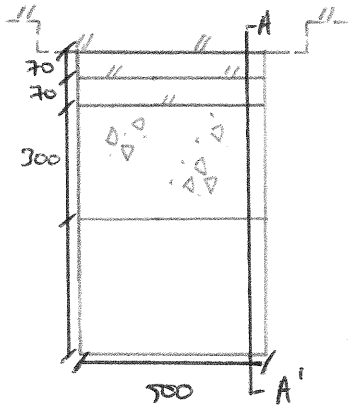
Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater not encountered	Scale: 1:20 Logged by: ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 21

Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 58.96	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

excavated on 16/4/12.

PLAN



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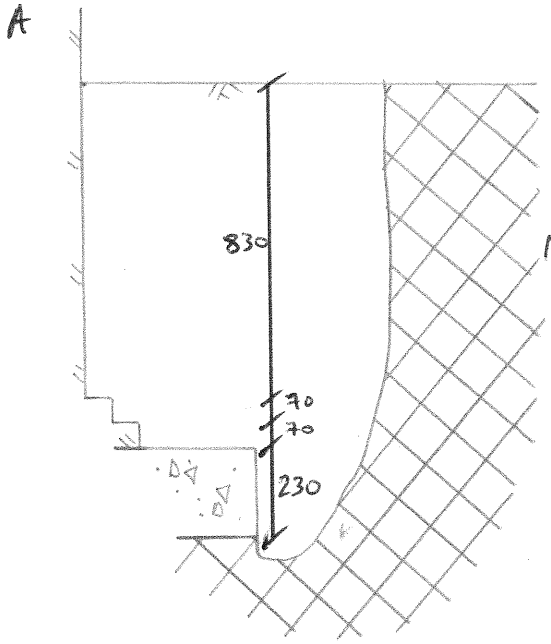
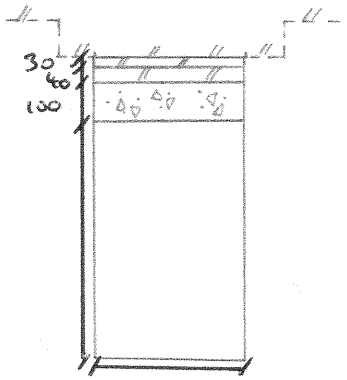


MADE GROUND (DARK BROWN GREYISH CLAYEY GRAVELLY SAND WITH BRICK, CONCRETE AND ROOTS)

Remarks: All dimensions in millimetres Sides of trial pit unstable during excavation Groundwater not encountered	Scale: 1:20 Logged by: ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** **23**
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 59.81	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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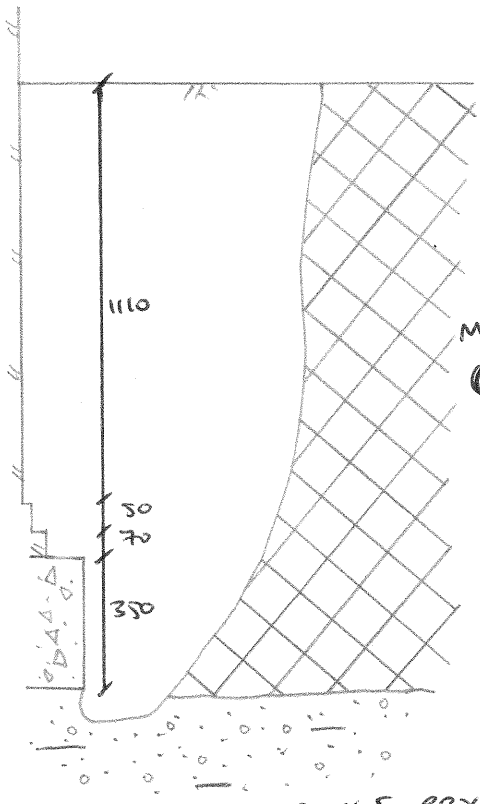
SECTION



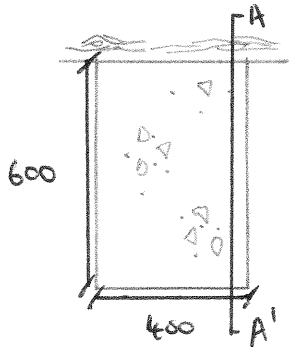
MADE GROUND (DARK BROWN TO BROWN CLAYEY SILTY GRAVELLY SAND WITH OCCASIONAL POCKETS OF ASH AND COAL)

ORANGE BROWN CLAYEY SAND AND GRAVEL

Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater not encountered	ME

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** **24**
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 59.831	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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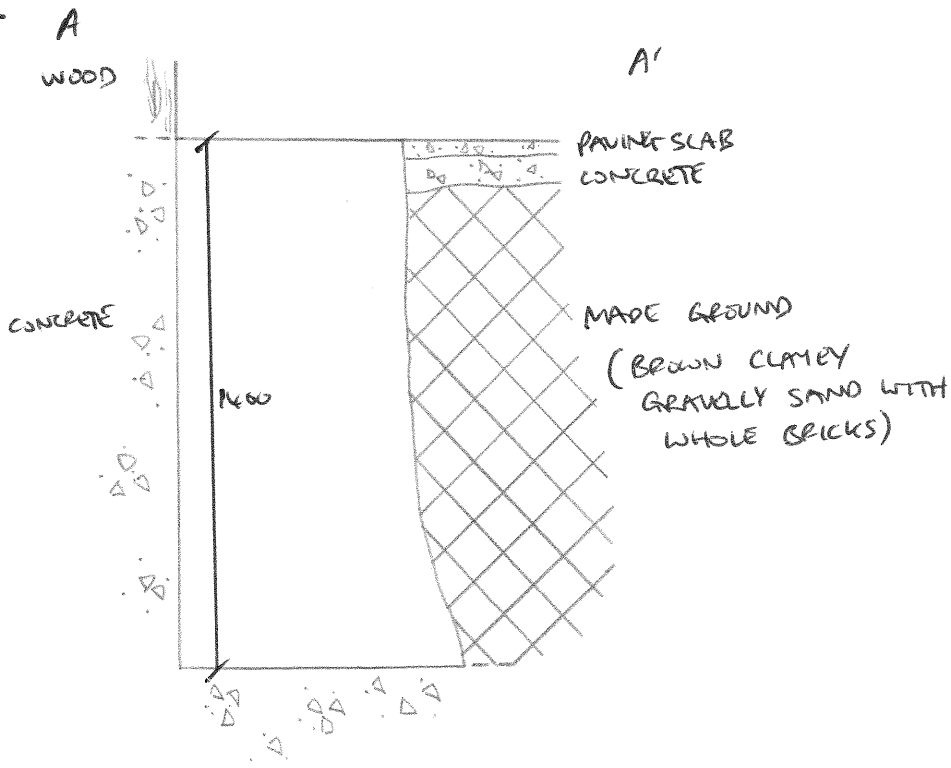
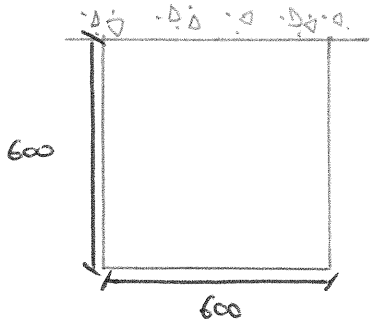


Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater not encountered	ME

GEA Geotechnical & Environmental Associates Tyttenhanger House Coursers Road St Albans Herts AL4 0PG			**Site** Ruskin College, Oxford, OX1 2HE	**Trial Pit Number** 25
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)** 59.793	**Client** Exeter College	**Job Number** J12073
	Location	**Dates** 4-14/4/2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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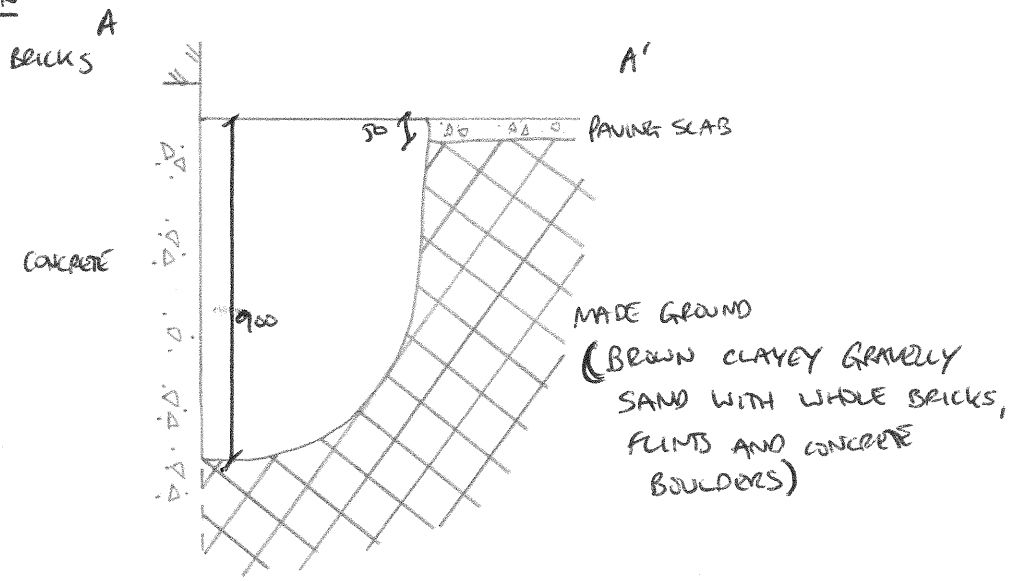


Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater not encountered	Scale: 1:20 Logged by: ME

Geotechnical & Environmental Associates
Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

Site Photographs

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073

Sheet 1 / 5

Trial Pit No 1

Trial Pit No 2

Trial Pit No 3

Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

Site Photographs

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073

Sheet 2 / 5

Trial Pit No 5 - photgraph looking south

Trial Pit No 6

Trial Pit No 7

Geotechnical & Environmental Associates
Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

Site Photographs

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073

Sheet 3 / 5

Trial Pit No 8

Trial Pit No 11

Trial Pit No 13

GEA Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

Insitu CBR Test Results

Site Ruskin College, Oxford, OX1 2HE

Client Exeter College

Engineer Stockley

Job Number J12073

Sheet 1/1

Test No 1 From Ground Level		Test No 2 From Ground Level		Test No 3 From Ground Level		Test No 4		Test No 5	
Location Adjacent to TP15		Location Adjacent to TP21		Location Adjacent to TP23		Location		Location	
Depth mm	CBR value %	Depth mm	CBR value %	Depth mm	CBR value %	Depth mm	CBR value %	Depth mm	CBR value %
75	2	75	1	75	10	75		75	
150	8	150	6	150	12	150		150	
225	12	225	5	225	14	225		225	
300	14	300	5	300		300		300	
375	14	375	7	375		375		375	
450		450	6	450		450		450	
525		525	5	525		525		525	
600		600	4	600		600		600	

Remarks: Results for CBR equivalent values from Mexecone penetromoter

PROJECT NAME	RUSKIN COLLEGE	Date	16/05/2012
	Project Number: J12073	Approved	Simon Burke
PROJECT NO:	GEO / 18236	Page	1 of 1

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression Tests			Chemical Tests			
Borehole No.	Depth (m)	No.	Type	Description	MC (%)	LL (%)	PL (%)	PI (%)	<425 mic (%)	Bulk (Mg/m³)	Dry (Mg/m³)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)	pH	2:1 W/S SO4 (g/l)	Ground Water SO4 (g/l)	Other tests and comments
BH1	1.20	3	D	Soft dark orange and brown sandy CLAY with rare fine to medium gravel	21	33	18	15	96						8.0	0.038		
BH1	4.00	1	U	Soft grey mottled black silty CLAY	37	43	25	18	100	1.90	1.39	80	54	27	7.7	0.54		
BH1	7.50	2	U	Firm to stiff grey CLAY	29	56	24	32	100	2.10	1.64	150	149	75				
BH1	10.50	3	U	Stiff fissured grey CLAY	23					2.06	1.68	210	243	121				
BH1	13.50	4	U	Stiff fissured grey CLAY	23					2.08	1.69	270	302	151				
BH1	16.50	5	U	Very stiff fissured grey CLAY	23	50	24	26	100	2.10	1.71	330	392	196				
BH1	19.50	6	U	Very stiff fissured grey CLAY	23					2.12	1.73	390	456	228				
TP1	0.60	-	D	Orange-brown silty clayey SAND and GRAVEL											8.0	0.37		Particle Size Distribution Test

SUMMARY OF GEOTECHNICAL TESTING

GEOLABS®

Geotechnical & Environmental Associates

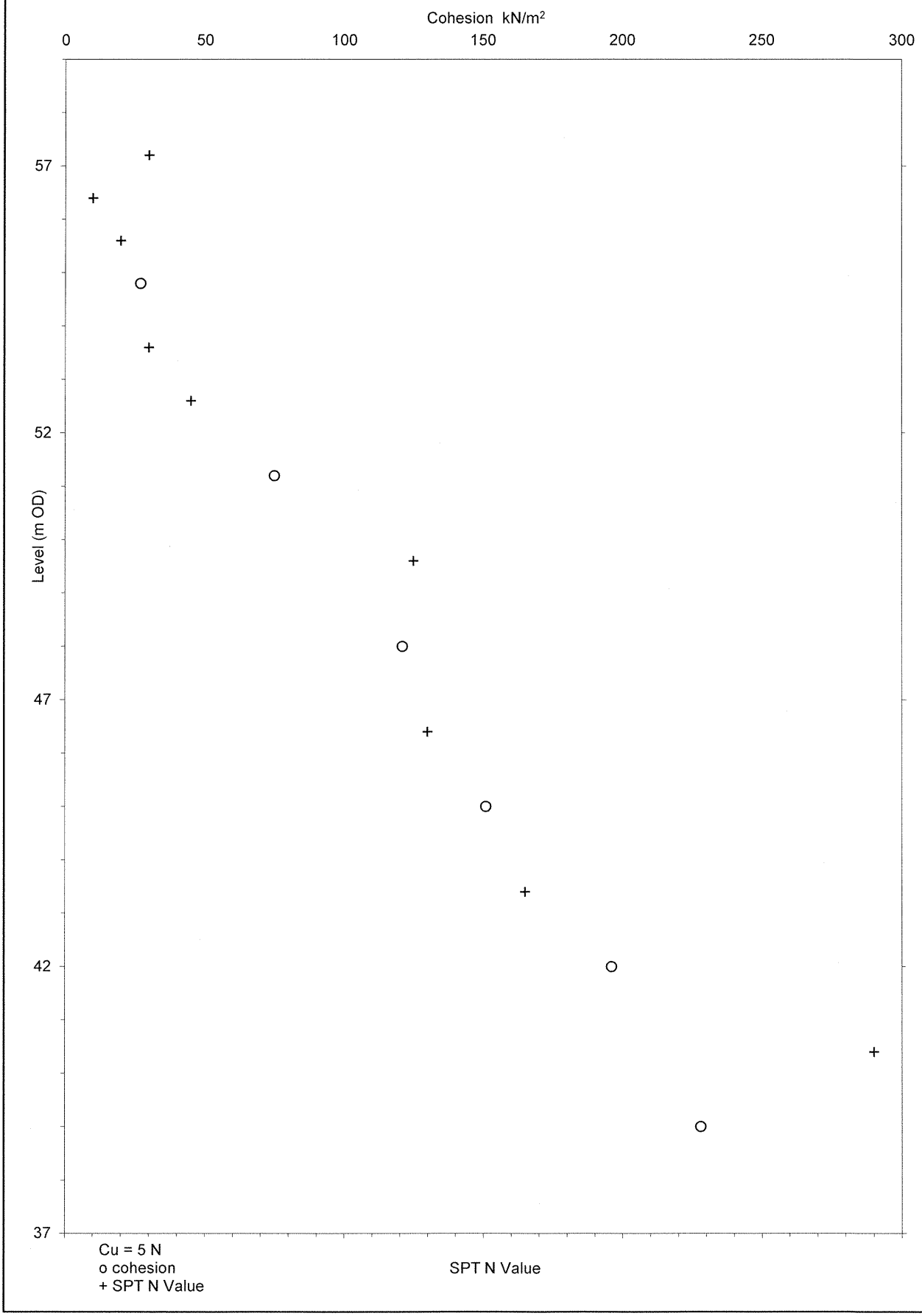
Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

SPT & Cohesion / Level Graph

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073

Sheet 1 / 1



GEA
Tyttenhanger House
Coursers Road
St Albans Herts
AL4 0PG

FAO Matthew Elcock

LABORATORY TEST REPORT

Results of analysis of 8 samples received 25 April 2012

J12073 - Ruskin College, Oxford

Chemtest
The right chemistry to deliver results

Report Date 03 May 2012

Login Batch No					204909							
Chemtest LIMS ID					AH25460	AH25461	AH25462	AH25463	AH25464	AH25465	AH25466	AH25467
Sample ID					TP1	TP3	TP11	TP25	TP13	TP15	TP19	TP21
Sample No												
Sampling Date					11/04/2012	11/04/2012	11/04/2012	11/04/2012	11/04/2012	11/04/2012	11/04/2012	11/04/2012
Depth					0.20m	0.30m	0.40m	0.50m	0.40m	0.30m	0.50m	0.10m
Matrix					*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*								
2300	Cyanide (total)	57125	mg kg-1	M	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2325	Sulfide (Easily Liberatable)	18496258	mg kg-1	M	3.9	22	5.4	7.6	2.2	3.3	2.9	3.6
2625	Total Organic Carbon		%	M	2.9	3.2	2.4	4.0	1.3	2.2	2.2	3.9
2220	Chloride (extractable)	16887006	g l-1	M	<0.010	0.027	<0.010	<0.010	<0.010	<0.010	0.092	0.022
2430	Sulfate (total) as SO4		mg kg-1	M	1500	2100	1200	1300	500	1600	1600	1300
2450	Arsenic	7440382	mg kg-1	M	34	31	8.1	21	21	15	26	34
	Cadmium	7440439	mg kg-1	M	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.17
	Chromium	7440473	mg kg-1	M	22	22	8.8	17	20	15	29	31
	Copper	7440508	mg kg-1	M	11	9.5	<5.0	10	12	8.3	26	50
	Mercury	7439976	mg kg-1	M	0.12	<0.10	<0.10	<0.10	0.15	0.27	0.34	1.1
	Nickel	7440020	mg kg-1	M	20	19	7.8	15	17	12	24	31
	Lead	7439921	mg kg-1	M	50	40	56	160	230	78	130	360
	Selenium	7782492	mg kg-1	M	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg-1	M	45	46	27	100	46	31	97	230
2670	TPH >C5-C6		mg kg-1	U	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH >C6-C7		mg kg-1	U	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH >C7-C8		mg kg-1	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH >C8-C10		mg kg-1	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH >C10-C12		mg kg-1	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH >C12-C16		mg kg-1	M	< 0.1	< 0.1	2.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH >C16-C21		mg kg-1	M	< 0.1	< 0.1	15	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH >C21-C35		mg kg-1	M	< 0.1	< 0.1	19	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Total Petroleum Hydrocarbons		mg kg-1	U	< 10	< 10	36	< 10	< 10	< 10	< 10	< 10
2700	Naphthalene	91203	mg kg-1	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Acenaphthylene	208968	mg kg-1	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Acenaphthene	83329	mg kg-1	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Fluorene	86737	mg kg-1	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

All tests undertaken between 30/12/1899 and 02/05/2012

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Chemtest
LABORATORY TEST REPORT
CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

GEA
Tyttenhanger House
Coursers Road
St Albans Herts
AL4 0PG

FAO Matthew Elcock

Results of analysis of 8 samples received 25 April 2012

J12073 - Ruskin College, Oxford

Report Date 4 May 2012

Login Batch No	**204910**
Chemtest LIMS ID	AH25473 Soil: AH25469
Sample ID	TP19
Sample No	
Sampling Date	11/04/2012 14
Depth	0.20m

Landfill Waste Acceptance Criteria Limits

Solid Waste Analysis

Determinand ↓	SOP ↓	*	Units ↓			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon	2625	M	%		3.8	3	5	6
Loss on Ignition	2610	N	%		1.62			10
Total BTEX	2761	M	mg kg^{-1}		<0.005	6		
Total PCBs (7 congeners)	2811	N	mg kg^{-1}		<1	1		
TPH Total WAC	2670	M	mg kg^{-1}		< 10	500		
Total (of 17) PAHs	2700	N	mg kg^{-1}		<2	100		
pH	2010	M			10.9		>6	
Acid Neutralisation Capacity	2015	N	mol kg^{-1}		0.148		To evaluate	To evaluate

Eluate Analysis

Determinand ↓	SOP ↓	*	2:1 Eluate mg l^{-1}	8:1 Eluate mg l^{-1}	2:1 Eluate mg kg^{-1}	Cumulative 10:1 Eluate mg kg^{-1}	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
Arsenic	1450	N	0.001	<0.001	<0.05	<0.05	0.5	2	25
Cadmium	1450	N	<0.0005	<0.0005	<0.01	<0.01	0.04	1	5
Chromium	1450	N	0.008	<0.001	<0.05	<0.05	0.5	10	70
Copper	1450	N	0.031	0.004	0.06	0.08	2	50	100
Mercury	1450	N	<0.0005	<0.0005	<0.01	<0.01	0.01	0.2	2
Molybdenum	1450	N	0.031	0.006	0.06	0.1	0.5	10	30
Nickel	1450	N	0.006	<0.001	<0.05	<0.05	0.4	10	40
Lead	1450	N	<0.001	<0.001	<0.01	<0.01	0.5	10	50
Antimony	1450	N	0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	1450	N	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	1450	N	0.003	<0.001	<0.5	<0.5	4	50	200
Chloride	1220	N	5.3	1.2	10.6	18.2	800	15000	25000
Fluoride	1220	N	0.72	0.46	1.44	4.99	10	150	500
Sulfate	1220	N	180	37	360	588	1000	20000	50000
Total Dissolved Solids	1040	N	320	140	639	1670	4000	60000	100000
Phenol Index	1920	N	0	0	<0.5	<0.5	1		
Dissolved Organic Carbon	1610	N	35	15	69.9	180	500	800	1000

Solid Information

Dry mass of test portion/kg	0.175

Leach Test Information

Leachant volume 1st extract/l	0.335
Leachant volume 2nd extract/l	1.4
Eluate recovered from 1st extract/l	0.2664

All tests undertaken between 16-Apr-2012 and 4-May-2012
* Accreditation status
This report should be interpreted in conjunction with the notes on the accompanying cover page.

Chemtest
LABORATORY TEST REPORT
CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

GEA
Tyttenhanger House
Coursers Road
St Albans Herts
AL4 0PG

FAO Matthew Elcock

Results of analysis of 8 samples received 25 April 2012

J12073 - Ruskin College, Oxford

Report Date 4 May 2012

Login Batch No	**204910**
Chemtest LIMS ID	AH25474 Soil: AH25470
Sample ID	TP24
Sample No	
Sampling Date	11/04/2012 14
Depth	0.20m

Landfill Waste Acceptance Criteria Limits

Solid Waste Analysis

Determinand ↓	SOP ↓	*	Units ↓			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon	2625	M	%		2.6	3	5	6
Loss on Ignition	2610	N	%		2.13			10
Total BTEX	2761	M	mg kg^{-1}		<0.005	6		
Total PCBs (7 congeners)	2811	N	mg kg^{-1}		<1	1		
TPH Total WAC	2670	M	mg kg^{-1}		< 10	500		
Total (of 17) PAHs	2700	N	mg kg^{-1}		<2	100		
pH	2010	M			10.8		>6	
Acid Neutralisation Capacity	2015	N	mol kg^{-1}		0.158		To evaluate	To evaluate

Eluate Analysis

Determinand ↓	SOP ↓	*	2:1 Eluate mg l^{-1}	8:1 Eluate mg l^{-1}	2:1 Eluate mg kg^{-1}	Cumulative 10:1 Eluate mg kg^{-1}	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
Arsenic	1450	N	0.002	<0.001	<0.05	<0.05	0.5	2	25
Cadmium	1450	N	<0.0005	<0.0005	<0.01	<0.01	0.04	1	5
Chromium	1450	N	0.013	<0.001	<0.05	<0.05	0.5	10	70
Copper	1450	N	0.004	0.001	<0.05	<0.05	2	50	100
Mercury	1450	N	<0.0005	<0.0005	<0.01	<0.01	0.01	0.2	2
Molybdenum	1450	N	0.012	0.003	<0.05	<0.05	0.5	10	30
Nickel	1450	N	<0.001	<0.001	<0.05	<0.05	0.4	10	40
Lead	1450	N	<0.001	<0.001	<0.01	<0.01	0.5	10	50
Antimony	1450	N	0.006	0.004	0.01	0.04	0.06	0.7	5
Selenium	1450	N	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	1450	N	<0.001	<0.001	<0.5	<0.5	4	50	200
Chloride	1220	N	7.8	1.9	15.6	28.1	800	15000	25000
Fluoride	1220	N	0.48	0.32	<1	3.45	10	150	500
Sulfate	1220	N	71	22	142	296	1000	20000	50000
Total Dissolved Solids	1040	N	170	89	340	1020	4000	60000	100000
Phenol Index	1920	N	0	0	<0.5	<0.5	1		
Dissolved Organic Carbon	1610	N	7.5	3.3	<50	<50	500	800	1000

Solid Information

Dry mass of test portion/kg	0.175

Leach Test Information

Leachant volume 1st extract/l	0.335
Leachant volume 2nd extract/l	1.4
Eluate recovered from 1st extract/l	0.2704

All tests undertaken between 16-Apr-2012 and 4-May-2012
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Results of analysis of 8 samples received 25 April 2012

J12073 - Ruskin College, Oxford

Report Date 4 May 2012

Login Batch No	**204910**
Chemtest LIMS ID	AH25475 Soil: AH25471
Sample ID	TP21
Sample No	
Sampling Date	11/04/2012 14
Depth	0.30m

Landfill Waste Acceptance Criteria Limits

Solid Waste Analysis

Determinand ↓	SOP ↓	*	Units ↓			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon	2625	M	%		4	3	5	6
Loss on Ignition	2610	N	%		5.91			10
Total BTEX	2761	M	mg kg^{-1}		<0.005	6		
Total PCBs (7 congeners)	2811	N	mg kg^{-1}		<1	1		
TPH Total WAC	2670	M	mg kg^{-1}		< 10	500		
Total (of 17) PAHs	2700	N	mg kg^{-1}		3.8	100		
pH	2010	M			8.3		>6	
Acid Neutralisation Capacity	2015	N	mol kg^{-1}		0.026		To evaluate	To evaluate

Eluate Analysis

Determinand ↓	SOP ↓	*	2:1 Eluate mg l^{-1}	8:1 Eluate mg l^{-1}	2:1 Eluate mg kg^{-1}	Cumulative 10:1 Eluate mg kg^{-1}	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
Arsenic	1450	N	0.009	0.007	<0.05	0.07	0.5	2	25
Cadmium	1450	N	<0.0005	<0.0005	<0.01	<0.01	0.04	1	5
Chromium	1450	N	<0.001	<0.001	<0.05	<0.05	0.5	10	70
Copper	1450	N	0.006	0.005	<0.05	0.05	2	50	100
Mercury	1450	N	<0.0005	<0.0005	<0.01	<0.01	0.01	0.2	2
Molybdenum	1450	N	0.012	0.004	<0.05	0.05	0.5	10	30
Nickel	1450	N	<0.001	<0.001	<0.05	<0.05	0.4	10	40
Lead	1450	N	<0.001	0.014	<0.01	0.13	0.5	10	50
Antimony	1450	N	0.004	0.003	0.01	0.03	0.06	0.7	5
Selenium	1450	N	0.002	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	1450	N	0.007	0.011	<0.5	<0.5	4	50	200
Chloride	1220	N	31	4.1	61.9	63.8	800	15000	25000
Fluoride	1220	N	0.26	0.19	<1	1.96	10	150	500
Sulfate	1220	N	88	19	176	248	1000	20000	50000
Total Dissolved Solids	1040	N	360	160	719	1770	4000	60000	100000
Phenol Index	1920	N	0	0	<0.5	<0.5	1		
Dissolved Organic Carbon	1610	N	15	7.2	<50	78.6	500	800	1000

Solid Information

Dry mass of test portion/kg	0.175

Leach Test Information

Leachant volume 1st extract/l	0.32
Leachant volume 2nd extract/l	1.4
Eluate recovered from 1st extract/l	0.1481

All tests undertaken between 16-Apr-2012 and 4-May-2012
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FAO Matthew Elcock

Results of analysis of 8 samples received 25 April 2012

J12073 - Ruskin College, Oxford

Report Date 4 May 2012

Login Batch No	**204910**
Chemtest LIMS ID	AH25476 Soil: AH25472
Sample ID	TP16
Sample No	
Sampling Date	11/04/2012 14
Depth	0.30m

Landfill Waste Acceptance Criteria Limits

Solid Waste Analysis

Determinand ↓	SOP ↓	*	Units ↓			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon	2625	M	%		2	3	5	6
Loss on Ignition	2610	N	%		4.32			10
Total BTEX	2761	M	mg kg⁻¹		0.02	6		
Total PCBs (7 congeners)	2811	N	mg kg⁻¹		<1	1		
TPH Total WAC	2670	M	mg kg⁻¹		< 10	500		
Total (of 17) PAHs	2700	N	mg kg⁻¹		<2	100		
pH	2010	M			8.4		>6	
Acid Neutralisation Capacity	2015	N	mol kg⁻¹		0.03		To evaluate	To evaluate

Eluate Analysis

Determinand ↓	SOP ↓	*	2:1 Eluate mg l⁻¹	8:1 Eluate mg l⁻¹	2:1 Eluate mg kg⁻¹	Cumulative 10:1 Eluate mg kg⁻¹	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
Arsenic	1450	N	0.005	0.006	<0.05	0.06	0.5	2	25
Cadmium	1450	N	<0.0005	<0.0005	<0.01	<0.01	0.04	1	5
Chromium	1450	N	<0.001	<0.001	<0.05	<0.05	0.5	10	70
Copper	1450	N	0.002	0.002	<0.05	<0.05	2	50	100
Mercury	1450	N	<0.0005	<0.0005	<0.01	<0.01	0.01	0.2	2
Molybdenum	1450	N	0.033	0.015	0.07	0.16	0.5	10	30
Nickel	1450	N	<0.001	<0.001	<0.05	<0.05	0.4	10	40
Lead	1450	N	<0.001	0.002	<0.01	0.02	0.5	10	50
Antimony	1450	N	0.002	0.002	<0.01	0.02	0.06	0.7	5
Selenium	1450	N	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	1450	N	<0.001	<0.001	<0.5	<0.5	4	50	200
Chloride	1220	N	16	2.4	32	32.4	800	15000	25000
Fluoride	1220	N	0.45	0.28	<1	2.9	10	150	500
Sulfate	1220	N	64	17	128	199	1000	20000	50000
Total Dissolved Solids	1040	N	240	110	480	1180	4000	60000	100000
Phenol Index	1920	N	0	0	<0.5	<0.5	1		
Dissolved Organic Carbon	1610	N	10	6.1	<50	63.4	500	800	1000

Solid Information

Dry mass of test portion/kg	0.175

Leach Test Information

Leachant volume 1st extract/l	0.315
Leachant volume 2nd extract/l	1.4
Eluate recovered from 1st extract/l	0.108

All tests undertaken between 16-Apr-2012 and 4-May-2012
* Accreditation status
This report should be interpreted in conjunction with the notes on the accompanying cover page.

GEA Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
St Albans
AL4 0PG

Generic Risk-Based Soil Guideline Values

Site	Ruskin College, Oxford, OX1 2HE	**Job Number**	J12073
Client	Exeter College	**Sheet**	1 / 1
Engineer	Stockley		

Proposed End Use Residential with plant uptake

Soil pH 8

Soil Organic Matter content % 6.0

Contaminant	Guideline Value mg/kg	Data Source
Metals		
Arsenic	32	SGV
Cadmium	10	SGV
Chromium (III)	3000	LQM/CIEH
Chromium (VI)	4.3	LQM/CIEH
Copper	2,330	LQM/CIEH
Lead	450	withdrawn SGV
Elemental Mercury	1	SGV
Inorganic Mercury	170	SGV
Nickel	130	LQM/CIEH
Selenium	350	SGV
Zinc	3,750	LQM/CIEH
Hydrocarbons		
Benzene	0.33	SGV
Toluene	610	SGV
Ethyl Benzene	350	SGV
Xylene	230	SGV
Aliphatic C5-C6	110	LQM/CIEH
Aliphatic C6-C8	370	LQM/CIEH
Aliphatic C8-C10	110	LQM/CIEH
Aliphatic C10-C12	540	LQM/CIEH
Aliphatic C12-C16	3000	LQM/CIEH
Aliphatic C16-C35	76,000	LQM/CIEH
Aromatic C6-C7	See Benzene	LQM/CIEH
Aromatic C7-C8	See Toluene	LQM/CIEH
Aromatic C8-C10	151	LQM/CIEH
Aromatic C10-C12	346	LQM/CIEH
Aromatic C12-C16	593	LQM/CIEH
Aromatic C16-C21	770	LQM/CIEH
Aromatic C21-C35	1230	LQM/CIEH
PRO (C_5 –C_{10})	1351	Calc
DRO (C_{12} –C_{28})	80,363	Calc
Lube Oil (C_{28} –C_{44})	77,230	Calc
TPH	**500**	Trigger for speciated testing

Contaminant	Guideline Value mg/kg	Data Source
Anions		
Soluble Sulphate	0.5 g/l	Structures
Sulphide	50	Structures
Chloride	400	Structures
Others		
Organic Carbon (%)	6	Methanogenic potential
Total Cyanide	140	WRAS
Total Mono Phenols	420	SGV
PAH		
Naphthalene	8.70	LQM/CIEH
Acenaphthylene	850	LQM/CIEH
Acenaphthene	1,000	LQM/CIEH
Fluorene	780	LQM/CIEH
Phenanthrene	380	LQM/CIEH
Anthracene	9,200	LQM/CIEH
Fluoranthene	670	LQM/CIEH
Pyrene	1,600	LQM/CIEH
Benzo(a) Anthracene	5.9	LQM/CIEH
Chrysene	9	LQM/CIEH
Benzo(b) Fluoranthene	7.0	LQM/CIEH
Benzo(k) Fluoranthene	10.0	LQM/CIEH
Benzo(a) pyrene	1.00	LQM/CIEH
Indeno(1 2 3 cd) Pyrene	4.2	LQM/CIEH
Dibenzo(a h) Anthracene	0.90	LQM/CIEH
Benzo (g h i) Perylene	47	LQM/CIEH
Total PAH	**6.7**	B(a)P / 0.15
Chlorinated Solvents		
1,1,1 trichloroethane (TCA)	28	LQM/CIEH
tetrachloroethane (PCA)	4.8	LQM/CIEH
tetrachloroethene (PCE)	4.8	LQM/CIEH
trichloroethene (TCE)	0.49	LQM/CIEH
1,2-dichloroethane (DCA)	0.014	LQM/CIEH
vinyl chloride (Chloroethene)	0.00099	LQM/CIEH
tetrachloromethane (Carbon tetra	0.089	LQM/CIEH
trichloromethane (Chloroform)	2.7	LQM/CIEH

Notes

Concentrations measured below the above values may be considered to represent 'uncontaminated conditions' which do not pose a risk to human health. Concentrations measured in excess of these valuesindicate a potential risk, and thus require further, site specific risk assessment.

SGV - Soil Guideline Value, derived from the CLEA model and published by Environment Agency 2009

withdrawn SGV - Former SGV, derived from the CLEA 2000 model and published by DEFRA pending confirmation of new approach to modeling lead

LQM/CIEH - Generic Assessment Criteria for Human Health Risk Assessment 2nd edition (2009)derived using CLEA 1.04 model 2009

Calc - sum of nearest available carbon range specified including BTEX for PRO fraction

B(a)P / 0.15 - GEA experince indicates that Benzo(a) pyrene (one of the most common and most carcenogenic of the PAHs) rarely exceeds 15% of the total PAH concentration, hence this Total PAH threshold is regarded as being conservative

Richardson's Botanical Identifications

Root identification
Vegetation surveys
Tree/Building investigations
Plant taxonomy

Dr Ian B K Richardson
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James Richardson
BSc (Hons. Biology)

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Geotechnical & Environmental Associates
Tyttenhanger House
Coursers Road
St Albans
AL4 0PG

Your ref: **J12073**

Our ref: 72/2609

09/05/2012

Dear Sirs

Ruskin College, Oxford

The samples you sent in relation to the above have been examined. The structure was referable as follows:

TP19

1 root: SAMBUCUS (Elder). A further root, not examined in detail appeared similar under low magnification.

TP21

1 root: an unidentified SHRUB - definitely NOT referable to either the above or below types. Please send us twigs from nearby bushes if this is critical, and we should be able to give you a match. A further root, not examined in detail appeared similar under low magnification.

TP23

1 root: HEDERA (Ivy); also the related FATSIA (a robust shrub with fig-like leaves). 2 further roots, not examined in detail appeared similar under low magnification.

I trust this is of help. Please call us if you have any queries; our Invoice is enclosed.

Yours faithfully

Dr Ian B K Richardson

Identified with no information on vegetation, on or off site.

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
38271069_1_1

Customer Reference:
J120

National Grid Reference:
450900, 206640

Slice:
A

Site Area (Ha):
0.19

Search Buffer (m):
1000

Site Details:

Ruskin College
Walton Street
OXFORD
OX1 2HE

Client Details:

Mr S Branch
GEA Ltd
Tyttenhanger House
Coursers Road
St Albans
Herts
AL4 0PG

Contents

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Natural England Copyright Notice

Ove Arup Copyright Notice

Peter Brett Associates Copyright Notice

Radon Potential dataset Copyright Notice

Report Version v47.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1			1	12
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 4			1	5
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 5		Yes		
Pollution Incidents to Controlled Waters	pg 5		5	13	48
Prosecutions Relating to Authorised Processes	pg 16				1
Prosecutions Relating to Controlled Waters					
Registered Radioactive Substances	pg 16			15	8
River Quality	pg 20			1	1
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register	pg 20				1
Water Abstractions	pg 20		1		13 (*5)
Water Industry Act Referrals	pg 25				1
Groundwater Vulnerability	pg 25	Yes	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 25	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 25	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences	pg 25	Yes	Yes	n/a	n/a
Flooding from Rivers or Sea without Defences	pg 26		Yes	n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Waste					
BGS Recorded Landfill Sites	pg 27				1
Historical Landfill Sites	pg 27			1	4
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Recorded Landfill Sites					
Registered Landfill Sites	pg 28				1
Registered Waste Transfer Sites	pg 28			1	
Registered Waste Treatment or Disposal Sites					

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS Recorded Mineral Sites					
BGS 1:625,000 Solid Geology	pg 29	Yes	n/a	n/a	n/a
Brine Compensation Area			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 29	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 29		Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 29	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 29	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 29		Yes	n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 30		11	n/a	n/a
Fuel Station Entries	pg 31				1

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Areas of Adopted Green Belt	pg 32			1	1
Areas of Unadopted Green Belt	pg 32			1	1
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas	pg 32				2
Forest Parks					
Local Nature Reserves					
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Nitrate Vulnerable Zones	pg 32	1			
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Sites of Special Scientific Interest	pg 32				1
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Special Protection Areas					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Discharge Consents** Operator: British Railways, Western Region, Paddington Sta, Property Type: Extraction Of Mineral Oil Location: Oil Interceptor, Loco Servicingdepot, British Railways, Oxon Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctcr.0879 Permit Version: 1 Effective Date: 13th December 1966 Issued Date: 13th December 1966 Revocation Date: 22nd December 1992 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: Castle Mill St:Bckwater-Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A14NW (E)	461	1	451400 206700
2	**Discharge Consents** Operator: Morrells Brewery Ltd. Property Type: Brewing & Malting Location: The Lion Brewery, St Thomas Street, Oxford, Oxon Authority: Environment Agency, Thames Region Catchment Area: Not Given Reference: Cntm.1005 Permit Version: 1 Effective Date: 2nd August 1993 Issued Date: 2nd August 1993 Revocation Date: 18th February 1999 Discharge Type: Trade Discharges - Cooling Water Discharge Environment: Freshwater Stream/River Receiving Water: Castle Millstream **Status: Consent revoked: Discharge ceased (Section 37(1))** Positional Accuracy: Located by supplier to within 100m	A8NW (S)	524	1	450900 206100
2	**Discharge Consents** Operator: Morrell'S Brewery Ltd Property Type: Brewing & Malting Location: The Lion Brewery, St Thomas Street, Oxford, Oxon Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctcr.1513 Permit Version: 1 Effective Date: 9th February 1977 Issued Date: 9th February 1977 Revocation Date: 1st August 1993 Discharge Type: Trade Discharges - Cooling Water Discharge Environment: Freshwater Stream/River Receiving Water: Castle Millstream **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A8NW (S)	524	1	450900 206100
3	**Discharge Consents** Operator: Mr T Khuja Property Type: Construction & Repair Of Buildings Location: Housing Development Land South Of Venneit Close Roger Dudman Way Oxford Ox1 1hy Authority: Environment Agency, Thames Region Catchment Area: Upper Thames-Elode/Ray(N) Reference: Cawm.1348 Permit Version: 1 Effective Date: 21st August 2006 Issued Date: 21st August 2006 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Fiddlers Island Stream **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A12NE (W)	589	1	450280 206720

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: Oxford City Council Property Type: Coal Stacking Grounds Location: Former Coalyard Of Power Station, Russell Street, Oxford Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctwc.0452 Permit Version: 1 Effective Date: 21st October 1985 Issued Date: 21st October 1985 Revocation Date: 24th September 1992 Discharge Type: Discharge Of Other Matter-Surface Water Discharge Environment: Freshwater Stream/River Receiving Water: River Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	697	1	450330 206180
5	**Discharge Consents** Operator: Oxford City Council Property Type: Coal Stacking Grounds Location: Former Coalyard Of Power Station, Russell Street, Oxford Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctwc.0451 Permit Version: 1 Effective Date: 21st October 1985 Issued Date: 21st October 1985 Revocation Date: 24th September 1992 Discharge Type: Discharge Of Other Matter-Surface Water Discharge Environment: Freshwater Stream/River Receiving Water: River Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	730	1	450330 206130
5	**Discharge Consents** Operator: Chancellor, Master & Scholars Of Oxford University Property Type: Laboratories Other Than Photographic Location: Osney Laboratory, Russell Street, Oxford, Oxon Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctcr.1333 Permit Version: 1 Effective Date: 12th March 1973 Issued Date: 12th March 1973 Revocation Date: 13th May 1986 Discharge Type: Trade Discharges - Cooling Water Discharge Environment: Freshwater Stream/River Receiving Water: Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	772	1	450300 206100
5	**Discharge Consents** Operator: The Chancellor Property Type: Laboratories Other Than Photographic Location: Osney Laboratory, Russell Street, Oxford, Oxon Authority: Environment Agency, Thames Region Catchment Area: Not Given Reference: CTWC.0860 Permit Version: 1 Effective Date: 9th May 1986 Issued Date: 9th May 1986 Revocation Date: 15th June 2011 Discharge Type: Trade Discharges - Cooling Water Discharge Environment: Freshwater Stream/River Receiving Water: River Thames **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	779	1	450310 206080

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	**Discharge Consents** Operator: Fine Print (Services) Ltd. Property Type: Industrial Parks & Estates Location: Electric Avenue, Osney Mead Industrial Estate, Oxford Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctwc.3402 Permit Version: 2 Effective Date: 17th March 2006 Issued Date: 16th June 1989 Revocation Date: 31st March 2018 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Into Land Receiving Water: Alluvium **Status: Transferred from COPA 1974** Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	989	1	450100 206000
9	**Local Authority Pollution Prevention and Controls** Name: Elite Dry Cleaners Location: 27 New Inn Hall Street, Oxford, Ox1 2dh Authority: Oxford City Council, Environmental Health Department Permit Reference: 06/00008/OP_B Dated: 14th February 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A13SE (SE)	359	2	451113 206322
10	**Local Authority Pollution Prevention and Controls** Name: Johnson Dry Cleaners Location: 61 Woodstock Road, Oxford, Ox2 6hj Authority: Oxford City Council, Environmental Health Department Permit Reference: 06/00005/OP_B Dated: 14th February 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18SE (N)	651	2	450936 207310
11	**Local Authority Pollution Prevention and Controls** Name: Oxpens Service Station Location: Oxpens Road, Oxford, Oxfordshire, OX1 1RX Authority: Oxford City Council, Environmental Health Department Permit Reference: EPA/28/99 Dated: 12th February 1999 Process Type: Local Authority Air Pollution Control Description: PG1/14 Petrol filling station **Status: Authorised** Positional Accuracy: Automatically positioned to the address	A8SW (S)	684	2	450699 205961
12	**Local Authority Pollution Prevention and Controls** Name: W Lucy & Co Ltd Location: Walton Well Road, OXFORD, Oxfordshire, OX2 6EE Authority: Oxford City Council, Environmental Health Department Permit Reference: Epa/16/93 Dated: 30th September 1993 Process Type: Local Authority Air Pollution Control Description: PG6/31 Powder coating processes (including sheradizing) **Status: Authorised** Positional Accuracy: Manually positioned to the address or location	A17SE (NW)	693	2	450521 207253
12	**Local Authority Pollution Prevention and Controls** Name: W Lucy Castings Foundry Location: Walton Well Road, OXFORD, Oxfordshire, OX2 6EE Authority: Oxford City Council, Environmental Health Department Permit Reference: EPA/13A/95 Dated: 31st March 1993 Process Type: Local Authority Air Pollution Control Description: PG2/4 Iron, steel and non-ferrous metal foundry processes **Status: Authorisation revokedRevoked** Positional Accuracy: Manually positioned to the address or location	A17SE (NW)	693	2	450521 207253
12	**Local Authority Pollution Prevention and Controls** Name: W Lucy Castings Foundry Location: Walton Well Road, OXFORD, Oxfordshire, OX2 6EE Authority: Oxford City Council, Environmental Health Department Permit Reference: EPA/13A/95 Dated: 31st March 1993 Process Type: Local Authority Air Pollution Control Description: Part B - General Coating Process (No Specific Reference) **Status: Authorisation revokedRevoked** Positional Accuracy: Manually positioned to the address or location	A17SE (NW)	693	2	450521 207253

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Nearest Surface Water Feature	A13SW (SW)	53	-	450818 206606
13	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Oxford City Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 13th March 1989 Incident Reference: W1890148 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NW (NW)	81	1	450800 206700
14	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Confirmed As A Pollution Incident Incident Date: 28th September 1990 Incident Reference: W1900515 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	168	1	450800 206470
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 21st January 1997 Incident Reference: THWE1997031319 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	209	1	450700 206500
16	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: W1910218 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	238	1	450800 206395
16	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Natural Note: Not Supplied Incident Date: 6th February 1997 Incident Reference: THWE1997031363 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (S)	282	1	450800 206350

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
17	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 1st June 1990 Incident Reference: W1900302 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SE (S)	245	1	451000 206400
18	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 25th April 1990 Incident Reference: W1900221 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	295	1	450600 206500
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Natural Note: Confirmed As A Pollution Incident Incident Date: 27th January 1995 Incident Reference: W1950036 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NW (S)	330	1	450800 206300
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: W1950131 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NW (S)	335	1	450800 206295
20	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Heating Oil Note: Chemicals - Unknown Incident Date: Not Supplied Incident Reference: W1960138 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NE (S)	343	1	451000 206300
21	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Natural Note: Confirmed As A Pollution Incident Incident Date: 5th February 1994 Incident Reference: W1940095 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NW (SW)	364	1	450700 206300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th October 1989 Incident Reference: W1890532 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NE (W)	368	1	450500 206700
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 11th April 1997 Incident Reference: THWE1997031543 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NE (W)	418	1	450450 206700
23	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Agricultural: General Note: Confirmed As A Pollution Incident Incident Date: 6th May 1994 Incident Reference: W1940218 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12SE (W)	389	1	450500 206500
23	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Hythe Bridge, OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 21st January 1995 Incident Reference: W1950025 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12SE (W)	390	1	450500 206495
24	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 8th August 1995 Incident Reference: W1950427 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NE (NW)	442	1	450500 206900
25	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed incident Incident Date: 5th June 1999 Incident Reference: THWE1999043274 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 10m	A12SE (W)	484	1	450400 206500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 6th November 1997 Incident Reference: THWE1997030792 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12NE (W)	488	1	450400 206800
27	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 9th August 1995 Incident Reference: W1950428 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SE (NW)	505	1	450500 207000
28	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Not Supplied Incident Date: 13th January 1996 Incident Reference: W1960019 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Unknown	A12SE (SW)	519	1	450400 206400
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Natural Note: Confirmed As A Pollution Incident Incident Date: 26th May 1994 Incident Reference: W1940348 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NE (S)	524	1	450905 206100
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Paradise Street, OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 15th March 1994 Incident Reference: W1940103 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NE (S)	529	1	450905 206095
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Confirmed As A Pollution Incident Incident Date: 15th February 1991 Incident Reference: W1910058 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NW (S)	529	1	450900 206095

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
55	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: OXFORD Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 7th December 1998 Incident Reference: THWE1998041291 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	992	1	450100 205995
56	**Prosecutions Relating to Authorised Processes** Location: 48-51 Broad Street, Oxford, Ox1 3bq Prosecution Text: Failure to comply with packaging waste regulations Prosecution Act: Pro97 Hearing Date: 5th July 2004 Verdict: Guilty Fine: 5000 Costs: 1203 Positional Accuracy: Manually positioned to the address or location	A14SW (E)	559	1	451481 206485
57	**Registered Radioactive Substances** Name: University Of Oxford Location: Radcliffe Infirmary, University Clinical Departments, Woodstock Road, OXFORD, Oxfordshire, OX2 6HE Authority: Environment Agency, Thames Region Permit Reference: AK9917 Dated: 17th February 1994 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variationSuperseded** Positional Accuracy: Unknown	A18SE (N)	488	1	451021 207141
57	**Registered Radioactive Substances** Name: Radcliffe Infirmary NHS Trust Location: Woodstock Road, OXFORD, Oxfordshire, OX2 6HE Authority: Environment Agency, Thames Region Permit Reference: AI5693 Dated: 17th February 1994 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Authorisation under RSA **Status: Authorisation either revoked or cancelledCancelled** Positional Accuracy: Automatically positioned to the address	A18SE (N)	491	1	451011 207146
57	**Registered Radioactive Substances** Name: Oxford Radcliffe Hospital Nhs Trust Location: Woodstock Road, OXFORD, OX2 6HE Authority: Environment Agency, Thames Region Permit Reference: Bz6414 Dated: 17th November 2005 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Authorisation under RSA **Status: Authorisation either revoked or cancelledCancelled** Positional Accuracy: Automatically positioned to the address	A18SE (N)	492	1	451016 207146
57	**Registered Radioactive Substances** Name: Oxford Radcliffe Hospital Nhs Trust Location: Woodstock Road, OXFORD, OX2 6HE Authority: Environment Agency, Thames Region Permit Reference: Bz6406 Dated: 17th November 2005 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Registration under the Act of an open source which is also the subject of an authorisation **Status: Authorisation either revoked or cancelledCancelled** Positional Accuracy: Automatically positioned to the address	A18SE (N)	492	1	451016 207146

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
64	**Registered Radioactive Substances** Name: University Of Oxford Location: The Stable Cottage, Christ Church College, OXFORD, Oxfordshire, OX1 1DP Authority: Environment Agency, Thames Region Permit Reference: AZ6339 Dated: 15th October 1997 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Authorisation under RSA **Status: Authorisation either revoked or cancelledCancelled** Positional Accuracy: Unknown	A9NW (SE)	805	1	451411 205983
	River Quality Name: Oxford Canal (Lower) GQA Grade: River Quality D Reach: Kidlington Stw - Castle Mill Strm Estimated Distance (km): 6.8 Flow Rate: Flow greater than 80 cumecs Flow Type: Canal Year: 2000	A13SW (SW)	272	1	450678 206429
	River Quality Name: Thames GQA Grade: River Quality B Reach: Evenlode - Castle Mill Strm Estimated Distance (km): 9.3 Flow Rate: Flow less than 20 cumecs Flow Type: River Year: 2000	A12NE (W)	597	1	450268 206642
65	**Substantiated Pollution Incident Register** Authority: Environment Agency - Thames Region, West Area Incident Date: 10th July 2003 Incident Reference: 172526 Water Impact: Category 2 - Significant Incident Air Impact: Category 4 - No Impact Land Impact: Category 4 - No Impact Positional Accuracy: Located by supplier to within 10m Pollutant: Inert : Construction / Demolition Material	A8NW (S)	577	1	450887 206046
66	**Water Abstractions** Operator: Worcester College Licence Number: 28/39/14/0198 Permit Version: 100 Location: Worcester College, Oxford, - Point 'A' Oxford Canal Authority: Environment Agency, Thames Region Abstraction: Schools and Colleges: Make-Up or Top Up Water Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 682 Yearly Rate (m3): 6819 Details: Worcester College, Oxford Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 10th April 1967 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	233	1	450800 206400
67	**Water Abstractions** Operator: Morrells Brewery Ltd Licence Number: 28/39/13/0018 Permit Version: Not Supplied Location: The Lion Brewery, OXFORD, Oxfordshire Authority: Environment Agency, Thames Region Abstraction: Brewery Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 300 Yearly Rate (m3): 30000 Details: River Gravel Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A8NW (S)	528	1	450800 206100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
68	**Water Abstractions** Operator: Morrells Brewery Ltd Licence Number: 28/39/13/0017 Permit Version: Not Supplied Location: The Lion Brewery, OXFORD, Oxfordshire Authority: Environment Agency, Thames Region Abstraction: Cooling Abstraction Type: Not Supplied Source: River/Stream Intake Daily Rate (m3): 240 Yearly Rate (m3): 60000 Details: Not Supplied Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A8NW (S)	627	1	450800 206000
69	**Water Abstractions** Operator: W Lucy & Co Ltd Licence Number: 28/39/13/0013 Permit Version: 100 Location: Eagle Works, Walton Well Road, -Point 'A' Authority: Environment Agency, Thames Region Abstraction: Commercial/Industrial/Public Services: Drinking; Cooking; Sanitary; Washing; (Small Garden) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 20 Yearly Rate (m3): 6000 Details: Eagle Works, Walton Well Road, Oxford Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 7th July 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A17SE (NW)	695	1	450530 207260
69	**Water Abstractions** Operator: W Lucy & Co Ltd Licence Number: 28/39/13/0013 Permit Version: 100 Location: Eagle Works, Walton Well Road, -Point 'A' Authority: Environment Agency, Thames Region Abstraction: Other Industrial/Commercial/Public Services: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 75 Yearly Rate (m3): 17000 Details: Eagle Works, Walton Well Road Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 7th July 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A17SE (NW)	695	1	450530 207260
69	**Water Abstractions** Operator: W Lucy & Co Ltd Licence Number: 28/39/13/0013 Permit Version: 100 Location: Eagle Works, Walton Well Road, -Point 'A' Authority: Environment Agency, Thames Region Abstraction: Other Industrial/Commercial/Public Services: Non-Evaporative Cooling Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Eagle Works, Walton Well Road Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 7th July 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A17SE (NW)	695	1	450530 207260

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Wolfson College Licence Number: 28/39/14/0308 Permit Version: 100 Location: Wolfson College, Linton Road, Oxford - River Cherwell Authority: Environment Agency, Thames Region Abstraction: Amenity: General Use (Low Loss) Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 11 Yearly Rate (m3): 2546 Details: Not Supplied Authorised Start: 01 March Authorised End: 31 October Permit Start Date: 30th October 1990 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A24NE (NE)	1676	1	451600 208200
76	**Water Industry Act Referrals** Name: W Lucy And Co Ltd Location: Edge Works,Walton Well Road,, Oxford, Oxford, Oxfordshire, OX2 6EE Authority: Environment Agency, Thames Region Permit Reference: BB6564 Dated: 1st July 1998 Process Type: Permissions or amendments to discharge under the Water Industry Act 1991 Description: Processes which result in the discharge of Special Category effluents under The Trade Effluents (Prescribed Processes and Substances) Regulations **Status: Application received by the EA but is not yet authorisedNot Yet Authorised** Positional Accuracy: Manually positioned to the address or location	A17SE (NW)	693	1	450514 207249
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 38 Upper Thames & Bedfordshire Scale: 1:100,000	A13NW (W)	0	1	450903 206643
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Desination: Unproductive Strata	A13NW (W)	0	3	450903 206643
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13NW (W)	0	3	450903 206643
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	0	1	450889 206639
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A13SW (SW)	81	1	450796 206587
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (S)	243	1	450840 206382
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (S)	247	1	450824 206380
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	247	1	450734 206416
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	248	1	450713 206431
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	249	1	450692 206447

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	249	1	450696 206443
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	10	1	450879 206611
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
77	**BGS Recorded Landfill Sites** Site Name: Works Tip Location: Walton Well Road, OXFORD, Oxfordshire Authority: British Geological Survey, National Geoscience Information Service Ground Water: Threat to ground water Surface Water: Threat to surface water Geology: N/A Positional Accuracy: Positioned by the supplier Boundary Accuracy: Moderate	A17SE (NW)	580	3	450405 207005
78	**Historical Landfill Sites** Licence Holder: British Rail Location: Oxford, Oxfordshire Name: Rewley Road Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD13432 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Deposited Waste included Inert, Industrial and Household Waste, and Liquid Sludge EA Waste Ref: Not Supplied Regis Ref: Not Supplied WRC Ref: 3100/0128 BGS Ref: Not Supplied Other Ref: 13.6.5006, TP0509	A12SE (W)	344	1	450528 206578
79	**Historical Landfill Sites** Licence Holder: W Lucy and Company Limited Location: Oxford Name: Eagle Iron Works Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD13430 First Input Date: 1st January 1966 Last Input Date: 31st December 1989 Specified Waste Type: Deposited Waste included Inert and Industrial Waste, and Liquid Sludge EA Waste Ref: Not Supplied Regis Ref: Not Supplied WRC Ref: 3100/0112 BGS Ref: 440 Other Ref: OCC/23, TP0129, W10005	A17SE (NW)	581	1	450405 207006
80	**Historical Landfill Sites** Licence Holder: Oxford City Council Location: Walton Well Road Name: Walton Well Road Allotments Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD13431 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Deposited Waste included Industrial, Commercial and Household Waste EA Waste Ref: Not Supplied Regis Ref: Not Supplied WRC Ref: 3100/0147 BGS Ref: Not Supplied Other Ref: TP0212, 13.6.5007	A12NE (W)	661	1	450240 206865
81	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Oxford Name: Walton Well Road Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD35518 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Not Supplied EA Waste Ref: Not Supplied Regis Ref: Not Supplied WRC Ref: Not Supplied BGS Ref: Not Supplied Other Ref: Not Supplied	A17NE (NW)	814	1	450407 207324

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
82	**Historical Landfill Sites** Licence Holder: Eagle Iron Works Location: Oxford Name: Walton Well Road North Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD13429 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Deposited Waste included Industrial, Commercial and Household Waste EA Waste Ref: Not Supplied Regis Ref: Not Supplied WRC Ref: 3100/0201 BGS Ref: Not Supplied Other Ref: TP0211, 13.6.50071	A17NE (NW)	858	1	450350 207338
	Local Authority Landfill Coverage Name: Oxfordshire County Council - Has supplied landfill data		0	9	450903 206643
	Local Authority Landfill Coverage Name: Oxford City Council - Has no landfill data to supply		0	8	450903 206643
83	**Registered Landfill Sites** Licence Holder: W Lucy & Co Ltd Licence Reference: OCC/ 23 Site Location: Eagle Iron Works, Walton Well Road, OXFORD, Oxfordshire, OX2 6EE Licence Easting: 450400 Licence Northing: 207200 Operator Location: As Site Address Authority: Environment Agency - Thames Region, West Area Site Category: Landfill Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: Waste produced/controlled by licence holder Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st February 1978 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the road within the address or location Boundary Accuracy: Not Applicable Authorised Waste: Foundry Sand Slag	A17SE (NW)	619	1	450467 207126
84	**Registered Waste Transfer Sites** Licence Holder: Partco Autoparts Ltd Licence Reference: OCC/114 Site Location: 56 St Thomas Street, OXFORD, Oxfordshire, OX1 1JR Operator Location: Lea Francis House, Station Road, Balsall Common, COVENTRY, West Midlands, CV7 7FD Authority: Environment Agency - Thames Region, West Area Site Category: Transfer Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st January 1993 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Quality: Not Supplied Authorised Waste: Contam.Standard Thinners Contam.Tetrosyl Gunwash Max.Storage In Licence Prohibited Waste: Waste N.O.S.	A8NW (S)	466	1	450760 206170

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Oxford Clay and Kellaways Beds	A13NW (W)	0	3	450903 206643
	Coal Mining Affected Areas In an area which may not be affected by coal mining				
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	3	450903 206643
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	149	3	450775 206506
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	3	450903 206643
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	149	3	450775 206506
	Potential for Ground Dissolution Stability Hazards No Hazard				
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	3	450903 206643
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	3	450903 206643
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	149	3	450775 206506
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	3	450903 206643
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	59	3	450807 206637
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	130	3	450753 206562
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	150	3	450753 206528
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (S)	205	3	450902 206420
	Radon Potential - Radon Affected Areas Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	3	450903 206643
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	3	450903 206643

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
85	**Contemporary Trade Directory Entries** Name: Kab Uk Ltd Location: 160, Walton Street, Oxford, OX1 2HD Classification: Engineers - General **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (E)	24	-	450963 206625
86	**Contemporary Trade Directory Entries** Name: Oxford Biodynamics Location: 26, Beaumont Street, Oxford, OX1 2NP Classification: Medical & Dental Laboratories **Status: Active** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	138	-	451019 206523
86	**Contemporary Trade Directory Entries** Name: Isis Dental Laboratory Location: 22, Beaumont Street, Oxford, OX1 2NA Classification: Medical & Dental Laboratories **Status: Active** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	170	-	451027 206490
86	**Contemporary Trade Directory Entries** Name: Massive Records Location: 95, Gloucester Green, Oxford, Oxfordshire, OX1 2DF Classification: Record, Tape & CD Manufacturers & Wholesalers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	209	-	451033 206449
87	**Contemporary Trade Directory Entries** Name: All Oxford Industrial Doors Services Ltd Location: 24-25, Walton Crescent, Oxford, OX1 2JG Classification: Door Manufacturers - Industrial **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	147	-	450746 206738
88	**Contemporary Trade Directory Entries** Name: Oxuniprint Location: Great Clarendon Street, Oxford, Oxfordshire, OX2 6DP Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	205	-	450807 206847
89	**Contemporary Trade Directory Entries** Name: Stagecoach Travel Centre Location: 103, Gloucester Green, Oxford, OX1 2BU Classification: Bus & Coach Operators & Stations **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	242	-	451087 206443
89	**Contemporary Trade Directory Entries** Name: Press To Print Ltd Location: 102, Gloucester Green, Oxford, Oxfordshire, OX1 2DF Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	242	-	451087 206443
89	**Contemporary Trade Directory Entries** Name: Press To Print Location: 102, Gloucester Green, Oxford, OX1 2DF Classification: Printers **Status: Active** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	242	-	451087 206443
90	**Contemporary Trade Directory Entries** Name: P P L Location: 20, Little Clarendon Street, Oxford, OX1 2HP Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	243	-	450998 206895
90	**Contemporary Trade Directory Entries** Name: Blue Amigo Location: 20, Little Clarendon Street, Oxford, OX1 2HP Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	243	-	450998 206895

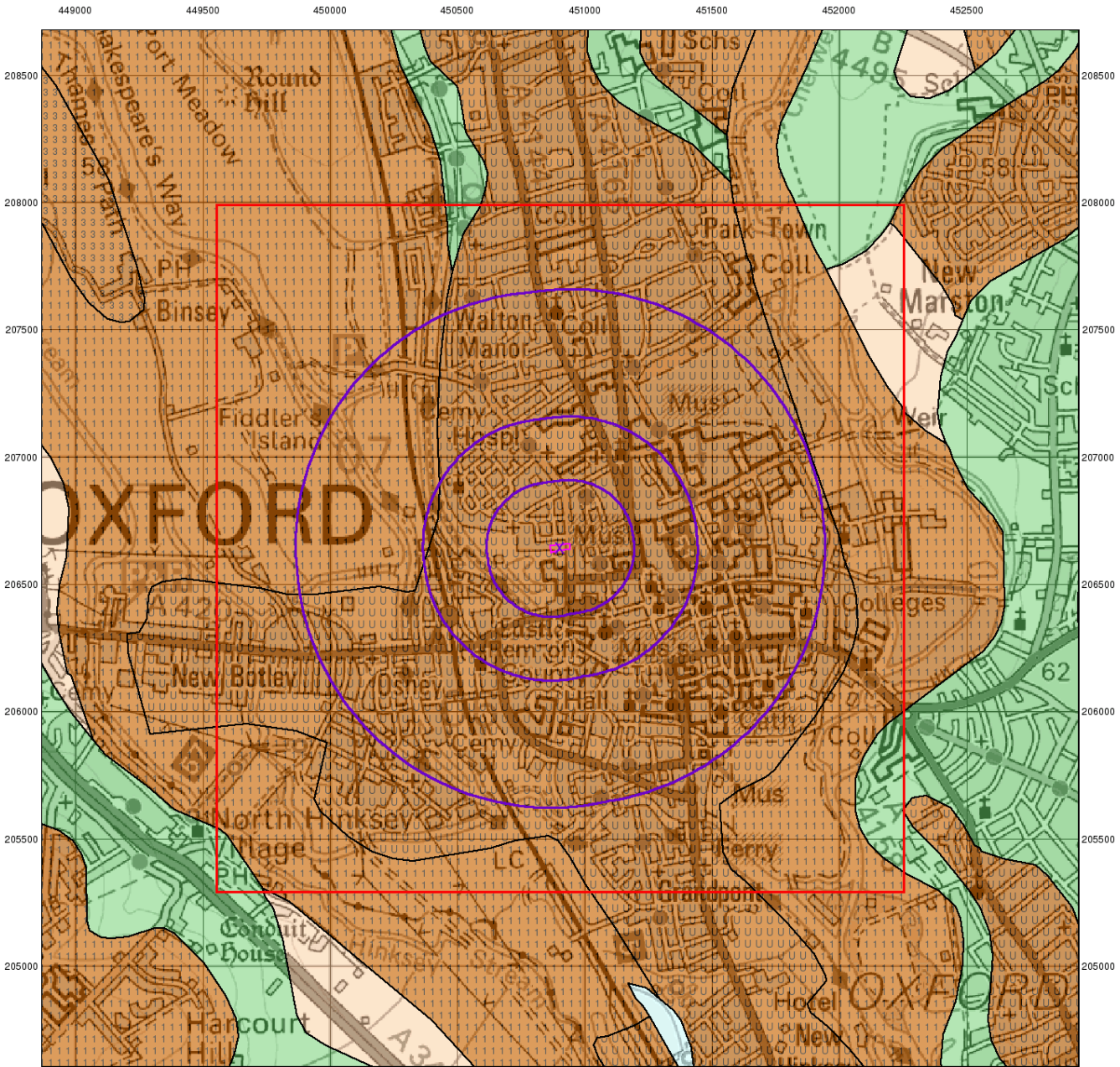
Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
91	**Fuel Station Entries** Name: Oxpens Service Station Location: Oxpens Road, Oxford, OX1 1RX Brand: ESSO Premises Type: Petrol Station **Status: Open** Positional Accuracy: Automatically positioned to the address	A8SW (S)	684	-	450699 205961

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
92	**Areas of Adopted Green Belt** Authority: Oxford City Council Plan Name: Oxford Local Plan 2001 - 2016 **Status: Adopted** Plan Date: 11th November 2005	A12SE (W)	494	4	450376 206580
93	**Areas of Adopted Green Belt** Authority: Oxford City Council Plan Name: Oxford Local Plan 2001 - 2016 **Status: Adopted** Plan Date: 11th November 2005	A19SW (NE)	561	4	451312 207080
94	**Areas of Unadopted Green Belt** Authority: Oxford City Council Plan Name: Core Strategy **Status: Submission Draft** Plan Date: 21st November 2008	A12SE (W)	488	4	450382 206579
95	**Areas of Unadopted Green Belt** Authority: Oxford City Council Plan Name: Core Strategy **Status: Submission Draft** Plan Date: 21st November 2008	A19SW (NE)	561	4	451312 207080
96	**Environmentally Sensitive Areas** Name: Upper Thames Tributaries Multiple Areas: Y Total Area (m2): 114097627.64 Source: Natural England	A12SE (W)	508	6	450358 206618
97	**Environmentally Sensitive Areas** Name: Upper Thames Tributaries Multiple Areas: Y Total Area (m2): 117363037.52 Source: Natural England	A9SW (SE)	977	6	451520 205850
98	**Nitrate Vulnerable Zones** Name: Not Supplied Description: NVZ Area Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A13NW (W)	0	7	450903 206643
99	**Sites of Special Scientific Interest** Name: Port Meadow With Wolvercote Common & Green Multiple Areas: Y Total Area (m2): 1685024.13 Source: Natural England Reference: 1000153 Designation Details: Ancient Monument Designation Date: 3rd October 1986 Date Type: Notified Designation Details: Nature Conservation Review Designation Date: 3rd October 1986 Date Type: Notified Designation Details: Special Area Of Conservation Designation Date: 3rd October 1986 Date Type: Notified	A17NE (NW)	913	6	450280 207353
100	**Special Areas of Conservation** Name: Oxford Meadows Multiple Areas: Y Total Area (m2): 2673955.07 Source: Natural England Reference: UK0012845 **Status: Designated**	A17NE (NW)	913	6	450280 207353

Useful Contacts

Contact	Name and Address	Contact Details
1	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
2	**Oxford City Council - Environmental Health Department** Ramsay House, 10 St Ebbes Street, Oxford, Oxfordshire, OX1 1PT	Telephone: 01865 249811 Fax: 01865 252144 Website: www.oxford.gov.uk
3	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
4	**Oxford City Council** Ramsay House, 10 St Ebbes Street, Oxford, Oxfordshire, OX1 1PT	Telephone: 01865 249811 Fax: 01865 252144 Website: www.oxford.gov.uk
5	**Vale of White Horse District Council** PO Box 27, The Abbey House, Abingdon, Oxfordshire, OX14 3JN	Telephone: 01235 520202 Fax: 01235 540396 Website: www.whitehorsedc.gov.uk
6	**Natural England** Northminster House, Northminster Road, Peterborough, Cambridgeshire, PE1 1UA	Telephone: 0845 600 3078 Fax: 01733 455103 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
7	**Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)** Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: 0113 2613333 Fax: 0113 230 0879
8	**Oxford City Council - Planning Business Unit** Ramsay House, 10 St. Ebbes Street, Oxford, Oxfordshire, OX1 1PT	Telephone: 01865 249811 Fax: 01865 252144 Website: www.oxford.gov.uk
9	**Oxfordshire County Council** County Hall, New Road, Oxford, Oxfordshire, OX1 1ND	Telephone: 01865 792422 Fax: 01865 810106 Email: environmental.services@oxfordshire.gov.uk Website: www.oxfordshire.gov.uk
-	**Health Protection Agency - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@hpa.org.uk Website: www.hpa.org.uk
-	**Landmark Information Group Limited** The Smith Centre, Henley On Thames, Oxfordshire, RG9 6AB	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / SEPA have a charging policy in place for enquiries.



GEA Geotechnical & Environmental Associates

Groundwater Vulnerability

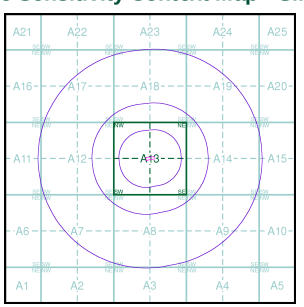
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A



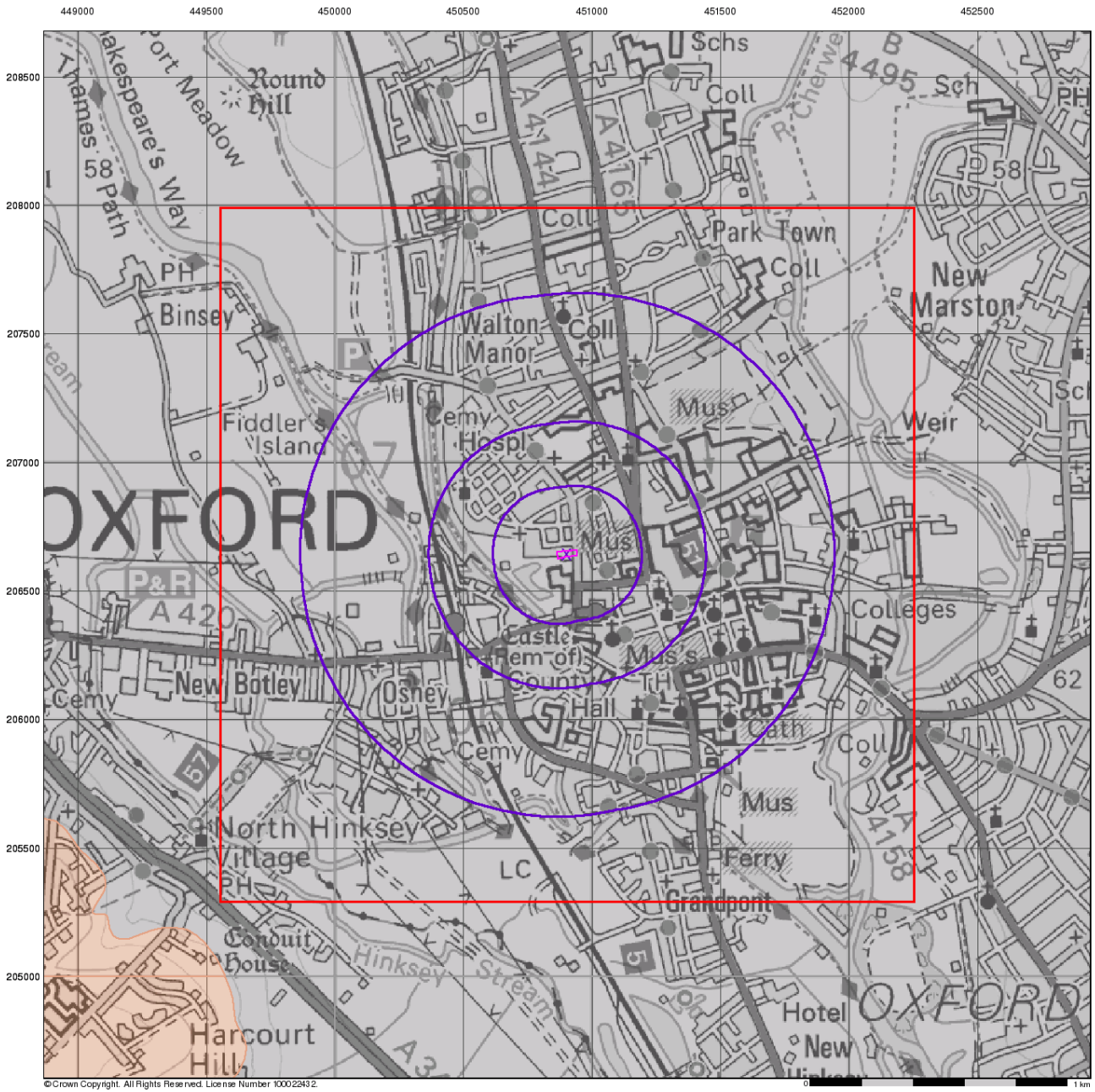
Order Details

Order Number:	38271069_1_1
Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

Ruskin College, Walton Street, OXFORD, OX1 2HE

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



GEA Geotechnical & Environmental Associates

Bedrock Aquifer Designation

General

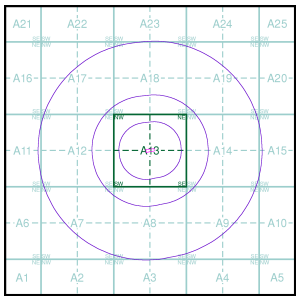
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

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

Site Sensitivity Context Map - Slice A



Order Details

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National Grid Reference:	450900, 206640
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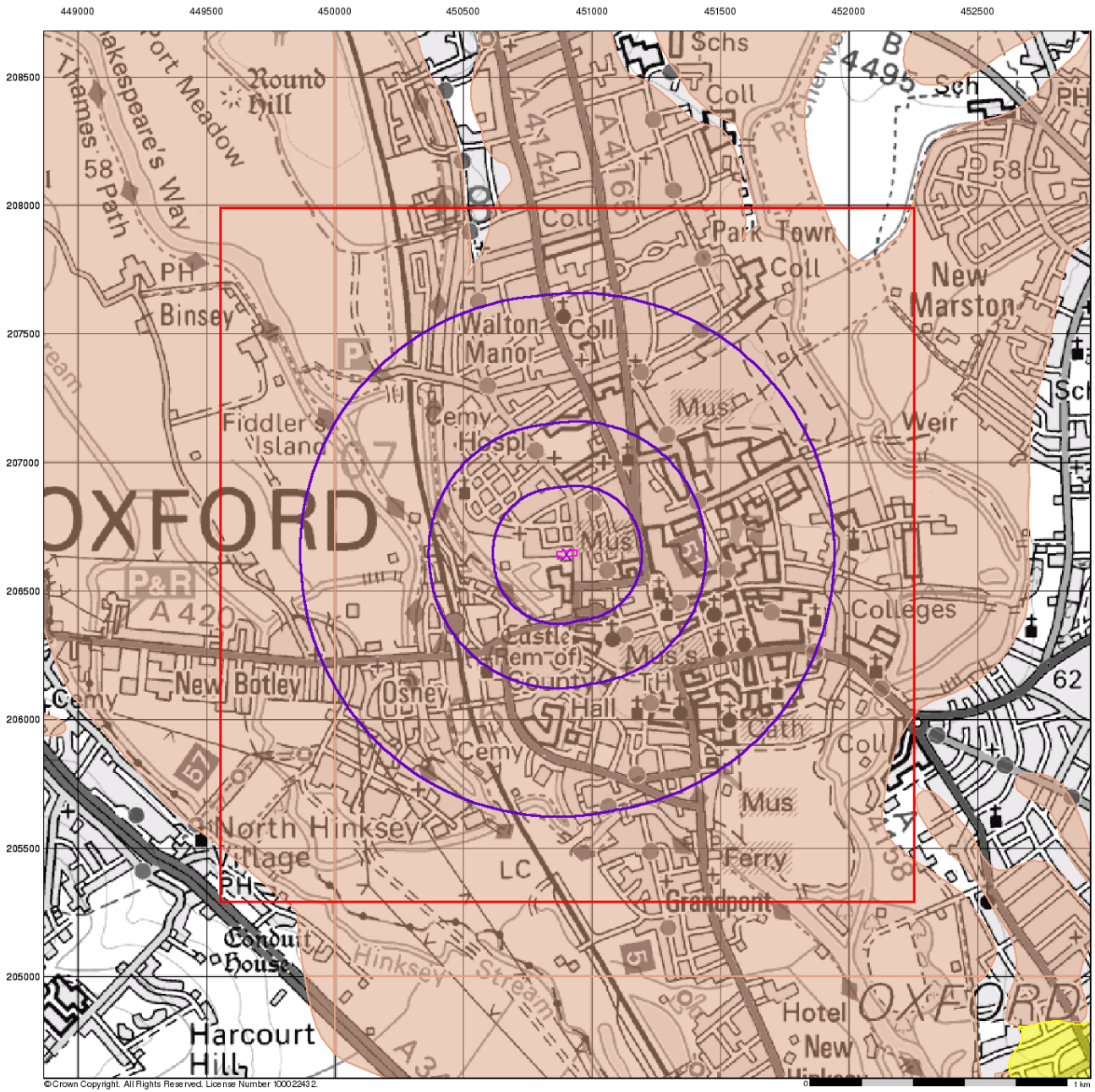


GEA Geotechnical & Environmental Associates

Superficial Aquifer Designation

General

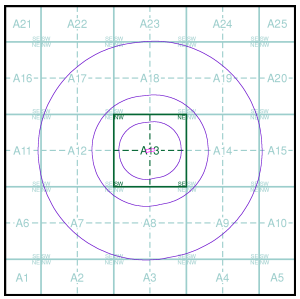
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

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

Site Sensitivity Context Map - Slice A



Order Details

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National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

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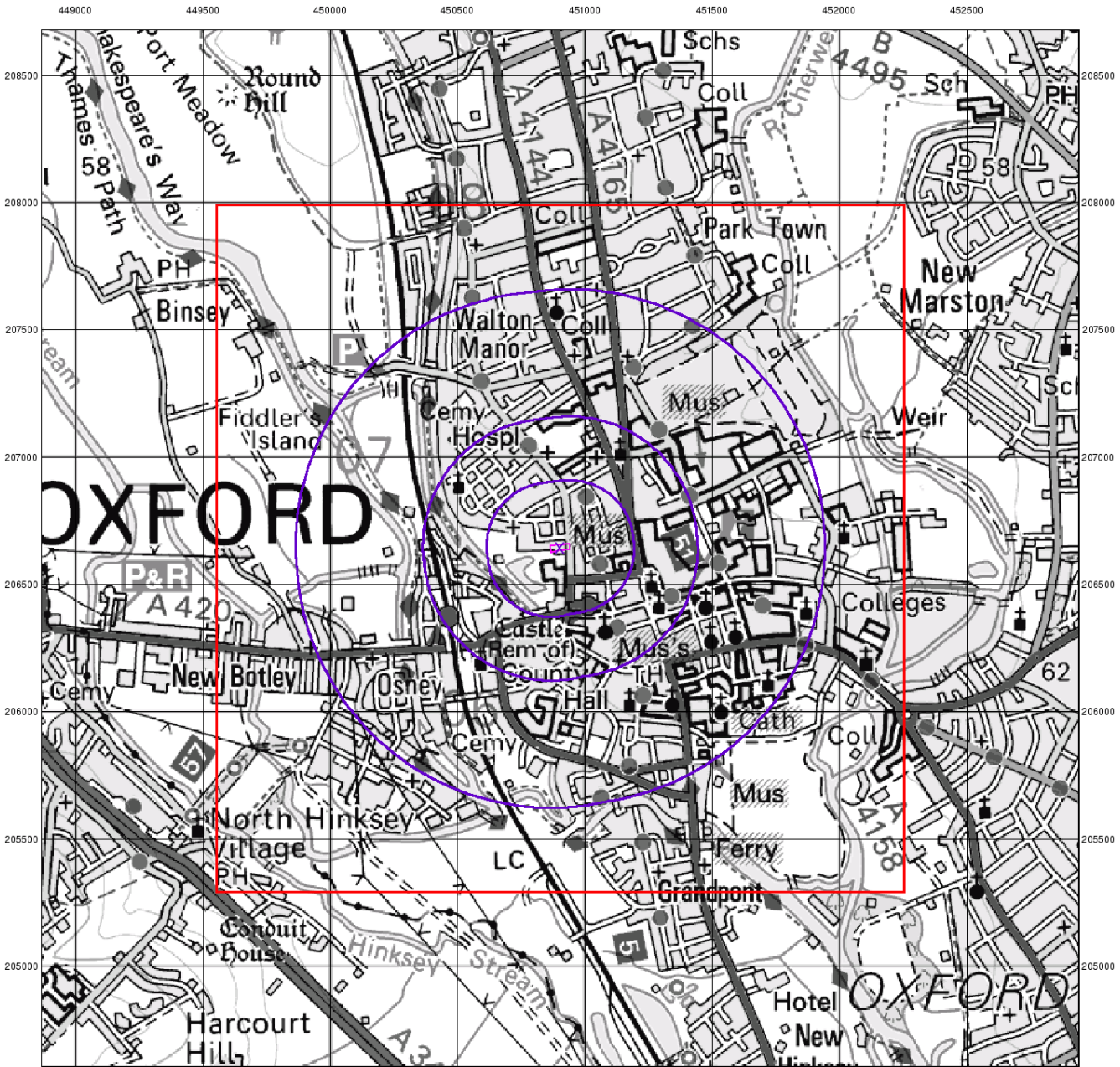


GEA Geotechnical & Environmental Associates

Source Protection Zones

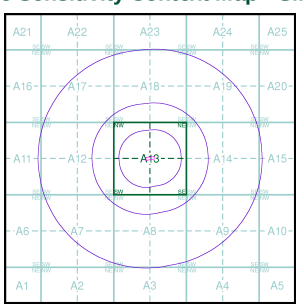
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Agency and Hydrological

Source Protection Zone I
Source Protection Zone II
Source Protection Zone III
Zone of Special Interest
Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	38271069_1_1
Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

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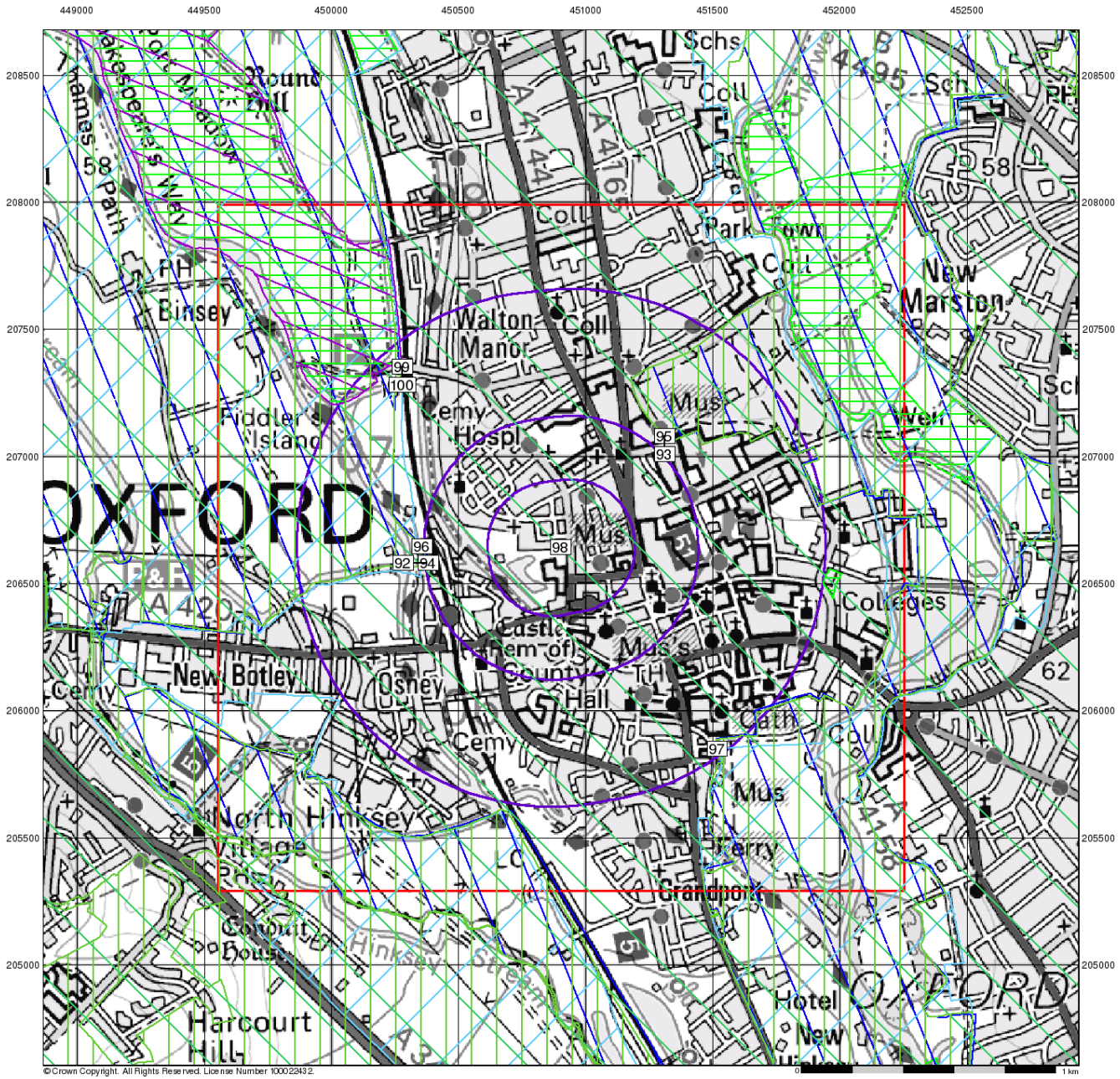


GEA Geotechnical & Environmental Associates

Sensitive Land Uses

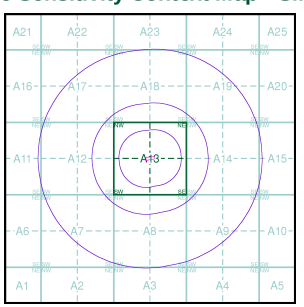
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	38271069_1_1
Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

Ruskin College, Walton Street, OXFORD, OX1 2HE

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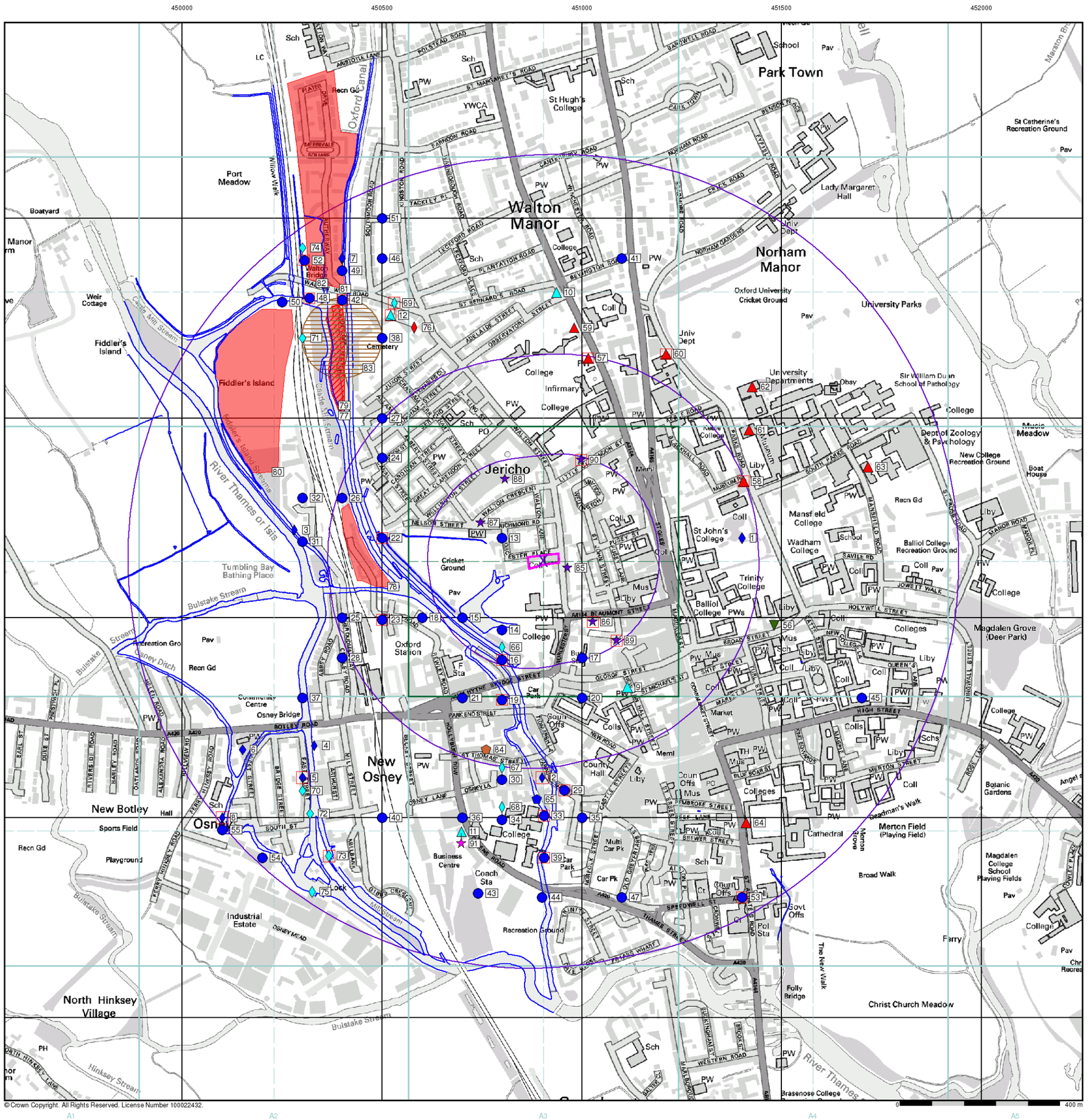
Web: www.envirocheck.co.uk



Geotechnical & Environmental Associates

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Geological

- BGS Recorded Mineral Site

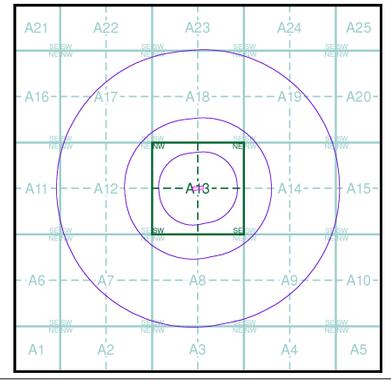
Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

Site Sensitivity Map - Slice A



Order Details

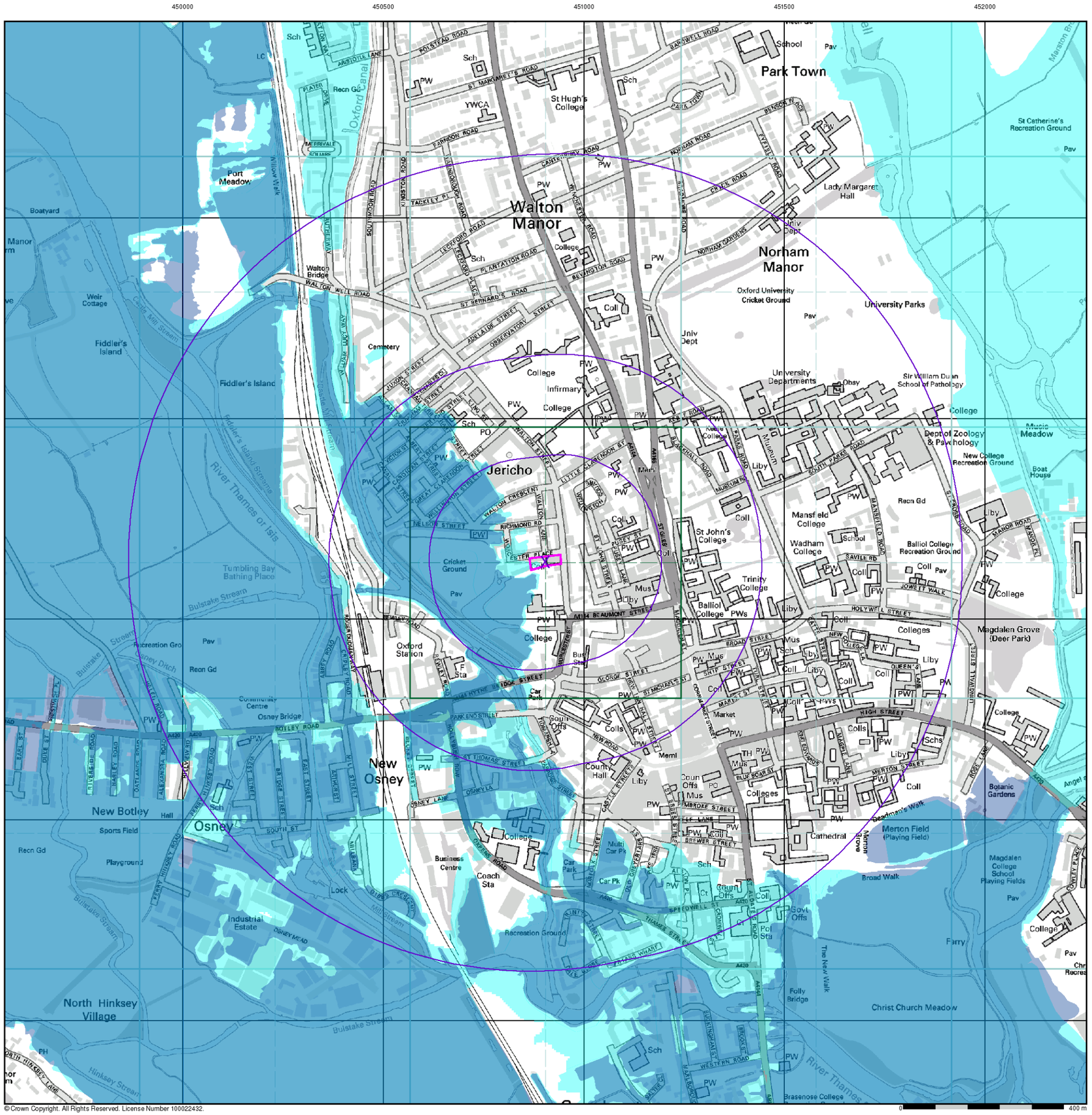
Order Number:	38271069_1_1
Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

Ruskin College, Walton Street, OXFORD, OX1 2HE

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



A1 A2 A3 A4 A5

Geotechnical & Environmental Associates

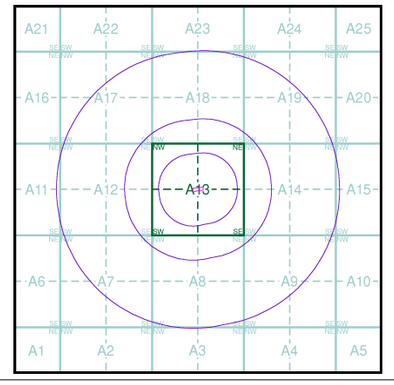
General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

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Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

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GEA Geotechnical & Environmental Associates

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

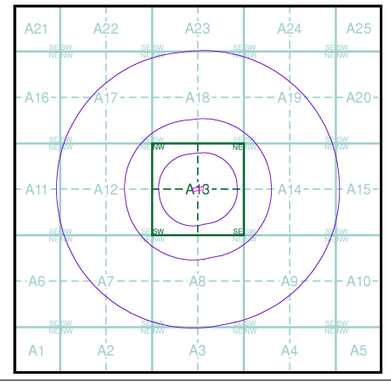
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



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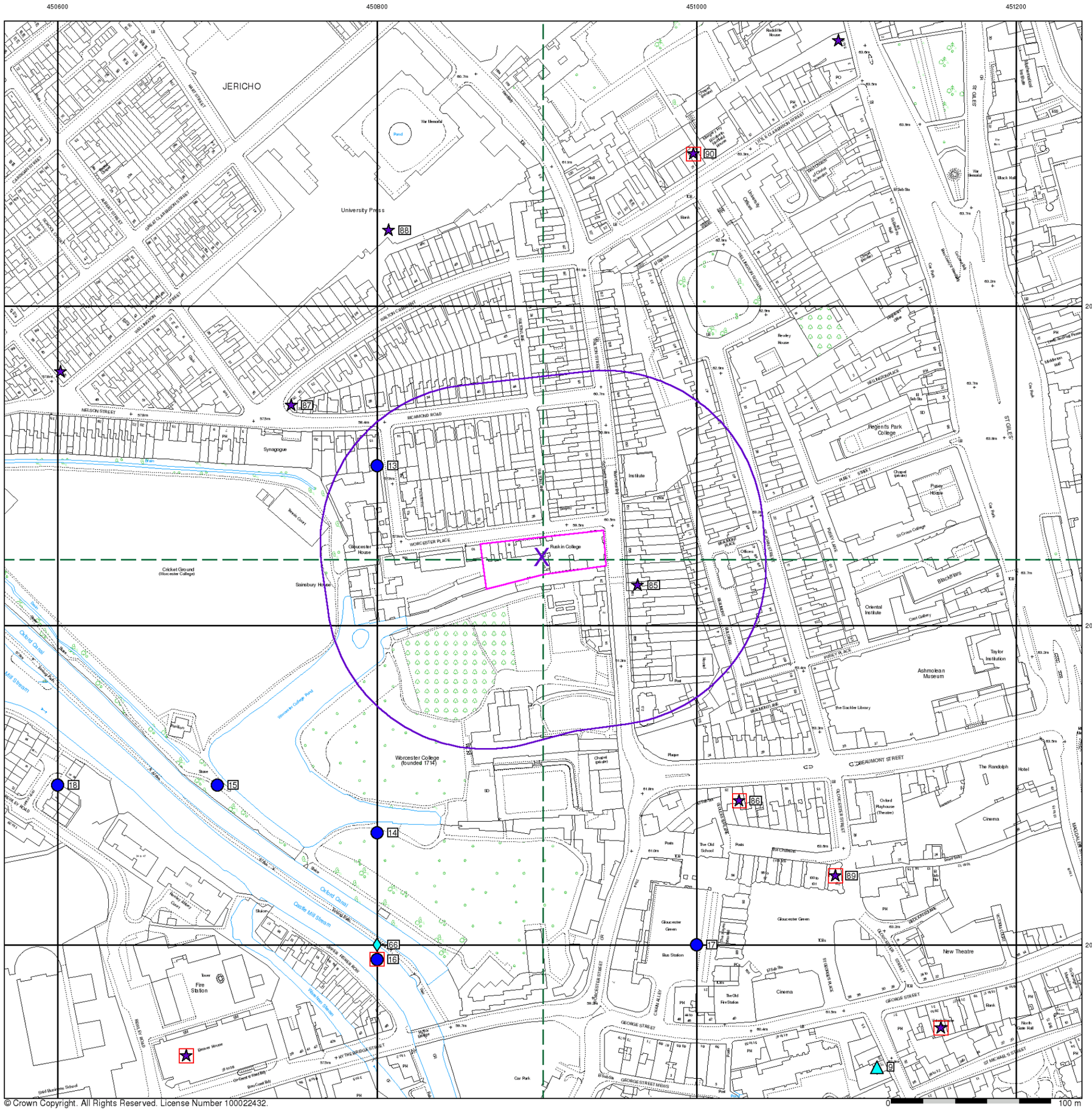

GEA Geotechnical & Environmental Associates

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
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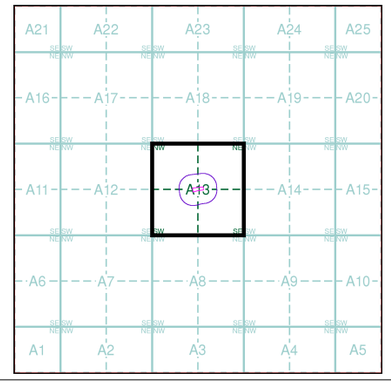
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Segment A13



Order Details

Order Number:	38271069_1_1
Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Plot Buffer (m):	100

Site Details

Ruskin College, Walton Street, OXFORD, OX1 2HE

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Web: www.envirocheck.co.uk

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

Quarry
Gravel Pit
Sand Pit
Clay Pit
Shingle
Refuse Heap
Sloping Masonry
Flat Rock
Marsh
Reeds
Osiers
Rough Pasture
Furze
Wood
Mixed Wood
Brushwood
Orchard
Fir
Ford
Stepping Stones
Ferry
Waterfall
Lock
Trig. Station
507 Altitude at Trig. Station
B.M.325·9 Bench Mark
342 Surface Level
Arrow denotes flow of water
Antiquities (site of)
Cutting
Embankment
Railway crossing Road
Level Crossing
Road crossing Railway
Railway crossing River or Canal
Road over single stream
Road over River or Canal
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	Sl.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

Inactive Quarry, Chalk Pit or Clay Pit
Active Quarry, Chalk Pit or Clay Pit
Rock
Boulders
Cliff
Slopes
Top
Roofed Building
Glazed Roof Building
Sloping Masonry
Archway
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Bench Mark
Antiquity (site of)
Cave Entrance
Triangulation Station
Electricity Pylon
Electricity Transmission Line
County Boundary (Geographical)
County & Civil Parish Boundary
Civil Parish Boundary
Admin. County or County Bor. Boundary
London Borough Boundary
Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250

Cliff
Slopes
Top
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Positioned Boulder
Scree
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Triangulation Station
Antiquity (site of)
Electricity Transmission Line
Electricity Pylon
BM 231.60m Bench Mark
Buildings with Building Seed
Roofed Building
Glazed Roof Building
Civil parish/community boundary
District boundary
County boundary
Boundary post/stone
Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

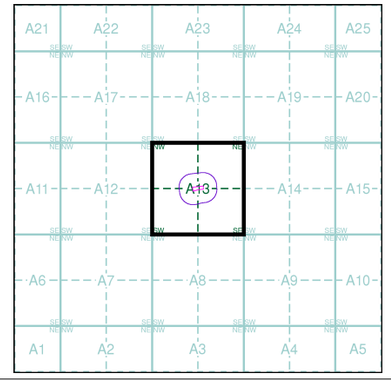
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place ofWorship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

GEA Geotechnical & Environmental Associates

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Oxfordshire	1:2,500	1876	2
Berkshire	1:2,500	1876	3
Oxfordshire	1:2,500	1899 - 1900	4
Berkshire	1:2,500	1921	5
Oxfordshire	1:2,500	1921	6
Berkshire	1:2,500	1937	7
Oxfordshire	1:2,500	1939	8
Ordnance Survey Plan	1:1,250	1958	9
Ordnance Survey Plan	1:1,250	1969 - 1971	10
Supply of Unpublished Survey Information	1:1,250	1972	11
Ordnance Survey Plan	1:1,250	1975 - 1976	12
Additional SIMs	1:1,250	1978 - 1989	13
Additional SIMs	1:1,250	1984 - 1992	14
Additional SIMs	1:1,250	1992	15
Large-Scale National Grid Data	1:1,250	1994	16
Large-Scale National Grid Data	1:1,250	1996	17

Historical Map - Segment A13



Order Details

Order Number: 38271069_1_1
Customer Ref: J120
National Grid Reference: 450900, 206640
Slice: A
Site Area (Ha): 0.19
Search Buffer (m): 100

Site Details

Ruskin College, Walton Street, OXFORD, OX1 2HE

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Electricity Transmission Line
Sloping Masonry
Pole
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

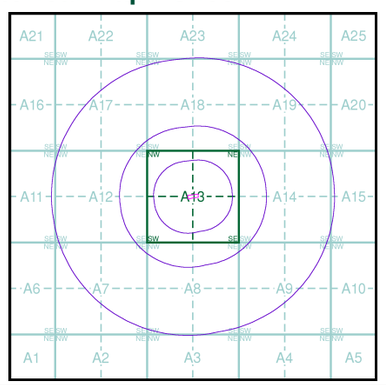
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

GEA Geotechnical & Environmental Associates

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Berkshire	1:10,560	1886	3
Oxfordshire	1:10,560	1887	4
Oxfordshire	1:10,560	1900	5
Berkshire	1:10,560	1914	6
Oxfordshire	1:10,560	1922	7
Berkshire	1:10,560	1922	8
Oxfordshire	1:10,560	1938	9
Berkshire	1:10,560	1938	10
Historical Aerial Photography	1:10,560	1947	11
Ordnance Survey Plan	1:10,000	1961	12
Ordnance Survey Plan	1:10,000	1968	13
Ordnance Survey Plan	1:10,000	1972 - 1977	14
Oxford	1:10,000	1973	15
Ordnance Survey Plan	1:10,000	1982	16
Ordnance Survey Plan	1:10,000	1994	17
10K Raster Mapping	1:10,000	1999	18
10K Raster Mapping	1:10,000	2006	19
10K Raster Mapping	1:10,000	2011	20

Historical Map - Slice A



Order Details

Order Number: 38271069_1_1
Customer Ref: J120
National Grid Reference: 450900, 206640
Slice: A
Site Area (Ha): 0.19
Search Buffer (m): 1000

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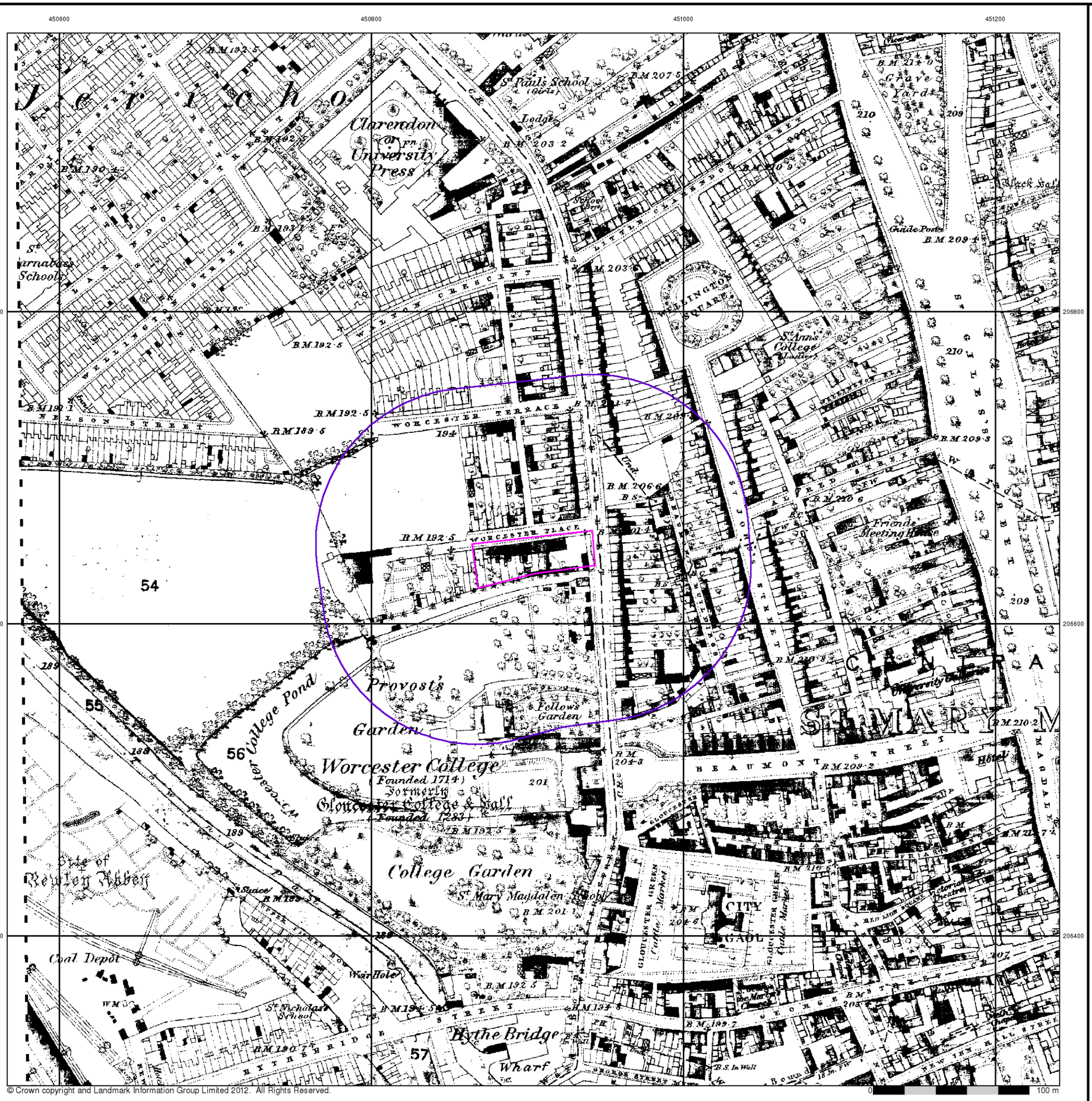


GEA Geotechnical & Environmental Associates

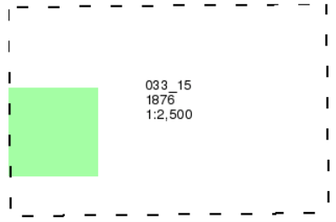
Oxfordshire

Published 1876

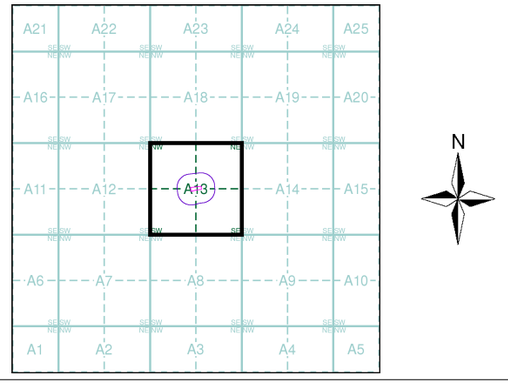
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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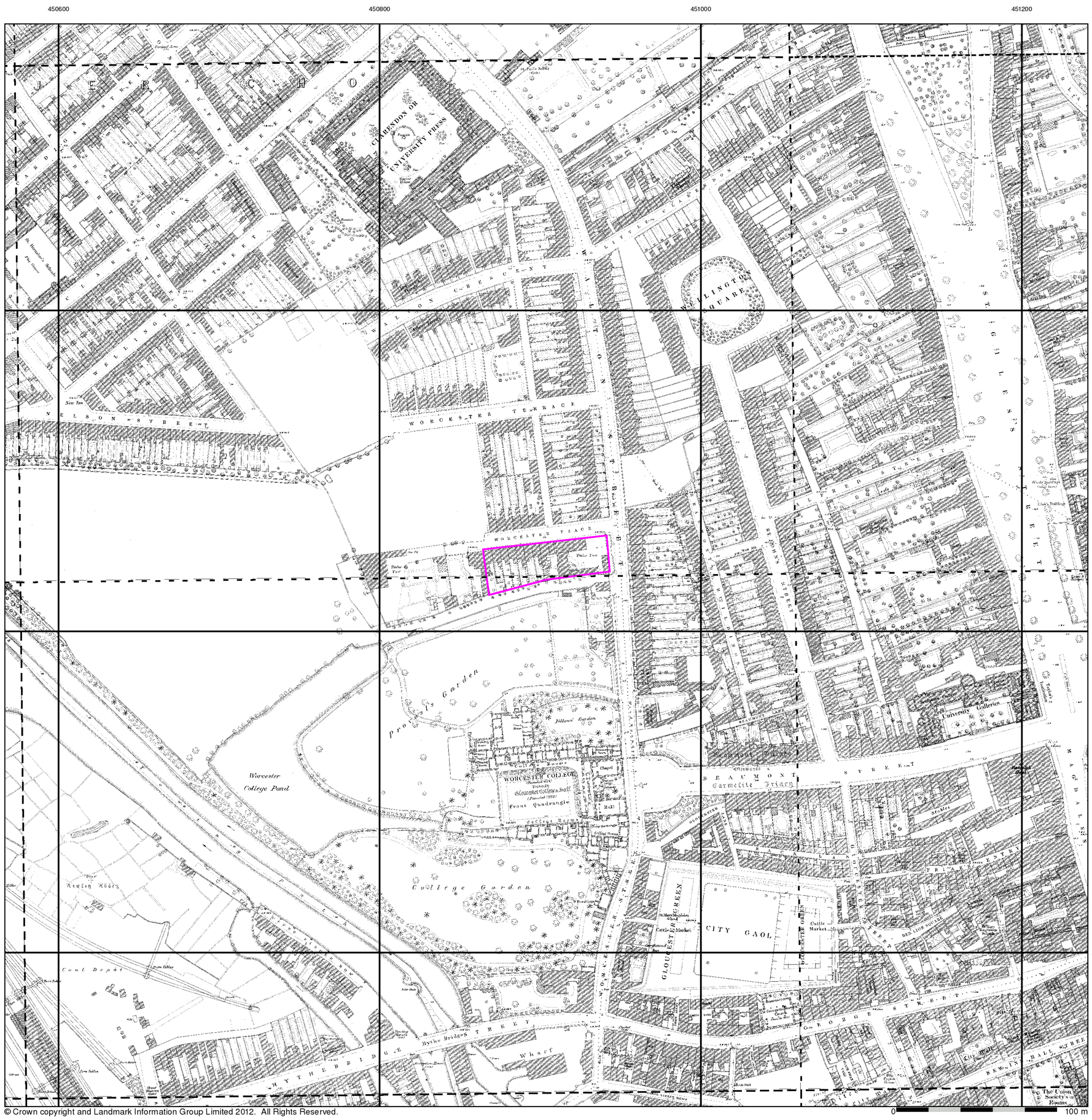


GEA Geotechnical & Environmental Associates

Oxfordshire

Published 1877 - 1878

Source map scale - 1:500

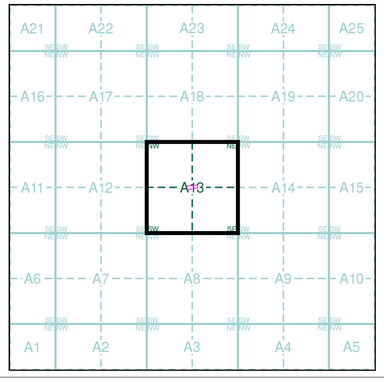
The 1:500 scale Ordnance Survey mapping was introduced in 1855 as a replacement for the 1:528 scale and to compliment the 1:2500 scale that had been implemented in 1853. By 1895, the 1:500 scale covered most towns over a population of about 4000 at the time of survey, although very few towns were mapped more than once at this scale, and none have been since 1910. The 1:500 scale gives particular emphasis to such features as lamp posts, man holes, arched passages and minor building projections. Also often featured are divisions between tenements, interior ground floor layouts of public buildings, and on earlier plans, the functions of the various parts of larger industrial premises are also indicated. Content of the plans does vary however, from one town to the next in terms of, for example, the completeness of railway tracks and the coverage of public buildings.

Please note: Due to the partial coverage of Historical Town Plans, it is possible that not all segments within an order will contain mapping. Only the segments that have Town Plan coverage will be generated.

Map Name(s) and Date(s)

1878	1878	1878
1:500	1:500	1:500
1877	1878	1878
1:500	1:500	1:500
1878	1878	1878
1:500	1:500	1:500
1878	1878	1878
1:500	1:500	1:500

Historical Town Plan - Segment A13



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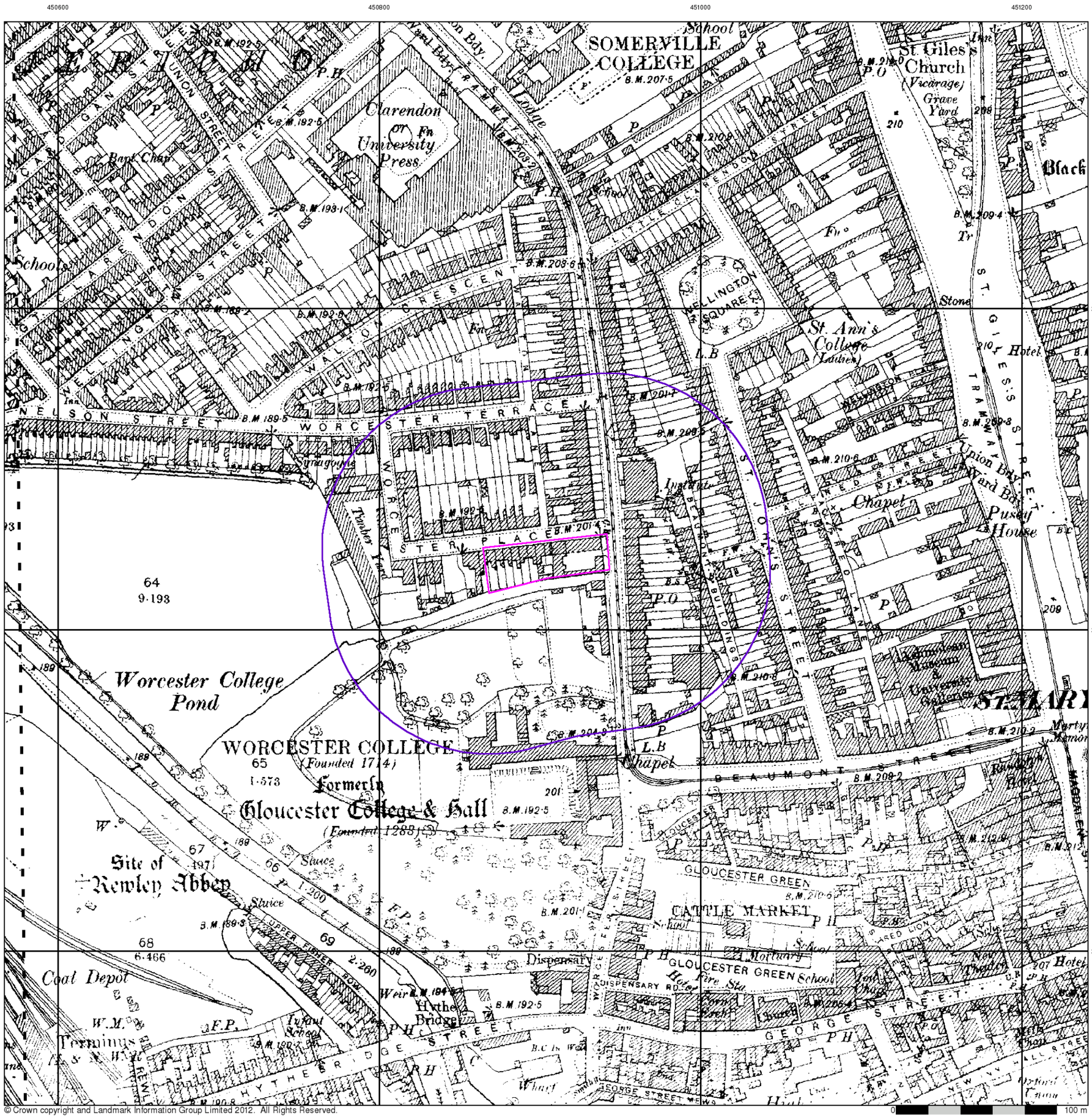


GEA Geotechnical & Environmental Associates

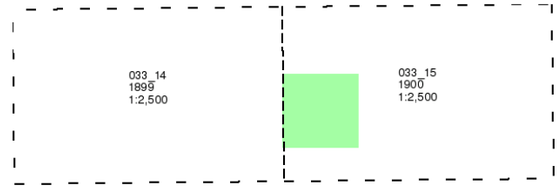
Oxfordshire

Published 1899 - 1900

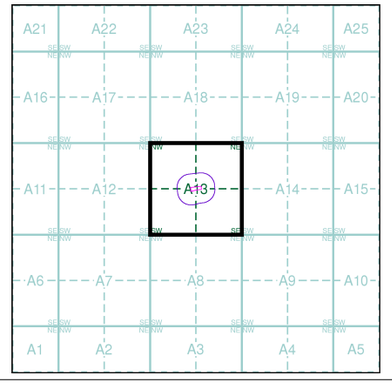
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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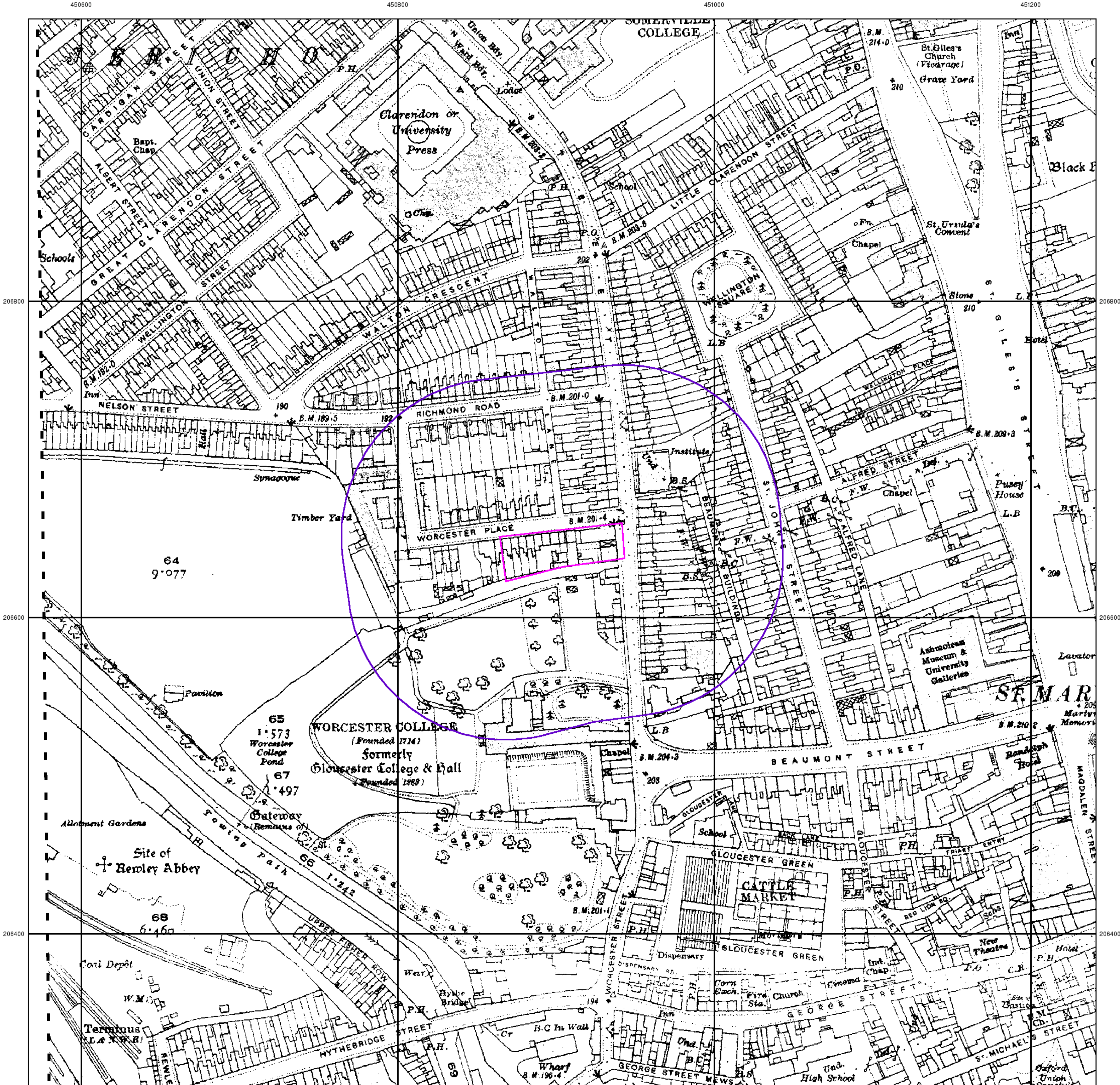
Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	100

Site Details

Ruskin College, Walton Street, OXFORD, OX1 2HE

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Geotechnical & Environmental Associates

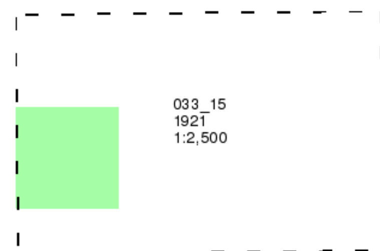
Oxfordshire

Published 1921

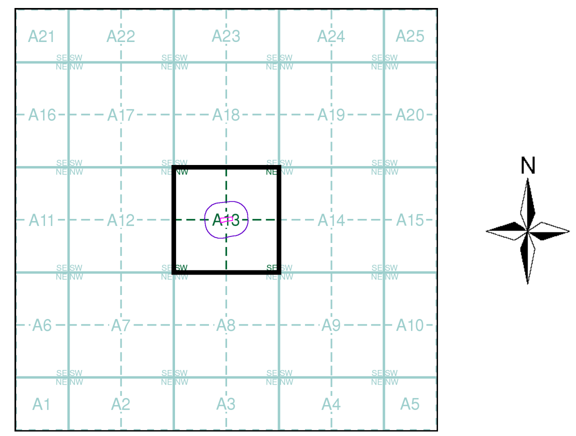
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	38271069_1_1
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Site Details

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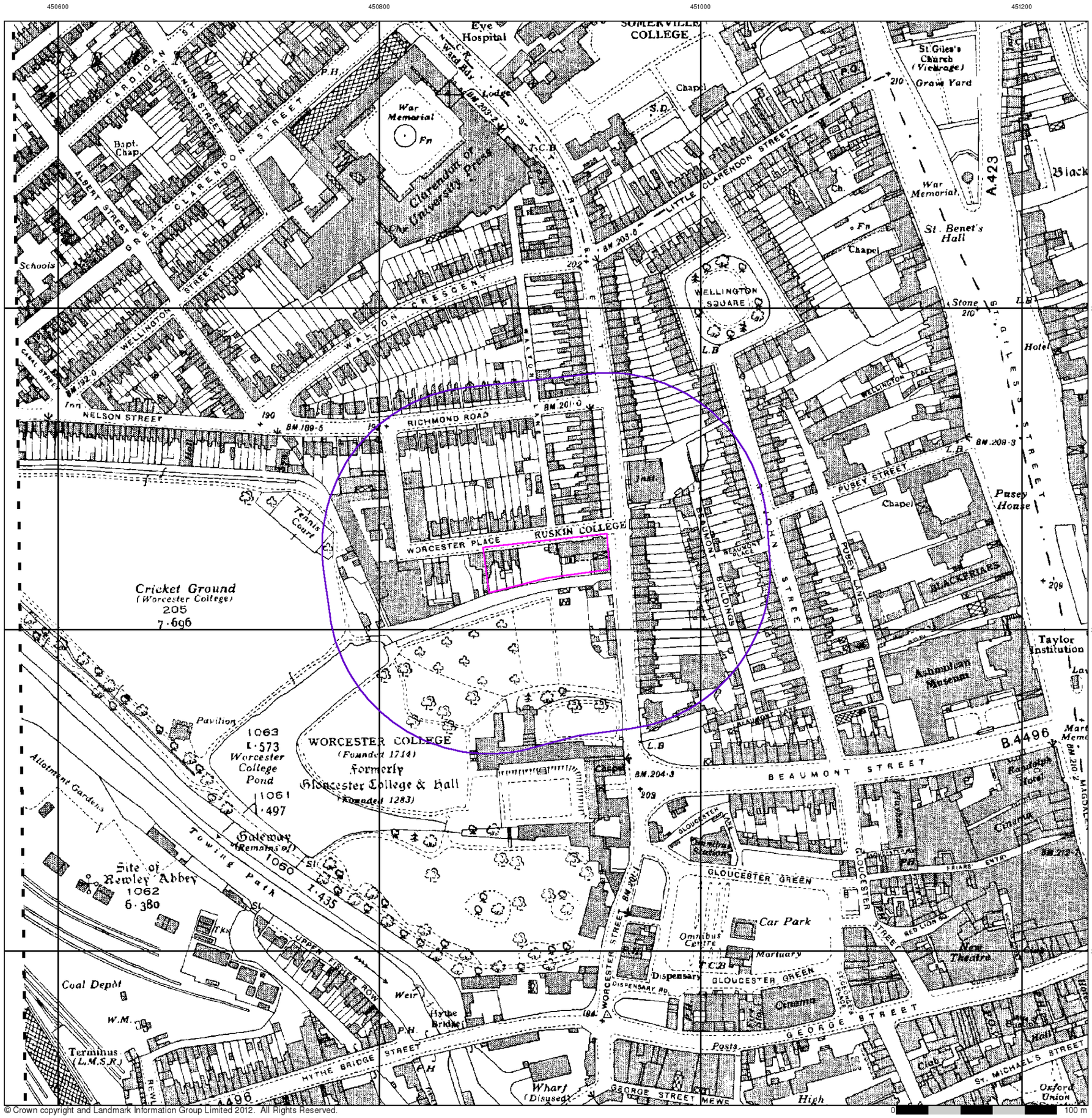


GEA Geotechnical & Environmental Associates

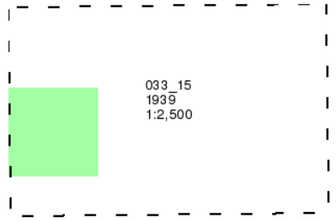
Oxfordshire

Published 1939

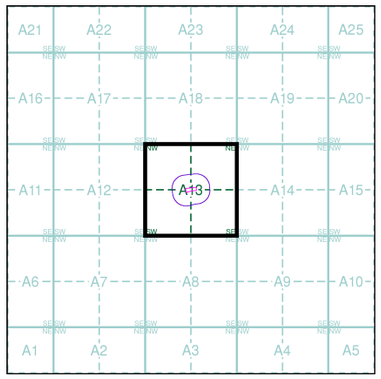
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	38271069_1_1
Customer Ref:	J120
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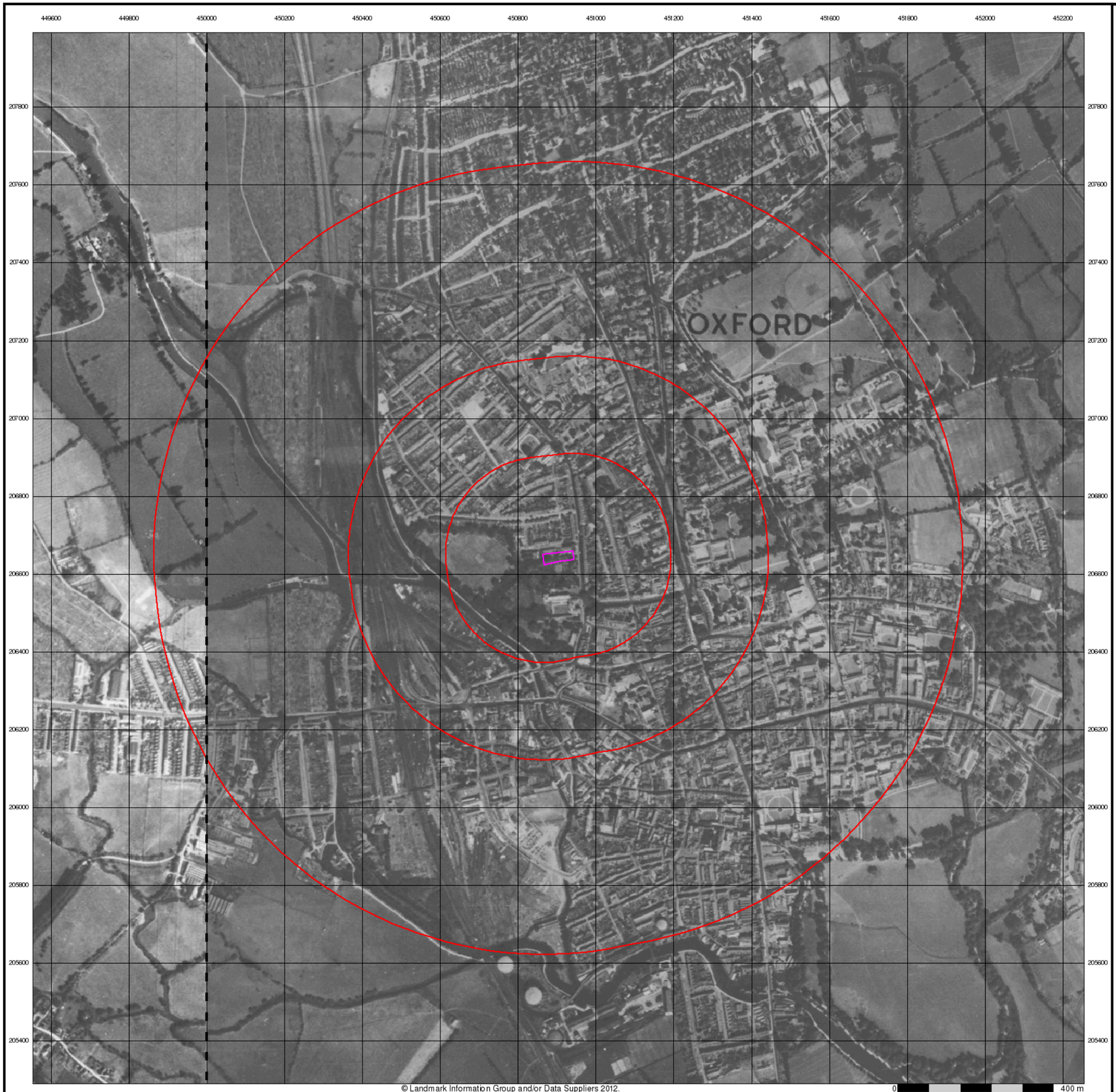


GEA Geotechnical & Environmental Associates

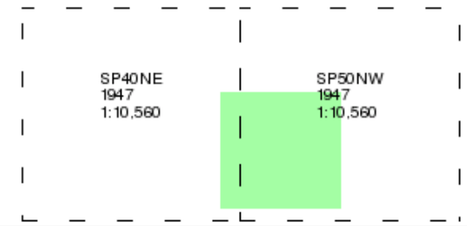
Historical Aerial Photography

Published 1947

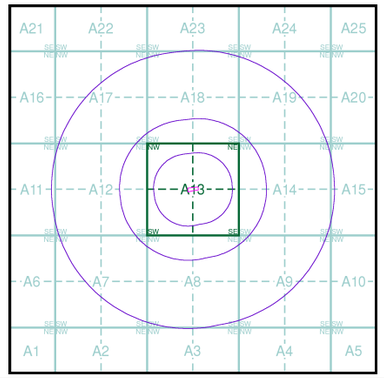
Source map scale - 1:10,560

The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



BRITISH LIBRARY

Order Details

Order Number:	38271069_1_1
Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

Ruskin College, Walton Street, OXFORD, OX1 2HE

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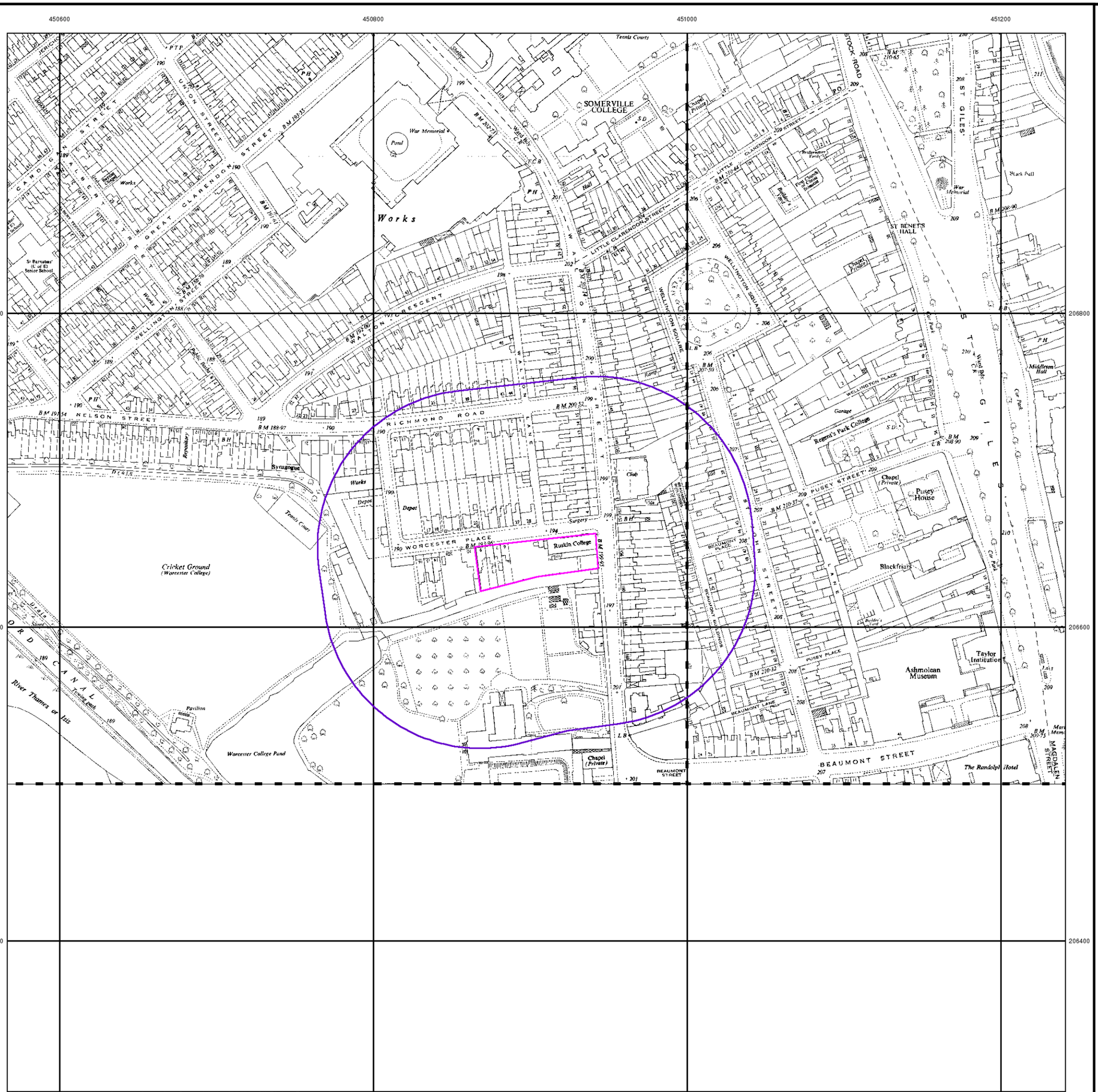


0 100 m

GEA Geotechnical & Environmental Associates

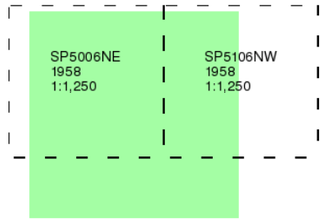
Ordnance Survey Plan

Published 1958

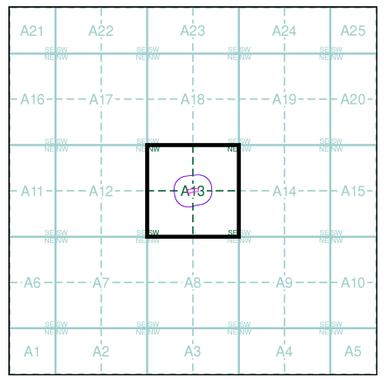
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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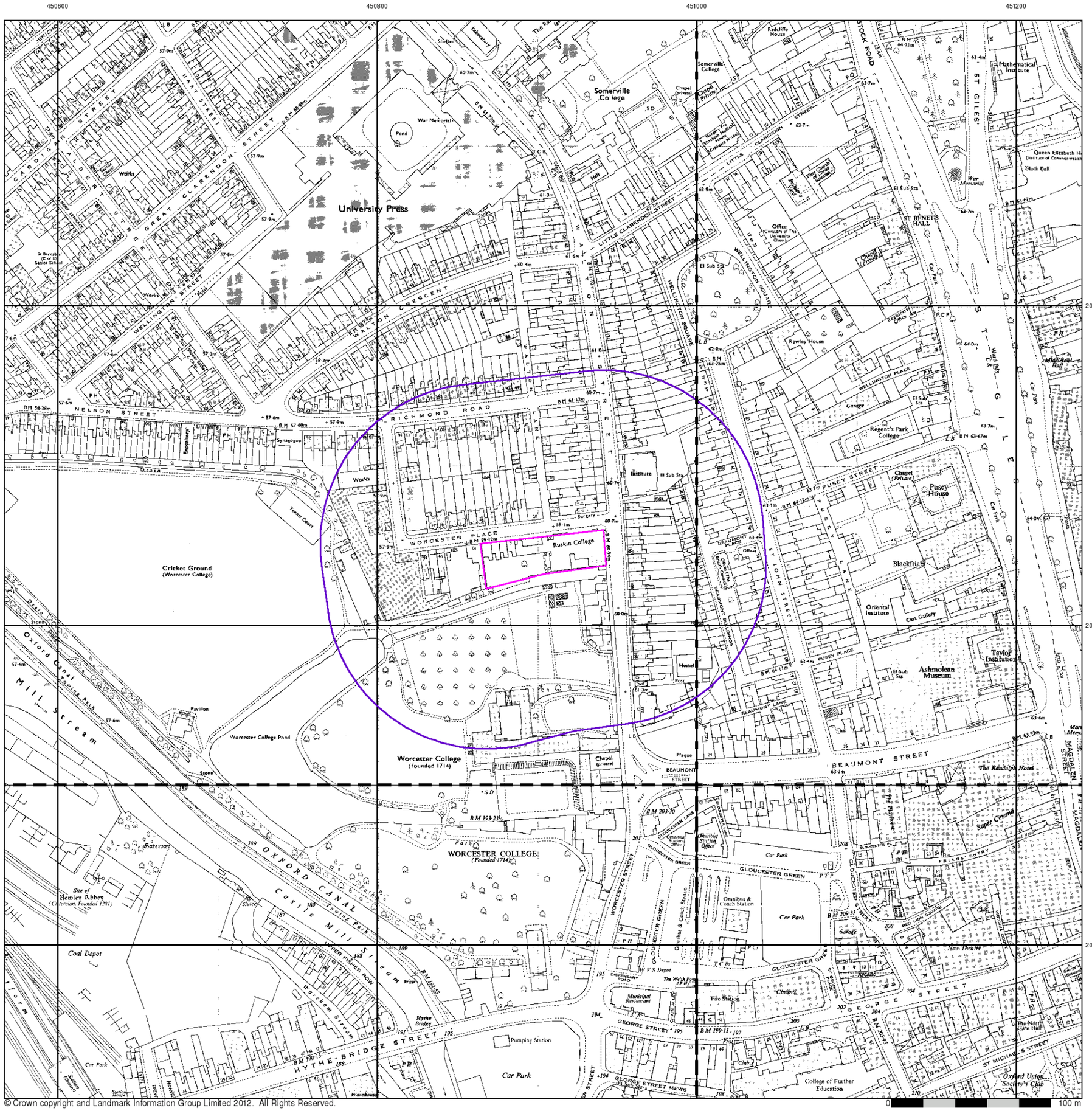


GEA Geotechnical & Environmental Associates

Ordnance Survey Plan

Published 1969 - 1971

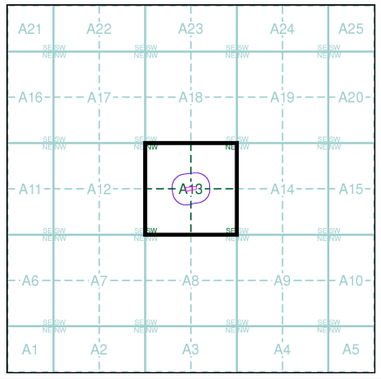
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SP5006NE 1971 1:1,250	SP5106NW 1969 1:1,250
SP5006SE 1969 1:1,250	SP5106SW 1969 1:1,250

Historical Map - Segment A13



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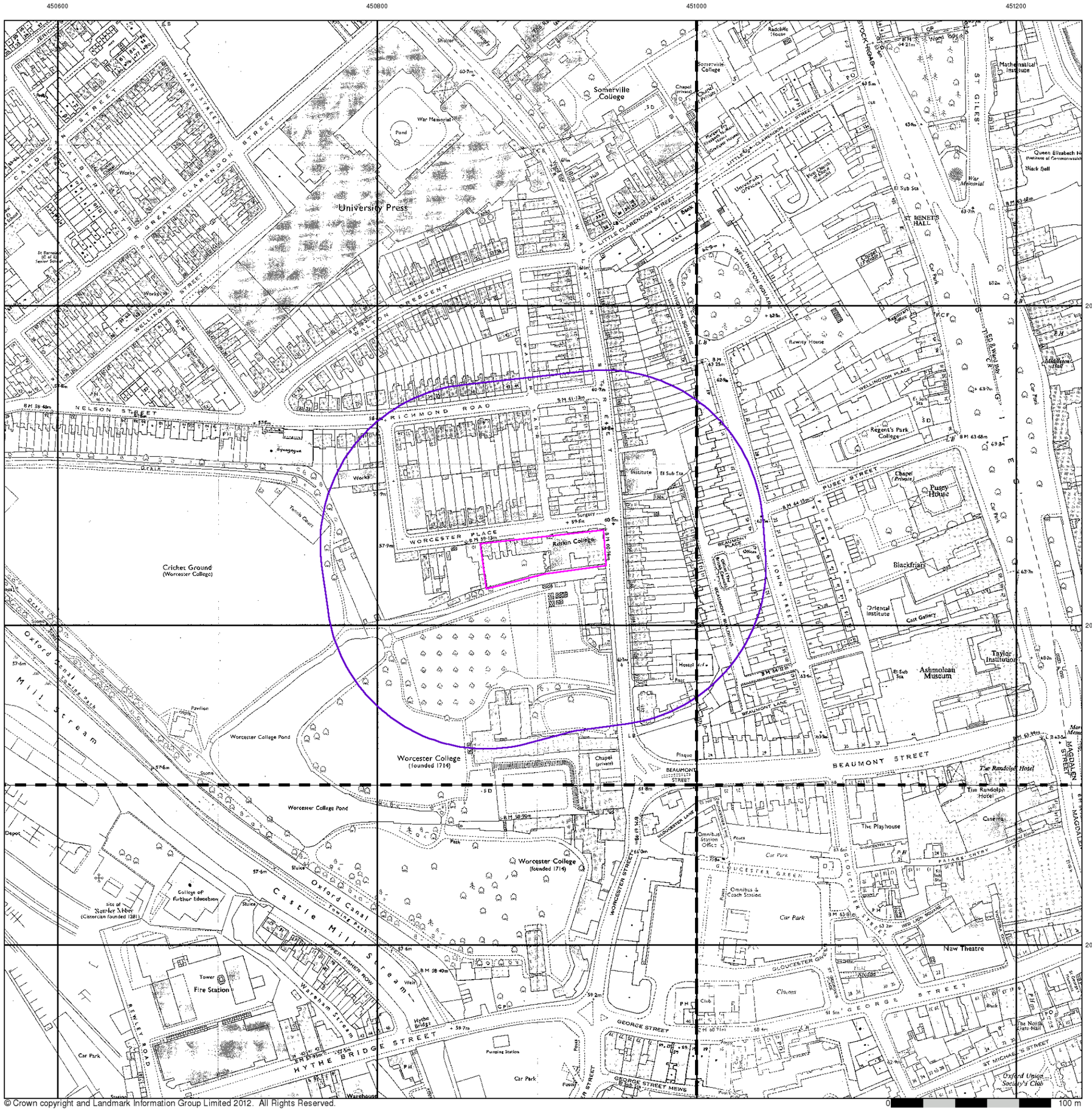

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Additional SIMs

Published 1978 - 1989

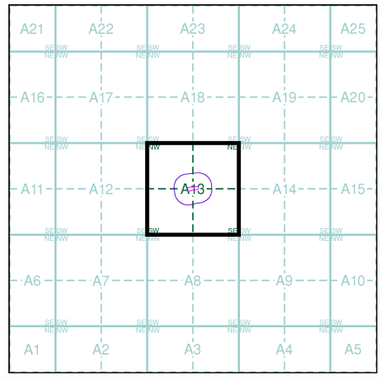
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SP5006NE 1978 1:1,250	SP5106NW 1981 1:1,250
SP5006SE 1989 1:1,250	SP5106SW 1984 1:1,250

Historical Map - Segment A13



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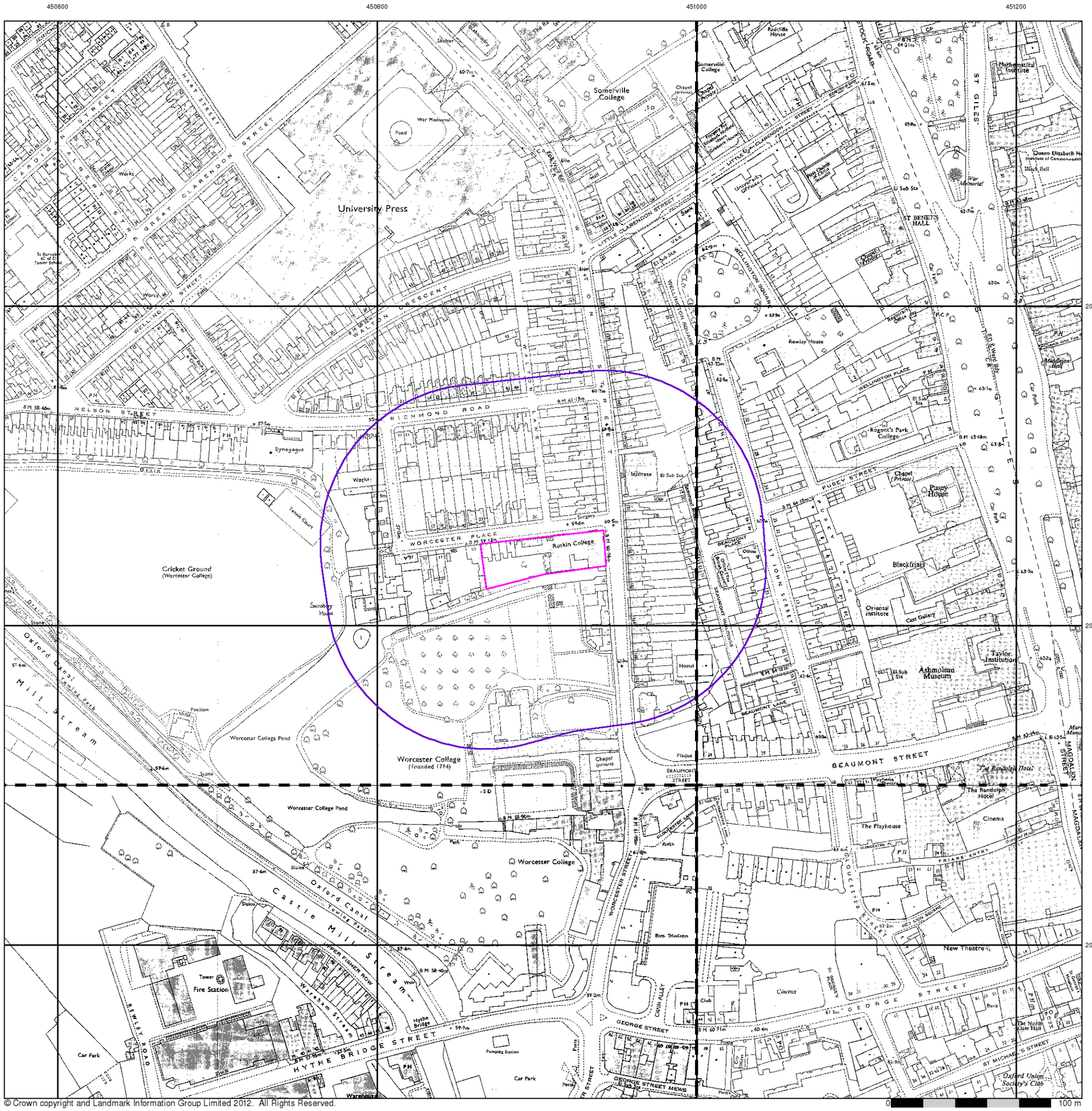


GEA Geotechnical & Environmental Associates

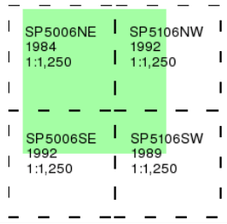
Additional SIMs

Published 1984 - 1992

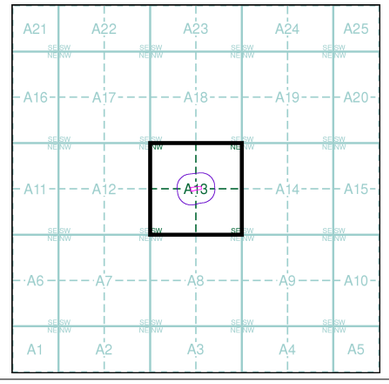
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	38271069_1_1
Customer Ref:	J120
National Grid Reference:	450900, 206640
Slice:	A
Site Area (Ha):	0.19
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Site Details

Ruskin College, Walton Street, OXFORD, OX1 2HE

Landmark Information Group
Tel: 0844 844 9952
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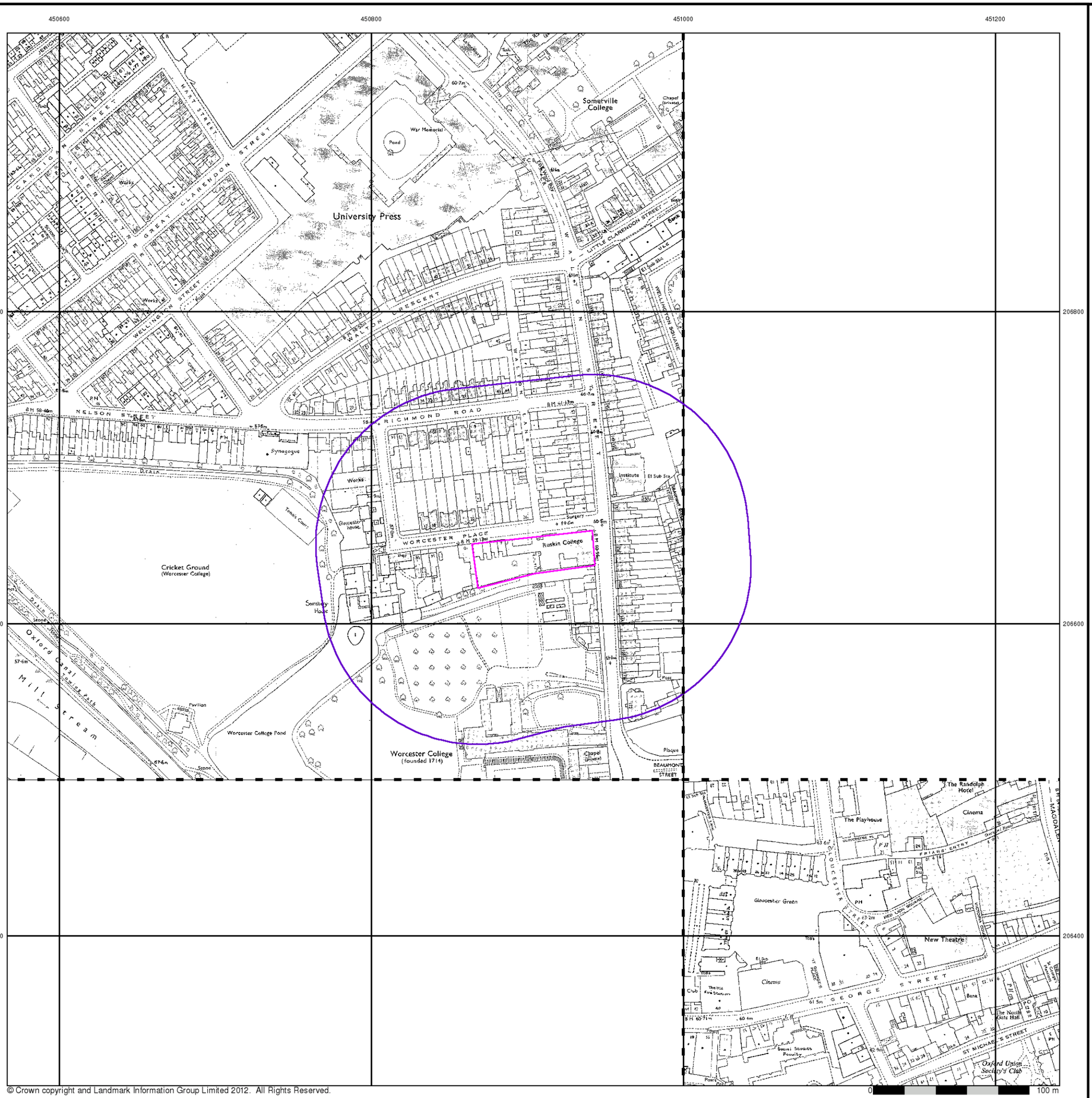

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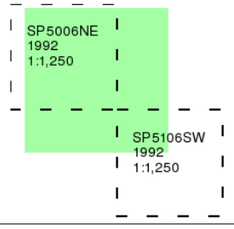
Additional SIMs

Published 1992

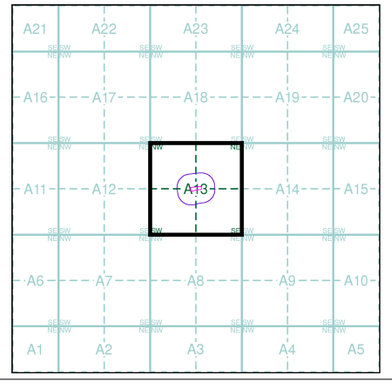
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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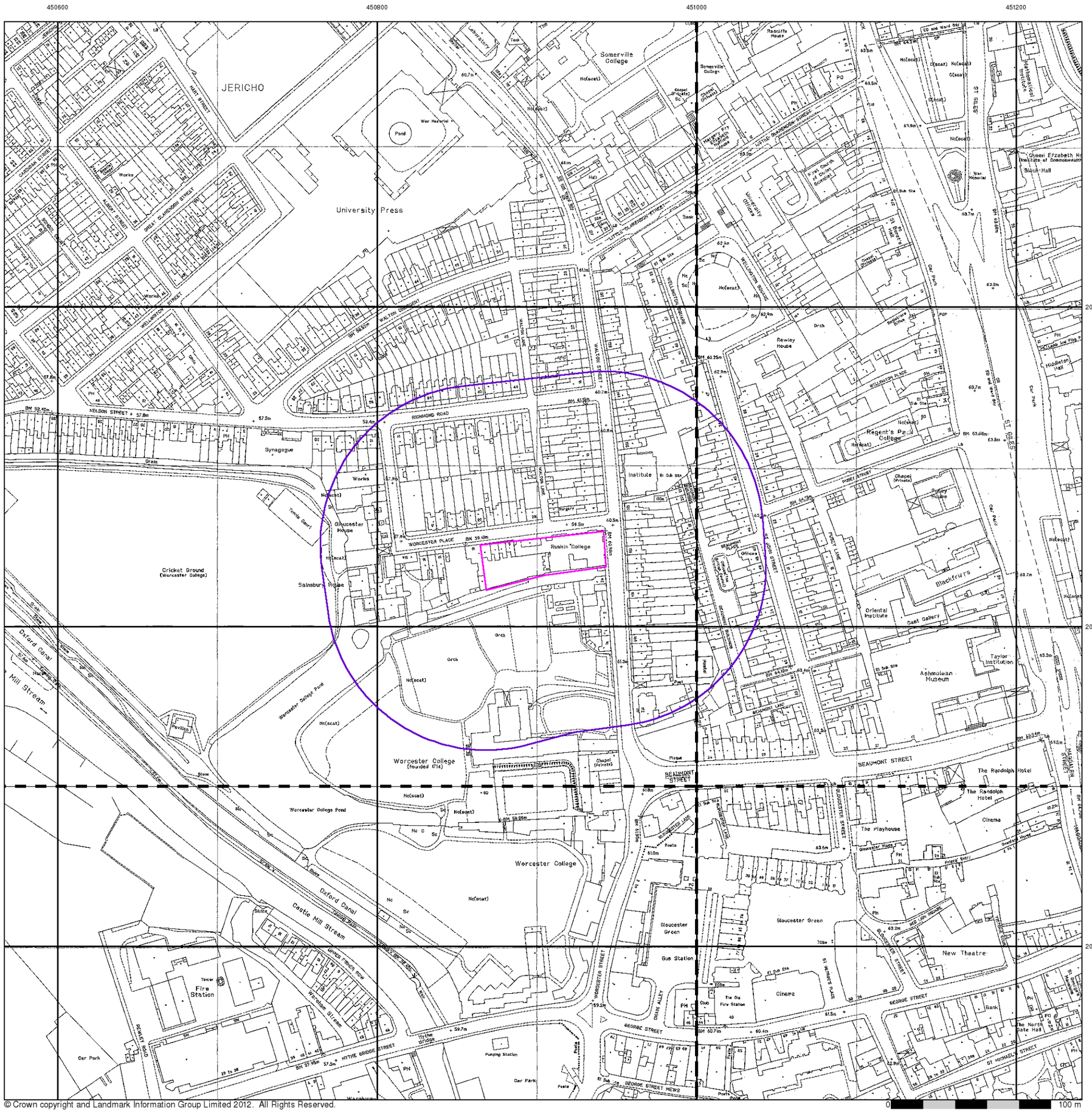


Geotechnical & Environmental Associates

Large-Scale National Grid Data

Published 1994

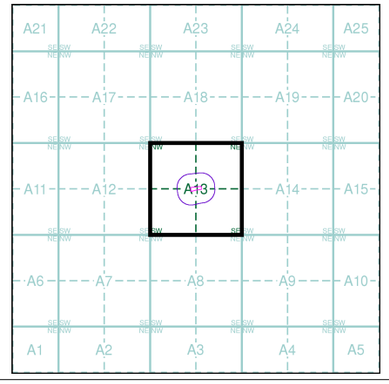
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SP5006NE 1994 1:1,250	SP5106NW 1994 1:1,250
SP5006SE 1994 1:1,250	SP5106SW 1994 1:1,250

Historical Map - Segment A13



Order Details

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Geotechnical & Environmental Associates

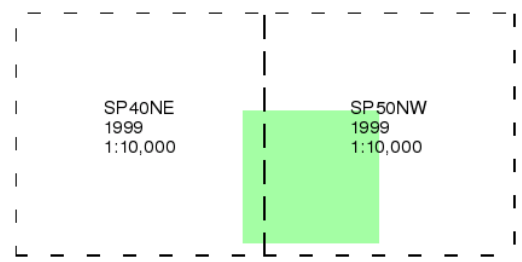
10k Raster Mapping

Published 1999

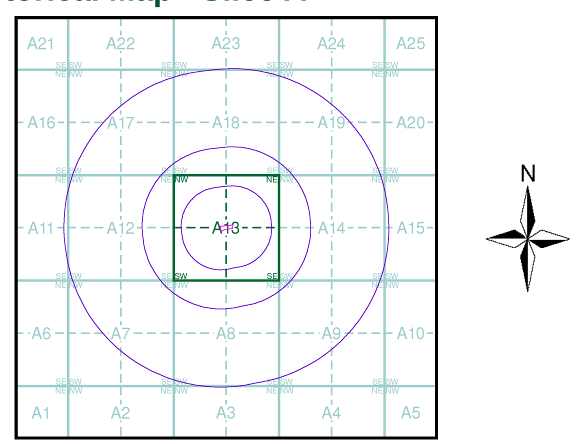
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

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Site Details

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Landmark® Information Group

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Web: www.envirocheck.co.uk

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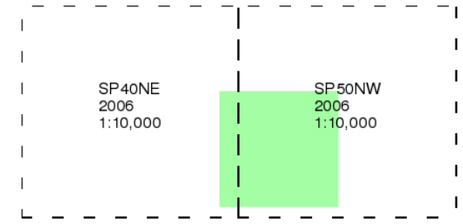
10k Raster Mapping

Published 2006

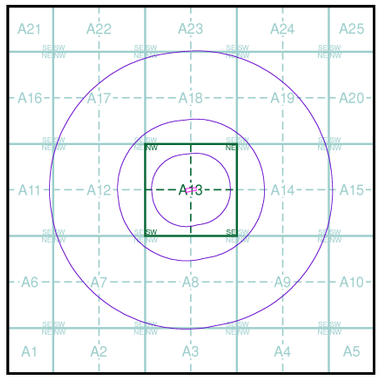
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



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Geotechnical & Environmental Associates

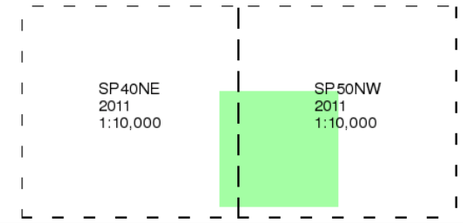
10k Raster Mapping

Published 2011

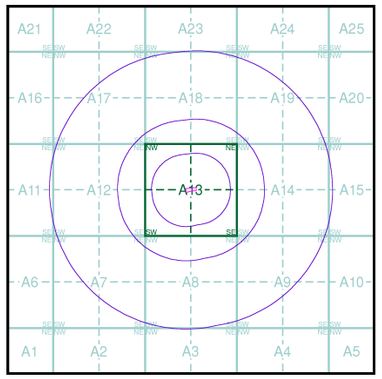
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



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GEA Geotechnical & Environmental Associates

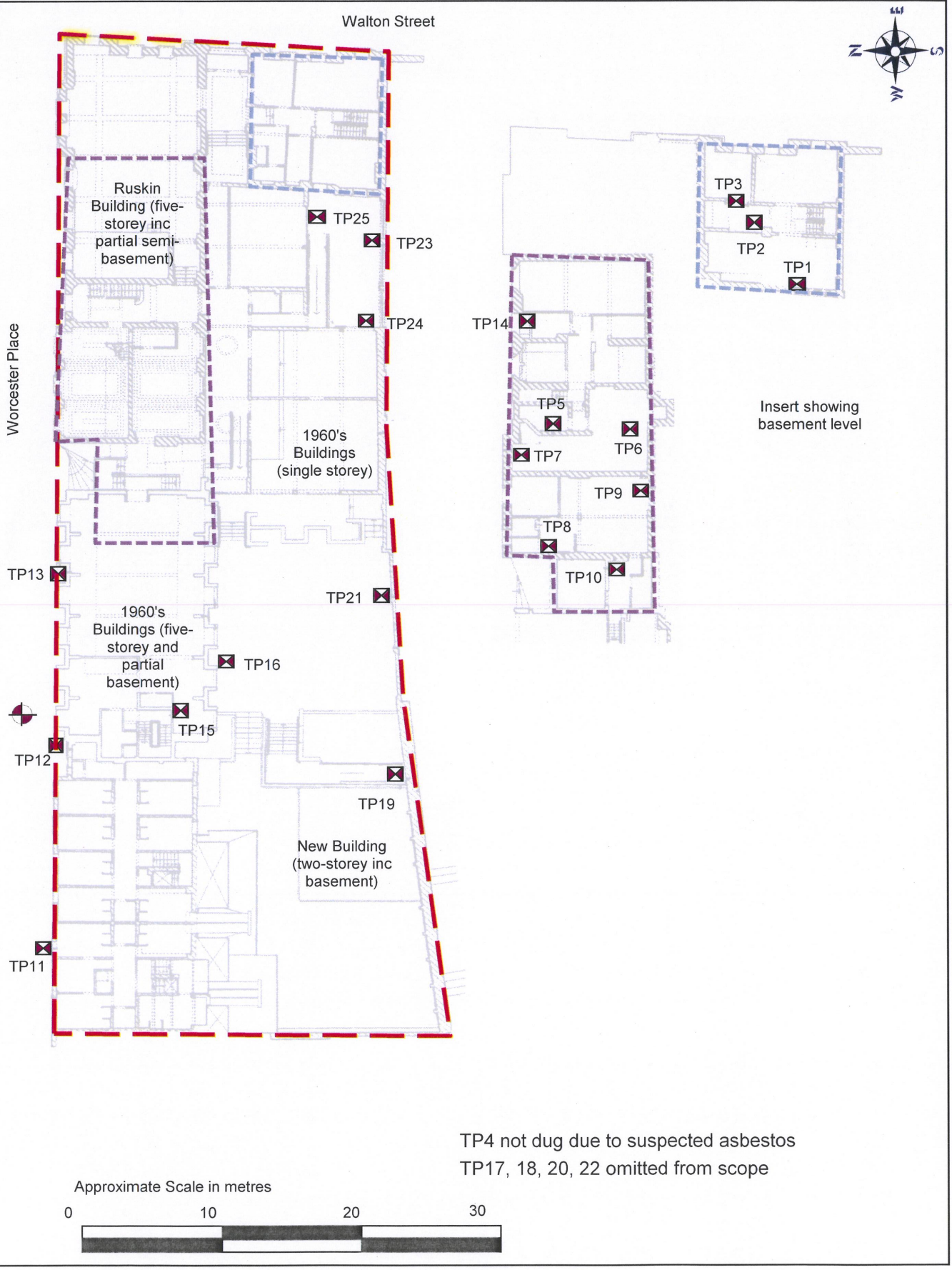
Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

Site Plan

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073

Sheet 1 / 1



Geotechnical & Environmental Associates (GEA) is an engineer-led and client-focused independent specialist providing a complete range of geotechnical and contaminated land investigation, analytical and consultancy services to the property and construction industries**.**

We have offices at

Tyttenhanger House
Coursers Road
St Albans
AL4 0PG
tel 01727 824666
mail@gea-ltd.co.uk

and

Church Farm
Gotham Road
Kingston on Soar
Notts
NG11 0DE
tel 01509 674888
midlands@gea-ltd.co.uk

Enquiries can also be made on-line at
www.gea-ltd.co.uk
where information can be found
on all of the services that we offer.

GEA Geotechnical & Environmental Associates

22 November 2012

Our ref: J12073A/ME/02

Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
St Albans
AL4 0PG

tel 01727 824666
fax 01727 824777
email mail@gea-ltd.co.uk
web www.gea-ltd.co.uk

Carol O'Riordan
Stockley
18 Bowling Green Lane
London
EC1R 0BW

Dear Carol

Re: RUSKIN COLLEGE, WALTON STREET, OXFORD, OX1 2HE

Further to your instruction of 14 August 2012, on behalf of Collexoncotoo Limited, we have completed the additional investigation work at the above site and this letter comprises our addendum report on our findings. As you know, we have previously carried out a ground investigation at the site, and the findings of that investigation are presented in our Desk Study and Ground Investigation Report (ref J12073, dated 30 May 2012. The conclusions in this addendum letter are based on the findings of the previous report and further information gained in the extra work; this letter report only supersedes the other report where noted below.

The conclusions and recommendations made in this letter are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted, the number of locations where the ground was sampled and the number of soil, gas or groundwater samples tested; no liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

1.0 INTRODUCTION

Consideration is being given to the demolition of the existing buildings, whilst retaining the original Ruskin Building façades onto Walton Street and Worcester Place and subsequent construction of new four-storey and six-storey buildings with single storey basements. The lower floors will be used as teaching spaces while upper floors will provide student accommodation and there will be two areas of open space. The new basement level will be formed by deepening existing basements by between 0.2 m and 1.2 m across the site whilst in other areas new basement excavations will be required, extending to a maximum depth of 2.5 m below ground level.

It is understood that a secant bored pile wall is currently the preferred foundation solution and the maximum column loads are expected to be in the region of 3211 kN. Traditional underpinning will however be required in some areas and some piles will be cantilevered.

This report is specific to the proposed development and the advice herein should be reviewed if the development proposals are amended.

1.1 Purpose of Work

The principal technical objectives of the work carried out were as follows:

- to confirm the ground conditions previously encountered, and their extend across the site;
- to further investigate the presence of tree roots and carry out root identification testing;
- to determine the groundwater level at the site;
- to confirm previous advice given in respect to the design of foundations and retaining walls;
- to carry out additional soil contamination testing; and
- to assess the risk that any such contamination may pose to the proposed development, its users or the wider environment.

1.2 Scope of Work

In order to meet the above objectives, an intrusive ground investigation was carried out which comprised, in summary, the following activities:

- three cable percussion boreholes advanced to a maximum depth of 20.0 m;
- standard penetration tests (SPTs), carried out at regular intervals in the boreholes; to provide quantitative data on the strength of the soils;
- laboratory testing of selected soil samples for geotechnical purposes and for the presence of contamination;
- five trial pits excavated by hand to investigate the presence of roots and to obtain samples for tree root identification testing;
- install groundwater monitoring standpipes and measure the depth of water on four occasions; and
- provision of a report presenting and interpreting the previous information, and information gained in this supplementary investigation, together with our amended advice and recommendations with respect to the proposed development.

The report includes a contaminated land assessment which has been undertaken in accordance with the methodology presented in Contaminated Land Report (CLR) 11[1] and involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the United Kingdom. The risk assessment is thus divided into three stages comprising Preliminary Risk Assessment, Generic Quantitative Risk Assessment, and Site-Specific Risk Assessment.

2.0 EXPLORATORY WORK

In order to meet the objectives described in Section 1.2, two cable percussion boreholes (Nos 2 and 4) were advanced to a depth of 20.0 while a single borehole (No 3) was drilled to 10.0 m

1 *Model Procedures for the Management of Land Contamination* issued jointly by the Environment Agency and the Department for Environment, Food and Rural Affairs (DEFRA) Sept 2004

using a dismantlable cable percussive drilling rig. Two of the borehole positions were within Ruskin College, whilst a third was drilled in the adjacent land of Worcester College. Standard Penetration Tests (SPTs) were carried out in the boreholes at regular intervals and disturbed and undisturbed samples were recovered for subsequent laboratory examination and testing. Groundwater monitoring standpipes were installed in all three boreholes and monitored on four weekly occasions.

In addition, five trial pits were excavated by hand to investigate the presence of roots and to carry out identification testing on samples obtained. The field work was carried out under the part time supervision of a geotechnical engineer from GEA and the trial pits were also viewed by an arboriculturist.

A selection of samples was submitted to a soil mechanics laboratory for a programme of geotechnical testing and an analytical laboratory for a programme of contamination testing.

The levels shown on the borehole and trial pit records have been interpolated from spot heights shown on a drawing provided by Stockley, titled Existing Plan at 59.5, Basement Level, Drawing No (EX)001 rev P02 dated March 2012.

2.1 Sampling Strategy

Three additional samples of made ground were subjected to analysis for a range of common industrial contaminants and contamination indicative parameters. For this investigation the analytical suite for the soil included a range of metals, speciation of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), total cyanide and monohydric phenols.

The soil samples were selected to provide a general view of the chemical conditions of the soils that are likely to be involved in a human exposure or groundwater pathway and to provide advice in respect of re-use or for waste disposal classification. The contamination analyses were carried out at an MCERTs accredited laboratory with the majority of the testing suite accredited to MCERTS standards. Details of the MCERTs accreditation and test methods are included in the Appendix together with the analytical results.

3.0 GROUND CONDITIONS

The supplementary investigation has generally confirmed the expected ground conditions in that, below a limited thickness of made ground, the Northmoor Sand and Gravel was found to be underlain by the Oxford Clay Formation. The discussion below is based upon information from both investigations.

The made ground generally comprised dark brown to orangish brown and grey sandy gravelly clay or a clayey gravelly sand with fragments of brick, concrete, chalk and occasionally whole bricks, ash, tile and coal which extended to depths of between 1.0 m (58.00 m OD) and 3.0 m (56.10 m OD).

The Northmoor Sand and Gravel was found to be variable and to initially generally comprise, with the exception of Borehole No 4, medium dense orange-brown to dark grey occasionally organic clayey silty gravelly sand or soft to firm sandy gravelly clay to depths of between 2.40 m (57.43 m OD) and 3.00 m (55.90 m OD). Soft low strength grey and orange-brown silty sandy gravelly clay with occasional plant remains extended to depths of between 5.00 m (53.90 m OD) and 6.30 m (52.80 m OD), although this was absent in Borehole No 3. It is thought that this represents flood plain material from within the Northmoor Sand and Gravel. A thin layer of either grey and orange-brown silty sand and gravel or a soft brown silty clay was then encountered and extended to a depth of between 5.30 m (53.60 m OD) and 6.80 m (52.20 m OD). Laboratory tests indicate the clay to be of low shrinkability.

The Oxford Clay Formation initially comprised soft fissured medium strength grey silty clay, which gradually became very stiff fissured high to very high strength silty clay with occasional sandy partings which extended to the maximum depth investigated of 20.00 m (39.00 m OD). A claystone was encountered in Borehole No 1 between 18.2 m and 18.3 m. Laboratory tests indicate the clay to be of medium shrinkability.

Fast inflows of groundwater were encountered in Borehole Nos 1 and 4 at depths of 6.2 m (52.80 m OD) and 6.30 m (52.80 m OD) respectively from within the Northmoor Sand and Gravel. The water in Borehole No 1 rose to 3.1 m (55.90 m OD) after a rest period of 20 minutes. Borehole Nos 2 and 3 encountered fast and slow groundwater inflows at 2.30 m (57.53 m OD) and 3.0 m (55.90 m OD) respectively. Groundwater was previously encountered as moderate to fast inflows in Trial Pit Nos 1, 2, 3, 5, 6, 7, 8, 9 and 10, which were dug from basement level. Groundwater was measured in these pits between depths of 0.10 m (57.70 m OD) and 1.20 m (57.80 m OD). A pump was used to complete some of the trial pits but it was not possible to control the inflows in Trial Pit Nos 5, 6 and 7. The pump was used to complete Trial Pit No 9 but Nos 8 and 10 were not completed as the water in these pits was found to have risen to near basement floor level and pumping was not feasible.

Standpipes were installed in Borehole Nos 2, 3 and 4 and the findings of four groundwater monitoring visits are presented in the table below.

Date	Borehole No	Depth to water (m) [Level (m OD)]
11 September 2012	2	2.15 [57.68]
	3	1.52 [57.38]
	4	2.67 [56.43]
20 September 2012	2	2.20 [57.63]
	3	1.58 [57.32]
	4	2.84 [56.26]
27 September 2012	2	1.96 [57.87]
	3	1.35 [57.55]
	4	2.39 [56.71]
8 October 2012	2	1.90 [57.93]
	3	1.28 [57.62]
	4	2.26 [56.84]

The table below sets out the values measured within 11 samples of made ground analysed; all concentrations are in mg/kg unless otherwise stated.

Determinant	Maximum concentration recorded (mg/kg)	Minimum concentration recorded (mg/kg)	Number of samples below detection limit	Normalised upper bound US_{95}
Arsenic	**34**	8.1	none	27.5
Cadmium	0.17	<0.1	10	0.1
Chromium	31	8.8	none	23.8

Determinant	Maximum concentration recorded (mg/kg)	Minimum concentration recorded (mg/kg)	Number of samples below detection limit	Normalised upper bound US_{95}
Copper	50	<5	1	23.8
Mercury	1.1	<0.1	4	0.4
Nickel	31	12	none	22.3
Lead	360	25	none	174.5
Selenium	<0.2	<0.2	11	0.2
Zinc	230	27	none	107.8
Total Cyanide	<0.5	<0.5	11	0.5
Total Phenols	<0.3	<0.3	11	0.3
Sulphide	22	2.1	none	8.6
Total PAH	**11**	<2	9	4.4
Benzo(a)pyrene	**1.1**	<0.1	9	0.4
Naphthalene	<0.1	<0.1	11	0.1
TPH	36	<10	10	16.6
Total Organic Carbon %	4.0	0.81	none	3.0

Note: The use of the normalised upper bound for 95th percentile confidence aims to remove some of the uncertainty associated with calculation of an arithmetic sample mean of a relatively small number of samples. The US95 value is the upper bound of the range within which it can be stated with 95% confidence that the true mean concentration of the data set will fall. Figure in bold indicates concentration in excess of risk-based soil guideline values, as discussed in Part 2 of this report

The results of the additional testing are in line with concentrations previously encountered and therefore recommendations made in the previous report are still valid.

Rootlets in Trial Pit No 1 were no deeper than 0.4 m and typically 1 to 2 mm in diameter but a couple of 15 mm diameter roots, which appeared dead, were noted at about 0.6 m. Trial Pit Nos 2, 3 and 4 all encountered roots of about 2 mm in diameter which were no deeper than 0.5 m. Roots in Trial Pit No 5 were generally located below the concrete paving slab and about 1 mm to 7 mm in diameter. Richardson's Botanical Identifications analysed root samples from each trial pit and Fraxinus (ash) and Hedera (ivy) were identified in Trial Pit No 1. Roots of a similar shrub were encountered in Trial Pit No 2, 3 and 5. Quercus (oak) roots were identified in Trial Pit No 5.

4.0 RECOMMENDATIONS

The additional investigation has generally confirmed the previous findings, in that made ground overlies the Northmoor Sand and Gravel, which was found to overlie the Oxford Clay Formation which appears to be shallower in the east of the site. The soils of the Northmoor Sand and Gravel were noted to generally be soft clays as previously encountered. On the basis of the monitoring, groundwater appears to be deeper toward the southwest, thus it is assumed to flow toward the southwest.

Our previous report suggested that piled foundations are likely to be required as the formation level for the proposed basement will be within the soft clay of the Northmoor Sand and Gravel which will not be suitable to support the proposed high loads. A secant bored pile wall is likely to be required to prevent groundwater inflows.

4.1 Basement Excavation

The proposed basement excavations will extend to a maximum depth of around 2.5 m (56.40 m OD). The investigation has indicated groundwater to be present at levels of between 57.93 m OD and 56.26 m OD and inflows are expected to be significant.

It would ideally be prudent to carry out a number of trial excavations, to depths as close to the full basement depth as possible to provide an indication of the likely groundwater conditions and to assess inflow rates as it is likely to be important at this site, especially near to the location of underpinning.

The design of basement support in the temporary and permanent conditions needs to take account of the need to maintain the stability of the excavation and surrounding structures, and to protect against groundwater inflows. In view of the likely level of the groundwater table, and the high inflow rates that have been indicated, it is apparent that bored pile walls will be required and at this stage it is considered that a secant bored pile walls should be used.

If the above mentioned trial pitting exercise indicates that groundwater inflows could be satisfactorily controlled then the existing foundations could be underpinned to form a retaining wall using a traditional 'hit and miss' approach. However, the use of this form of underpinning will require the soils being underpinned to stand unsupported, and difficulties are likely to be encountered with unsupported excavations, particularly if any perched groundwater is encountered. It is therefore essential that the groundworks contractor has a contingency plan in place to deal with any such instability if this method is carried out. Trial excavations or a 'test pin' would be prudent to provide an assessment of the stability of the clayey Northmoor Sand and Gravel such that the feasibility of underpinning could be confirmed. Jet grouting under foundation to form retaining walls may provide an alternative solution to traditional underpinning.

The ground movements associated with the basement excavation will depend on the method of excavation and support and the overall stiffness of the basement structure in the temporary condition. Thus, a suitable amount of propping will be required to provide the necessary rigidity. The stability of existing structures will need to be ensured at all times and the retaining walls may need to be designed to accommodate the loads from these foundations.

4.2 Basement Retaining Walls

The following parameters are suggested for the design of the permanent basement retaining walls.

Stratum	Bulk Density (kg/m^3)	Effective Cohesion (c' – kN/m^2)	Effective Friction Angle (□' – degrees)
Made ground	1700	Zero	27
Northmoor Sand and Gravel (clay)	1900	Zero	27
Northmoor Sand and Gravel (gravel)	1900	Zero	32
Oxford Clay	2100	Zero	25

The investigation has indicated that groundwater is likely to be present within the basement excavation. BS8102:2009[2] states that for basements not exceeding 4m deep a design water level should be ¾ the depth of the basement, alternatively a more practical method would be to use monitoring information to determine the design depth.

2 BS8102 (2009) *Code of practice for protection of below ground structures against water from the ground*

4.3 Basement Heave

The excavation of the proposed basement will result in a maximum unloading of approximately 45 kN/m^2.

The heave will comprise an "immediate" elastic component that may be expected to occur within the construction period, together with long term swelling movement that would theoretically occur over a period of many years. The effects of heave are likely to be mitigated to some extent by the loads applied by the by the new building.

The heave pressure will be approximately 50 % of the total heave, which would equate to approximately 25 kN/m^2. The final slab design should be based on the greater value of either the heave pressure or the uplift water pressure, assuming a design water level that is the highest of either the monitoring results or ¾ of the basement excavation.

An estimate of heave has been made, assuming a 2.5 m deep excavation. We have not allowed for any slab loadings and have assumed that structural loads will be supported by piles. Short term movements at the centre of the basement have been estimated about 15 mm to 20 mm, with an additional theoretical long term or swelling movement of about 20 mm. The applied loads would however serve to reduce the longer term movements, as would the piles and retaining walls.

4.4 Spread Foundations

Spread foundations bearing in the soft clays of the Northmoor Sand and Gravel may be designed to apply a net allowable bearing pressure of 75 kN/m^2 at a minimum depth of 0.75 m assuming that restrictions are applied on planting of shrubs in the vicinity of foundations, or at a depth of 1.0 m if there is unrestricted planting of shrubs in the new development, subject also to the further restrictions on new tree planting as detailed in the NHBC guidelines. This value incorporates an adequate factor of safety to ensure that settlement remains within normal tolerable limits.

Within the zone of influence of trees, foundations in clay will need to be deepened and National House Building Council (NHBC) guidelines should be followed in this respect. Low shrinkability clays should be used in calculations within the clayey deposits of the Northmoor Sand and Gravel. If the Oxford Clay is found at shallow depth, which may be the case in the east of the site, then medium shrinkability clays should be used in calculations. Deepening of foundations will not be required once granular soil has been encountered. Where trees are to be removed the required founding depth should be determined on the basis of the existing tree height if it is less than 50% of the mature height and on the basis of full mature height if the current height is more than 50% of the mature height. Where a tree is to be retained the final mature height should be adopted. Notwithstanding NHBC guidelines, all foundations should extend beyond the zone of desiccation. Due allowance should be made for future growth of the trees.

The requirement for compressible material alongside foundations should be determined by reference to the NHBC guidelines.

It is considered that given the age of the existing building that all settlement should now be complete. The bearing pressure given above for new foundations ensures that settlements should be within normal tolerable limits, however movement joints will be required where the new structure abut the original façade.

4.5 Piled Foundations

For the ground conditions at this site, driven or bored piles could be adopted. Driven piles

would have the advantage of minimising the spoil that is generated, but consideration would need to be given to the effects of noise and vibrations on neighbouring sites. Some form of bored pile will therefore be more appropriate. A conventional rotary augered pile could be considered, but temporary casing installed into the Oxford Clay would be required to protect against groundwater inflows and instability from the Northmoor Sand and Gravel. Therefore, to avoid the requirement for casing, bored piles installed using continuous flight auger (cfa) techniques are most suitable.

The following table of ultimate coefficients may be used for the preliminary design of bored piles based on the measured SPT and Cohesion / level graph in the appendix. For the purposes of preliminary design, groundwater has been assumed to be at a level of 57.90 m OD and depths of strata have been generalised.

Ultimate Skin Friction		***kN/m²***
Made ground and Northmoor Sand and Gravel	Ground level (59.0 m OD) to 2.5 m (56.5 m OD)	Ignore – basement excavation
Northmoor Sand and Gravel (sandy clay) ($\alpha = 0.4$)	2.5 m (56.5 m OD) to 7 m (52.0 m OD)	Increasing linearly from 10 to 30
Oxford Clay Formation ($\alpha = 0.5$)	7 m (52.00 m OD) to 20.0 m (39.0 m OD)	Increasing Linearly 40 to 125

Ultimate End Bearing		***kN/m²***
Oxford Clay	10.0 m (46.5 m OD) to 18.0 m (38.50 m OD)	Increasing linearly from 1350 to 2250

In the absence of pile tests, we have applied a factor of safety of 3.0 to the above coefficients to calculate the safe theoretical working loads.

On the basis of the above coefficients, applying a factor of safety of 3.0, it has been estimated that a 600 mm diameter pile extending to a depth of 17.5 m (41.50 m OD) below ground level, or 15.0 m below the proposed basement, should provide a safe working load of about 700 kN. A similar diameter pile extending to a depth of 20.50 m (38.50 m OD), or 18.0 m below the proposed basement should provide a safe working load of approximately 960 kN.

Tension capacities for 600 mm diameter piles to levels of 41.50 m OD and 20.50 m OD have been calculated using a factor of safety of two are 775 kN and 1100 kN respectively.

The above examples are not intended to constitute any form of recommendation with regard to pile size or type, but merely serve to illustrate the use of the above coefficients. Specialist piling contractors should be consulted with regard to the design of an appropriate piling scheme and their attention should be drawn to the presence of groundwater within the made ground, Northmoor Sand and Gravel and the claystone with the Oxford Clay.

4.6 Effect of Sulphates

Chemical analyses have revealed concentrations of soluble sulphate and near-neutral pH in samples of the soil, corresponding to Class DS-2 and AC-2 of Table 2 of BRE Special Digest 1 Part C (2005), assuming mobile groundwater conditions.

The guidelines contained in the above digest should be followed in the design of foundation concrete.

4.7 Waste Disposal

Any spoil arising from excavations or landscaping works, which is not to be re-used in accordance with the CL:AIRE guidance[3], will need to be disposed of to a licensed tip. Under the European Waste Directive, waste is classified as being either Hazardous or Non-Hazardous and landfills receiving waste are classified as accepting hazardous or non-hazardous wastes or the non-hazardous sub-category of inert waste in accordance with the Waste Directive. Waste going to landfill is subject to landfill tax at either the standard rate of £64 per tonne (about £120 per m^3) or at the lower rate of £2.50 per tonne (roughly £5 per m^3). However, the classifications for tax purposes and disposal purposes differ and currently all made ground and topsoil is taxable at the 'standard' rate and only naturally occurring rocks and soils, which are accurately described as such in terms of the 2011 Order[4], would qualify for the 'lower rate' of landfill tax.

Based upon on the technical guidance provided by the Environment Agency[5] it is considered likely that the made ground from this site, as represented by the eleven chemical analyses carried out, would be classified as NON-HAZARDOUS waste under the waste code 17 05 04 (soils and stones not containing dangerous substances) and would be taxable at the standard rate. It is likely that the natural soils, if separated out, could be classified as an INERT waste also under the waste code 17 05 04. This material would be taxable at the lower rate, if accurately described as naturally occurring clay in terms of the 2011 Order on the waste transfer note. As the site has never been developed or used for the storage of potentially hazardous materials, it is likely that WAC leaching tests would not be required for such inert waste going to landfill. This would however need to be confirmed by the receiving landfill site.

Under the requirements of the European Waste Directive all waste needs to be pre-treated prior to disposal. The pre-treatment process must be physical, thermal, chemical or biological, including sorting. It must change the characteristics of the waste in order to reduce its volume, hazardous nature, facilitate handling or enhance recovery. The waste producer can carry out the treatment but they will need to provide documentation to prove that this has been carried out. Alternatively, the treatment can be carried out by an approved contractor. The Environment Agency has issued a position paper[6] which states that in certain circumstances, segregation at source may be considered as pre-treatment and thus excavated material may not have to be treated prior to landfilling if the soils can be "segregated" on site by sufficiently characterising the soils insitu prior to excavation.

The above opinion with regard to the classification of the excavated soils and its likely landfill taxable rate is provided for guidance only and should be confirmed by the receiving landfill once the soils to be discarded have been identified.

The local waste regulation department of the Environment Agency (EA) should be contacted to obtain details of tips that are licensed to accept the soil represented by the test results. The tips will be able to provide costs for disposing of this material but may require further testing.

If consideration were to be given to the re-use of the soil as a structural fill on this or another site, in accordance with the Code of Practice for the definition of waste, it would be necessary to confirm its suitability for use, its certainty of use and to confirm that only as much material is to be used as is required for the specific purpose for which it was being used. A materials

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3 CL:AIRE (2011) *The Definition of Waste: Development Industry Code of Practice* Version 2, March 2011

4 *Landfill Tax (Qualifying Material) Order 2011*

5 Environment Agency (2008) *Hazardous Waste: Interpretation of the definition and classification of hazardous waste. Technical Guidance* WM2 Second Edition Version 2.2, May 2008

6 Regulatory Position Statement (2007) *Treating non-hazardous waste for landfill - Enforcing the new requirement* Environment Agency 23 Oct 2007

management plan could then be formulated and a tracking system put in place such that once placed the material would no longer be regarded as being a waste and thus waste management licensing and landfill tax would not apply.

5.0 OUTSTANDING RISKS AND ISSUES

This section of the report aims to highlight areas where further work is required as a result of limitations on the scope of this investigation, or where issues have been identified by this investigation that warrant further consideration. The scope of risks and issues discussed in this section is by no means exhaustive, but covers the main areas where additional work may be required.

The ground is a heterogeneous natural material and variations will inevitably arise between the locations at which it is investigated. This report provides an assessment of the ground conditions based on the discrete points at which the ground was sampled, but the ground conditions should be subject to review as the work proceeds to ensure that any variations from the Ground Model are properly assessed by a suitably qualified person.

An issue that requires careful consideration at this site is the extent to which groundwater will affect the basement excavation in the temporary condition and the groundwater level to be adopted in the permanent design. It would be prudent to carry out trial excavations and possibly a test pin to determine the rate of inflow and if they will be controllable.

Soft clays have been encountered across the site and the recommended bearing pressure for spread foundations has been limited to prevent overstressing of the soft clay.

We trust that we have provided sufficient information for your present requirements, but if you require any additional information please do not hesitate to contact us.

Yours sincerely
GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES

Matthew Elcock

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GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Ruskin College, Oxford, OX1 2HE	**Borehole Number** **BH2**
Boring Method Cable Percussion	**Casing Diameter**	**Ground Level (mOD)** 59.83	**Client** Exeter College	**Job Number** J12073A
	Location Small courtyard	**Dates** 29/08/2012- 30/08/2012	**Engineer** Stockley	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					59.73	(0.10)	Paving slab		
						0.10			
0.30	D					(0.40)	MADE GROUND (dark grey silty clayey gravelly sand with brick and concrete fragments)		
0.50	D				59.33	0.50			
							Medium dense orange-brown clayey silty gravelly SAND. Gravel is fine to coarse and subrounded to subangular		
1.20-1.65	CPT N=16		DRY	1,2/2,3,5,6					
1.20-1.65	B					(1.90)			
1.75	D								
2.00-2.45	CPT N=11	1.90	2.00	2,5/4,3,2,2					
2.00-2.45	B			FAST(1) at 2.30m, sealed at 3.00m.	57.43	2.40			▽1
2.50	D						Soft becoming stiff fissured high becoming very high strength dark blueish grey silty slightly sandy CLAY		
3.00-3.45	U	2.70	DRY	25 blows					
3.75	D								
4.00-4.45	SPT N=15	3.00	DRY	2,3/3,3,3,6					
4.00-4.45	D								
4.75	D								
5.00-5.45	U	3.00	DRY	35 blows					
6.00	D								
6.50-6.95	CPT N=14	3.00	DRY	6,3/,4,5,5					
6.50-6.95	D								
7.50	D								
8.00-8.45	U	3.00	DRY	40 blows					
9.00	D								
9.50-9.95	SPT N=23	3.00	DRY	3,4/5,5,6,7					
9.50-9.95	D								

Remarks
Starter pit excavated to 1.2 m to check for the presence of services and roots
Groundwater standpipe installed to a depth of 3.0 m
Water measured at a depth of 2.15 m (57.68 m OD) on the 11 September 2012
Water measured at a depth of 2.20 m (57.63 m OD) on the 20 September 2012
Water measued at a depth of 1.96 m (57.87 m OD) on the 27 September 2012
Water measured at a epth of 1.90 m (57.93 m OD) on the 8 October 2012

Scale (approx)	Logged By
1:50	ME

Figure No.
J12073A.BH2

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	Site Ruskin College, Oxford, OX1 2HE	Borehole Number BH2

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		59.83	Exeter College	J12073A
	Location	**Dates**	**Engineer**	**Sheet**
	Small courtyard	29/08/2012- 30/08/2012	Stockley	2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50	D								
11.00-11.45	U	3.00	DRY	50 blows					
12.00	D								
12.50-12.95	SPT N=26	3.00	DRY	5,6/6,7,6,7					
12.50-12.95	D								
13.50	D								
14.00-14.45	U	3.00	DRY	60 blows					
15.00	D					(17.60)			
15.50-15.95	SPT N=29	3.00	DRY	4,5/6,7,7,9					
15.50-15.95	D								
16.50	D								
17.00-17.45	U	3.00	DRY	60 blows					
18.00	D								
18.50-18.95	SPT N=35	3.00	DRY	4,6/7,7,10,11					
18.50-18.95	D								
19.25	D								
19.55-20.00	SPT N=36	3.00	DRY	6,7/7,8,10,11					
19.55-20.00	D				39.83	20.00			

Remarks

Scale (approx)	Logged By
1:50	ME

Figure No. J12073A.BH2

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	Site Ruskin College, Oxford, OX1 2HE	Borehole Number BH3
Boring Method Cable Percussion	**Casing Diameter**	**Ground Level (mOD)** 58.90	**Client** Exeter College	**Job Number** J12073A
	Location Main Courtyard	**Dates** 31/08/2012- 03/09/2012	**Engineer** Stockley	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(1.40)	MADE GROUND (dark brown clayey silty gravelly sand with occasional fragments of brick and chalk)		
1.20-1.65 1.20-1.65 1.50	CPT N=2 B D		DRY	1,1/1,0,1,0	57.50	1.40			
						(1.60)	Soft dark grey slightly organic very clayey sandy SILT with occasional gravel. Gravel is fine to coarse and subrounded to subangular		
2.00-2.45 2.00-2.45	CPT N=3 B	2.20	DRY	1,0/0,1,1,1					
2.75	D								
3.00-3.45	B			SEEPAGE(1) at 3.00m, sealed at 6.00m.	55.90	3.00			▽1
3.00-3.45	CPT N=6	2.90	DAMP	1,0/1,2,1,2			Soft orange-brown silty sandy gravelly CLAY. Gravel is fine to coarse and subrounded to subangular		
3.75	D								
						(2.00)			
4.00-4.45 4.00-4.45	CPT N=6 B	3.90	DAMP	1,1/2,1,2,1					
4.75	D								
5.00-5.45	CPT N=8	4.90	DAMP	2,1/2,2,2,2	53.90	5.00			
5.00	D					(0.30)	Soft brown silty CLAY with occasional fine gravel of quartz		
5.30	D				53.60	5.30			
							Soft becoming stiff fissured high strength dark blueish grey silty slightly sandy CLAY		
6.50-6.95	U	6.00	DRY	45 blows					
7.50	D					(4.70)			
8.00-8.45 8.00-8.45	SPT N=20 D	6.00	DRY	3,3/4,5,5,6					
9.00	D								
9.50-9.95	U	6.00	DRY	45 blows					
10.00-10.45	SPT N=24	6.00	DRY	2,3/5,7,6,6	48.90	10.00			

Remarks
Starter pit excavated to a depth of 1.2 m to check for services and roots
Groundwater standpipe installed to a depth of 7.0 m
Set up rig over posisiton, 3 hrs
Tidy up working areas and dismantle rig, 4 hrs
Water measured at a depth of 1.52 m (57.38 m OD) on 11 September 2012
Water measured at a depth of 1.58 m (57.32 m OD) on 20 September 2012
Water measured at a depth of 1.35 m (57.55 m OD) on 27 September 2012
Water measured at a depth of 1.28 m (57.62 m OD) on 8 October 2012

Scale (approx)	Logged By
1:50	ME

Figure No.
J12073A.BH3

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	Site Ruskin College, Oxford, OX1 2HE	Borehole Number BH3

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		58.90	Exeter College	J12073A
	Location Main Courtyard	**Dates** 31/08/2012- 03/09/2012	**Engineer** Stockley	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							Complete at 10.45m		

Remarks	Scale (approx)	Logged By
	1:50	ME
	Figure No. J12073A.BH3	

Geotechnical & Environmental Associates	Tyttenhanger House, Coursers Road, St Albans, AL4 0PG	Site: Ruskin College, Oxford, OX1 2HE	Borehole Number: BH4

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		59.10	Exeter College	J12073A
	Location	**Dates**	**Engineer**	**Sheet**
	Worcester College	28/08/2012-29/08/2012	Stockley	1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							MADE GROUND (dark grey silty clay with brick and tile fragments)		
0.76	D					(1.70)			
1.20-1.65	CPT N=6		DRY	2,1/2,1,2,1					
1.20-1.65	B								
					57.40	1.70			
1.75	D						MADE GROUND (dark grey and brown silty sandy clay with occasional gravel of brick, tile and concrete)		
2.00-2.45	CPT N=5		DRY	1,0/1,2,1,1					
2.00-2.45	B					(1.30)			
2.75	D								
3.00-3.45	CPT N=4	2.00	DRY	1,0/1,0,2,1	56.10	3.00	Soft orange-brown silty sandy gravelly CLAY with partings of clayey silt		
3.00-3.45	B								
3.75	D								
4.00-4.45	CPT N=4	3.00	DRY	1,2/1,0,1,2					
4.00-4.45	B								
						(3.30)			
4.75	D								
5.00-5.45	CPT N=7	4.50	DRY	1,2/2,1,2,2					
5.00-5.45	B								
6.00	D								
				FAST(1) at 6.30m, sealed at 7.00m.	52.80	6.30 (0.20)	Orange brown clayey silty sandy GRAVEL		▽1
6.50-6.95	CPT N=15	6.40	4.00	1,3/2,4,4,5	52.60	6.50	Firm becoming very stiff fissured typically very high becoming extreamly high strength dark blueish grey silty sandy CLAY		
6.50-6.95	D								
7.50	D								
8.00-8.45	U	7.00	DRY	40 blows					
9.00	D								
9.50-9.95	SPT N=23	7.00	DRY	3,4/5,5,6,7					
9.50-9.95	D								

Remarks

Starter pit dug to 1.2 m to check for the presencxe of servces and roots
Groundwater standpipe installed to a depth of 7.0 m
Set up rig over position, 2 hrs
Dismantle rig and move to next position, bag and remove exces spoil, 6 hrs
Water measured at a depth of 2.67 m (56.43 m OD) on 11 September 2012
Water measured at a depth of 2.84 m (56.26 m OD) on 20 September 2012
Water measured at a depth of 2.39 m (56.71 m OD) on 27 Septmber 2012
Water measured at a depth of 2.26 m (56.84 m OD) on 8 October 2012

Scale (approx)	Logged By
1:50	ME

Figure No. J12073A.BH4

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	Site Ruskin College, Oxford, OX1 2HE	Borehole Number BH4

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		59.10	Exeter College	J12073A
	Location Worcester College	**Dates** 28/08/2012- 29/08/2012	**Engineer** Stockley	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50	D								
11.00-11.45	U	7.00	DRY	50 blows					
12.00	D								
12.50-12.95	SPT N=25	7.00	DRY	4,5/5,6,6,8					
12.50-12.95	D								
13.50	D								
14.00-14.45	U	7.00	DRY	50 blows					
15.00	D					(13.50)			
15.50-15.95	SPT N=28	7.00	DRY	6,5/6,6,8,8					
15.50-15.95	D								
16.50	D								
17.00-17.45	U	7.00	DRY	50 blows					
18.00	D								
18.50-18.95	SPT N=34	7.00	DRY	4,6/7,8,8,11					
18.50-18.95	D								
19.55-20.00	CPT N=37	7.00	DRY	7,6/7,8,10,12					
19.55-20.00	D				39.10	20.00			

Remarks

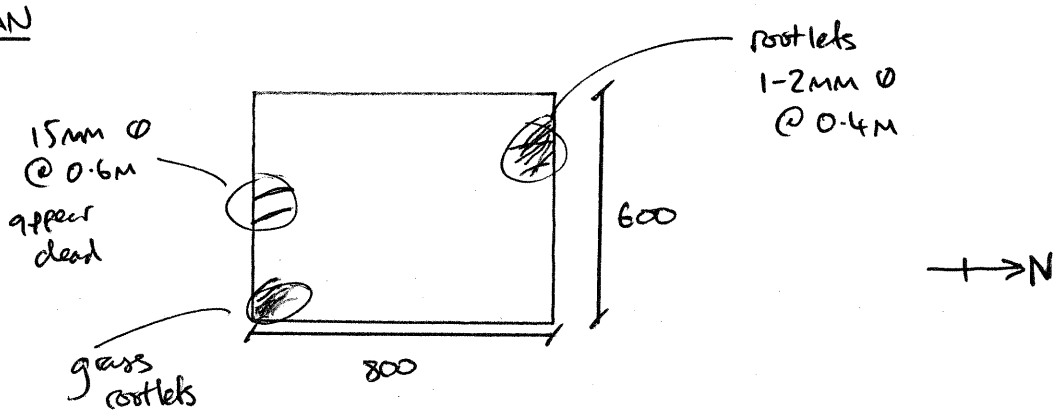
Scale (approx)	Logged By
1:50	ME

Figure No.
J12073A.BH4

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	Site Rusking College, Oxford, OX1 2HE	Trial Pit Number 1

Excavation Method Manual	Dimensions (mm)	Ground Level (mOD)	Client Exeter College	Job Number J12073A
	Location	Dates 28 to 30 August 2012	Engineer Stockley	Sheet 1 / 1

PLAN



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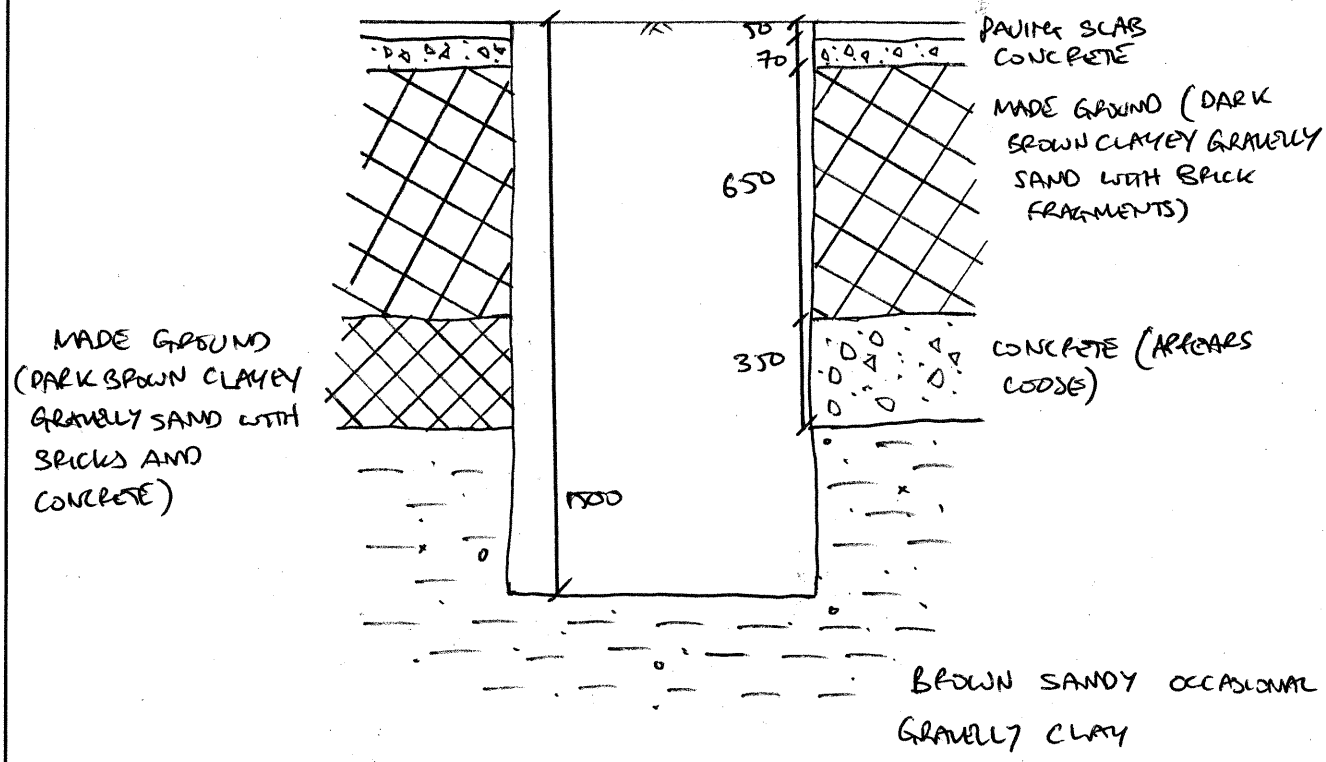
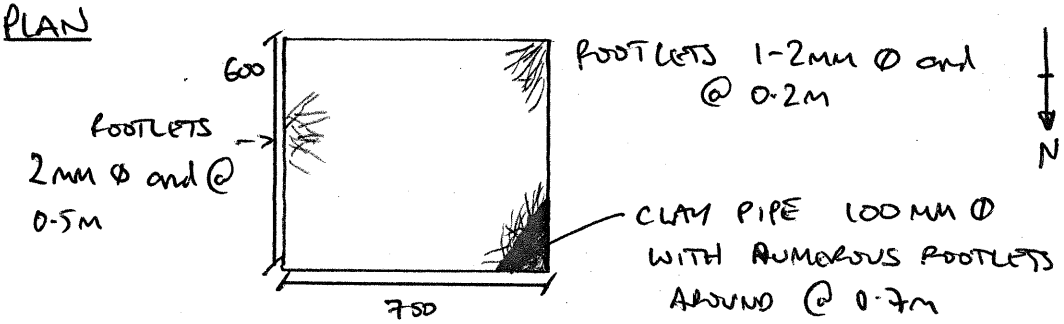


Water in base of trial pit from rain

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20
	Logged by: ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	Site Rusking College, Oxford, OX1 2HE	Trial Pit Number 2
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)**	**Client** Exeter College	**Job Number** J12073A
	Location	**Dates** 28 to 30 August 2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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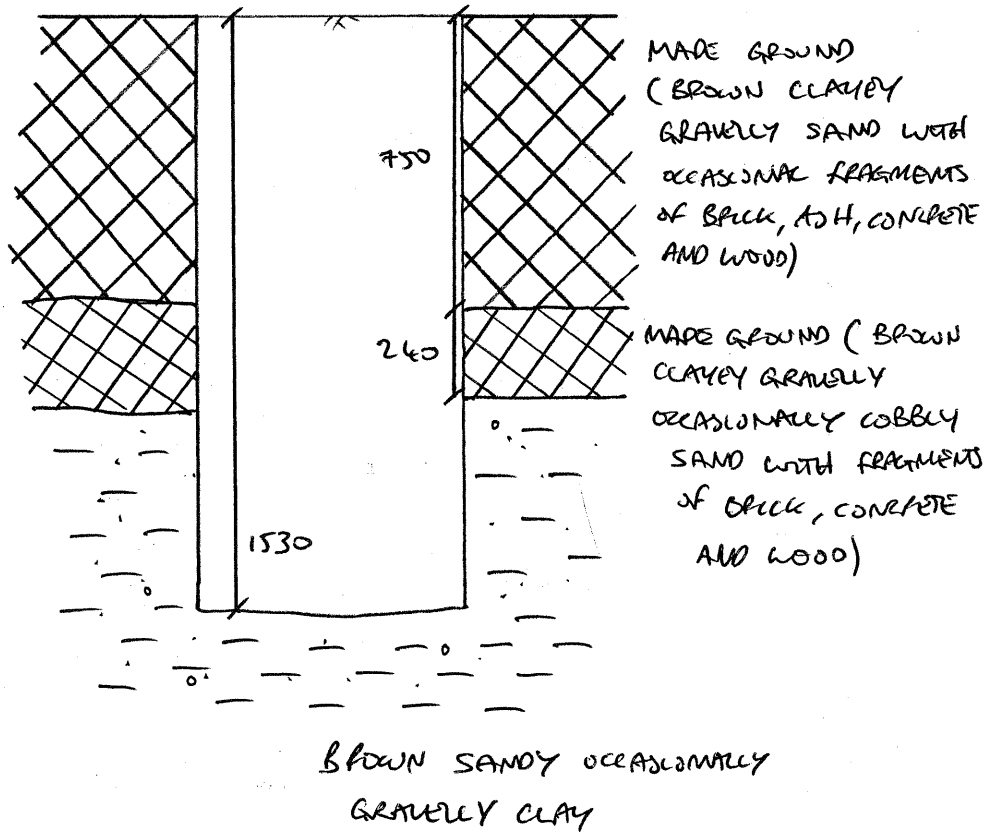
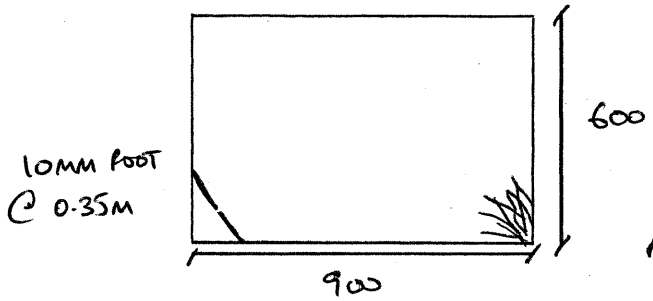


Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20
	Logged by: ME

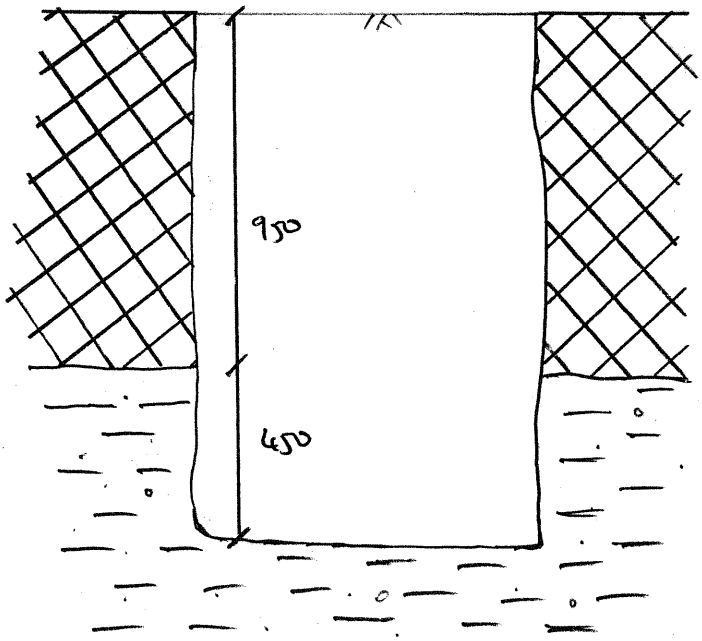
GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	**Site** Rusking College, Oxford, OX1 2HE	**Trial Pit Number** 3
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)**	**Client** Exeter College	**Job Number** J12073A
	Location	**Dates** 28 to 30 August 2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



FOOTLETS UNDER PAVING SLAB 1-2mm Ø @ 0.05m

TYPICAL SECTION



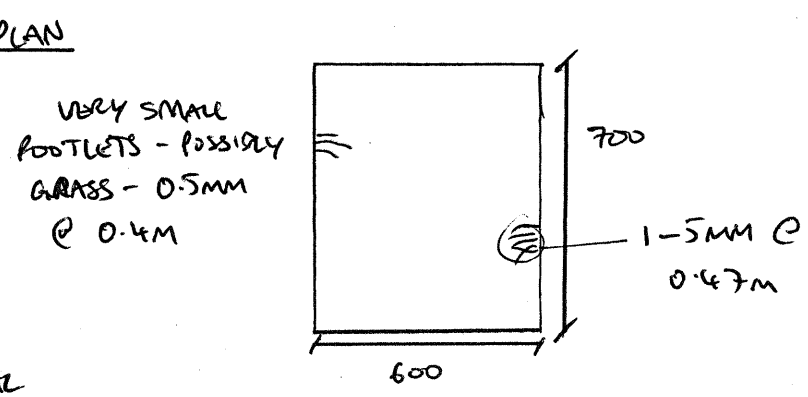
MADE GROUND. PAVING SLAB OVER PART OF TRIAL PIT (DARK BROWN CLAYEY GRAVELLY SAND WITH POTTERY, BRICK, CONCRETE AND BONE FRAGMENTS)

BROWN SANDY OCCASIONALLY GRAVELLY CLAY

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20 Logged by: ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	Site Rusking College, Oxford, OX1 2HE	Trial Pit Number 4
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)**	**Client** Exeter College	**Job Number** J12073A
	Location	**Dates** 28 to 30 August 2012	**Engineer** Stockley	**Sheet** 1 / 1

PLAN



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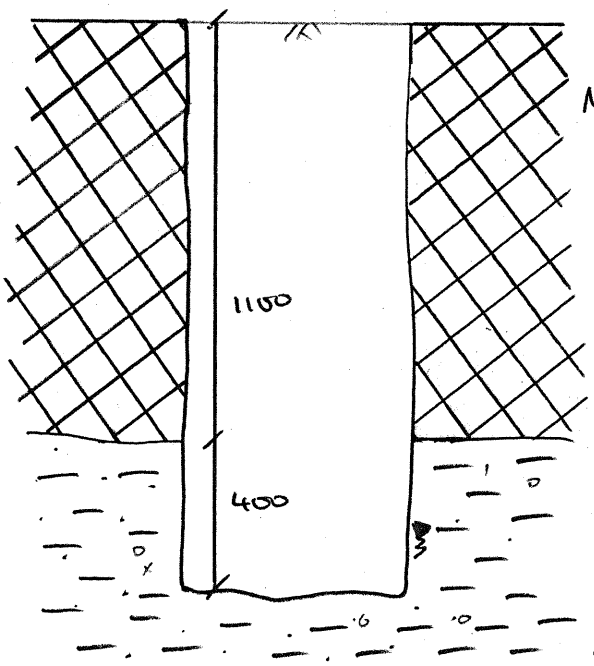


MADE GROUND (DARK BROWN CLAYEY GRAVELLY SAND WITH OCCASIONAL FRAGMENTS OF BRICK, CONCRETE & OCCASIONAL BLACK MOTTLING OF ORGANIC AND COAL MATERIAL)

BROWN SANDY OCCASIONALLY GRAVELLY CLAY

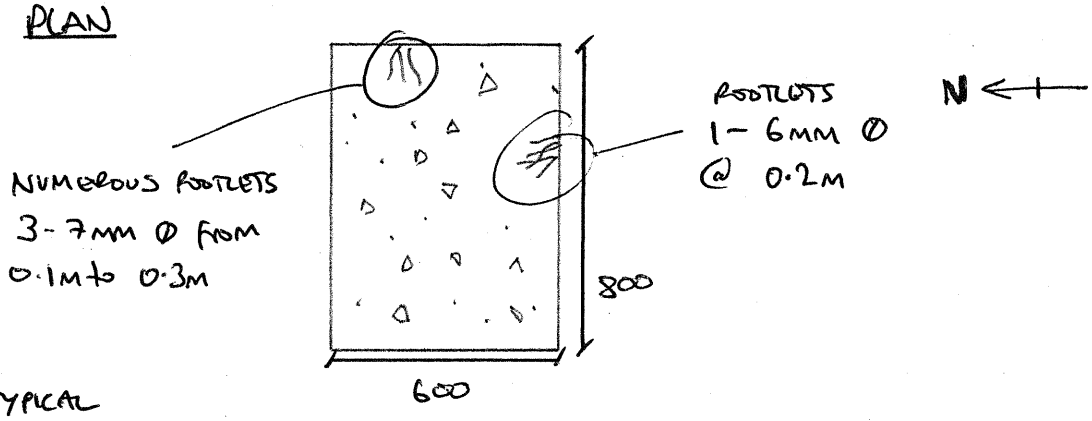
SEEPAGE OF GROUND WATER AT ABOUT 1.4M

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation	Scale: 1:20 Logged by: ME

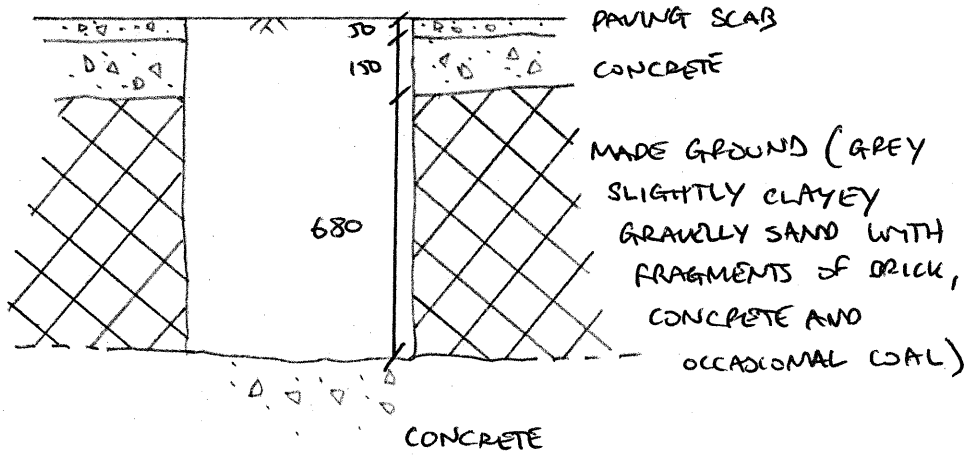
Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans Herts AL4 0PG	Site Rusking College, Oxford, OX1 2HE	Trial Pit Number 5

Excavation Method Manual	Dimensions (mm)	Ground Level (mOD)	Client Exeter College	Job Number J12073A
	Location	Dates 28 to 30 August 2012	Engineer Stockley	Sheet 1 / 1

PLAN



TYPICAL SECTION



Remarks: All dimensions in millimetres Sides of trial pit unstable during excavation	Scale: 1:20
	Logged by: ME

Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

Site Photographs

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073A

Sheet 1 / 2

Trial Pit No 1

Trial Pit No 2

Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

Site Photographs

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073A

Sheet 2 / 2

Trial Pit No 3

Trial Pit No 5

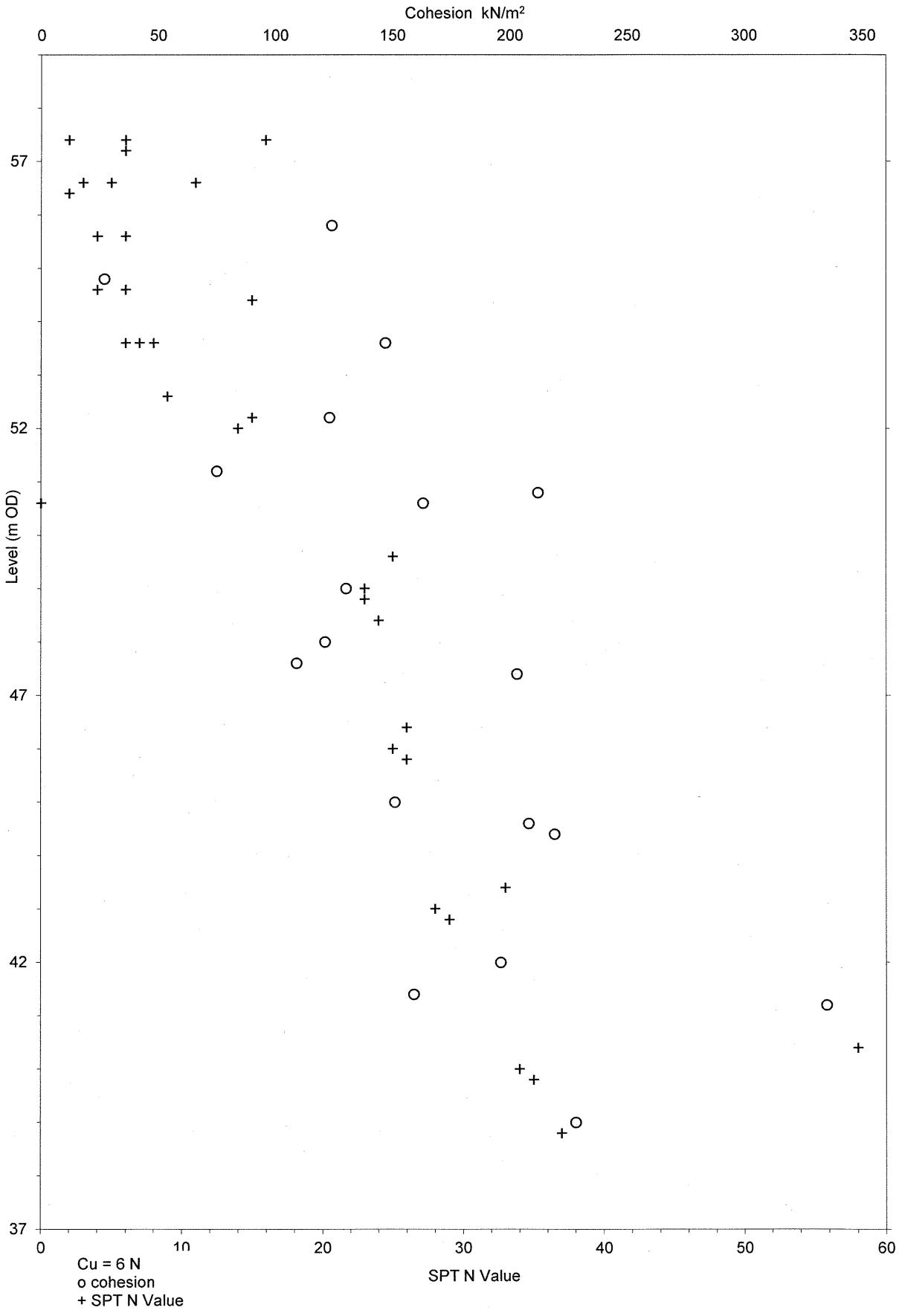
Geotechnical & Environmental Associates
Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

SPT & Cohesion / Level Graph

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073A

Sheet 1 / 1



Richardson's Botanical Identifications

Root identification
Vegetation surveys
Tree/Building investigations
Plant taxonomy

Dr Ian B K Richardson
BSc, PhD, PGCE, MSB, FLS
James Richardson
BSc (Hons. Biology)

Geotechnical & Environmental Associates
Tyttenhanger House
Coursers Road
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AL4 0PG

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49–51 Whiteknights Road
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Tel: (0118) 986 9552 *(Direct line)*
E-mail: richardsons@botanical.net
Web: www.botanical.net

07/09/2012

Your ref: **J12073A**
Our ref: 72/6010

Dear Sirs

Ruskin College, Oxford

The samples you sent in relation to the above on 31/08/2012 (received by us on 07/09/2012) have been examined. The structure was referable as follows:

TP1

1 root: FRAXINUS (Ash). Alive, recently*.

1 root: HEDERA (Ivy); also the related FATSIA (a robust shrub with fig-like leaves). 2 further roots, not examined in detail appeared similar under low magnification. Alive, recently*.

TP2

1 root: an unidentified SHRUB. Please send us twigs from nearby bushes if this is critical, and we should be able to give you a match. 2 further roots, not examined in detail appeared similar under low magnification. Alive, recently*.

1 piece of BARK only, insufficient material for identification.

TP3

1 root: a SHRUB, almost certainly the same type as from TP2, above. A further root, not examined in detail appeared similar under low magnification. Alive, recently*.

1 root: herbaceous (non-woody) plants.

TP4

1 root: again, the same SHRUB as TP2 and TP3. 3 further roots, not examined in detail appeared similar under low magnification. Alive, recently*.

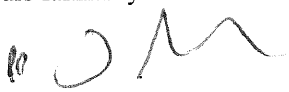
1 root: microscopic examination showed insufficient cells for recognition.

TP5

1 root: QUERCUS (Oak). 4 further roots, not examined in detail appeared similar under low magnification. Alive, recently*.

I trust this is of help. Please call us if you have any queries; our Invoice is enclosed.

Yours faithfully



Dr Ian B K Richardson

* Based mainly on the Iodine test for starch. Starch is present in some cells of a living woody root, but is more or less rapidly broken down by soil micro-organisms on death of the root, sometimes before decay is evident. This result need not reflect the state of the parent tree.

Identified with no information on vegetation, on or off site.

PROJECT NAME	RUSKIN COLLEGE, OXFORD, OX1 2HE	Date	24/09/2012
	Job Number: J12073A	Approved	Simon Burke
PROJECT NO:	GEO / 18711	Page	1 of 2

Sample details				Description	Classification Tests					Density Tests		Undrained Triaxial Compression Tests			Chemical Tests			Other tests and comments
Borehole No.	Depth (m)	No.	Type		MC (%)	LL (%)	PL (%)	PI (%)	<425 mic (%)	Bulk (Mg/m³)	Dry (Mg/m³)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)	pH	2:1 W/S SO4 (g/l)	Ground Water SO4 (g/l)	
BH2	1.20	-	B	Brown silty clayey gravelly SAND														Particle Size Distribution
BH2	2.50	-	D												8.3	0.34		
BH2	3.00	-	U	Stiff fissured grey silty CLAY	20	40	18	22	100	2.07	1.73	60	248	124				
BH2	5.00	-	U	Stiff fissured grey CLAY	22					2.10	1.72	100	295	147				
BH2	8.00	-	U	Very stiff fissured grey CLAY	22					2.17	1.78	160	425	212				
BH2	10.50	-	U	Dark greyish brown silty CLAY	23	52	21	31	100									
BH2	11.00	-	U	Very stiff fissured grey CLAY	23					2.22	1.80	220	405	203				
BH2	14.00	-	U	Very stiff fissured grey CLAY	21					2.11	1.74	280	437	219				
BH2	17.00	-	U	Very stiff fissured grey CLAY	24					2.11	1.70	340	319	159				
BH3	2.00	-	B	Brown gravelly very sandy CLAY. Gravel is fine to medium flint	33	39	23	16	72									
BH3	3.75	-	D	Brown sandy gravelly CLAY. Gravel is fine to medium flint	32	34	20	14	80						8.0	0.18		
BH3	5.30	-	D	Brown and grey slightly fine sandy silty CLAY	34	52	27	25	100									

SUMMARY OF GEOTECHNICAL TESTING

GEOLABS®

PROJECT NAME	RUSKIN COLLEGE, OXFORD, OX1 2HE	Date	24/09/2012
	Job Number: J12073A	Approved	Simon Burke
PROJECT NO:	GEO / 18711	Page	2 of 2

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression Tests			Chemical Tests			
Borehole No.	Depth (m)	No.	Type	Description	MC (%)	LL (%)	PL (%)	PI (%)	<425 mic (%)	Bulk (Mg/m³)	Dry (Mg/m³)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)	pH	2:1 W/S SO4 (g/l)	Ground Water SO4 (g/l)	Other tests and comments
BH3	6.50	-	U	Stiff fissured grey CLAY	34					2.16	1.62	130	246	123				
BH3	7.50	-	D												8.2	0.68		
BH3	9.50	-	U	Stiff fissured grey CLAY	23					2.12	1.72	190	261	130				
BH4	1.75	-	D	MADE GROUND: (Brown very sandy gravelly silty clay. Gravel includes, flint, concrete and pottery)	17	38	24	14	43									
BH4	3.00	-	B	Brown gravelly sandy silty CLAY. Gravel is fine to medium														Particle Size Distribution
BH4	4.00	-	D												8.1	0.067		
BH4	8.00	-	U	Very stiff fissured grey CLAY	21					2.12	1.75	160	326	163				
BH4	11.00	-	U	Stiff fissured grey CLAY	25					2.06	1.65	220	217	109				
BH4	14.00	-	U	Very stiff fissured grey CLAY	23					2.07	1.68	280	417	208				
BH4	17.00	-	U	Very stiff fissured grey CLAY	20					2.06	1.72	340	671	335				

SUMMARY OF GEOTECHNICAL TESTING

GEA
Tyttenhanger House
Coursers Road
St Albans Herts
AL4 0PG

FAO Matthew Elcock

LABORATORY TEST REPORT

Results of analysis of 3 samples received 10 September 2012

J12073A - Ruskin College, Oxford

Chemtest
The right chemistry to deliver results

Report Date
18 September 2012

Login Batch No					212579		
Chemtest LIMS ID					AH72124	AH72125	AH72126
Sample ID					BH2	BH2	BH3
Sample No							
Sampling Date					Not Provided	Not Provided	Not Provided
Depth					0.30m	0.50m	1.20m
Matrix					*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*			
2030	Moisture		%	n/a	12.9	13	14
	Stones content (>50mm)		%	n/a	<0.02	<0.02	<0.02
2040	Soil colour			n/a	brown	brown	brown
	Soil texture			n/a	clay	clay	clay
	Other material			n/a	stones	stones	stones
2010	pH			M	8.3	8.4	8.4
2300	Cyanide (total)	57125	mg kg-1	M	<0.50	<0.50	<0.50
2325	Sulfide (Easily Liberatable)	18496258	mg kg-1	M	4.6	2.2	2.1
2625	Total Organic Carbon		%	M	2.4	0.83	0.81
2220	Chloride (extractable)	16887006	g l-1	M	<0.010	<0.010	<0.010
2430	Sulfate (total) as SO4		mg kg-1	M	1300	600	300
2450	Arsenic	7440382	mg kg-1	M	20	27	15
	Cadmium	7440439	mg kg-1	M	<0.10	<0.10	<0.10
	Chromium	7440473	mg kg-1	M	18	20	22
	Copper	7440508	mg kg-1	M	18	13	23
	Mercury	7439976	mg kg-1	M	0.48	0.28	<0.10
	Nickel	7440020	mg kg-1	M	23	20	19
	Lead	7439921	mg kg-1	M	140	34	25
	Selenium	7782492	mg kg-1	M	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg-1	M	110	55	46
2670	TPH >C5-C6		mg kg-1	U	< 0.1 [1,2]	< 0.1 [1,2]	< 0.1 [1,2]
	TPH >C6-C7		mg kg-1	U	< 0.1 [1,2]	< 0.1 [1,2]	< 0.1 [1,2]
	TPH >C7-C8		mg kg-1	M	< 0.1 [1,2]	< 0.1 [1,2]	< 0.1 [1,2]

[1]The sample container/fill level was not appropriate for the specified analysis - these results may be compromised and will not be accredited (UKAS/MCerts)
[2]No sampling date was specified, stability times for this analyte may have been exceeded and these results may be compromised and will not be accredited (UKAS/MCerts)

All tests undertaken between 10/09/2012 and 17/09/2012

* Accreditation status

This report should be interpreted in conjuction with the notes on the accompanying cover page.

GEA
Tyttenhanger House
Coursers Road
St Albans Herts
AL4 0PG

FAO Matthew Elcock

LABORATORY TEST REPORT

Results of analysis of 3 samples received 10 September 2012

J12073A - Ruskin College, Oxford

Chemtest
The right chemistry to deliver results

Report Date
18 September 2012

					212579		
					AH72124	AH72125	AH72126
					BH2	BH2	BH3
					Not Provided	Not Provided	Not Provided
					0.30m	0.50m	1.20m
					SOIL	*SOIL*	*SOIL*
2670	TPH >C8-C10		mg kg-1	M	< 0.1 [1,2]	< 0.1 [1,2]	< 0.1 [1,2]
	TPH >C10-C12		mg kg-1	M	< 0.1 [1,2]	< 0.1 [1,2]	< 0.1 [1,2]
	TPH >C12-C16		mg kg-1	M	< 0.1 [1,2]	< 0.1 [1,2]	< 0.1 [1,2]
	TPH >C16-C21		mg kg-1	M	0.56 [1,2]	< 0.1 [1,2]	< 0.1 [1,2]
	TPH >C21-C35		mg kg-1	M	< 0.1 [1,2]	< 0.1 [1,2]	< 0.1 [1,2]
	Total Petroleum Hydrocarbons		mg kg-1	U	< 10 [1,2]	< 10 [1,2]	< 10 [1,2]
2700	Naphthalene	91203	mg kg-1	M	< 0.1	< 0.1	< 0.1
	Acenaphthylene	208968	mg kg-1	M	< 0.1	< 0.1	< 0.1
	Acenaphthene	83329	mg kg-1	M	< 0.1	< 0.1	< 0.1
	Fluorene	86737	mg kg-1	M	< 0.1	< 0.1	< 0.1
	Phenanthrene	85018	mg kg-1	M	0.19	< 0.1	< 0.1
	Anthracene	120127	mg kg-1	M	< 0.1	< 0.1	< 0.1
	Fluoranthene	206440	mg kg-1	M	0.32	< 0.1	< 0.1
	Pyrene	129000	mg kg-1	M	0.51	< 0.1	< 0.1
	Benzo[a]anthracene	56553	mg kg-1	M	0.28	< 0.1	< 0.1
	Chrysene	218019	mg kg-1	M	0.32	< 0.1	< 0.1
	Benzo[b]fluoranthene	205992	mg kg-1	M	0.3	< 0.1	< 0.1
	Benzo[k]fluoranthene	207089	mg kg-1	M	0.16	< 0.1	< 0.1
	Benzo[a]pyrene	50328	mg kg-1	M	0.32	< 0.1	< 0.1
	Dibenzo[a,h]anthracene	53703	mg kg-1	M	< 0.1	< 0.1	< 0.1
	Indeno[1,2,3-cd]pyrene	193395	mg kg-1	M	0.46	< 0.1	< 0.1
	Benzo[g,h,i]perylene	191242	mg kg-1	M	0.39	< 0.1	< 0.1
	Total (of 16) PAHs		mg kg-1	M	3.3	< 2	< 2
2920	Phenols (total)		mg kg-1	N	<0.3	<0.3	<0.3

[1]The sample container/fill level was not appropriate for the specified analysis - these results may be compromised and will not be accredited (UKAS/MCerts)
[2]No sampling date was specified, stability times for this analyte may have been exceeded and these results may be compromised and will not be accredited (UKAS/MCerts)

All tests undertaken between 10/09/2012 and 17/09/2012

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Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
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Generic Risk-Based Soil Guideline Values

Site	Ruskin College, Oxford, OX1 2HE	**Job Number**	J12073A
Client	Exeter College	**Sheet**	1 / 1
Engineer	Stockley		

Proposed End Use Residential with plant uptake

Soil pH 8

Soil Organic Matter content % 6.0

Contaminant	Guideline Value mg/kg	Data Source
Metals		
Arsenic	32	SGV
Cadmium	10	SGV
Chromium (III)	3000	LQM/CIEH
Chromium (VI)	4.3	LQM/CIEH
Copper	2,330	LQM/CIEH
Lead	450	withdrawn SGV
Elemental Mercury	1	SGV
Inorganic Mercury	170	SGV
Nickel	130	LQM/CIEH
Selenium	350	SGV
Zinc	3,750	LQM/CIEH
Hydrocarbons		
Benzene	0.33	SGV
Toluene	610	SGV
Ethyl Benzene	350	SGV
Xylene	230	SGV
Aliphatic C5-C6	110	LQM/CIEH
Aliphatic C6-C8	370	LQM/CIEH
Aliphatic C8-C10	110	LQM/CIEH
Aliphatic C10-C12	540	LQM/CIEH
Aliphatic C12-C16	3000	LQM/CIEH
Aliphatic C16-C35	76,000	LQM/CIEH
Aromatic C6-C7	See Benzene	LQM/CIEH
Aromatic C7-C8	See Toluene	LQM/CIEH
Aromatic C8-C10	151	LQM/CIEH
Aromatic C10-C12	346	LQM/CIEH
Aromatic C12-C16	593	LQM/CIEH
Aromatic C16-C21	770	LQM/CIEH
Aromatic C21-C35	1230	LQM/CIEH
PRO (C_5 –C_{10})	1351	Calc
DRO (C_{12} –C_{28})	80,363	Calc
Lube Oil (C_{28} –C_{44})	77,230	Calc
TPH	**500**	Trigger for speciated testing

Contaminant	Guideline Value mg/kg	Data Source
Anions		
Soluble Sulphate	0.5 g/l	Structures
Sulphide	50	Structures
Chloride	400	Structures
Others		
Organic Carbon (%)	6	Methanogenic potential
Total Cyanide	140	WRAS
Total Mono Phenols	420	SGV
PAH		
Naphthalene	8.70	LQM/CIEH
Acenaphthylene	850	LQM/CIEH
Acenaphthene	1,000	LQM/CIEH
Fluorene	780	LQM/CIEH
Phenanthrene	380	LQM/CIEH
Anthracene	9,200	LQM/CIEH
Fluoranthene	670	LQM/CIEH
Pyrene	1,600	LQM/CIEH
Benzo(a) Anthracene	5.9	LQM/CIEH
Chrysene	9	LQM/CIEH
Benzo(b) Fluoranthene	7.0	LQM/CIEH
Benzo(k) Fluoranthene	10.0	LQM/CIEH
Benzo(a) pyrene	1.00	LQM/CIEH
Indeno(1 2 3 cd) Pyrene	4.2	LQM/CIEH
Dibenzo(a h) Anthracene	0.90	LQM/CIEH
Benzo (g h i) Perylene	47	LQM/CIEH
Total PAH	**6.7**	B(a)P / 0.15
Chlorinated Solvents		
1,1,1 trichloroethane (TCA)	28	LQM/CIEH
tetrachloroethane (PCA)	4.8	LQM/CIEH
tetrachloroethene (PCE)	4.8	LQM/CIEH
trichloroethene (TCE)	0.49	LQM/CIEH
1,2-dichloroethane (DCA)	0.014	LQM/CIEH
vinyl chloride (Chloroethene)	0.00099	LQM/CIEH
tetrachloromethane (Carbon tetra	0.089	LQM/CIEH
trichloromethane (Chloroform)	2.7	LQM/CIEH

Notes

Concentrations measured below the above values may be considered to represent 'uncontaminated conditions' which do not pose a risk to human health. Concentrations measured in excess of these valuesindicate a potential risk, and thus require further, site specific risk assessment.

SGV - Soil Guideline Value, derived from the CLEA model and published by Environment Agency 2009

withdrawn SGV - Former SGV, derived from the CLEA 2000 model and published by DEFRA pending confirmation of new approach to modeling lead

LQM/CIEH - Generic Assessment Criteria for Human Health Risk Assessment 2nd edition (2009)derived using CLEA 1.04 model 2009

Calc - sum of nearest available carbon range specified including BTEX for PRO fraction

B(a)P / 0.15 - GEA experince indicates that Benzo(a) pyrene (one of the most common and most carcenogenic of the PAHs) rarely exceeds 15% of the total PAH concentration, hence this Total PAH threshold is regarded as being conservative

GEA Geotechnical & Environmental Associates

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Site Plan

Site	Ruskin College, Oxford, OX1 2HE
Client	Exeter College
Engineer	Stockley

Job Number J12073A

Sheet 1 / 1