CCG-C-13/7346a

PHASE I DESK STUDY REPORT FOR LAND AT BIDEFORD DRIVE, MANCHESTER, M23

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1.0 INTRODUCTION

CC GEOTECHNICAL LTD (***CCG***) is providing consultancy services to ***BYA Limited***, in connection with the proposed redevelopment of land at Bideford Drive, Brooklands, Manchester, M23 0QB.

It is proposed that the site be redeveloped for residential land use by the construction of 10nr residential dwellings comprising 5nr pairs of semi-detached properties, constructed in traditional brick elevations, together with gardens, hardstandings, and areas of soft landscaping. The proposed layout and elevations for this site are as shown on ***BYA Limited*** Drawing No.1766/201, presented in Appendix A.

The proposed redevelopment falls within the administrative jurisdiction of Manchester City Council.

A Phase I Desk Study Report was required in connection with the proposed development.

The report was devised to generally comply with the relevant principles and requirements of a wide range of guidance including BS5930:1999 as amended 2007: "Code of Practice for Site Investigations", BS10175: 2011 "Investigation of Potentially Contaminated Sites - Code of Practice", and the DEFRA/Environment Agency Report CLR11 "Model Procedures for the Management of Land Contamination".

This report should be read in conjunction with the Notes on Limitations, given in Appendix B.

2.0 PURPOSE & AIMS OF THE STUDY

The primary aim of the Phase I Desk Study was to assess whether the site is likely to be affected by contamination, to an extent that it may pose a risk to human health and/or the built environment and/or the wider natural environment, or is affected by any other natural or man-made features which may impact on the proposed redevelopment.

Specific tasks undertaken to achieve these objectives were as follows:

- Undertaking of a review of available historical mapping, environmental databases, and Environment Agency data
- Undertaking of s site walkover inspection
- Development of Preliminary Conceptual Model
- Development of a Phase 2 intrusive investigation strategy

3.0 SITE DATA

3.1 Site Location

The site is located to the north of Bideford Drive, Brooklands, Manchester, M23 0QB, as shown on Drawing No.7346a-1, and Aerial Plate No.7346a-2, presented in Appendix A. the Ordnance Survey coordinates for the approximate site centre is 380770,389464. It stands at an approximate elevation of 35maOD.

3.2 Site Description & Walkover Observations

The site was visited during October 2013 on completion of a review of all relevant historical and environmental mapping data (provided in Appendix D). Photographs taken at the time of the site visit are presented in Appendix E.

It was observed that the site is situated within an established residential context and comprises a rectangular shaped parcel of land extending to approximate dimensions of 80m x 26m, its long axis being on an approximate west-east alignment. It was observed that the site was being utilised as a car parking facility.

The site is adjoined to the north by an extensive area of public amenity grassland, and to the west by 2nr storey residential properties. Its eastern and southern boundaries are delineated by a multi storey residential apartment block (Moorcroft Court), and by Bedford Drive, respectively.

The topography across the site was observed to be generally flat before rising slightly towards a grassed verge and public pavement fronting on to Bideford Drive. It surface is predominately poorly maintained tarmac accommodating surface water drainage channels and gullies, with patches of perennial herbs throughout, and stripes of maintained and neglected grassed margins, occasionally populated by mature and immature deciduous woodlands species around its periphery. A portacabin is sited on land to the east of the site.

A square metal drainage cover was observed within the grassed lawn fronting Bideford Drive.

No native and/or non-native invasive plant species were observed within, or adjoining, the boundary.

Vehicle and pedestrian access is via Bideford Drive.

The information obtained from the visit is summarised in Table 1 hereunder.

Table 1: Summary of Walkover Observations

FEATURE		OBSERVATION
Current Use of Land		Car parking facility
Context		Residential / commercial context
Surfaces		Predominantly poorly maintained tarmac with maintained and neglected grassed margins around the periphery
Topography		Generally flat, rising slightly towards public highway to the S
Dimensions		Overall site approximately 80m x 26m,
Access		Vehicle access via Bideford Drive
Buildings Adjacent To the Site		Residential buildings to the E & W Salvation Army property & residential properties to the S
Services		Rainwater gullies set within hard pavement
Boundary	North	2m security fencing backed by extensive amenity grassland
	West	2nr storey residential properties
	South	Public pavem,ent
	East	High rise accommodation apartment (Moorcot)
Material storage		None observed though porta cabin is located within site boundary
Waste disposal		None observed
Other potential contamination		Potential hydrocarbons associated with onsite car parking facility
Ecology*		Non observed

**These comments on the ecology are for initial preliminary assessment only and are based on observations undertaken by a person who is a trained ecologist but who has not undertaken a comprehensive Phase I Habitat Survey or similar.*

4.0 SITE HISTORY

The history of the site and its immediate surrounds was investigated by consultation with a range of archive resources. Geographical information, historical mapping and environmental data were primarily based on a GroundSure Environmental Report (Reference No. CMAPS-AAG-264997-4165-141013, dated October 2013 which is presented in Appendix D.

A summary of the historical mapping data is given hereunder:

Table 2: Historical Map Review

YEAR	SCALE	ON SITE	ADJACENT TO SITE	<250M
1874-1876 1897 1898	1:2,500 1:10,560 1:2,500	Site utilised for agricultural land use	Adjoining land utilised for agricultural land use.	Surrounding land predominantly utilised for agricultural land use. Waterway c.40m W. Lower Mount Pleasant & School/congregational chapel c180m SW. Royal Oak public house 140m SE. Large ponds 140m NE. Waterway 150m N. Farm accommodating an orchid c.190m SE. unspecified buildings c.130m S.
1905-1907 1907-1908 1907-1911 1910	1:10,560 1:10,560 1:10,560 1:2,500	No significant change	No significant change	Sycamore Farm c.100m SW.
1916	1:10,560	No significant change	No significant change	No significant change
1922 1923	1:2,500 1:10,560	No significant change	No significant change	Development of residential semi-detached dwellings c.120m S
1935 1938	1:2,500 1:10,560	No significant change	No significant change	Significant redevelopment of nearby traffic infrastructure to the S. Land to the S & SE developed for residential & commercial land use. Amenity land to the rear of, and adjacent, the Royal Oak public house
1949-1955	1:10,560	Site fully developed by the construction of prefabricated dwellings	Land to the E & W fully developed by the construction of prefabricated dwellings	Land to the E & W fully developed for mixed residential & commercial land use by the construction of predominantly prefabricated structures.
1958 1959	1:2,500 1:1,250	No significant change	N significant change	Land to the north of the site now shown as playing fields
1964-1967	1:10,560	No significant change	No significant change	No significant change
1970-1975 1972-1977	1:10,000 1:1,250	Site cleared of all buildings	Land to the E & W redeveloped for continued residential land use.	All/most prefabricated building surrounding the site not shown. Land redeveloped for continued residential/commercial land use.
1985-1990 1988-1990 1990-1992 1992 1995	1:1,250 1:10,000 1:1,250 1:1,250 1:10,000	No significant change	No significant change	Land c.50m S of site redeveloped for residential land use
2002 2011 2011	1:10,000 1:,2,500 1:10,000	No significant change	No significant change	No significant change

5.0 ENVIRONMENTAL SETTING

5.1 Geology

The geology of the site was researched by reference to the 1:50000 scale British Geological Survey (BGS) Sheet 098 (1962) Stockport (Solid and Drift Editions)

The BGS Solid and Drift map indicate the site to be underlain with Glaciofluvial Sheet Deposits comprising coarse sands and gravels with Boulder Clay of Glacial Origin (Devensian) underlying. The solid geology is documented as the Bollin Mudstone Member (known as the *Lower Keuper Marl*) comprising argillaceous mudstone with siltstones of the (*Anisian*) Triassic Period.

As with many developed sites, made ground of an unknown extent and thickness may be present at the surface.

Geological Information obtained from the GroundSure Environmental Report is presented in Appendix D, and summarised hereunder:

Table 3: Summary of Geological Data from GroundSure Report

GEOLOGY			
Data		**Distance**	**Comments**
Artificial Ground		N/A	Artificial ground is not present
Superficial Deposits / Drift Geology		On Site	Glaciofluvial Sheet Deposits & Boulder Clay of Glacial Origin
Permeability of Boulder Clay Deposits		Maximum Permeability	High
		Minimum Permeability	Low
Permeability of Glaciofluvial Deposits		Maximum Permeability	Very High
		Minimum Permeability	High
Bedrock and Solid Geology		On Site	Bollin Mudstone Member (known as the Lower Keuper Marl) comprising argillaceous mudstone with siltstones of the (Anisian) Triassic Period
Permeability of Bedrock	On Site	Minimum Permeability	Low
		Maximum Permeability	Low
Faults		On Site	None
		<250m	None
Radon Affected Area		N/A	Less than 1% of properties are above the action level
Radon Protection		N/A	No radon protective measures are necessary

HISTORIC AND CURRENT GROUNDWORKINGS		
Data	**Distance**	**Comments**
Historical Land Use	On site	No records
	<250m	139 – 147m N – NE (Ponds 1905-1947)
Historical Underground Workings	<500m	No records
Current BGS Ground Workings	<500m	No records
Historical Mining	<500m	No records
Are there any coal mining areas within 1km of the study site?	<1000m	No records
Non-Coal Mining Activities	<1000m	No records
Non-Coal Mining Cavities	<1000m	No records
Natural Cavities	N/A	No records
Brine Extraction Activities	N/A	No records
Gypsum Extraction	N/A	No records
Tin Mining	N/A	No records
Clay Mining	N/A	No records

HAZARDS		
Data	**Distance**	**Comments**
Maximum Shrink-Swell hazard rating	On site	Negligible - Very Low
Maximum Landslide hazard rating	On site	Very Low
Maximum Soluble Rocks hazard rating	On site	Null-Negligible
Maximum Compressible Deposits hazard rating	On site	Negligible
Maximum Collapsible Deposits hazard rating	On site	Very Low
Maximum Running Sand hazard rating	On site	Very Low

5.2 Mining

Geological mapping and the Coal Authority Gazetteer confirm the site is not within an area which may be affected by historical coal mining activity and therefore a Coal Authority Coal and Brine Report was not procured.

5.3 Hydrology and Hydrogeology

Information on hydrology and hydrogeology obtained from a GroundSure Environmental Report is presented in Appendix D, and summarised hereunder:

Table 4: Summary of Hydrology and Hydrogeological Data from GroundSure Environmental Report

HYDROGEOLOGY AND HYDROLOGY		
Aquifer within Boulder Clay Deposits	On site	**Boulder Clay Deposits:** These are drift deposits with low permeability that have negligible significance for water supply or river base flow
Aquifer within Glaciofluvial Sheet Deposits	On site	**Glaciofluvial Sheet Deposits: Secondary A Aquifer:** Permeable deposits capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
Aquifer within Bedrock Deposits	On site	**Bollin Mudstone Secondary B Aquifer:** Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
Groundwater Abstraction licenses	<1000m	None
Surface water abstraction licenses	<1000m	None
Potable Water Abstraction Licences	<1000m	None
Nearest surface water body	<250m	None
Source Protection Zones	<250m	None
River Quality	<1000m	No data
Are there any detailed River Networks within 250m of Site?		189m N. Baguley Brook. Primary River 240m N. Baguley Brook, Culvert

FLOODING		
Environment Agency indicative Zone 2 floodplains	<250m	167 – 250m N NE Zone II Floodplain (Fluvial Models)
Environment Agency indicative Zone 3 floodplains	<250m	167m N. Zone III Floodplain (Fluvial Models)
Areas benefiting from Flood Defences	<250m	None
Are there any areas used for Flood Storage?	<250m	No
What is the BGS Flood Risk Susceptibility Rating?		Very High Susceptibility to Groundwater Flooding

For simplified interpretation, the geological succession underlying the site may be regarded as a series of discrete units in terms of their Hydrogeological significance, as illustrated hereunder:

Table 5: Hydrogeological Interpretation

UNIT	PROPERTIES	HYDROGEOLOGICAL DESIGNATION
Made Ground	If present, likely to be generally granular and permeable and will permit vertical and lateral transmission of groundwater. Such deposits are highly susceptible to groundwater contamination.	Unproductive
Boulder Clay Deposits	These are drift deposits with low permeability that have negligible significance for water supply or river base flow	Unproductive
Glaciofluvial Sheet Deposits	Permeable deposits capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers	Secondary A
Bollin Mudstone Member	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers	Secondary B

6.0 FURTHER ENVIRONMENTAL DATA

Environmental data was researched using several sources including Environment Agency Maps and GroundSure Envirosight Report presented in Appendix D, and is summarised hereunder in Table 6. This environmental data has been used to carry out a Preliminary qualitative Risk Assessment (Tier 1) and formulate the preliminary conceptual model as discussed in Section 8.0 of this report.

Table 6: Summary of Environmental Data

STATUTORY AUTHERISATIONS		
Data	**Distance**	**Comments**
Records of historic IPC Authorisations within 500m of the study site:	<500m	No records
Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:	<500m	No records
Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:	<500m	No records
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:	<500m	No records
Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:	<500m	No records
Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:	<500m	No records
Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:	<500m	160m SW. Shell Baguley, Altrincham Road. Part B 413m S. Dresser Rand Uk Ltd., Southmoor Road, Part B 441m W. Tesco Stores LTD(Baguley), Part B
Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site:	<500m	412m SW. C9831 412m SW. AC9742 412m SW. AC9777 412m SW. AK1258 412m SW. AC9769 412m SW. BS7293 412m SW. BS7293
Records of Licensed Discharge Consents within 500m of the study site:	<500m	No records
Records of Planning Hazardous Substance Consents & Enforcements within 500m of study site	<500m	No records
Records of COMAH & NIHHS sites within 500m of study site	<500m	No records
Records of National Incidents Recording System, List 2 within 250m of the study site:	<500m	No records
Records of National Incidents Recording System, list 2 within 500m of study site	<500m	No records
How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?	<500m	No records

Records of Potentially Contaminative Land Uses		
Data	**Distance**	**Comments**
Current Land Uses within 250m of study site	<250m	103m SE. Gas Governor 105m SE. Gas Governor Station 129m S. MJB Travel 150m S. Elect substation 171m SW. Shell UK 171m SW. Shell 185m NW. Elect substation
Petrol & Fuel Sites	<250m	136m SW. Shell
Underground High Pressure Oil and Gas Pipelines	<250m	No records

LANDFILL & OTHER WASTE SITES		
Data	**Distance**	**Comments**
Records from Environment Agency landfill data within 1000m of the study site:	<1000m	None
Records of Environment Agency historic landfill sites within 1500m of the study site:	<1500m	None
Records of BGS/DoE non-operational landfill sites within 1500m of the study site:	<1500m	None
Records of Local Authority landfill sites within 1500m of the study site:	<1500m	None
Records of waste treatment, transfer or disposal sites within 500m of the study site:	<500m	350m W. Recycling facility
Records of Environment Agency licensed waste sites within 1500m of the study site:	<1500m	None

DESIGNATED ENVIRONMENTALLY SENSITIVE SITES		
Data	**Distance**	**Comments**
Records of SSSI within 500m of site	<500m	None
Records of NNR within 500m of site	<500m	None
Records of SAC's within 500m of site	<500m	None
Records of SPA's within 500m of site	<500m	None
Records of Ramsar sites within 500m of site	<500m	None
Records of LNR sites within 500m of site	<500m	None
Records of ESA within 500m of site	<500m	None
Records of AONB within 500m of site	<500	None
Records of Nitrate Sensitive Areas within 500m of site	<500m	None
Records of Nitrate Vulnerable Zones within 500m of site	<500m	Onsite – NVZ Zone (DEFRA)
Records of Ancient Woodlands within 500m of site	<500m	None

7.0 PREVIOUS SITE INVESTIGATIONS / REPORTS

Searches and consultations have not established if previous site investigations have been undertaken on the subject site.

8.0 PRELIMINARY QUALITATIVE RISK ASSESSMENT (TIER 1)

8.1 Introduction

The risk assessment methodologies adopted by ***CCG*** are based on current available guidance from a number of sources and are included in Appendix D.

The Tier 1 Risk Assessment and Preliminary Conceptual Model (PCM) were formulated using the information discussed above and based on the following assumptions:

- It is proposed that the site be redeveloped for residential land use by the construction of 10nr residential dwellings comprising 5nr semi-detached properties, constructed of traditional brick elevations under pitched tile roofing materials, together with associated hard paved car parking facilities and areas of soft landscaping
- Drinking water will be from a mains supply.

8.2 Credible Potential Sources of Contamination

A low risk of a legacy of contamination was identified in the desk study, site inspections, and reviews of historical mapping and published environmental data. The land uses to which the site has been put are unlikely to have been potentially contaminative.

However, some potentially contaminative land uses or features warrant further assessment as summarised hereunder and these have been carried forward to the conceptual model discussed in Section 6.4 hereunder:

- Made ground and imported made ground associated with development of site and adjoining area
- Migrating ground gases associated with superficial made ground deposits and nearby water course/historical in-filled ponds
- Hydrocarbons associated with on-site car parking facilities

The contaminants of concern associated with these potential sources were researched by reference to published industry profiles, and are summarised hereunder:

Table 7: Summary of Contaminants of Concern

SOURCE	METALS	NON-METALS	ORGANICS	GASES	OTHERS
Made Ground /Imported made ground associated with the development & redevelopment of the site & adjoining area	Be, Cd, Cr (total and VI), Ni, Cu, Pb, Hg, Se	As, sulphates	Hydrocarbons PAH's	-	pH Asbestos
Migrating gases associated made ground & nearby water course & historical ponds	-	-	-	CH_4, CO_2, H_2S	-
Hydrocarbons associated with onsite car parking facilities	-	-	Hydrocarbons BTEX	-	-
Summary Suite	Be, Cd, Cr (total and VI), Ni, Cu, Pb, Hg, Se	As, sulphates	Hydrocarbons BTEX PAH's	CH_4, CO_2, H_2S	pH Asbestos

8.3 Potential Receptors

Credible potential receptors of contamination on this site may be evaluated as hereunder:

Table 8: Potential Receptors

RECEPTOR	IS RECEPTOR PRESENT?
Human beings (construction workers)	Yes – Construction workers will be exposed during the construction phase of the development.
Human beings (future occupants)	Yes - The site is to be redeveloped for residential land use. Future workers/occupants to include both male & females (adults & infants)
Designated ecological systems	No – No sensitive systems on or adjoining the site
Property in the form of buildings (on site)	Yes – There will be residential buildings on site
Property in the form of buildings (adjacent)	Yes – The site is adjoined by residential / commercial properties
Property in the form of crops/livestock (on site)	No - There are no crops or livestock present on site
Property in the form of crops/livestock (adjacent)	No - The are no crops or livestock adjacent to the site
Potable water mains (on site)	Yes – Development will be served by water mains
Potable water mains (off site)	No – Services for adjacent properties should not run through the site
Perched soil water (underlying site)	Yes – Perched water may be present in the superficial made ground / drift soils
Groundwater (underlying aquifer)	Yes – Underlying bedrock is a Secondary B Aquifer
Groundwater abstractions	No - There are no licensed groundwater abstractions on site or within 500m of the site.
Surface water bodies	None
Local flora and fauna during and post construction	No- No important ecological features on or adjoining the site.

8.4 Pollutant Linkages / Preliminary Conceptual Model

Pollutant linkages potentially exist between each identified contamination source and each identified receptor as illustrated in the Preliminary Conceptual Model summarised in Table 9 hereunder:

Table 9: Summary of Potential Pollutant Linkages / Preliminary Conceptual Model

SOURCE	RECEPTOR	PATHWAY
Soil contamination as listed in Table 7	Construction workers	Dermal contact
		Ingestion of soil/soil dust (outdoors)
		Inhalation of soil/soil dust (outdoors)
		Inhalation of vapours from soil (outdoors)
	Future occupants	Dermal contact
		Ingestion of soil/soil dust (indoors & outdoors)
		Inhalation of soil/soil dust (indoors & outdoors)
		Inhalation of vapours from soil (indoors & outdoors) Contaminants adhered to home grown food produce
	Building fabric	Direct contact with aggressive soils
	Potable water supply for human consumption.	Direct contact with contaminated soils and/or groundwater
	Perched soil water	Dissolution of contaminants from made ground

Gas arising from made ground,	Future worker occupants	Inhalation of asphyxiant gases Accumulation of explosive gas / air mixtures
Contaminated perched groundwater water	Underlying controlled waters in superficial deposits linked to the wider aquatic environment	Vertical and lateral migration of impacted groundwater

8.5 Summary of Risks

Based on the foregoing analysis, there is a credible potential for pollution linkages to exist, and if present, these could adversely impact on human or environmental receptors. Given the sensitive end use proposed for the site, and since no previous site investigation has been undertaken, an intrusive phase of investigation is recommended to determine whether the postulated pollutant linkages are actually present on site.

9.0 AIMS AND PROPOSED SCOPE OF PHASE II INTRUSIVE INVESTIGATION

Based on the findings of this Phase 1 desk study, and taking account of the proposed form of development, an intrusive investigation is proposed. The Phase II Intrusive Investigation should include for exploratory holes to be sunk through made ground into the underlying natural strata.

The primary objectives of ground investigations are to obtain enough data to reliably ascertain ground conditions on site, and also to aid confirmation of the potential pollution linkages identified within the Preliminary Conceptual Model above. Sufficient soil and groundwater/soil leachate contamination data should be obtained to reliably characterise the underlying ground conditions on site, allowing the Preliminary Conceptual Model to be tested and refined by the performance of a quantitative risk assessment.

Using the guidance contained in BS10175: 2011, for a relatively small site, it is proposed that 8nr boreholes be sunk by light dynamic sampling methods to a nominal depth of 5mbgl.

Selective boreholes will be utilised for the installation of standpipes thus enabling a programme of groundwater level monitoring, groundwater sampling and ground gas monitoring, to be undertaken. To comply with CIRIA C665 for a “Moderate” risk site, it is proposed that gas monitoring is undertaken on 6nr occasions over a period of 3 months.

The prime objective of the proposed boreholes is to provide reliable soil/groundwater data and to assess the soil engineering properties of the subsoils in relation to the design of suitable foundations.

The proposed scope of works is summarised in Table 10 hereunder:

Table 10: Proposed Scope of Works

RISK	METHOD OF ASSESSMENT
Is the superficial ground impacted by contamination to the extent it may present a risk to human health?	8nr boreholes to be sunk to a nominal depth of 5mbgl. The stratigraphy of the borehole will be carefully logged and subsampled as appropriate. Broad spectrum contamination analyses will be performed on 1nr sub sample of recovered made ground from each borehole. Proposed locations of boreholes are as shown on Drawing No.7346a/3.
What are the geotechnical properties of the ground?	Standard Penetration Test’s (SPT’s) to be carried out at regular depth increments throughout the boreholes, & HSV test to be carried out in cohesive strata A programme of soil engineering laboratory testing will be carried out. The *in-situ* tests and soil engineering test data will be used in formulating suitable foundation solutions.
Is the site affected by migrating gas from made ground underlying the site &/or nearby water course?	The evidence of the desk study is that there is a low risk of the site being contaminated by ground gases and therefore the boreholes will be utilised for the installation of gas / groundwater monitoring standpipes.

	CIRIA C665 recommends monitoring on 6nr occasions over a period of 3 month. Locations of gas monitoring standpipes are as shown on Drawing No. 7346a/3.
Does the site pose a risk to the underlying aquifer?	Soil water samples will be recovered from the standpipes and will be analysed to the suite proposed in Table 7. In the event that water does not accumulate in the standpipes, soil leachate analyses will be undertaken to the suite in Table 7. The results will be assessed against Drinking Water Standards and Environmental Quality Standards.

The layout of the proposed investigation is as shown the site is shown on Drawing 7346a/3.

Contamination data will be assessed against SGV's/GAC's based on the 'Residential Land' use.

GAC's based on this conceptual model will be provided in the Phase 2 Report

APPENDIX A: DRAWINGS:

7346a-1 – SITE LOCATION PLAN
7346a-2 – AERIAL PLATE
7346a-3 – PROPOSED SITE INVESTIGATION LAYOUT

CC GEOTECHNICAL LTD

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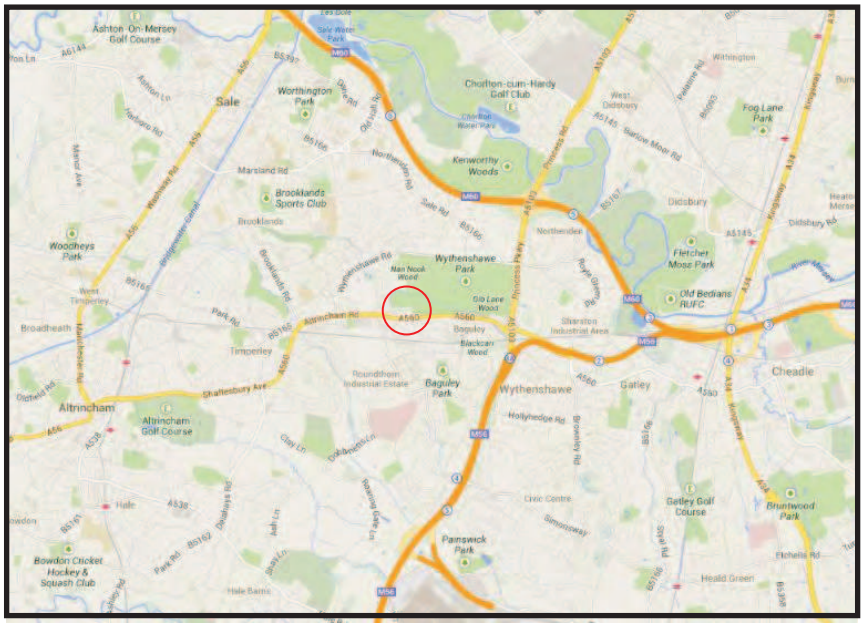

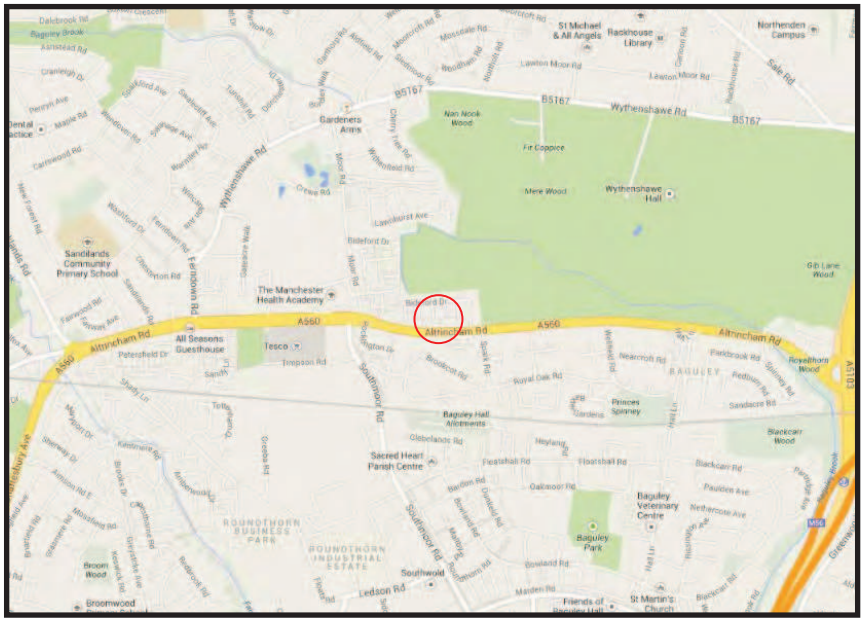

Drawing Number:	13/7346a/1
Site Location:	Bideford Drive, Manchester
Map Information:	Site Location

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Unit 1 Deltic Way, Kirkby Industrial Estate, Kirkby
Merseyside. L33 7BA
Tel: 0151 545 2750
Fax: 0151 548 7892



Drawing Number:	13/7346a/2
Site Location:	Bideford Drive, Manchester
Map Information:	Aerial Photo
Scale:	NTS

Consulting Geotechnical and Geoenvironmental Engineers

CC GEOTECHNICAL LTD

Unit 1 Deltic Way
Kirkby Industrial Estate
Kirkby
Merseyside
L33 7BA
e: enquiries@ccgeotechnical.co.uk w: www.ccgeotechnical.co.uk

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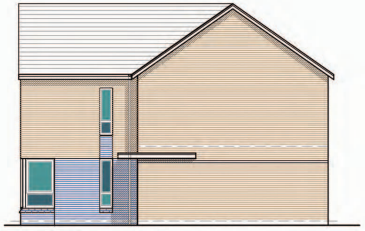
FRONT



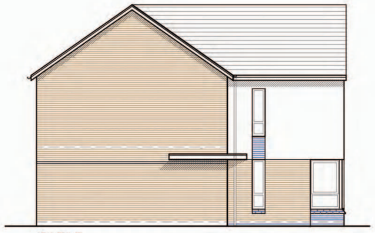
GABLE



REAR

FACING MATERIALS

- Roofs: Interlocking concrete roof tiles, flat profile, grey
- Roofs: upvc dry verge units
- Roofs: eaves, upvc fascias, grey Rainwater goods, upvc, black
- Walls: Facing brick red/buff
- Walls: Facing brick blue
- Walls: Render off-white
- Windows: upvc, colour grey to outside face windows to front elevations of houses to have sub-sills of two courses blue plinth stretcher bricks
- Front doors to houses: grp/timber composite



GABLE

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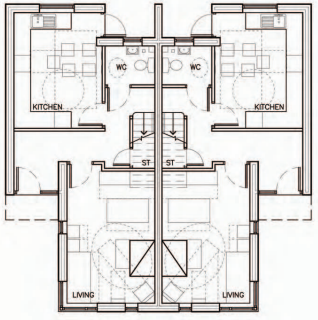
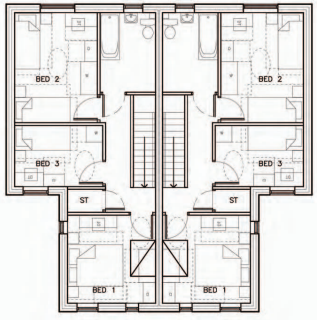


GROUND FLOOR



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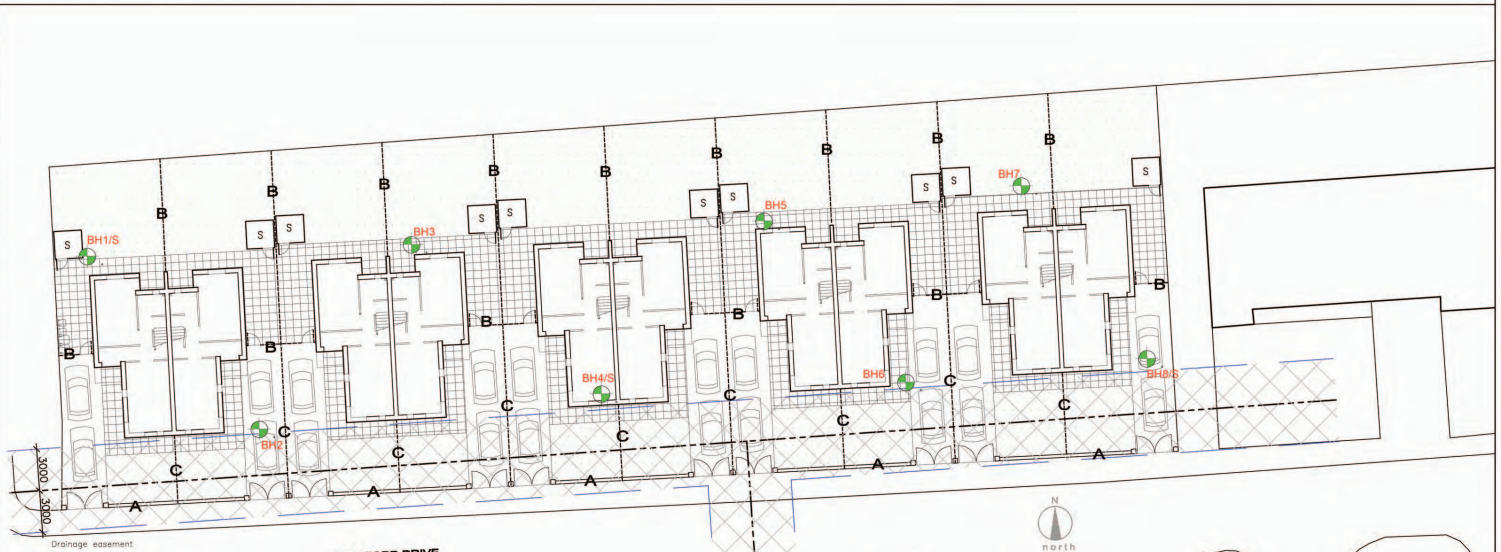


BOUNDARY TREATMENTS

A — new low brick wall with railings over with contrasting brick on edge coping and matching vehicular gates to total 1.1m height as detail B, BYA dwg 1763/30

B — new fences between front and rear of properties & rear gardens concrete post + timber panel 1.8m high with gates with padbolts, as detail C, BYA dwg 1763/30

C — new fences between front gardens concrete post and timber picket 0.9m high, as detail D, BYA 1763/30

PLANTING

Front and rear gardens to be turfed with general amenity grade turf. Imported top soil min 150mm depth to be certified uncontaminated

GENERAL

Paving : 600x600mm concrete paving flags.

macadam — Primary vehicle standing area: Bituminous macadam

S — Garden shed and secure cycle store, to rear gardens of all plots
For Code compliance shed size must be to size noted below with lock (not padlock) and a steel frame to be provided within the to which cycles can be locked by wheel and frame
e.g. Sheffield pattern cycle stand
2 bed dwellings – 2m x 1.5m (1cycle)

W — Water butt 203litres with a child proof lid, a tap, an overflow connection into rainwater drainage system, easily detached from rwp and cleanable sited on stable ground and supported

Bins as supplied by Local Council :
1No 240 litre for waste.
1No 240 litre for re-cyclable.
1No 140 litre for re-cyclable garden waste
1No kitchen waste re-cycling caddy.

lockable timber gate & fence to match height of fencing

Rotary clothes dryers with minimum 4m line length

HEALTH & SAFETY

Locations of all underground services should be confirmed throughout the site.
No other residual matters

NOTES

REVISIONS DATE

DWG. TITLE
PROPOSED SITE LAYOUT, PLANS & ELEVATIONS

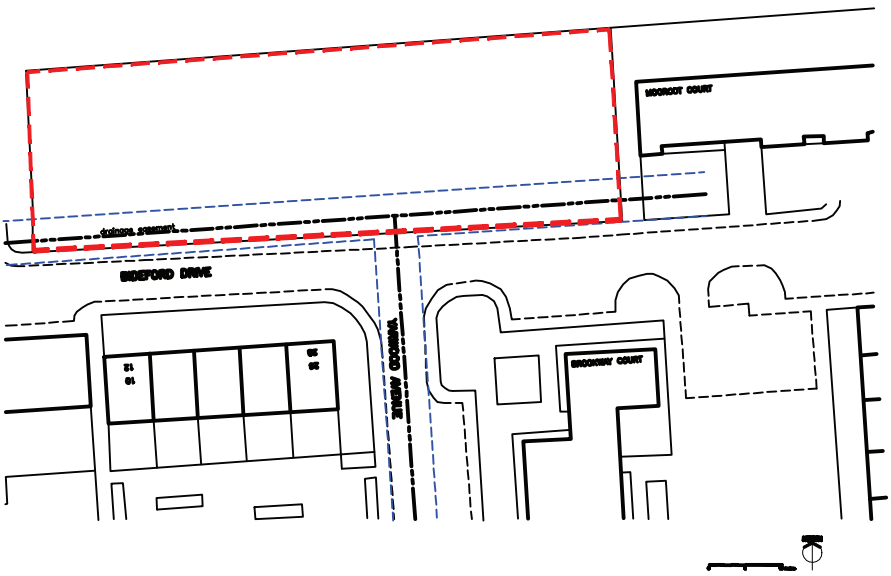
JOB
10 new dwellings at land off:
BIDEFORD DRIVE
MANCHESTER M23

CLIENT
Wythenshawe Community Housing Group

SCALE	DWG No
1:100/200 @ A1 1:200/400 @ A3	1766/201
DRAWN: TA	DATE: 24.09.13

B Y A
ARCHITECTS . PROJECT MANAGERS . PROPERTY CONSULTANTS . CDM PLANNING CONSULTANTS

BYA Limited
Alma House,10 St Vincent Street, Liverpool, L3 5XW
Tel: 0151 708 6121 Fax: 0151 708 9141



DWG TITLE LOCATION PLAN	SCALE 1:1000 @ A4
JOB Land at: BIDEFORD DRIVE Manchester M23 0QB.	DATE 10.09.13 DRAWN DWG No 1766–200

B Y A
BYA Limited
Alma House,19 St Vincent Street, Liverpool, L3 8XW
Tel: 0151 709 0121 Fax: 0151 709 0141

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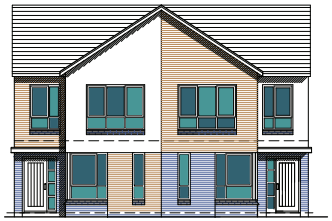
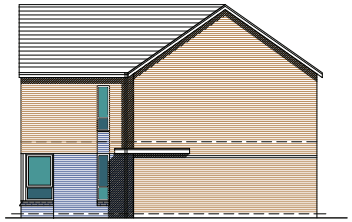


FRONT



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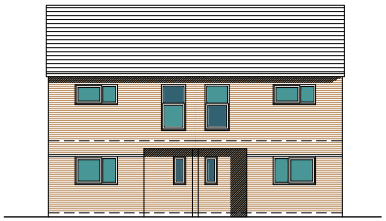

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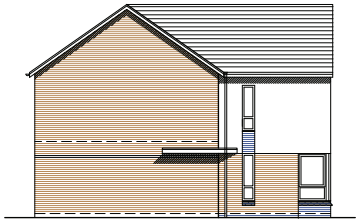

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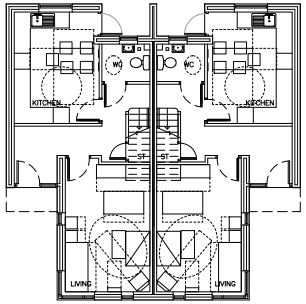
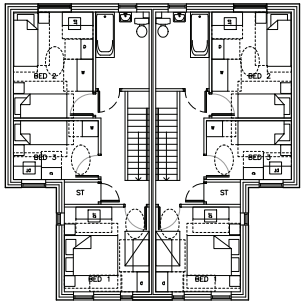


GROUND FLOOR



FIRST FLOOR

scale
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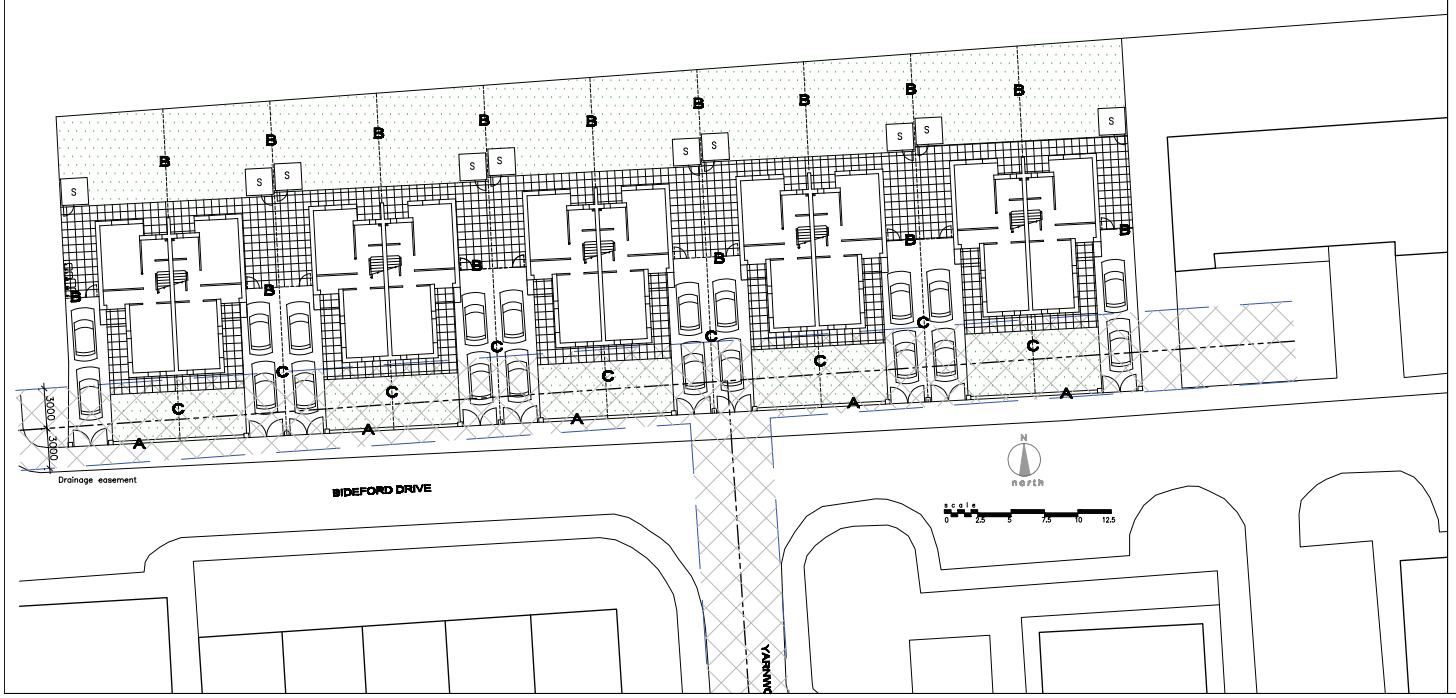

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BIDEFORD DRIVE
MANCHESTER M23

CLIENT
Wythenshawe Community Housing Group

SCALE 1:100/200 @ A1
1:200/400 @ A3

DWG No 1766/201

DRAWN TA

DATE 24.09.13

BYA Limited
Alma House,19 St Vincent Street, Liverpool, L3 8XW
Tel: 0151 708 8121 Fax: 0151 708 8141

APPENDIX B: NOTES ON LIMITATIONS

Standard Terms and Conditions of Engagement
Notes on Limitations
For: Geoenvironmental and Geotechnical Consultancy Services

General

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

CC GEOTECHNICAL LTD accepts no responsibility or liability for:

- The consequences of this document being used for any purpose or project other than for which it was commissioned and/or
- The consequences of use of this document by any party with whom an agreement has not been executed.

Phase I Environmental Audits / Desk Studies

The work undertaken to provide the basis of a Phase 1 Desk Study report comprises a study of available documented information from a variety of sources (including the client), together with (where appropriate) a walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in a Desk Study report have been dictated by finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in the report, ***CC GEOTECHNICAL LTD*** reserves the right to review such information and to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits

The investigation of the site has been carried out with the intention of providing sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated to potential human targets, building materials, the environment (including adjacent land), and surface and groundwater.

The amount of exploratory work and chemical testing undertaken may have been restricted by the timescale available, and the locations of the exploratory holes may have been restricted to areas unoccupied by the building(s) on the site, and further restricted by the existence of buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

For those reasons, if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

Geoenvironmental Ground Investigations

The investigation of the site has been carried out to provide sufficient information within the agreed scope of the investigation, under the general headings of type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions, to provide a reasonable assessment of the environmental risks together with engineering and development implications.

If costs have been included in relation to the site remediation, these must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of the site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the sites which have not been disclosed by this investigation, and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal, weather, or other effects.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

APPENDIX C: CURRENT CONTAMINATED LAND GUIDANCE / LEGISLATION & RISK ASSESSMENT METHODOLOGIES

CURRENT CONTAMINATED LAND LEGISLATION / GUIDANCE & ENVIRONMENTAL RISK ASSESSMENT METHODLOGY

LEGISLATION OVERVIEW

This report includes hazard identification and risk assessment in line with the risk-based methods referred to in relevant UK legislation and guidance. Government environmental policy is based upon a "suitable for use approach". When considering the current use of land, Part IIA of the Environment Protection Act 1990 (EPA 1990) provides the regulatory regime, which was introduced by Section 57 of the Environment Act 1995, which came into force in England on 1 April 2000. The main objective of introducing the Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment given the current use and circumstances of the land.

Part IIA provides a statutory definition of contaminated land under Section 78A(2) as:

"any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land, that:

Significant harm is being caused or there is a significant possibility of such harm being caused;
or
Pollution of controlled waters is being, or is likely to be, caused."

Part IIA provides a statutory definition of the pollution of controlled waters under Section 78A(9) as:

"the entry into controlled waters of **any** poisonous, noxious or polluting matter or **any** solid waste matter".

In order to assist in establishing if there is a "significant possibility of significant harm" there must be a "significant pollutant linkage" for potential harm to exist. That means there must be a source(s) of contamination, sensitive receptors present and a connection or pathway between the two. This combination of source-pathway-receptor is termed a "pollutant linkage or SPR linkage."

Part IIA of The Environmental Protection Act 1990 is supported by a substantial quantity of guidance and other Regulations, especially DEFRA Circular 01/2006 Contaminated Land (this replaces DETR Circular 02/2000). Part IIA defines the duties of Local Authorities in dealing with it. With the exception of situations of very high pollution risk, Part IIA places contaminated land responsibility on thee planning and redevelopment process. In situations where there is very high pollution risk direct action from the Local Authority is usually necessary. Planning Policy Statement 23 (PPS23) provides guidance on the planning process and requires that sites which have been developed shall not be capable of being determined "contaminated land" under Part IIA.

The criteria for assessing levels of pollutants and hence determining whether a site represents a hazard are based on a range of techniques, models and guidance. Within this context it is relevant to note that Government objectives are:

(a) to identify and remove unacceptable risks to human health and the environment;
(b) to seek to bring damaged land back into beneficial use;
(c) to seek to ensure that the cost burdens faced by individuals, companies and society as a whole are proportionate, manageable and economically sustainable.

These three objectives underlie the "suitable for use" approach to remediation of contaminated land. The "suitable for use" approach focuses on the risks caused by land contamination. The approach recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Risks therefore should be assessed on a site-by-site basis.

The "suitable for use" approach then consists of three elements:

(a) ensuring that land is suitable for its current use - in other words, identifying any land where contamination is causing unacceptable risks to human health and the environment, assessed on the basis of the current use and circumstances of the land, and returning such land to a condition where such risks no longer arise; the contaminated land regime provides the regulatory mechanisms to achieve this;

(b) ensuring that land is made suitable for any new use, as planning permission is given for that new use - in other words, assessing the potential risks from contamination, on the basis of the proposed future use and circumstances, before official permission is given for the development and, where necessary to avoid unacceptable risks to human health and the environment, remediating the land before the new use commences; this is the role of the town and country planning and building control regimes; and

(c) limiting requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land for which planning permission is being sought - in other words, recognising that the risks from contaminated land can be satisfactory assessed only in the context of specific uses of the land (whether current or proposed), and that any attempt to guess what might be needed at some time in the future for other uses is likely to result either in premature work (thereby running the risk of distorting social, economic and environmental priorities) or in unnecessary work (thereby wasting resources).

The mere presence of pollutants does not therefore necessarily warrant action, and consideration must be given to the scale of risk involved for the current and proposed end use of the site.

RISK ASSESSMENT METHODOLOGY

Current practice recommends that the determination of potential liabilities that could arise from land contamination be carried out using the process of risk assessment, whereby "risk" is defined as:

"(a) The probability, or frequency, or occurrence of a defined hazard; and
(b) The magnitude (including the seriousness) of the consequences."

The UK's approach to the assessment of environmental risk is set out in by the Department of the Environment (2000) publication "A Guide to Risk Assessment and Risk Management for Environmental Protection." This established an iterative, systematic staged process which comprises:

(a) Hazard identification
(b) Hazard assessment
(c) Risk estimation
(d) Risk evaluation
(e) Risk Assessment

At each stage during the investigation process the above steps are repeated as more detailed information becomes available for the site.

CLR11- 'Model Procedures for the Management of Land Contamination', a document published by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) outlines a tiered approach to the assessment of risks posed by contaminated land, as summarised hereunder:

Tier 1: Preliminary Risk Assessment
A Preliminary Risk Assessment is usually undertaken as part of a desk study, outlines potential risks posed by potential contamination to all receptors by defining plausible "pollution linkages" and developing a preliminary conceptual model (PCM). The purpose of this model is to define all possible complete pollution linkages, where the requisite source – pathway – target elements are present, and these elements being defined as:

- a contaminant (source) is a hazardous substance or agent, present at levels that have the potential to cause harm or damage a receptor
- a pathway is the means by or through which a contaminant comes into contact with, or otherwise affects, the receptor
- a receptor (target) is an entity (human being, aquatic environment, flora and fauna etc) that is vulnerable to the adverse effects of the contaminant

This relationship is termed a "pollution linkage". It should be recognised that for a health or environmental risk to exist, all three elements of the relationship or linkage must be present, i.e.

- if there is no contaminant, or contaminant present at levels below those considered to be harmful or damaging to a receptor, then there can be no adverse effect on a receptor
- if there is no receptor present that can be adversely affected by a contaminant, no harm or damage can arise
- even where both a contaminant and a receptor are present, no harm or damage will occur if there is no pathway by or through which a linkage between the two can be established

The absence of one or more of each component (source, pathway, receptor) would prevent a pollutant linkage being established and there would be no significant environmental risk.

The PCM is subject to continual refinement as additional data becomes available. As part of a Phase I Investigation (Desk Study and site walk over) a PCM is formed. Based on the PCM, potential pollutant linkages can be assessed. If the PCM and hazard assessment indicate that a pollution linkage is not of significance then no further assessment or action is required due to this linkage. For each significant and possible linkage a risk assessment is carried out. The linkages which potentially pose significant risks may require a variety of responses ranging from immediate remedial action or risk management or, more commonly, further investigation and risk assessment. This next stage is usually termed a Phase II Main Site Investigation and should provide additional data to allow refinement of the PCM and assess the level of risk from each pollutant linkage. Risk assessment will usually include Tier 2 Generic Quantitative Risk Assessment and / or, if necessary, a Tier 3 Detailed Quantitative Risk Assessment.

Tier 2: Generic Quantitative Risk Assessment (GQRA)
GQRA requires an intrusive investigation in order to characterise the site assisting in the re-assessment of the source-pathway receptor linkage. The conceptual model should be refined accordingly.

Upon completion of an intrusive investigation a it must be decided whether Generic Assessment Criteria (GAC) are suitable for assessing the risk posed by potential contaminantion at the site. If GAC are deemed unacceptable for risk assessment purposes or cannot be developed a Tier 3 Detailed Quantitative Risk Assessment (DQRA) is required.

If GQRA reveals that unnacceptable risks are not present then no further action is required. If GQRA identifies a possibility of risk, a decision must be made whether further work is required or necessary for the purposes of risk assessment. If further risk assessment is is deemed not suitable not required an Options Appraisal should be undertaken. If further risk assessment is required, the scope nature of further risk assessment must be decided – it is possible that a Tier 3 DQRA will be undertaken in this scenario.

Tier 3: Detailed Quantitative Risk Assessment (DQRA)
DQRA is used when pollutant linkages require further assessment. DQRA is often undertaken for pollutant linkages where GAC are unavailable or inappropriate for or more conservative than the actual circumstances of the site. Site specific data is used to create Site Specific Assessment Criteria (SSAC) and enable a more accurate assessment of the risks. Further investigation may or may not be required to formulate SSAC depending on the site specific conditions and information alrerady obtained.

If DQRA reveals that unnacceptable risks are not present then no further action is required. If DQRA identifies a possibility of risk, a decision must be made whether further work is required or necessary for the purposes of risk assessment. If further risk assessment is is deemed not suitable not

required an Options Appraisal should be undertaken. If further risk assessment is required, the scope and nature of further risk assessment must be decided at this point.

NOTE: A Tier 1 Preliminary Risk Assessment is undertaken as part of a Desk Study Report and a Preliminary Conceptual Model is devloped for all pollutant linkages. However, the methodologies for assessing the risks to human health, risks to controlled waters and risk posed by ground gas using quantative techniques vary considerably, therefore GQRA and DQRA for human health, controlled waters and ground gas must be undertaken seperately. The risk assessment methodologies where quantative assessment is used for risks to human health, risks to controlled waters and risks posed by ground gas, if relevant, are described hereunder.

BACKGROUND INFORMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED TO HUMAN HEALTH

Background
In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the EA published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. These reports (CLR7-10) together with associated "SGV" documents have since been withdrawn (August 2008) and the following documents have been published as revised guidance to the CLEA assessment:

Environment Agency : 2008: Updated Technical Background to the CLEA model Science Report SC050021/SR3
Environment Agency : 2008: Human Health Toxicological Assessment of Contaminants in Soil SC050021/SR2

Additional guidance on statistical assessment replacing CLR 7 is provided in:

CL:AIRE :2008 Guidance on Comparing Data With a Critical Concentration

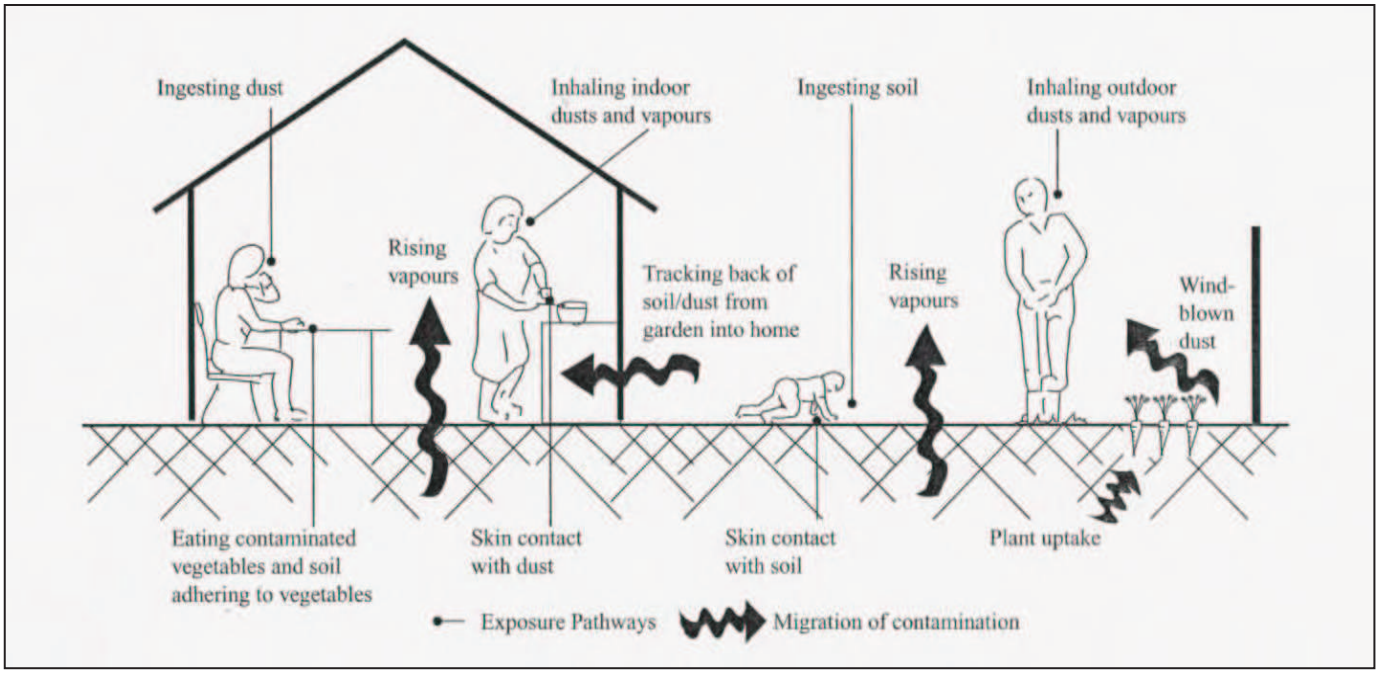
Other guidance/software used in spatial / statistical assessment is provided in:

USEPA 2006: Data Quality Assessment: Statistical Methods for Practitioners
Spatial Analysis and Decision Assistance (SADA) – The University of Tennessee

A different approach to the statistical appraisal of data is required depending on whether the assessment of risk is to assess whether land is Contaminated Land in accordance with regulations, or whether the assessment is to determine whether the site is suitable for new development in according with Planning guidance. This is discussed further in CL:AIRE :2008 "Guidance on Comparing Data With a Critical Concentration".

A program for the derivation of GAC`s based on the above guidance is provided by the Environment Agency and is entitled "CLEA Software Version 1.04".

The CLEA model has been developed to calculate an estimated tolerable daily soil intake (TDSI) for site users given a set 'default' exposure pathways. Ten human exposure pathways are covered in the CLEA model as presented below:



Ingestion
ingestion of outdoor soil
ingestion of indoor dust
ingestion of home grown produce

ingestion of soil attached to home grown produce

Dermal Contact
dermal contact with outdoor soil
dermal contact with indoor dust

Inhalation
inhalation of outdoor dust
inhalation of indoor dust
inhalation of outdoor soil vapour
inhalation of indoor soil vapour

It should be noted that there are other potential exposure pathways on some sites not included in the CLEA model e.g. certain organic compounds can pass through plastic water pipes into drinking water supply.

Where contaminated water is present at a depth less than 2.00mbgl and there is a potential risk of inhalation of vapours (only when volatile compounds are present) the risk from inhalation of vapours from soil water will be assessed using a UK compliant version of BP Risc v4.02.

The presence and/or significance of each of the above exposure pathways are dependent on the type of land use being considered and the nature of the contaminant under scrutiny. Accordingly, the CLEA model considers for principle 'default' land use types and makes a series of 'default' assumptions with regard to human exposure frequency, duration and critical human target groups for each land use considered:

residential
allotments
commercial / industrial land use

The above land use categories defined in the CLEA are detailed below:

Residential: This generic scenario assumes a typical residential property consisting of a two-storey house built on a ground-bearing slab with a private garden consisting of lawn, flowerbeds, and a small fruit and vegetable patch. The occupants are assumed to be parents with young children, who make regular use of the garden area.

Allotments: This generic scenario assumes a plot of open space (about 250 m2), commonly made available by the local authority to tenants to grow fruit and vegetables for their own consumption. There are usually several plots to a site and the overall site area may cover more than a hectare. The tenants are assumed to be parents or grandparents and that young children make occasional accompanied visits to the plot.

Commercial/Industrial: There are many different kinds of workplace and work-related activities. This generic scenario assumes a typical commercial or light industrial property consisting of a threestorey building at which employees spend most time indoors and are involved in officebased or relatively light physical work.

Human Health Risk Assessment Methodolgy
Assessment of risk for the protection of human health is undertaken using the methodology as outlined previously, and summarised hereunder:

Tier 1 Preliminary Risk Assessmnent
Tier 2 Generic Quantitative Risk Assessment
Tier 3 Detailed Quantitative Risk Assessment

The Tier 1 Preliminary Risk Assessment is undertaken as part of the desk study report and includes the development of a Preliminary Conceptuel Model. Tier 2 and Tier 3 Quantitative Risk Assessments are undertaken in order to develop and refine the Preliminary Conceptual Model aiding a more detailed assessment of the risk posed by contaminants revelaed by site investigation and soil / soil water chemical analyses.

The methods used by CC GEOTECHNICAL LTD to derive assessment criteria, to statistically analyse chemical data and to compare chemical data to the derived assessment criteria are discussed herunder.

Derivation of Generic Assessment Criteria (GAC) and Site Specific Assessment Criteria (SSAC)
GAC`s are derived on the basis of the proposed land use and the associated applicable exposure pathways. It should be noted that there are difficulties in establishing soil concentrations of contaminants beyond which risks from exposure to these contaminants would be 'unacceptable' and the GAC value does not necessarily equate to the level for "significant possibility of significant harm" as defined in Part IIA of The Environmental Protection Act (1990) to determine whether land is "contaminated." This ultimately requires detailed 'toxicological' information of the health effects of individual contaminants and also a scientific judgement on what constitutes an 'unacceptable' risk. The primary purpose of the CLEA derived GAC's are as 'minimal risk thresholds' for the assessment of human health risks in relation to land use.

Minimal risk thresholds calculated using generic input parameters for each of the above land uses are termed Generic Assessment Criteria (GAC) and are used for Generic Quanatative Risk Assessment (GQRA). However, further assessment may be required taking into consideration site specific factors such as the way the land is used, the soil type, the building characteristics and the exact nature of the receptor, to determine whether there is a significant possibility of risk to human health to site users. Such an assessment is known as a Detailed Quantitative Risk Assessment (DQRA) and the resultant threshold concentrations are known as Site Specific Assessment Criteria (SSAC). Such assessments should be conducted with the agreement of the local authority (or the Environment Agency) since it is the authority that determines whether land is Contaminated Land or whether Planning Permission for a new development may be granted.

For the purposes of this report, assessment criteria have been derived in accordance with current guidance based on the conceptual model for the proposed land use using the CLEA v1.04 software. These criteria are not intended to indicate whether the site may be contaminated land nor do they replace any published soil guideline values. However, the values are intended to provide guidance for the local authority on whether the site may be considered uncontaminated. If, based on the site's proposed future use, the site would be considered by the local authority to be uncontaminated and therefore, on the basis of soil concentrations, fit for purpose, then no further risk assessment based on soil concentrations and the risk to human health would be necessary. However, should these criteria be exceeded or the conceptual site model vary from the model used in the risk assessment to derive these values then the risk assessment should be updated accordingly.

For contamiants routinely analysed where inhalation is a significant pathway (naphthalene, phenanthrene, Aromatic EC5-EC7, Aromatic EC7-EC8, Aromatic EC8-EC10, Aromatci EC10-EC12, Aromatic EC12-EC16, Aliphatic EC5-EC6, Aliphatic EC8_EC10, Aliphatic EC10-EC12, Aliphatic EC12-EC16), plots of the GAC as a function of Soil Organic Matter (SOM) are used to determine if they pose a potential risk to human health, which are presented hereunder. Where there is an exceedance further assessment may be undertaken.

Statistical Assessment of Soil Contamination Data & Comparison of Contamination Data to Threshold Values
In any site investigation only a small fraction of the soil on the site is analysed. Therefore the mean derived from the contamination data for a contaminant may not be the same as the true mean for the contaminant distribution on the site. To improve the reliability of any assessment a statistical analyses is undertaken in line with the CL:AIRE document "Guidance on Comparing Soil Contamination Data with a Critical Concentration".

Statistical assessment of soil data is undertaken using programs based on the guidance in the CL:AIRE document or the USEPA software ProUCL v4.0.

Where the number of results in a dataset is less than four, a statistical assessment is not undertaken, and the assessment is performed by comparison of the maximum value(s) with a Health Criteria Value (HCV), such as Generic Assessement Criteria value(s).

For the Planning situation, the regulator needs to check whether the concentration of contaminants is low compared to the HCV. This decision is based on whether there is at least a 95% confidence level that the true mean of the dataset is lower than the HCV.

For the Part IIA scenario the regulator needs to determine whether the concentration of contaminants is greater than the HCV. This decision is based on whether there is at least a 95% confidence level that the true mean of the dataset is higher than the HCV. However, the regulator may proceed with determination if there is just a 51% probability, "on the balance of probabilities".

The Outlier Test used in the statistical assessment may not be able identify separate populations if numerous populations are present. Inorder to ensure that this is not the case a spatial assessment of the data will be undertaken using SADA.

If the screening levels are exceeded then more sophisticated quantitative risk assessment or remedial action may be undertaken. The benefits of undertaking a quantitative risk assessment must be weighed against the likelihood that it will bring about cost savings in the proposed remediation.

BACKGROUND INFORMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED TO CONTROLLED WATER

Definition of Controlled Waters
The term 'controlled waters' is defined in Section 104 of the Water Resources Act 1991 as:

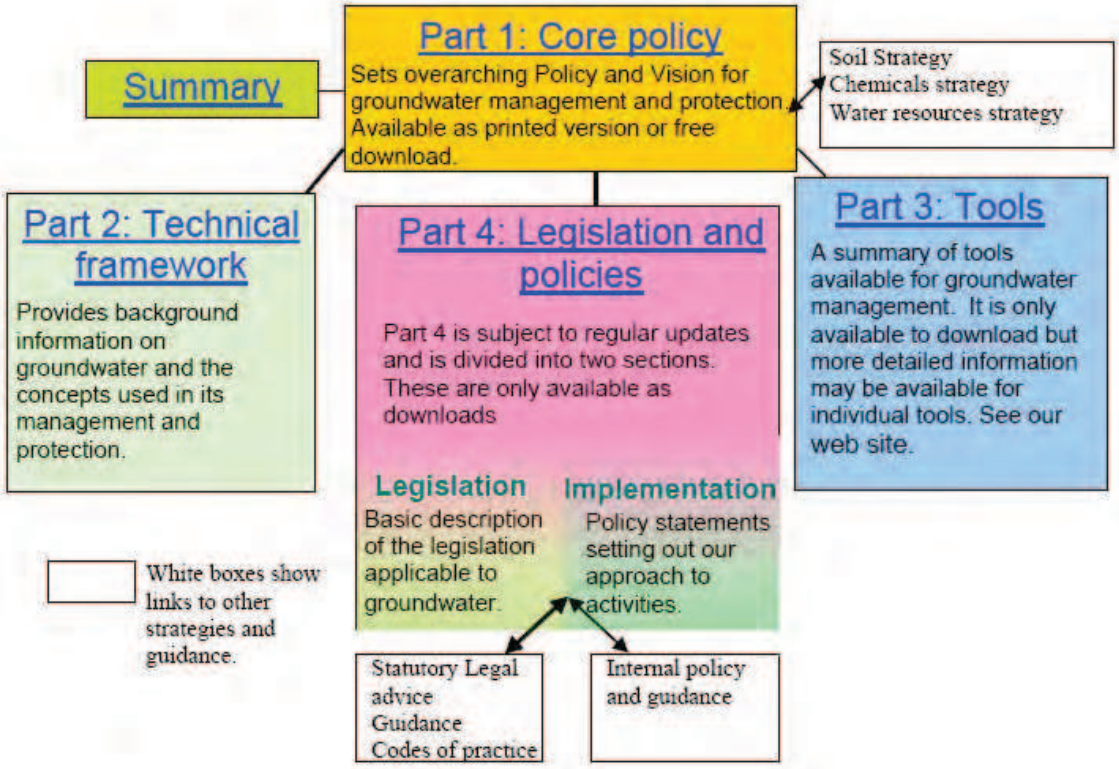
"Territorial Waters…which extend seawards for three miles…, coastal waters…, inland freshwaters, waters in any relevant lake or pond or of so much of any relevant river or watercourse as is above the freshwater limit, and ground waters, that is to say, any waters contained in underground strata."

Note that the definition of groundwater under the Water Resources Act 1991 includes all water within underground strata (including soil / pore water in the unsaturated zone). The definition of groundwater under the Groundwater Directive however is limited to water in the saturated zone. For the purposes of Part IIA of the Environmental Protection Act 1990, the Environment Agency recommends that the groundwater within the saturated zone only is considered as the receptor (rather than soil / pore water).

Environment Agency Guidance
Legislation and guidance surrounding the protection of controlled waters in the UK is abundant and can be complex. The Environment Agency's overall position on groundwater is "To protect and manage groundwater resources for present and future generation in ways that are appropriate for the risks that we identify" (Groundwater Protection : Policy and Practice GP3, 2006). In brief, the core objectives of the existing legislation serve to enforce this position.

In 1992, the National Rivers Authority published their Policy and Practice for the Protection of Groundwater (PPPG), this document was influential as it provided a focus for key developments such as Source Protection Zones (SPZs) and Groundwater Vulnerability Maps. The Policy was then revised in 1998, since which there have been substantial changes in legislation, driven by Europe. Key European Directives relating to groundwater include the Groundwater Directive (80/68/EEC) and the Water Framework Directive (2000/60/EC). Aspects of these directives are controlled by primary UK legislation such as the Water Resources Act 1991. Further to legislative changes, gaps identified in the 1998 PPPG required addressing. These changes are reflected in the forthcoming Environment Agency Policy document entitled Groundwater Protection : Policy and Practice (GP3), a draft version of which was available for public consultation (Parts 1 to 3) ending July 2006 with Part 4 issued in March 2008. Part 4 includes a section on key groundwater legislation and the Environment Agency's interpretation of it.

The following gives a breakdown of the structure of the document (taken from the Environment Agency GP3 draft consultation document, 2006)



Controlled Water Risk Assessment Methodology
The risk posed to controlled water is assessed by CC GEOTECHNICAL in accordance with current guidance as outlined hereunder.

In order for a developer of a potentially contaminated site to fulfil their obligations under the legislation, a site assessment would be required to be undertaken in order to identify any potential risks to controlled waters and to derive suitable clean-up criteria if necessary to ensure the protection of controlled waters. The general approach for Groundwater Protection is detailed further in Part 3 of GP3.

When assessing groundwater impact the Environment Agency advocate the application of their framework methodology "Remedial Targets Methodology – Hydrogeological Risk Assessment for Land Contamination" Environment Agency (2006). The methodology has four levels of assessment as described below:

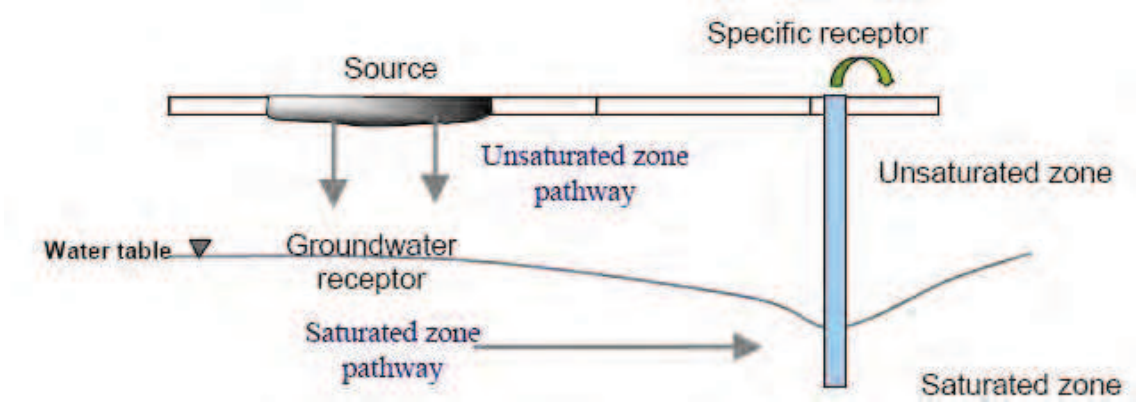
Level 1 considers whether contaminant concentrations in "pore water" in contaminated soil are sufficient to impact on the receptor, ignoring dilution, dispersion and attenuation along the pathway. The "pore water" concentration is determined from:
measured "pore water" concentrations or perched water quality
ii) soil leaching tests
iii) theoretical calculations based on soil/water partitioning equations

Level 2 considers dilution by the receiving groundwater or surface water body and whether this is sufficient to reduce contaminant concentrations to acceptable levels. The remedial target is defined as the target concentration multiplied by a dilution factor (DF).

Levels 3 and 4 consider whether natural attenuation (including dispersion, retardation and degradation) of the contaminant as it moves through the unsaturated and saturated zones to the receptor are sufficient to reduce contaminant concentrations to acceptable levels. The remedial target is defined as target concentration multiplied by a dilution factor (DF) and attenuation factor (AF). In Level 3 simple analytical models are used to calculate the significance of attenuation. The Environment Agency has released a "Remedial targets worksheet v3.1" to carry out basic calculations using a conservative approach up to Level 3 using basic principles assuming a simple migration of contaminants from the source zone into the aquifer receptor. Level 4 assessment uses more sophisticated numerical models, and allows for the introduction of additional geological horizons and is used mainly to determine whether soil contaminants will reach their target within a specified timeframe. Use of such software should only be used once agreement has been obtained from the Environment Agency.

Three main stages apply to any risk assessment of controlled waters, these are:

1. Risk Screening (Tier 1 Preliminary Risk Assessment): The understanding of the Conceptual Site Model (CSM) is the key to assessing any site. Using a robust CSM, potential pathways or receptors may be screened out from any further assessment at an early stage. For example if the pathway through the unsaturated zone is blocked by the presence of a significant thickness of low permeability clay. A greater understanding of the CSM is achieved with each tier of risk assessment. An example of a basic CSM is given below (taken from the Environment Agency GP3 draft consultation document, 2006):



2. Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Level 1): When undertaking the Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Tier 1), comparison of chemical analytical results is made with screening criteria. Published values of screening criteria with which chemical test results can be compared are published in the following guidance:

Water Supply (Water Quality) Regulations 2000
The Private Water Supplies Regulations 1991
Environmental Quality Standards for surface waters based on The EC Dangerous Substnaces Directive (76/464/EEC and Daughter Directives)
The Surface Waters(Abstraction for Drinking Water Classification) Reguslations 1996
World Health Organisation Drinking Water Standards 2004

Should the Level 1 assessment indicate threshold levels to be exceeded, then there are three alternative ways in which to proceed:

To devise suitable remedial solutions
To carry out more investigation, sampling and analysis
To conduct a site specific Detailed Quantitative Risk Assessment (DQRA) to determine determine if the materials are suitable for thair proposed use, or devise site specific clean-up level

3. Detailed Quantitative Risk Assessment (EA Remedial Targets Methodology Levels 2 to 4): The decision to carry out a DQRA will be dependant on the extent and implications of the initial qualitative and generic assessment. The scope of any such assessment will be accurately defined by the outcomes of the previous levels of assessment. The conceptual model will be sufficiently refined by this stage that only certain contaminants of concern, certain pathways and certain receptors will require further assessment, the remainder having been screened out.

Additional site specific data is normally required for this stage of assessment, as explained above, more processes that are capable of affecting contaminant concentrations are considered (such as dilution and attenuation).

Remediation criteria, if derived, will therefore be specific to each site and will be based on a detailed assessment of the potential impact at the identified receptor or compliance point. A greater level of confidence can be placed on the predicted impact on the compliance point following a DQRA.

BACKGROUND INFORMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED BY GROUND GAS

Origin of Ground and Landfill Gases
When carrying out a ground gas risk assessment, the origin or source of the gases is important as potential risks will vary depending on the source. This Appendix relates to the risk of the two main ground gases of concern; methane and carbon dioxide, and does not apply to other ground gases (e.g. radon or vapours from hydrocarbon spills). Methane and carbon dioxide are major constituents of landfill gas but can also occur from a variety of anthropogenic and natural sources, as summarised in Table 5 below:

Gas	Source	Comments
Landfill Gas	Anaerobic decomposition of degradable waste within landfill sites. Typically 60% methane and 40% carbon dioxide during methanogenic phase.	Composition varies over time, particularly in early stages. Contains a range of minor constituents (particularly carbon monoxide and hydrogen sulphide).
Landfill Associated Gases	- Anaerobic degradation of leachate external to the site; - Degassing of dissolved gases in groundwater; - Evolution of gases following interaction between leachate and groundwater	Can result in secondary (external) production of methane or carbon dioxide.
Made Ground	Anaerobic degradation of organic components	Very variable depending on source
Sewer Gas, Cess Pits	Anaerobic degradation of organic components of sewage producing methane and carbon dioxide.	Often characterised by hydrogen sulphide odour.
Mains Gas	Leakage from underground pipework or storage tanks. Mainly methane but	An odouriser is added to permit detection of leaks.

Gas	Source	Comments
	often contains higher alkanes.	Typically 90% CH4, but 1 to 27% C2-C4 alkanes, May also contain other trace gases e.g. CO, helium and CO2 (from degradation of CH4 in the ground).
Other Anthropogenic Sources	- Degradation of leaked or spilled hydrocarbons or other industrial chemicals; - Anaerobic degradation of organic contaminants in groundwaters (e.g. silage liquor); - Reactions between monitoring well construction components and environment; - Burial grounds/cemeteries.	Hydrocarbon spillages often have an 'oily' odour. Fuel spillages common – Petrol or Diesel and can contain a wide range of VOC's. Can degrade to produce methane / carbon dioxide.
Alluvium / Marsh / Peat Gas	Anaerobic microbial degradation of organic material (usually waterlogged vegetation / peat). Often associated with the presence of alluvial deposits or dredgings.	
Geogenic Gas	Natural seepages of carbon dioxide and hydrocarbon gases derived from geologic sources such as coal seams and deep oil / gas source formations. Can be present in solution in groundwaters.	Methane most common but can contain carbon dioxide and higher alkanes.
Mine Gases	Various types. Most common is "fire damp" with high methane, produced by the desorption of gas trapped in coal. "Black damp" (Stythe gas) with high carbon dioxide and denser than air. "White damp" is high in carbon monoxide.	Methane most common. Can contain higher alkanes, carbon dioxide and carbon monoxide. Often low in oxygen.
Natural Shallow Ground Gas	Various types - high carbon dioxide formed by subsurface aerobic activity leading to depleted oxygen and elevated carbon dioxide; - chemical degradation of rocks (e.g. carbonates) producing carbon dioxide; - carbon dioxide production in root zone of soils by plants.	Gases can be emitted from ground under falling barometric pressure conditions.

Table 5. Potential Sources of Ground Gases

This Appendix does not provide guidance for the assessment of risk when other gases are present due to 'Other Sources' from the above table (particularly organic compounds such as BTEX and VOC's or for the risk from radon or hydrogen sulphide).

To determine the origin of the gas a range of factors must be considered together, including;

1. Proximity of likely sources
2. Ground conditions (geology, hydrogeology, anthropogenic pathways etc)
3. Properties of gases present including:
    - Chemical composition
    - Physical properties
    - Ratios of components e.g. methane : carbon dioxide
4. Timeframe of activities such as infilling periods, capping works, installation of gas control systems etc

Identification of the originating source may be problematic given that there may be more than one source present and trace gas analysis may be required. Identification of the sources of the gases encountered during monitoring is usually carried out through a process of eliminating the most unlikely potential sources (given the site setting) and selecting those which are most likely.

Hazards Associated with Presence of Methane

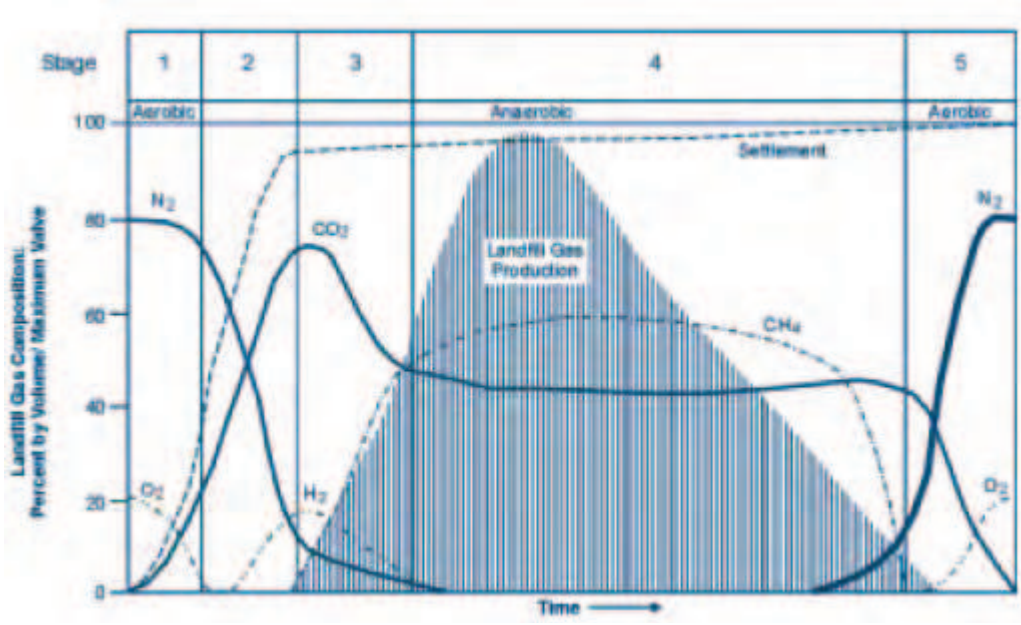
Methane gas is combustible and potentially explosive. When the concentration of methane in air is between the limits of 5.0%v/v and 15.0%v/v an explosive mixture is formed. The Lower Explosive Limit (LEL) of methane is 5.0%v/v, which is equivalent to 100% LEL. The 15.0%v/v limit is known as the Upper Explosive Limit (UEL), but concentrations above this level cannot be assumed to represent safe concentrations. Further, the LEL and UEL will vary (up and down) depending upon the proportion of other gases (including oxygen). However, the fact that methane is a colourless, odourless gas means that there is no simple indicator of the presence of the gas until such a time as explosive limits are reached and an incident occurs. Methane is lighter than air and has a low toxicity. However, at high concentrations it can result in asphyxiation due to oxygen displacement.

Hazards Associated with Presence of Carbon Dioxide

Carbon dioxide is a colourless, odourless gas, which, although non-flammable, is both toxic and an asphyxiant. As carbon dioxide is denser than air, it will collect in low points and depressions. The UK Health & Safety Executive (HSE) has published information relating to concentrations of carbon dioxide that humans may be exposed to, which uses concentrations contained in the Control of Substances Hazardous to Health Regulations 2002 (as amended). These are the Long Term Occupational Exposure Limit (LTOEL, 8 hour period) and the Short Term Occupational Exposure Limit (STOEL, 15 minute period), which are 0.5% and 1.5% carbon dioxide, respectively.

Parameters Influencing the Rate of Ground Gas Production

The figure below is taken from EA guidance document LFTGN 03 illustrates typical ground gas generation curves from biodegradable materials:



The production of methane and carbon dioxide at a landfill site may be expected to be considerable and ongoing. Concentrations of methane will eventually decrease, followed by concentrations of carbon dioxide, but the duration and rate of gas production can vary markedly between sites. Five distinct phases of gas production occur during the process which are, in order of event as marked above, as follows:

1. An aerobic phase involving oxygen depletion and temperature increase through aerobic respiration;
2. The establishment of anaerobic conditions and the evolution of carbon dioxide and hydrogen through acidogenic activity;
3. Commencement of methanogenic activity; the establishment of populations of methanogenic bacteria;
4. A phase of stable methanogenic activity, which may go on for many tens of years;
5. A phase of decreasing methanogenic activity, representing depletion of the organic material and a return to aerobic conditions.

The time scale for the return to the normal ground gas concentrations will be highly variable, depending upon the types and quantities of materials present. In addition, the optimum parameters influencing the rate of decomposition and ground gas production within the ground at a site are as follows:

High water content with adequate rainfall and water infiltration to provide moisture content between approximately 20 to 26%;
Conditions that either are or are very close to anaerobic;
High proportion of biodegradable materials;
A pH between 6.5 and 8.5, ideally verging slightly on the acidic between pH 6 to 7;
Temperature between 25°C and 55°C;
The ratio of the biochemical and chemical oxygen demands (BOD:COD);
High permeability;
Small particle size, as finer subsurface materials possess a greater surface area to provide a growing 'face' for the micro-organisms but high fines levels reduces permeability and reduces decomposition rate.

For this reason, it is vital that sources of methane and carbon dioxide are identified prior to the commencement of any work on a construction site, and that the ground gas regime is characterised at the worst temporal conditions a site may experience. From this, a risk assessment is carried out to identify the risk at the site from ground gases so that suitable protection measures can be designed and incorporated into a development to prevent a dangerous build-up of gas occurring.

Factors Influencing the Migration and Behaviour of Ground Gases
There are many factors that influence the migration of ground gases which can effect the risk from a gassing source:

driving force – pressure differential along a pathway, diffusion and dissolved in solution;
meteorological conditions – short term and seasonal conditions including atmospheric pressure changes (e.g. rapidly falling pressure causes gas to expand increasing emission rates), rainfall, frozen ground and thawing, temperature;
geological and groundwater conditions – these can have the over riding influence on the direction/pathways and quantity of migrating gas;
anthropogenic influences – man-made pathways include mine shafts, service runs/drains, foundation piles, underground voids/pits/basements, foundation/building design/construction

Current Guidance
Previous versions of Building Regulations Approved Document C provided statutory guidance stating that consideration should be given to appropriate action and / or specific solutions in situations where methane concentration exceeded 1%v/v or carbon dioxide concentrations exceeded 5%v/v. The latest Building Regulations Approved Document C (DoE 2004) no longer endorses this approach and recommends the use of a risk based approach to interpreting a gas monitoring survey. This is in line with current EA guidance for landfill gas (LFTGN 03, 2004) which recommends the use of a structured risk based approach similar to that outlined in CLR 11. On this basis, recent guidance has been produced in 2006 and 2007 with the aim of providing up to date advice in relation to residential and commercial development. The guidance does not address issues associated with gas

derived from landfills, for this refer to "Guidance on the Management of Landfill Gas" (Environment Agency 2004) for an overview.

Recent guidance relevant to gas assessments for residential and commercial development includes;

Wilson et al. (CIRIA C665, December 2007) "Assessing Risks Posed by Hazardous Ground Gases for Buildings."
This document provides up to date advice on all aspects of ground gas risk assessment such as investigation, monitoring programmes, data collection and interpretation. The guidance presents separate methodologies for the characterisation of:
All development types except low rise housing with gardens (Situation A)
Low rise housing with gardens (Situation B)

Boyle and Witherington (NHBC / RSK Group, Report 10627-R01(04) January 2007) "Guidance on the Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are Present."
This document presents the "Traffic Lights System" detailed below and is relevant only for low rise properties (e.g. bungalows and town houses) that have a ventilated sub-floor void (i.e. Situation B as described in CIRIA C665).

British Standard (BS 8485, December 2007) "Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments"
This document provides an overview of gas characterisation and assessment. The Standard is intended to be used by designers of gas protection measures and regulators involved in the assessment of design solutions.

Further guidance, Wilson and Card (CIEH) "Ground Gas Handbook for Designers and Regulators" providing practical guidance on ground gas assesments and the design and evaluation of protection measures, is expected to be published in March 2009.

Each of these documents continues to highlight the importance of, and give further guidance towards, carrying out a tiered risk-based decision-making process in accord with government policy on dealing with contamination from historic or natural sources and highlight the importance of the Conceptual Model in site characterisation.

Ground Gas Risk Assessment Methodology
Assessment of risk posed by ground gas is undertaken using the methodology as outlined previously, and summarised hereunder:

Tier 1 Preliminary Risk Assessmnent
Tier 2 Generic Quantitative Risk Assessment
Tier 3 Detailed Quantitative Risk Assessment

The methodology used in each of the above assessments with concern to ground gas is discussed hereunder.

Tier 1 Preliminary Risk Assessment
All potential sources of methane and carbon dioxide are identified in the Preliminary Conceptual Model and the generation potential determined. The background information discussed earlier is referred to in order to determine the potential for a source to generate ground gas.

CIRIA C665 provides idealised monitoring frequency / period dependant upon generation potential of gas source and sensitivity of the proposed land use as below:

Idealised Frequency and Period of Monitoring (after Table 5.5a and 5.5b, CIRIA C665)

		Generation Potential of Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4/1	6/2	6/3	12/6	12/12
	Moderate (Flats)	6/2	6/3	9/6	12/12	24/24
	High (Residential with Gardens)	6/3	9/6	12/6	24/12	24/24

Notes
1. First number is the number of readings and the second is the minimum period in months (e.g. 6/2 – six sets of readings over two months).
2. At least two sets of readings must be at low (preferably under 1,000 mb) and falling pressure.

The monitoring programme is decided using the above table prior to the intrusive site investigation. However, if the intrusive investigation reveals that a the potential source is better or worse than anticipated the monitoring programme should be modified accordingly. For example, if the made ground contains no evidence of organic material and comprises entirely granular brick fill, the potential for that made ground to generate ground gas is reduced considerably.

Tier 2 Generic Quantitative Risk Assessment
Generic Quantitiative Risk Assessment is undertaken upon completion of the required gas monitoring period.

All three current guidance documents propose that both ground gas concentrations and flow rates are used to calculate the limiting gas well gas volume flow rates for methane and carbon dioxide, based on the ground gas conditions monitored for during the worse-case temporal conditions. This limiting gas well volume flow rate is termed the Gas Screening Value (GSV, note that this was termed borehole gas volume flow), and is calculated as follows:

GSV (l/hr) = [gas well gas concentration (%v/v)] x [gas well flow rate (l/hr)]
100

GSV's are compared to typical max concentrations and limiting gas screening values derived for either Situation A - All development except low rise housing with gardens, or Situation B low rise housing with gardens (NHBC Traffic Light System). Table 8.5 from CIRIA C665 is used for comparison of gas screening values for "Situation A Developments" and is presented hereunder:

Characteristic Situation (CIRIA R149)	Comparable Partners in Technology gas Regime (see Box 8.2)	Risk Classification	Gas Screening Value (CH4 or CO2) (l/hr)1	Additional Factors	Typical Source of Generation
1	A	Very low risk	<0.07	Typically methane ≤ 1% and/or carbon dioxide ≤ 5%. Otherwise consider increase to Situation 2	Natural soils with low organic content "Typical" made ground
2	B	Low risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to characteristic Situation 3	Natural soil, high peat/organic content. "Typical" made ground
3	C	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures.	Mineworking susceptible to flooding, completed landfill (WMP 26B criteria)
5	E	High risk	<70		Mineworking unflooded inactive with shallow workings near surface
6	F	Very high risk	>70		Recent landfill site

Table 8.5 from CIRIA C665 Modified Wilson and Card Classification

Table 8.7 is used for comparison of gas screening values for "Situation B Developments" and is presented herunder:

Traffic Light	Methane1		Carbon Dioxide2	
	Typical max concentration3 (% by volume)	Gas screening value2,4 (litres/hour)	Typical max concentration3 (% by volume)	Gas screening value2,4 (litres/hour)
Green	1	0.13	5	0.78
Amber 1	5	0.63	10	1.60
Amber 2	20	1.60	30	3.10
Red				

Notes:
1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter will be the decoder as to what Traffic Light is allocated;
2. Borehole Gas Volume Flow Rate, in litres per hour as defined in Wilson and Card (1999), is the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered;
3. The Typical Maximum Concentration can be exceeded in certain circumstances should the Conceptual Site Model indicate it is safe to do so;
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

Table 8.7 from CIRIA C665 - NHBC Traffic light system for 150 mm void

Dependant on the outcome of the assessment of risk posed by ground gas it is determined whether gas protection measures are required for the proposed development, and or whether a detailed quantitative risk assessment is required for the site.

Selection & Design of Protective Measures
Table 8.6 and Box 8.4 of CIRIA C665 contain information on the detailed design of protection measures and were initially intended for the purposes of determining then level of protection measures a development requires. These tables and related text include some useful information on the design of gas protection measures, however BS84845:2007, which supersedes the guidance included within CIRIA C665, is used for selection of gas protection measures.

BS8485: 2007 uses a scoring system dependant on the Characteristic Situation / NHBC Traffic Light and proposed end use of the site. The scoring system is summarised in BS8485:2007 Table 2 as presented hereunder:

Characteristic gas situation, CS	NHBC traffic light	Required gas protection			
		Non-managed property e.g. private housing	Public building (a)	Commercial buildings	Industrial buildings (b)
1 2 3	Green Amber 1 Amber 2	0 3 4	0 3 3	0 2 2	0 1 (c) 2
4 5 6	Red	6 (d)	5(d) 6(e)	4 5 7	3 4 6
NOTE Traffic light indications are taken from NHBC Report no.:10627-RO1 (04) and are mainly applicable to low-rise residential housing1. These are for comparative purposes but the boundaries between the traffic light indications and CS values do not coincide.					
a) Public buildings include, for example, managed apartments, schools and hospitals. b) Industrial buildings are generally open and well ventilated. However, areas such as office pods might require a separate assessment and may be classified as commercial buildings and require a different scope of gas protection to the main building. c) Maximum methane concentration 20% otherwise consider and increase to CS3. d) Residential building on higher traffic light/CS sites is not recommended unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations. e) Consideration of issues such as ease of evacuation and how false alarms will be handled are needed when completing the design specification of any gas protection scheme					
1 The NHBC guidance and CIRIA C665 guidance refers to low rise housing (which is up to three storeys without lifts) that is constructed with a 150mm ventilated sub-floor void.					

BS8485:2007 Table 2 Required gas protection by characteristic gas situation and type of building

Once a score is assigned, a combination of protection systems / elements is chosen from BS8485:2007 Table 3 shown below:

PROTECTION ELEMENT/SYSTEM		SCORE	COMMENTS
a) Venting/dilution (See Annex A BS8485)			
Passive sub floor ventilation (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.)A	Very good performance	2.5	Ventilation performance in accordance with Annex A (BS8485)
	Good performance	1	If passive ventilation is poor this is generally unacceptable and some form of active system will be required.
Subfloor ventilation with active abstraction/pressurization (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.)A		2.5	There have to be robust management systems in place to ensure the continued maintenance of any ventilation system. Active ventilation can always be designed to meet good performance.
Ventilated car park (basement or undercroft)		4	Mechanically assisted systems come in two forms: extraction and positive pressurization.
b) Barriers			
Floor slabs Block and beam floor slab Reinforced concrete ground bearing slab Reinforced concrete ground bearing foundation raft with limited service penetrations that are cast into slab Reinforced concrete cast in situ suspended floor slab with minimal service penetrations and water bars around all slab penetrations and at joints Fully tanked basement		 0 0.5 1.5 1.5 2	It is good practice to install ventilation in all foundation systems to effect pressure relief as a minimum. Breaches in floor slabs such as joints have to be effectively sealed against gas ingress in order to maintain these performances.
c) Membranes			
Taped and sealed membrane to reasonable levels of workmanship/in line with current good practice with validation B,C		0.5	The performance of membranes is heavily dependent on the quality of design of the installation, resistance to damage after installation, and the integrity of joints.
Proprietary gas resistant membrane to reasonable levels of workmanship /in line with good practice under independent inspection (CQA)B,C		1	
Proprietary gas resistant membrane installed to reasonable levels of workmanship/in line with current good practice under CQA with integrity testing and independent validation		2	
d) Monitoring and detection (not applicable to non-managed property, or in isolation)			
Intermittent monitoring using hand held equipment		0.5	Where fitted, permanent monitoring systems ought to be installed in the underfloor venting/dilution system in the first instance but can also be provided within the occupied space as a fail safe.
Permanent monitoring and alarm system A	Installed in the underfloor venting/dilution system	2	
	Installed in the building	1	
e) Pathway Intervention			
Pathway intervention		-	This can consist of site protection measures for off-site or on-site sources (see Annex A, BS8485)
NOTE In practice the choice of materials might well rely on factors such as construction method and the risk of damage after installation. It is important to ensure that the chosen combination gives an appropriate level of protection			

It is possible to test ventilation systems by installing monitoring probes for post installation validation. If a 1 200g DPM material is to function as a gas barrier it should be installed according to BRE 212 /BRE 414 being taped and sealed to all penetrations Polymeric Materials> 1200 g (proportional to thickness) but their physical properties mean that they are more robust and resistant to damage.

BS8485:2007 Table 3 Solution Scores

Where the gas situation is 4 or more (and for NHBC Red situations) the site requires a comprehensive risk assessment to confirm the scope of protection measures. These are higher risk sites and reliance on Table 2 and 3 alone is not sufficient.

For a site which is impacted by migratory gases from an off site source, the development may be protected by imposing pathway intervention methods, which if successfully validated, could also remove the need for further analysis. It is essential that the gas regime in these circumstances has been fully characterised and that the only source impacting the site is located off site and that the pathway is clearly defined and its interception equally proven before construction commences. Pathway intervention methods may include vertical membrane installations, venting trenches, rows of stone columns, activated trenches and various proprietary systems. These systems are particularly relevant to domestic housing where there is limited scope for foundation type solutions.

CURRENT GUIDANCE ON REMEDIATION

When risk assessment of the site has been completed and it indicates that remedial works are required, the main guidance in managing this process is set out in the DEFRA/EA publication CLR11 (2004) "Model Procedures for the Management of Land Contamination." The stages of managing remediation are as follows:

(a) Options Appraisal and develop Remediation Strategy;
(b) Develop Implementation Plan and Verification Plan;
(c) Remediation, Verification and Monitoring.

The Remediation Strategy sets out the remediation targets, identifies technically feasible remedial solutions and presents an evaluation of the options so that these can be assessed enabling that the most suitable solution is adopted. An outline of the proposed remedial method should be presented. Agreement should be sought of the appropriate statutory bodies for the Remediation Strategy before proceeding to the next stage.

The Implementation Plan is a detailed method statement setting out how the remediation is to be carried out including stating how the site will be managed, welfare procedures, health and safety considerations together with practical measures such as details of temporary works, programme of works, waste management licences and regulatory consents required. Agreement should again be sought of the appropriate statutory bodies for this Plan.

The Verification Plan sets out the requirements for gathering data to demonstrate that the remediation has met the required remediation objectives and criteria. The Verification Plan presents the requirements for a wide range of issues including the level of supervision, sampling and testing regimes for treated materials, waste and imported materials, required monitoring works during and post remediation, how compliance with all licenses and consents will be checked etc. Agreement should again be sought of the appropriate statutory bodies for the Verification Plan. On completion of the remediation a Verification Report should be produced to provide a complete record of all remediation activities on site and the data collected as required in the Verification Plan. The Verification Report should demonstrate that the remediation has met the remedial targets to show that the site is suitable for the proposed use.

APPENDIX D: COMMERCIAL ENVIRONMENTAL DATA

CENTREMAPS
Brockamin House, ,
Worcester, WR6 5JU

GroundSure Reference:	CMAPS-AAG-264997-4165-141013EDR
Your Reference:	4165
Report Date:	14 Oct 2013
Report Delivery Method:	**Email - pdf**
Client Email:	andy@centremaps.com

GroundSure EnviroInsight

Address: BIDEFORD DRIVE,BROOKLANDS,MANCHESTER, M23 0QB

Dear Sir/Madam,

Thank you for placing your order with CENTREMAPS. Please find enclosed the GroundSure EnviroInsight as requested

If you need further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.
GroundSure EnviroInsight

GroundSure EnviroInsight

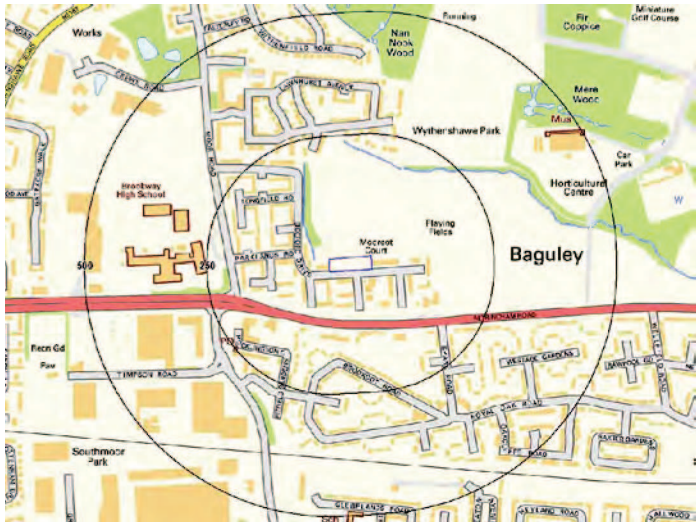
Address: BIDEFORD DRIVE,BROOKLANDS,MANCHESTER, M23 0QB

Date: 14 Oct 2013

GroundSure Reference: CMAPS-AAG-264997-4165-141013EDR

Your Reference: 4165

Client: CENTREMAPS



Brought to you by CENTREMAPS

Aerial Photograph of Study Site

NW ▲ N NE

◄W E►



SW ▼ S SE

Aerial photography supplied by Getmapping PLC.
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Site Name: BIDEFORD DRIVE,BROOKLANDS,MANCHESTER, M23 0QB
Grid Reference: 380770,389464
Size of Site: 0.21 ha

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Report Section	Number of records found within (X) m of the study site boundary					
1. Environmental Permits, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations						
Records of historic IPC Authorisations	0	0	0	0	-	-
Records of Part A(1) and IPPC Authorised Activities	0	0	0	0	-	-
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0	-	-
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0	-	-
Records of List 1 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of List 2 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of Part A(2) and Part B Activities and Enforcements	0	0	1	2	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	8	-	-
Records of Licensed Discharge Consents	0	0	0	0	-	-
Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0	-	-
1.2 Records of COMAH and NIHHS sites	0	0	0	0	-	-
1.3 Environment Agency Recorded Pollution Incidents						
National Incidents Recording System, List 2	0	0	0	-	-	-
National Incidents Recording System, List 1	0	0	0	-	-	-
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0	-	-
2. Landfill and Other Waste Sites	on-site	0-50	51-250	251-500	501-1000	1000-1500
2.1 Landfill Sites						
Environment Agency Registered Landfill Sites	0	0	0	0	0	-
Environment Agency Historic Landfill Sites	0	0	0	0	0	0
BGS/DoE Landfill Site Survey	0	0	0	0	0	0
GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	1	-	-
Environment Agency Licensed Waste Sites	0	0	0	0	0	0

3. Current Land Uses

	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	0	0	7	-	-	-
3.2 Records of Petrol and Fuel Sites	0	0	1	0	-	-
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0	-	-

4. Geology

	Description
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site? *	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site? *	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	

Source: Scale: 1:50,000 BGS Sheet 098

* This includes an automatically generated 50m buffer zone around the site.

5. Hydrogeology and Hydrology

	on-site	0-50	51-250	251-500	501-1000	1001-2000
5.1 Are there any records of Productive Strata in the Superficial Geology within 500m of the study site?				Yes		
5.2 Are there any records of Productive Strata in the Bedrock Geology within 500m of the study site?				Yes		
5.3 Groundwater Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.4 Surface Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.6 Are there any Source Protection Zones within 500m of the study site?					No	

5.7 River Quality	on-site	0-50	51-250	251-500	501-1000	1001-1500
Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.8 Detailed River Network entries within 500m of the site	0	0	2	0	-	-
5.9 Surface water features within 250m of the study site	No	No	Yes	-	-	-

6. Flooding

6.1 Are there any Environment Agency indicative Zone 2 floodplains within 250m of the study site?	Yes
6.2 Are there any Environment Agency indicative Zone 3 floodplains within 250m of the study site?	Yes
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Very High
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

7. Designated Environmentally Sensitive Sites

	on-site	0-50	51-250	251-500	501-1000	1001-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0

7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
7.3 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.4 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
7.5 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.6 Records of Ramsar sites	0	0	0	0	0	0
7.7 Records of World Heritage Sites	0	0	0	0	0	0
7.8 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.9 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.10 Records of National Parks	0	0	0	0	0	0
7.11 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.12 Records of Nitrate Vulnerable Zones	1	0	0	0	3	0
7.13 Records of Ancient Woodlands	0	0	0	0	0	0

8. Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Very Low

9. Mining

9.1 Are there any coal mining areas within 75m of the study site?	No
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Negligible
9.3 Are there any brine affected areas within 75m of the study site?	No

Using this Report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure underground oil and gas pipelines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (08444 159000) for further information and guidance.

Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

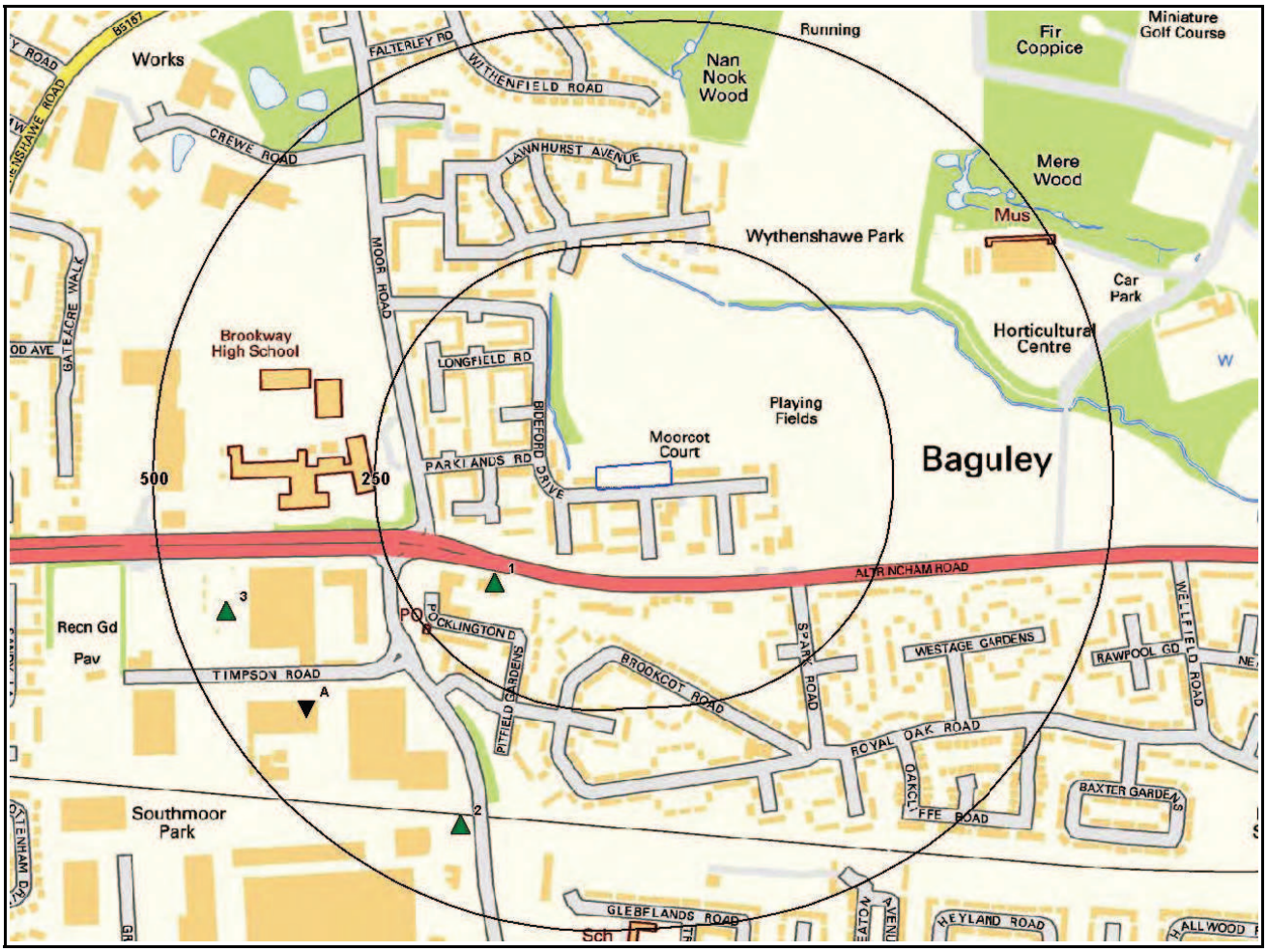
All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Environmental Permits, Incidents and Registers Map

NW ▲ N NE

◄W E►

SW ▼ S SE



Authorisations,Incidents and Registers Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- 250 / 500 Search Buffers (m)
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

1.Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

Records of historic IPC Authorisations within 500m of the study site: **0**

Database searched and no data found.

Records of Part A(1) and IPPC Authorised Activities within 500m of the study site: **0**

Database searched and no data found.

Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: **0**

Database searched and no data found.

Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site: **0**

Database searched and no data found.

Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: **0**

Database searched and no data found.

Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: **0**

Database searched and no data found.

Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: **3**

The following Part A(2) and Part B Activities are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
1	160.0	SW	380612, 389340	Address: Shell Baguley, Altrincham Road, Altricham, M23 9aa Process: Petrol Filling Station Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
2	413.0	S	380574, 389066	Address: Dresser Rand Uk Ltd., Southmoor Road, Wythenshawe, M23 9lh Process: Coating Processes. Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

3	441.0	W	380310, 389308	Address: Tesco Stores LTD(Baguley), Altrincham Road, Wythenshawe Process: Petrol Filling Station Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site: 8

The following RAS Licence (3 or 4) records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance [m]	Direction	Address	Operator	Type	Permission Number	Dates	Status
12A	412.0	SW	Magnox Electric Ltd, Technology Division, Timpson Road, Manchester, Greater Manchester, M23 9LL	Magnox Electric Ltd	Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3)	AC9831	Date of Approval:31/3/1991 00:00:00 Effective from:31/3/1991 00:00:00 Last date of update:2013-07-01	Revoked/ cancelled
13A	412.0	SW	Magnox Electric Ltd, Technology Division, Timpson Road, Manchester, Greater Manchester, M23 9LL	Magnox Electric Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AC9742	Date of Approval:31/3/1991 00:00:00 Effective from:31/3/1991 00:00:00 Last date of update:2013-07-01	Revoked/ cancelled
14A	412.0	SW	Magnox Electric Ltd, Technology Division, Timpson Road, Manchester, Greater Manchester, M23 9LL	Magnox Electric Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AC9777	Date of Approval:31/3/1991 00:00:00 Effective from:31/3/1991 00:00:00 Last date of update:2013-07-01	Revoked/ cancelled
15A	412.0	SW	Magnox Electric Ltd, Timpson Road, Wythenshawe, Manchester, M23 9LL	Magnox Electric Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AK1258	Date of Approval:31/3/1991 00:00:00 Effective from:31/3/1991 00:00:00 Last date of update:2013-07-01	Superseded By Variation
16A	412.0	SW	Magnox Electric Ltd, Timpson Road, Wythenshawe, Manchester, M23 9LL	Magnox Electric Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AK1258	Date of Approval:27/10/1992 00:00:00 Effective from:27/11/1992 00:00:00 Last date of update:2013-07-01	Revoked/ cancelled

17A	412.0	SW	Magnox Electric Ltd, Technology Division, Timpson Road, Manchester, Greater Manchester, M23 9LL	Magnox Electric Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AC9769	Date of Approval:31/3/1991 00:00:00 Effective from:31/3/1991 00:00:00 Last date of update:2013-07-01	Revoked/ cancelled
18A	412.0	SW	Serco Assurance, Timpson Road, Wythenshawe, Manchester, M23 9LL	Serco Assurance	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BS7293	Date of Approval:19/5/2003 00:00:00 Effective from:19/5/2003 00:00:00 Last date of update:2013-07-01	Revoked/ cancelled
19A	412.0	SW	Serco Assurance, Timpson Road, Wythenshawe, Manchester, M23 9LL	Serco Assurance	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BS7293	Date of Approval:29/8/2002 00:00:00 Effective from:26/9/2002 00:00:00 Last date of update:2013-07-01	Superseded By Variation

Records of Licensed Discharge Consents within 500m of the study site: **0**

Database searched and no data found.

Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: **0**

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: **0**

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site: **0**

Database searched and no data found.

Records of National Incidents Recording System, List 1 within 250m of the study site: **0**

Database searched and no data found.

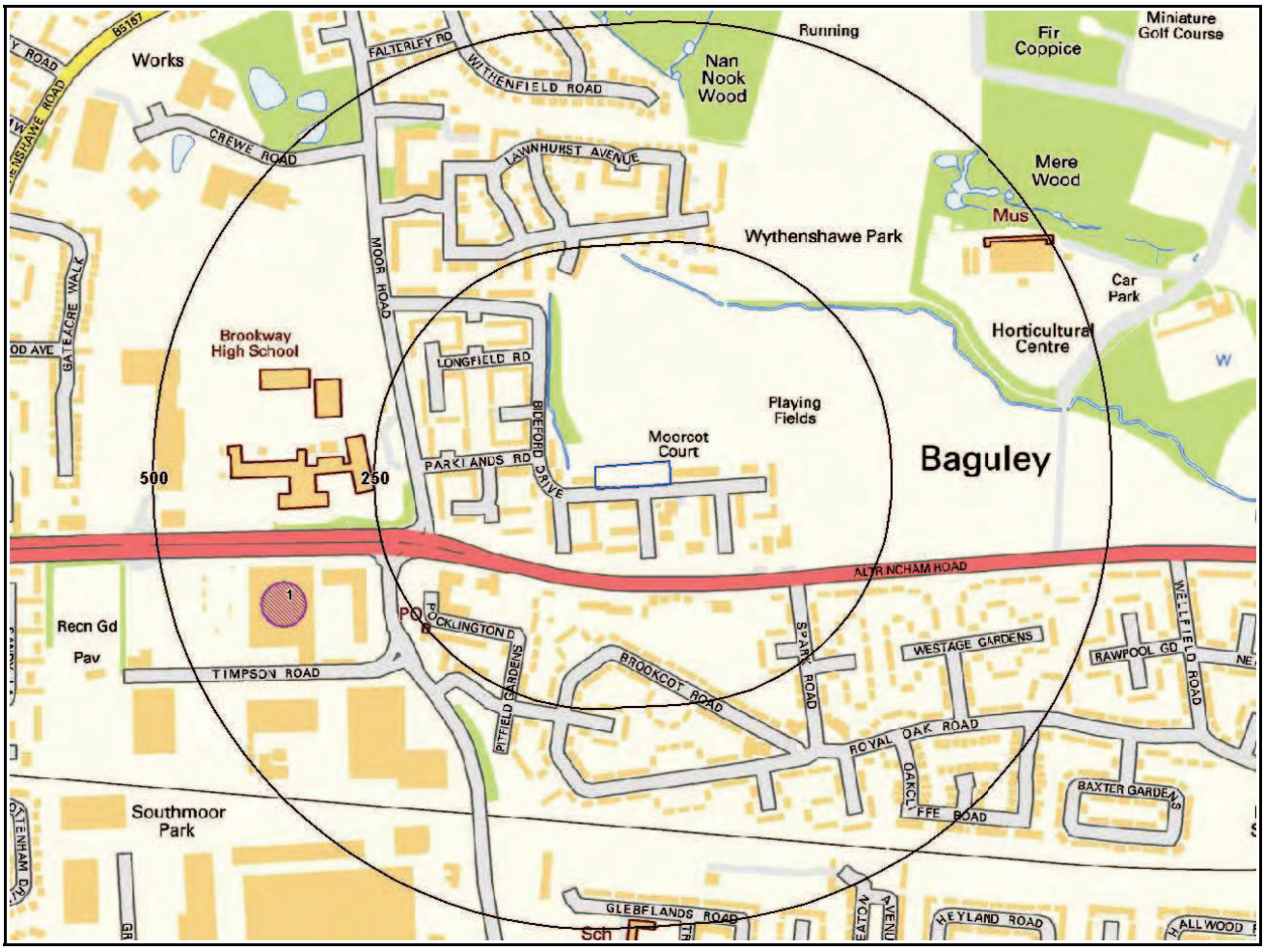
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? **0**

Database searched and no data found.

2. Landfill and Other Waste Sites Map

NW N NE



W ◄ E ►

SW S SE

Landfill & Other Waste Sites Legend

Mapping sourced from Ordnance Survey

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Site Outline

250 / 500 Search Buffers (m)

E.A. Active Landfill

E.A. Historic Landfill

Local Authority Landfill

Historic and Planned Waste Sites

E.A. Licensed Waste Site

BGS / DoE Survey Landfill

2. Landfill and Other Waste Sites

2.1 Landfill Sites

Records from Environment Agency landfill data within 1000m of the study site: **0**

Database searched and no data found.

Records of Environment Agency historic landfill sites within 1500m of the study site: **0**

Database searched and no data found.

Records of BGS/DoE non-operational landfill sites within 1500m of the study site: **0**

Database searched and no data found.

Records of Local Authority landfill sites within 1500m of the study site: **0**

Database searched and no data found.

2.2 Other Waste Sites

Records of waste treatment, transfer or disposal sites within 500m of the study site: **1**

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance [m]	Direction	Details		
1	352.0	W	Type of Site: Recycling Facilities Site Address: Tesco Stores Ltd, Altrincham Road, MANCHESTER, Greater Manchester, M23 9TJ	Planning Application Reference: 084201/FO/2007/S2 Date: -	Further Details: Scheme comprises relocation of recycling facilities including reinstatement of parking spaces. An application (ref: 084201/FO/2007/S2) for detailed planning permission was granted by Manchester C.C. Planning decision obtained Data Source: Historic Planning Application Data Type: Point

---

Records of Environment Agency licensed waste sites within 1500m of the study site: **0**

Database searched and no data found.

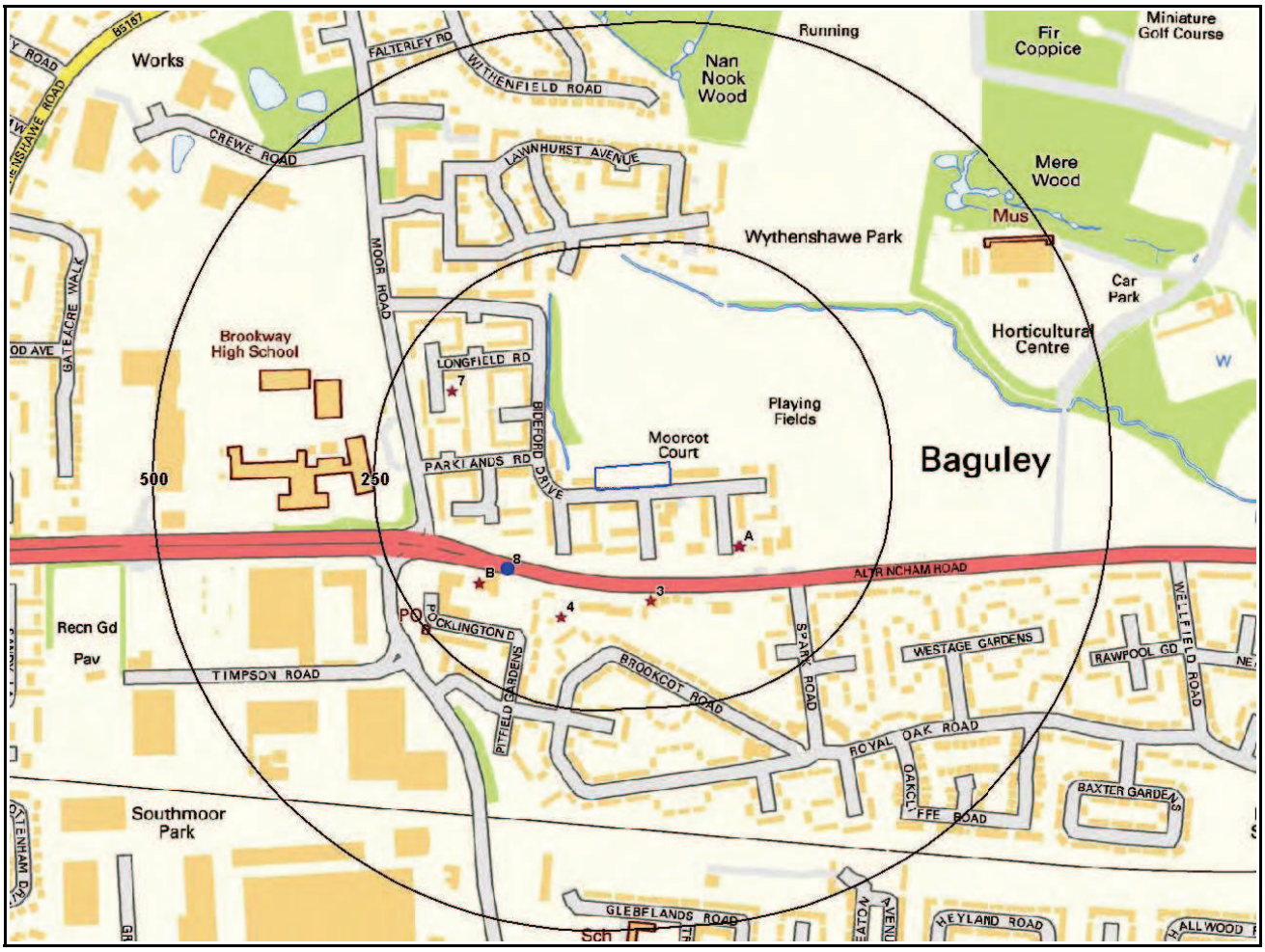
---

3. Current Land Use Map

NW N NE

◄W E►

SW S SE



Current Land Use Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500 Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Underground High Pressure Oil & Fuel Pipelines

3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: **7**

The following records are represented as points on the Current Land Uses map.

ID	Distance	Direction	Company	Address	Activity	Category
1A	103.0	SE	Gas Governor	M23	Gas Features	Infrastructure and Facilities
2A	105.0	SE	Gas Governor Station	M23	Gas Features	Infrastructure and Facilities
3	129.0	S	M J B Travel	659, Altrincham Road, Manchester, M23 9AA	Vehicle Hire and Rental	Hire Services
4	150.0	S	Electricity Sub Station	M23	Electrical Features	Infrastructure and Facilities
5B	171.0	SW	Shell UK	Altrincham Road, Manchester, M23 9AA	Petrol and Fuel Stations	Road and Rail
6B	171.0	SW	Shell Baguley	Altrincham Road, Baguley, Manchester, Lancashire, M23 9AA	Petrol and Fuel Stations	Road and Rail
7	185.0	NW	Electricity Sub Station	M23	Electrical Features	Infrastructure and Facilities

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: **1**

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance	Direction	NGR	Company	Address	LPG	Status
8	136.0	SW	380628, 389358	Shell	Shell Baguley, Altrincham Road, Altrincham Road, Baguley, Manchester, Lancashire, M23 9AA	Yes	Open

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site: **0**

Database searched and no data found.

4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
GFDUD-SAGR	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
GFSDD-SAGR	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

4.3 Bedrock and Solid Geology

The database has been searched on site, including a 50m buffer.

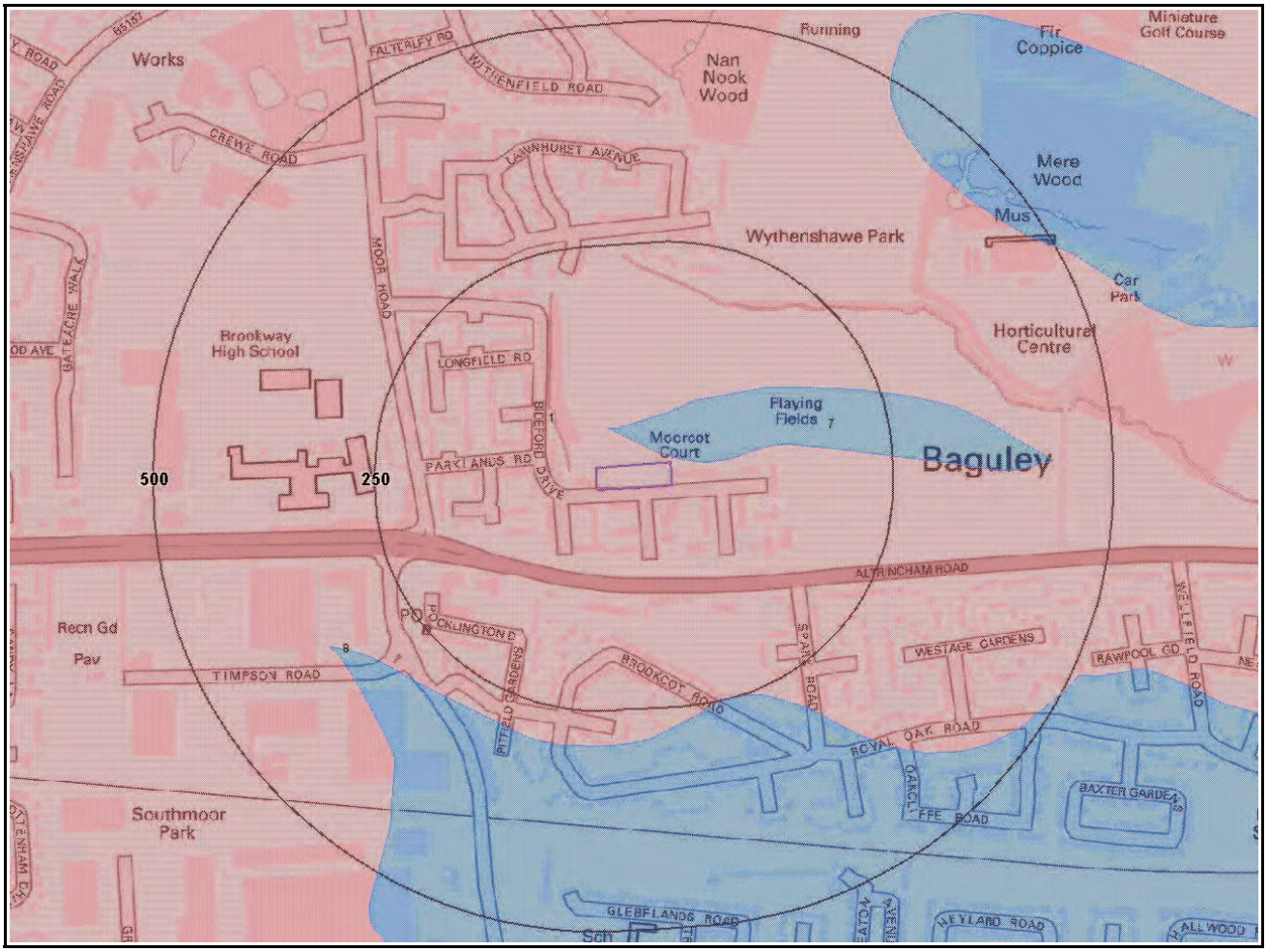
LEX Code	Description	Rock Type
BOM-MDST	BOLLIN MUDSTONE MEMBER	MUDSTONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

For more detailed geological and ground stability data please refer to the "GroundSure GeoInsight". Available from our website.

5a. Hydrogeology - Aquifer Within Superficial Geology

NW N NE



W E

SW S SE

Aquifer Within Superficial Geology Legend

Mapping sourced from Ordnance Survey

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Site Outline

250 500 Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

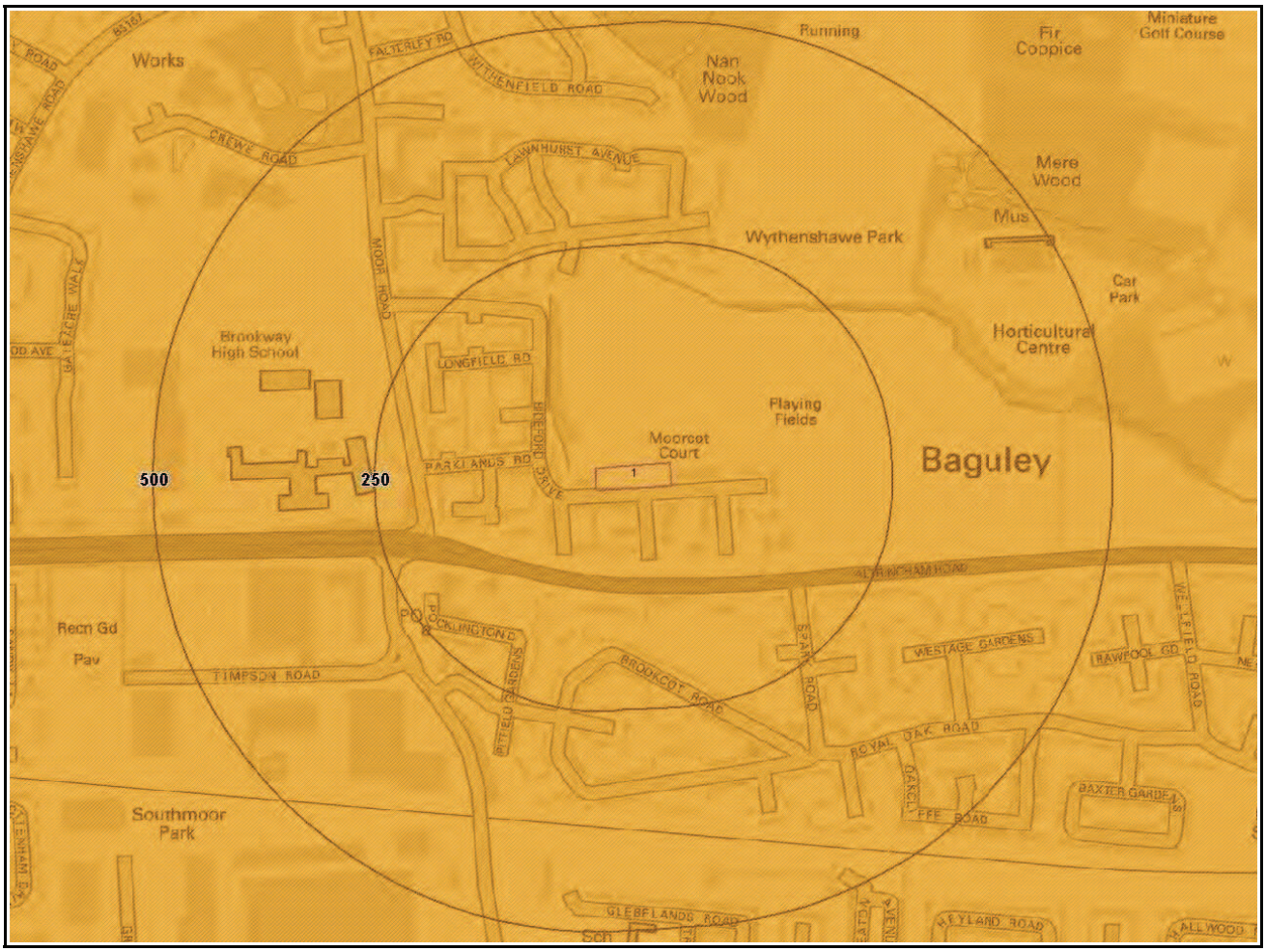
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

5b. Hydrogeology - Aquifer Within Bedrock Geology and Abstraction Licenses

NW N NE



W E

SW S SE

Aquifer Within Bedrock Geology Legend

Mapping sourced from Ordnance Survey

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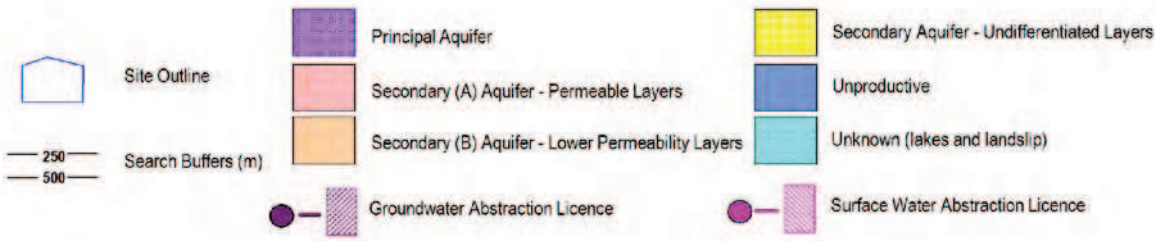
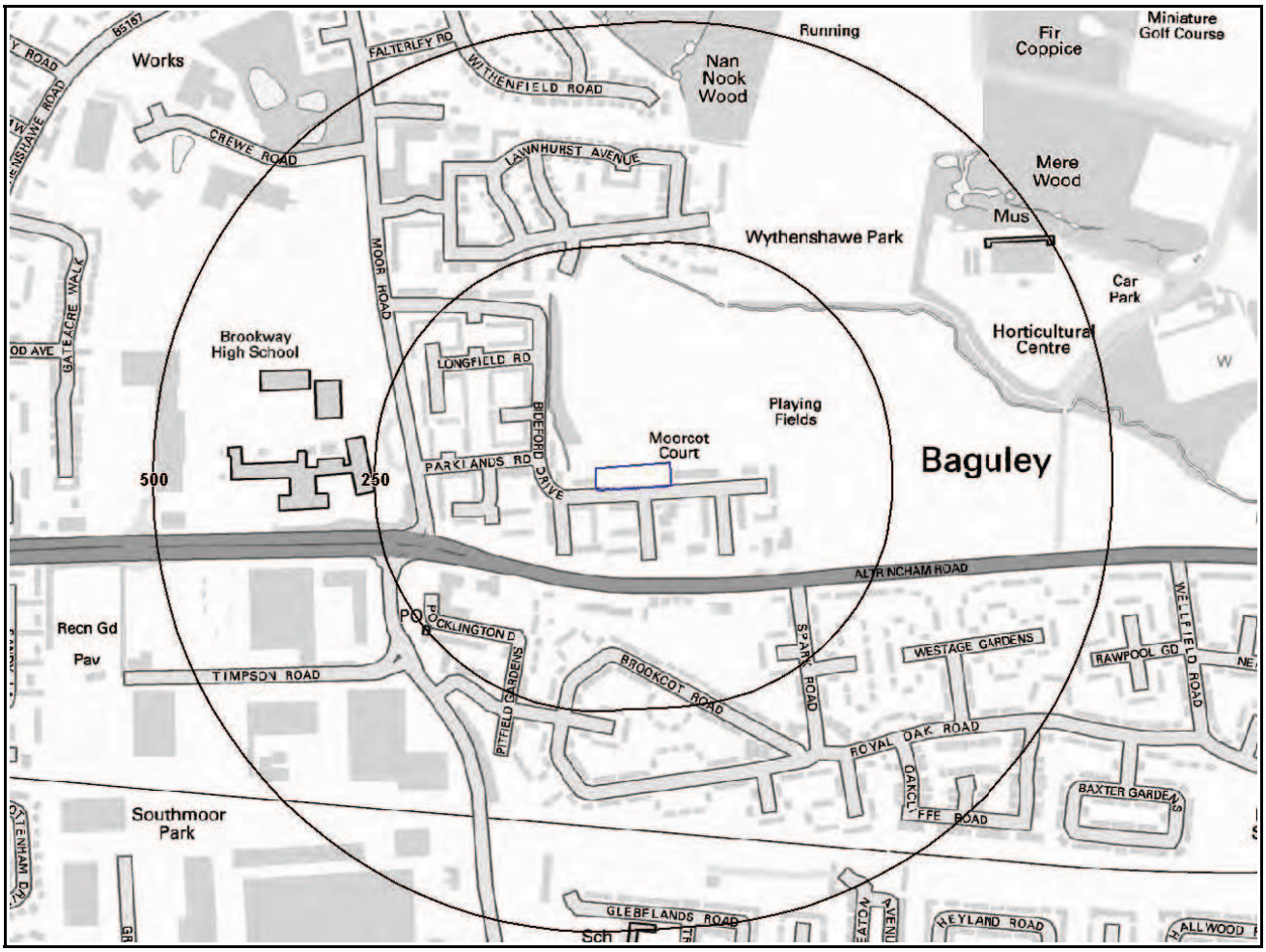


5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

NW N NE

W



E

SW S SE

SPZ and Potable Water Abstraction Licenses
Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

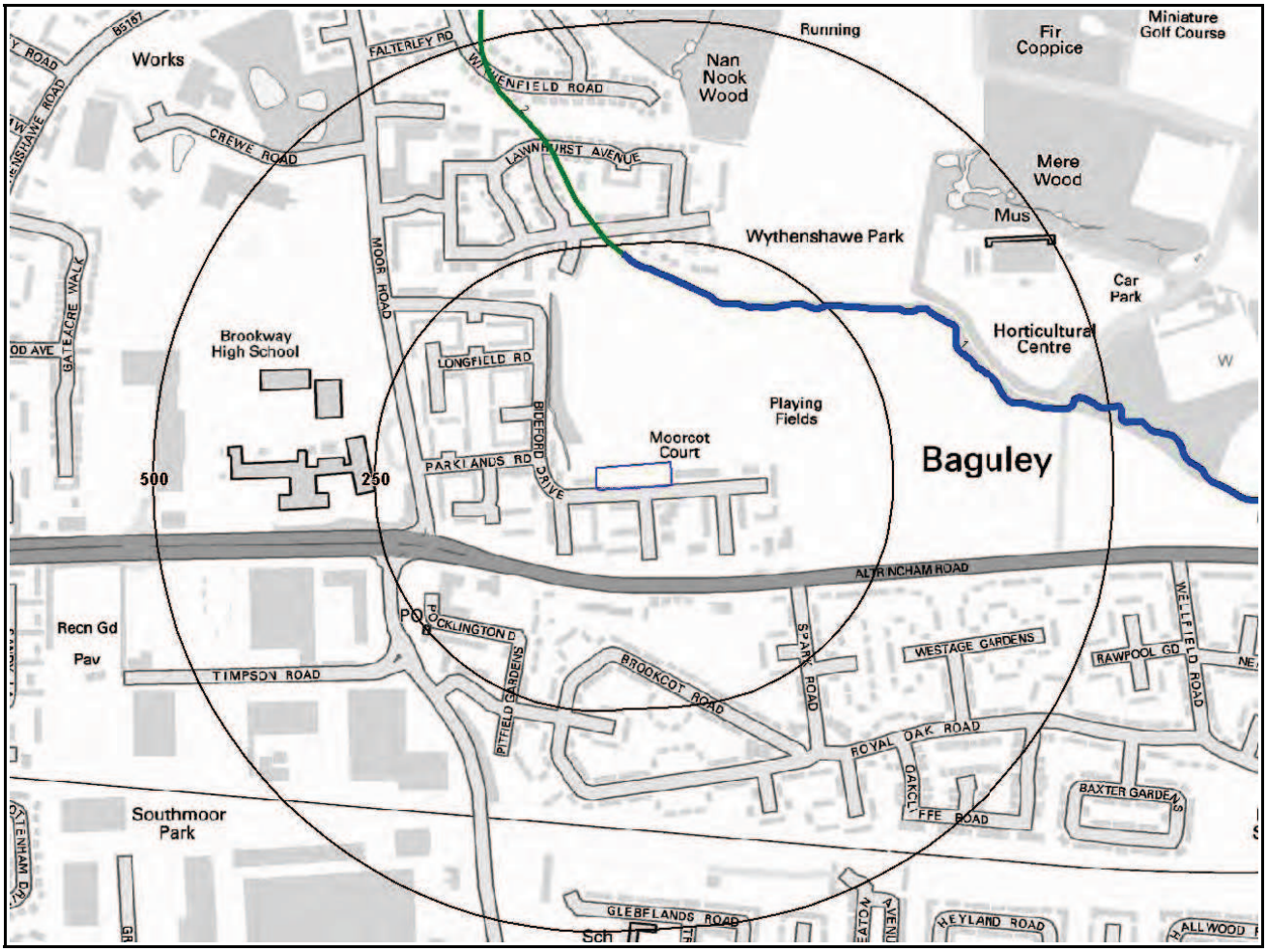
Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

5d. Hydrology – Detailed River Network and River Quality

NW N NE

W



E

SW S SE

Hydrology Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- 250 / 500 Search Buffers (m)
- Primary River
- Secondary River
- Tertiary River
- Lake/Reservoir
- Underground River (inferred)
- General Quality Assessment: Biology
- General Quality Assessment: Chemistry
- Canal
- Canal Tunnel
- Culvert
- Multiple Channel Culvert
- Underground River (Potential Sewer)
- Underground River (local knowledge)

5.Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of productive strata within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance [m]	Direction	Designation	Description
1	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
7	8.0	N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
8	250.0	S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

5.2 Aquifer within Bedrock Deposits

Are there records of productive strata within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance [m]	Direction	Designation	Description
1	0.0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? **No**

Database searched and no data found.

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? **No**

Database searched and no data found.

5.7 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? **No**

Biological Quality:

Database searched and no data found.

Chemical Quality:

Database searched and no data found.

5.8 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? **Yes**

The following Detailed River Network records are represented on the Hydrology Map (5d):

ID	Distance	Direction		Details
1	189.0	N	River Name: Baguley Brook Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
2	240.0	N	River Name: Baguley Brook Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined

5.9 Surface Water Features

Are there any surface water features within 250m of the study site? **Yes**

The following surface water records are not represented on mapping:

Distance to Surface Water (m)	on-site	0-50	51-250

Surface water features within 250m of the study site	No	No	Yes

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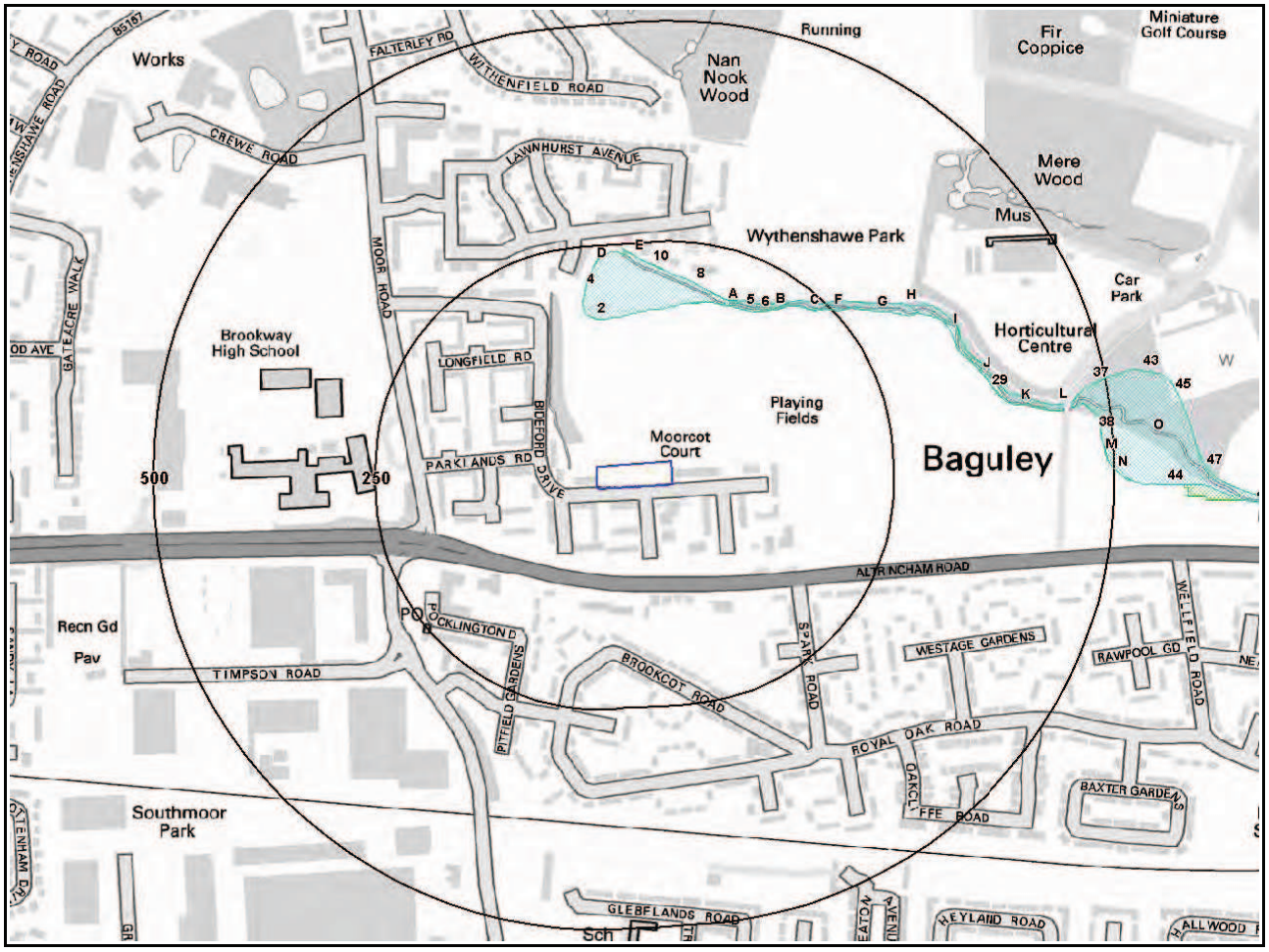
6. Environment Agency Flood Map

NW ▲ N NE



◄W E►

SW S ▼ SE

Environment Agency Flood Legend

Mapping sourced from Ordnance Survey

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Site Outline

250 / 500 Search Buffers (m)

Zone 2 Floodplain

Zone 3 Floodplain

Flood Storage Area

Area Benefiting from Flood Defences

Flood Defences

6. Flooding

6.1 Zone 2 Flooding

Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%) or greater from rivers and the sea but less than 1% from rivers or 0.5% from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 2 floodplain? **Yes**

The following floodplain records are represented as green shading on the Flood Map:

ID	Distance	Direction	Update	Type
1A	167.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
2	167.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
3A	186.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
4	188.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
5	190.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)
6	194.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)
7B	202.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)
8	202.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
9B	210.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)
10	213.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
11B	218.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)
12D	226.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
13C	229.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)
14E	233.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
15C	235.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)
16D	235.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
17E	241.0	N	09-Sep-2013	Zone 2 - (Fluvial Models)
18F	246.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)
19F	250.0	NE	09-Sep-2013	Zone 2 - (Fluvial Models)

6.2 Zone 3 Flooding

Zone 3 estimates the annual probability of flooding as one in one hundred (1%) or greater from rivers and a one in two hundred (0.5%) or greater from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 3 floodplain? **Yes**

The following floodplain records are represented as blue shading on the Flood Map:

ID	Distance	Direction	Update	Type
54A	167.0	N	09-Sep-2013	Zone 3 - (Fluvial Models)

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site?	**No**

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site?	**No**

6.5 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?	**No**

6.6 Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site?	**Yes**
What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?	**Very High**

6.7 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?	**Moderate**

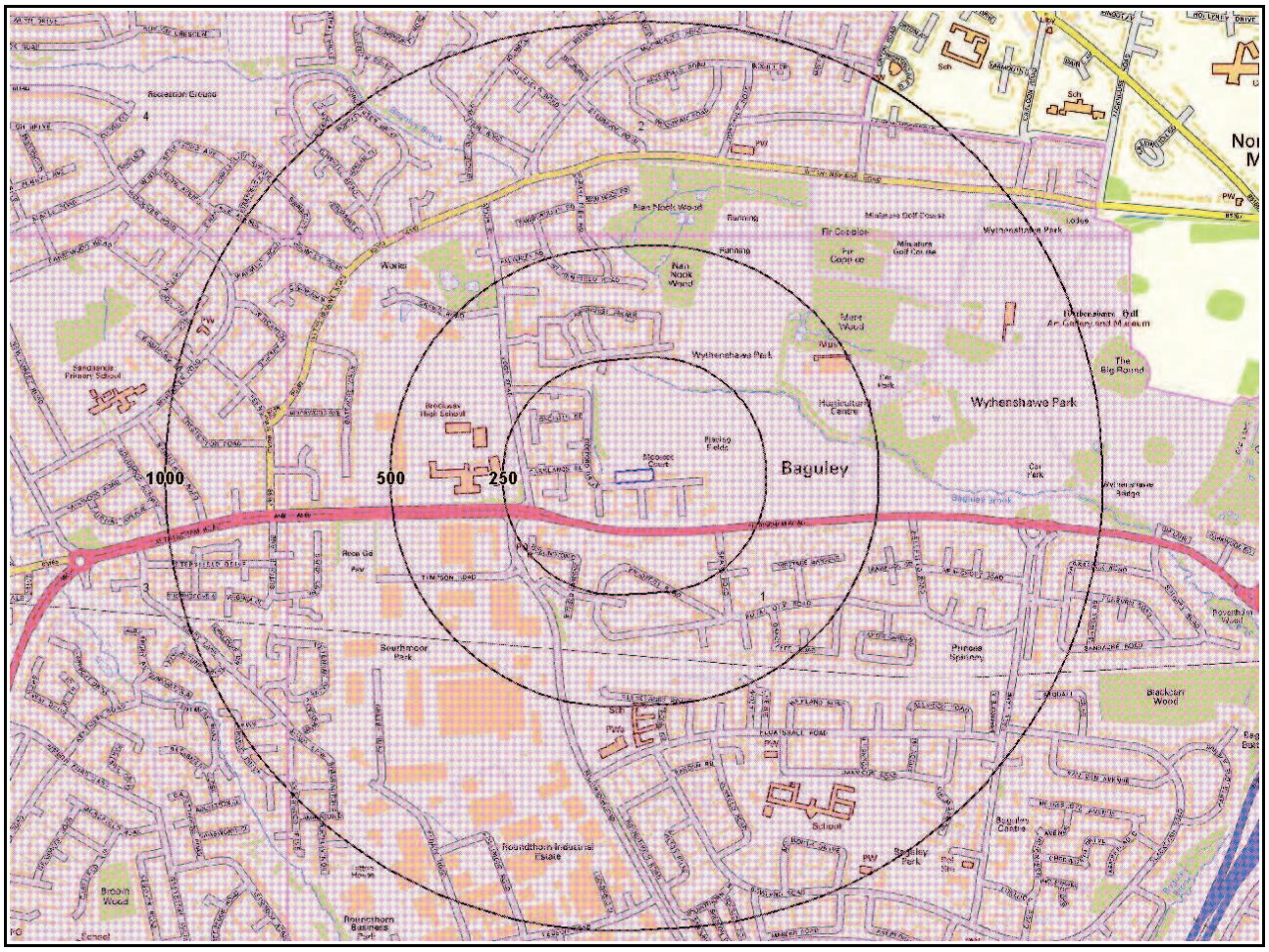
Notes:

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The **confidence rating** is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

7.Designated Environmentally Sensitive Sites Map

NW N NE



W E

SW S SE

Designated Environmentally Sensitive Sites Legend

Mapping sourced from Ordnance Survey

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Site Outline
SAC
SSSI
NNR
World Heritage Sites
SPA
Ramsar
LNR
Environmentally Sensitive Areas
Areas of Outstanding Natural Beauty
Nitrate Vulnerable Zones
Nitrate Sensitive Areas
National Parks
Ancient Woodlands

7.Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? **Yes**

Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: **0**

Database searched and no data found.

Records of National Nature Reserves (NNR) within 2000m of the study site: **0**

Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 2000m of the study site: **0**

Database searched and no data found.

Records of Special Protection Areas (SPA) within 2000m of the study site: **0**

Database searched and no data found.

Records of Ramsar sites within 2000m of the study site: **0**

Database searched and no data found.

Records of Local Nature Reserves (LNR) within 2000m of the study site: **0**

Database searched and no data found.

Records of World Heritage Sites within 2000m of the study site: **0**

Database searched and no data found.

Records of Environmentally Sensitive Areas within 2000m of the study site: **0**

Database searched and no data found.

Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site: **0**

Database searched and no data found.

Records of National Parks (NP) within 2000m of the study site: **0**

Database searched and no data found.

Records of Nitrate Sensitive Areas within 2000m of the study site: **0**

Database searched and no data found.

Records of Nitrate Vulnerable Zones within 2000m of the study site: **4**

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance	Direction	NVZ Type	Data Source
1	0.0	On Site	NVZ Area	DEFRA
2	521.0	N	NVZ Area	DEFRA
3	728.0	W	NVZ Area	DEFRA
4	899.0	NW	NVZ Area	DEFRA

Records of Ancient Woodland within 2000m of the study site: **0**

Database searched and no data found.

8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a GroundSure GeoInsight, available from our website. The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? **Very Low**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? **Very Low**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? **Null - Negligible**

Soluble rocks are not present in the search area. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? **Negligible**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? **Very Low**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

8.1.6Running Sand

What is the maximum Running Sand* hazard rating identified on the study site? **Very Low**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* This indicates an automatically generated 50m buffer and site.

9.Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? **No**

Database searched and no data found.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*? **Negligible**

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? **No**

Guidance: No Guidance Required.

10.Contacts

CENTREMAPS
Telephone: #CustomerHelpLine#
groundsure@centremaps.co.uk

British Geological Survey (England & Wales)
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276. Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

Environment Agency
National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY
Tel: 08708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk

Public Health England
Public information access office, Public Health England
Wellington House, 133-155 Waterloo Road, London, SE1 8UG
https://www.gov.uk/government/organisations/public-health-england
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5
Web: www.groundstability.com

Ordnance Survey
Romsey Road
Southampton SO16 4GU
Tel: 08456 050505

Local Authority
Authority: Manchester City Council
Phone: 0161 234 5000
Web: www.manchester.gov.uk
Address: Town Hall, Albert Square, Manchester, M60 2LA

Get Mapping PLC
Virginia Villas, High Street, Hartley Witney, Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements

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Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:
"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.
"Client" means the party or parties entering into a Contract with GroundSure.
"Commercial" means any building or property which is not Residential.
"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than
(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and
(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).
"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.
"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.
"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.
"Data Reports" means reports comprising factual data with no accompanying interpretation.
"Fees" has the meaning set out in clause 5.1.
"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.
"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.
"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.
"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.
"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.
"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.
"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.
"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.
"Residential" means any building or property used as or intended to be used as a single dwelling.
"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.
"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.
"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.
"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.
"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.
2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.
2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.
2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.
2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.
2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and
(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and
(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.
3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.
3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.
3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.
3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.
3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.
4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;
(i) the Beneficiary,
(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
(iv) the first purchaser or first tenant of the Site, and
(v) the professional advisers and lenders of the first purchaser or tenant of the Site.
4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.
4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").
5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.
5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to
(i) full payment of all relevant Fees and
(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.
6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.
6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.
6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:
(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;
(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;
(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
(iv) not combine the Services with or incorporate such Services into any other information data or service;
(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);
(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and
(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,
6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.
6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:
(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;
(ii) any use made of the Reports, Services, Materials or any part of them; and
(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.
7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.
7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.
7.4 GroundSure shall not be liable for
(i) loss of profits;
(ii) loss of business;
(iii) depletion of goodwill and/or similar losses;
(iv) loss of anticipated savings;
(v) loss of goods;
(vi) loss of contract;
(vii) loss of use;
(viii) loss or corruption of data or information;
(ix) business interruption;
(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;
(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
(xiii) loss or damage to a computer, software, modem, telephone or other property; and
(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.
7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.
7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.
8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:
(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or
(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.
9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:
(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and
(ii) the Reports and/or Mapping provided under this Contract are
(a) supplied to the Client's specification(s) and in any event
(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:
(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and
(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract. 11 Anti-Bribery
11.1 The Client warrants that it shall:
(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;
(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and
(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.
11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.
12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.
12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.
12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.
12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:
(i) the Client or Beneficiary's failure to provide facilities, access or information;
(ii) fire, storm, flood, tempest or epidemic;
(iii) Acts of God or the public enemy;
(iv) riot, civil commotion or war;
(v) strikes, labour disputes or industrial action;
(vi) acts or regulations of any governmental or other agency;
(vii) suspension or delay of services at public registries by Third Party Data Providers;
(viii) changes in law; or
(ix) any other reason beyond GroundSure's reasonable control.
In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.
12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.
12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.
12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.
12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.
12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.
12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

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CENTREMAPS
Brockamin House,
Worcester, WR6 5JU

Report Reference:	CMAPS-AAG-264997-4165-141013GEO
Your Reference:	4165
Report Date	14 Oct 2013
Report Delivery Method:	Email - pdf

GroundSure GeoInsight

Address: BIDEFORD DRIVE,BROOKLANDS,MANCHESTER, M23 0QB

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure GeoInsight** as requested.

If you need further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.
GroundSure GeoInsight

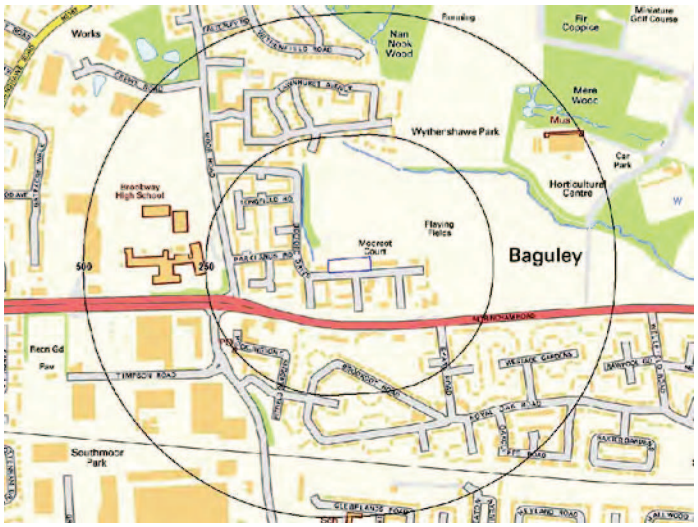
GroundSure GeoInsight

Address: BIDEFORD DRIVE,BROOKLANDS,MANCHESTER, M23 0QB

Date: 14 Oct 2013

Report Reference: CMAPS-AAG-264997-4165-141013GEO

Your Reference: 4165



Brought to you by CENTREMAPS

If you would like any further assistance regarding this report then please contact
CENTREMAPS on (T) 01886 832972, (F) 01886 833485, email: groundsure@centremaps.co.uk

Aerial Photograph of Study Site

NW N NE



W E

SW S SE

Aerial photography supplied by Getmapping PLC.
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Site Name: BIDEFORD DRIVE,BROOKLANDS,MANCHESTER, M23 0QB

Grid Reference: 380770,389464

Size of Site: 0.21 ha

Overview of Findings

The GroundSure GeoInsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Report Section	Number of records found within (X) m of the study site boundary
1. Geology	**Description**
1.1 Artificial Ground,	
1.1.1 Is there any Artificial Ground /Made Ground present beneath the study site?*	No
1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology & Landslips	
1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?	Yes
1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
1.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No
1.3 Bedrock, Solid Geology & Faults	
1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
1.3.2 Are there any records relating to permeability of bedrock within the study site* boundary?	Yes
1.3.3 Are there any records of faults within 500m of the study site boundary?	No
1.3.4 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level
1.3.5 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary

* This includes an automatically generated 50m buffer zone around the site

Source:Scale 1:50,000 BGS Sheet No:098

2. Ground Workings	on-site	0-50	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	5	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	0	0	0

3. Mining, Extraction & Natural Cavities	on-site	0-50	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	0	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	2
3.4 Non-Coal Mining*	0	0	0	0	0
3.5 Non–Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

*This includes an automatically generated 50m buffer zone around the site

4. Natural Ground Subsidence	on-site*	0-50	51-250	251-500	501-1000
4.1 Shrink-Swell Clay	Very Low	-	-	-	-
4.2 Landslides	Very Low	-	-	-	-
4.3 Ground Dissolution of Soluble Rocks	Null	-	-	-	-
4.4 Compressible Deposits	Negligible	-	-	-	-
4.5 Collapsible Deposits	Very Low	-	-	-	-
4.6 Running Sand	Very Low	-	-	-	-

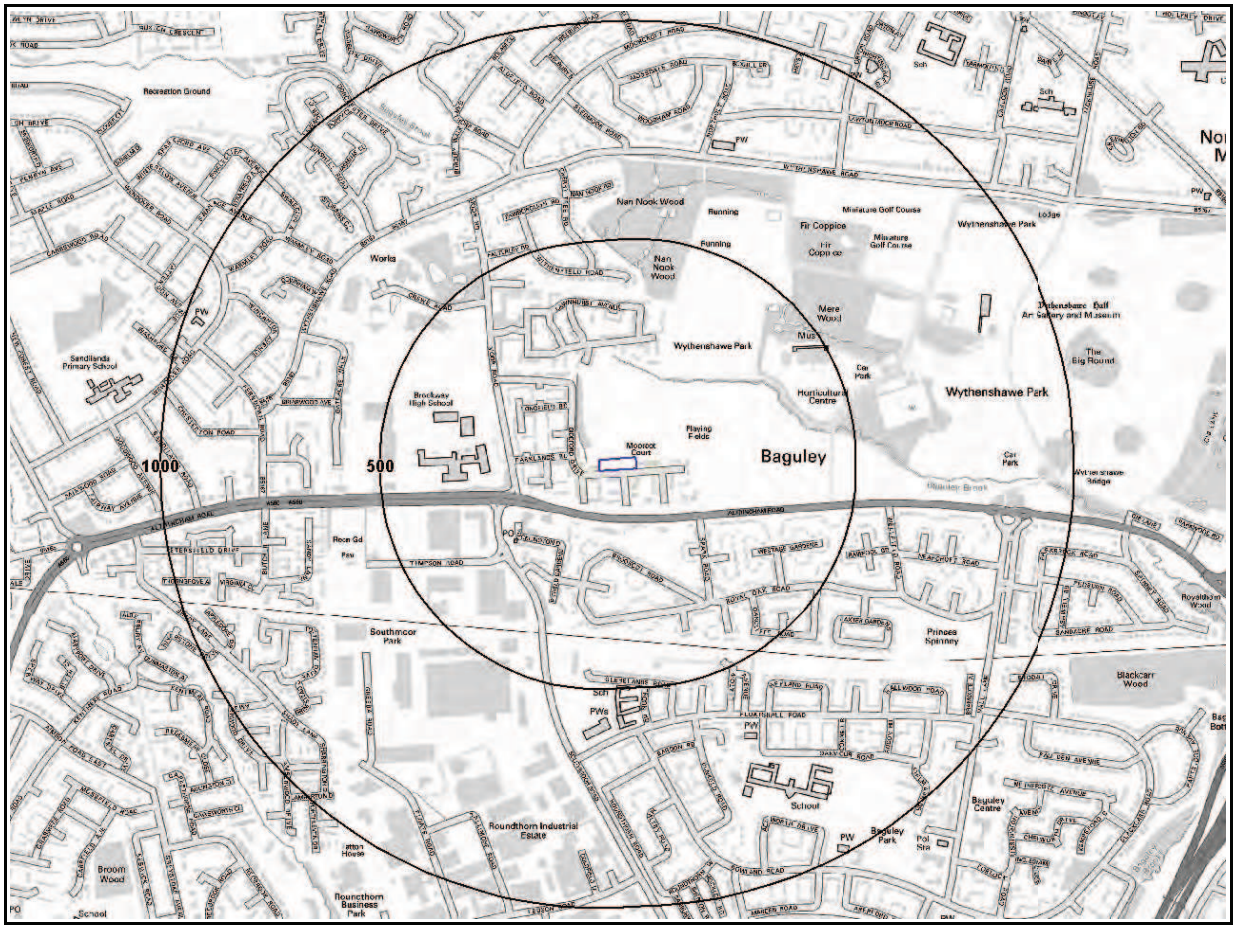
* This includes an automatically generated 50m buffer zone around the site

5. Borehole Records	on-site	0-50	51-250	251-500	501-1000
5.1 BGS Recorded Boreholes	0	0	0	-	-

6. Estimated Background Soil Chemistry	on-site	0-50	51-250	251-500	501-1000
6.1 Records of Background Soil Chemistry	1	2	0	-	-

1.1 Artificial Ground Map

NW N NE



W E

SW S SE

Artificial Ground Legend

Mapping sourced from Ordnance Survey

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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

Reclaimed Ground

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:098

1.1.1 Artificial/Made Ground

Are there any records of Artificial/Made Ground within 500m of the study site boundary? **No**

Database searched and no data found.

1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site* boundary? **No**

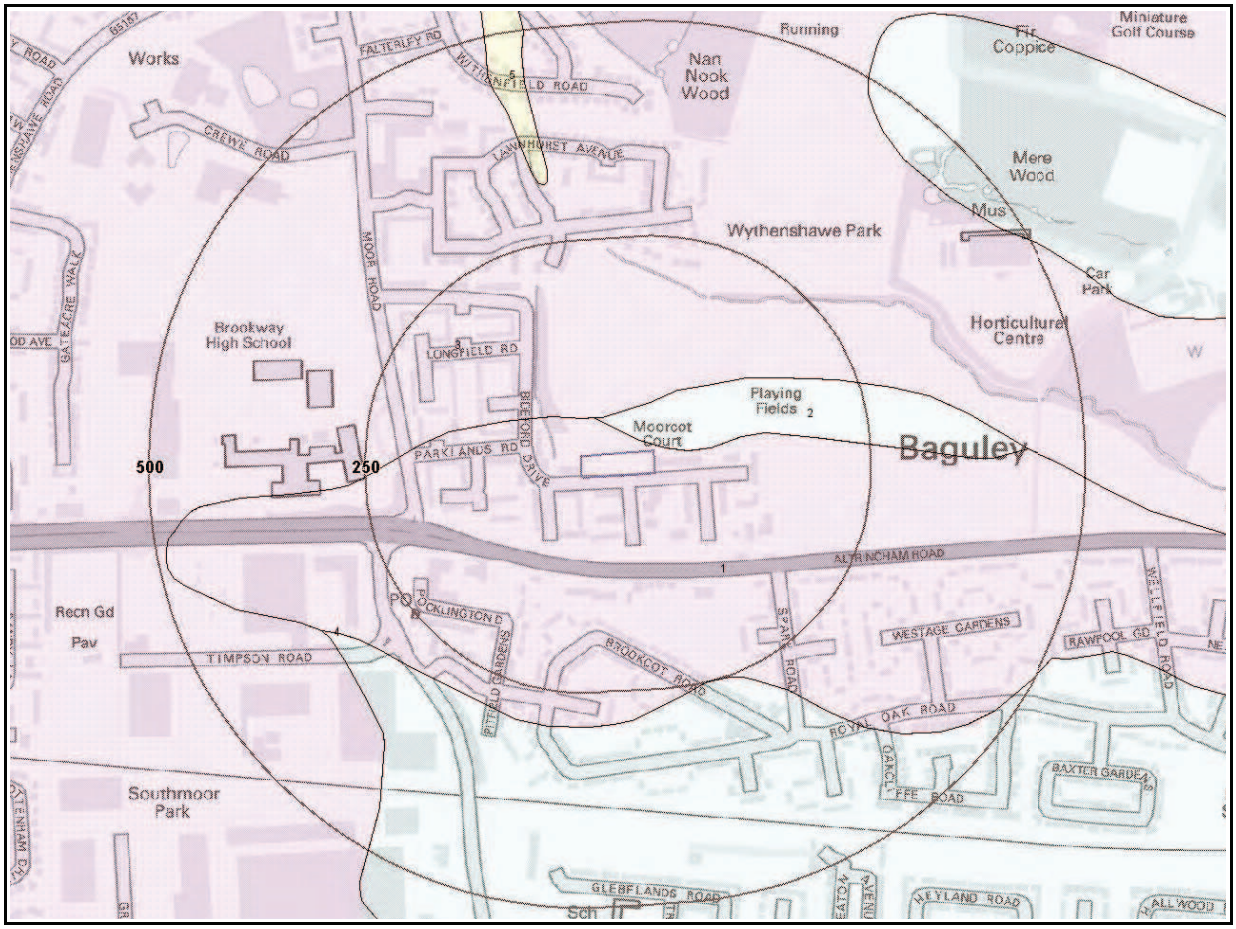
Database searched and no data found.

---

* This includes an automatically generated 50m buffer zone around the site.

1.2 Superficial Deposits and Landslips Map

NW N NE



W E

SW S SE

Superficial and Landslips Legend

Mapping sourced from Ordnance Survey

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Site Outline

500
1000
Search Buffers (m)

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/Drift Geology

Are there any records of Superficial Deposits/Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	Lex Code	Description	Rock Description
1	0.0	On Site	GFDUD-SAGR	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
2	8.0	N	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
3	43.0	N	GFSDD-SAGR	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL
4	250.0	S	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
5	319.0	N	ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site* boundary? Yes

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	High
8.0	N	Mixed	High	Low
43.0	N	Intergranular	Very High	High

1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.2.4 Landslip Permeability

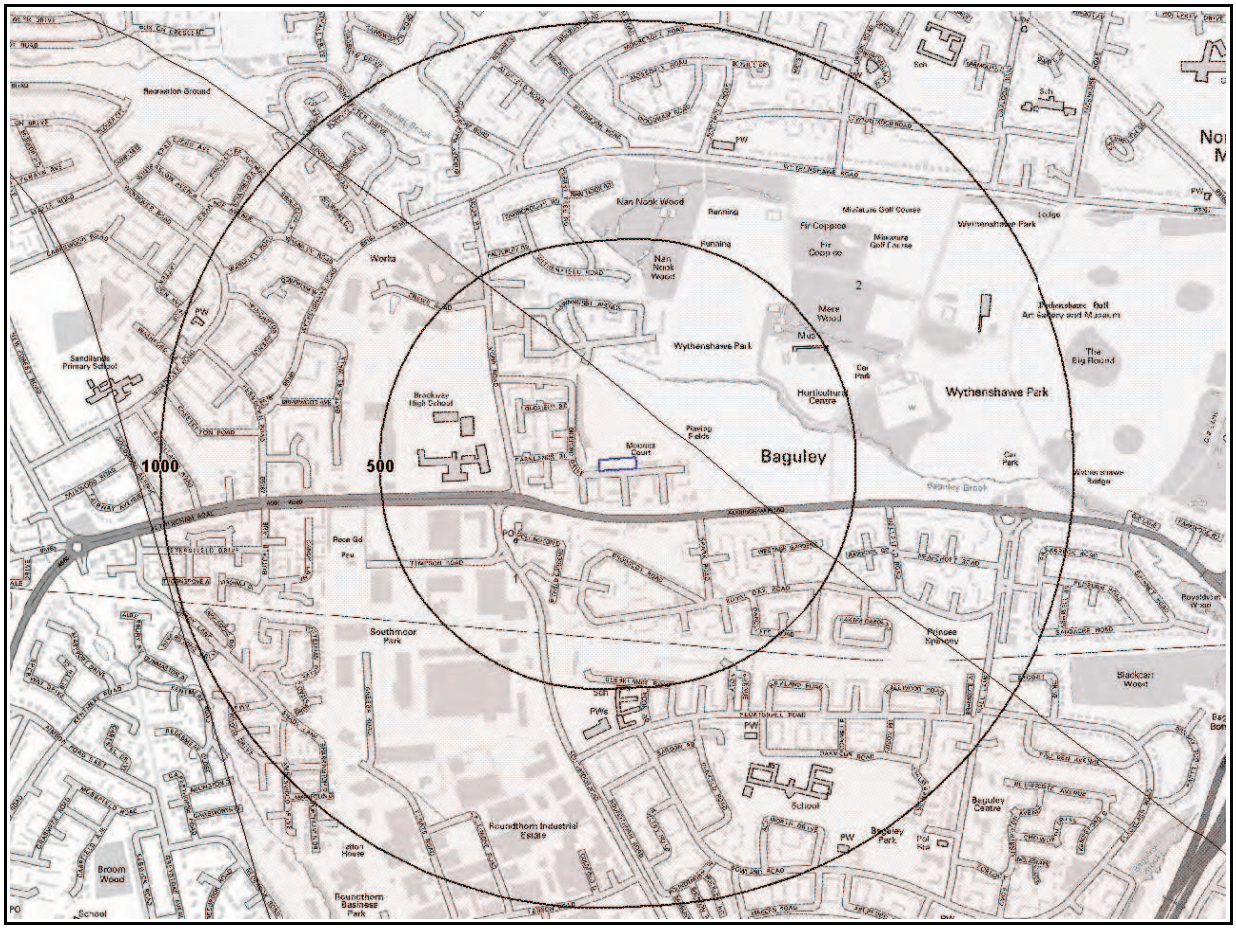
Are there any records relating to permeability of landslips within the study site* boundary? No

Database searched and no data found.

*This includes an automatically generated 50m buffer zone around the site.

1.3 Bedrock and Faults Map

NW N NE



W E

SW S SE

Bedrock & Faults Deposits Legend

Mapping sourced from Ordnance Survey

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Site Outline

500
1000
Search Buffers (m)

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:098

1.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	BOM-MDST	Bollin Mudstone Member - Mudstone	Anisian
2	99.0	NE	TPSF-SISD	Tarporley Siltstone Formation - Siltstone And Sandstone	Anisian / Olenekian

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site* boundary? Yes

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Low	Low

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3.4 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level

1.3.5 Radon Protection

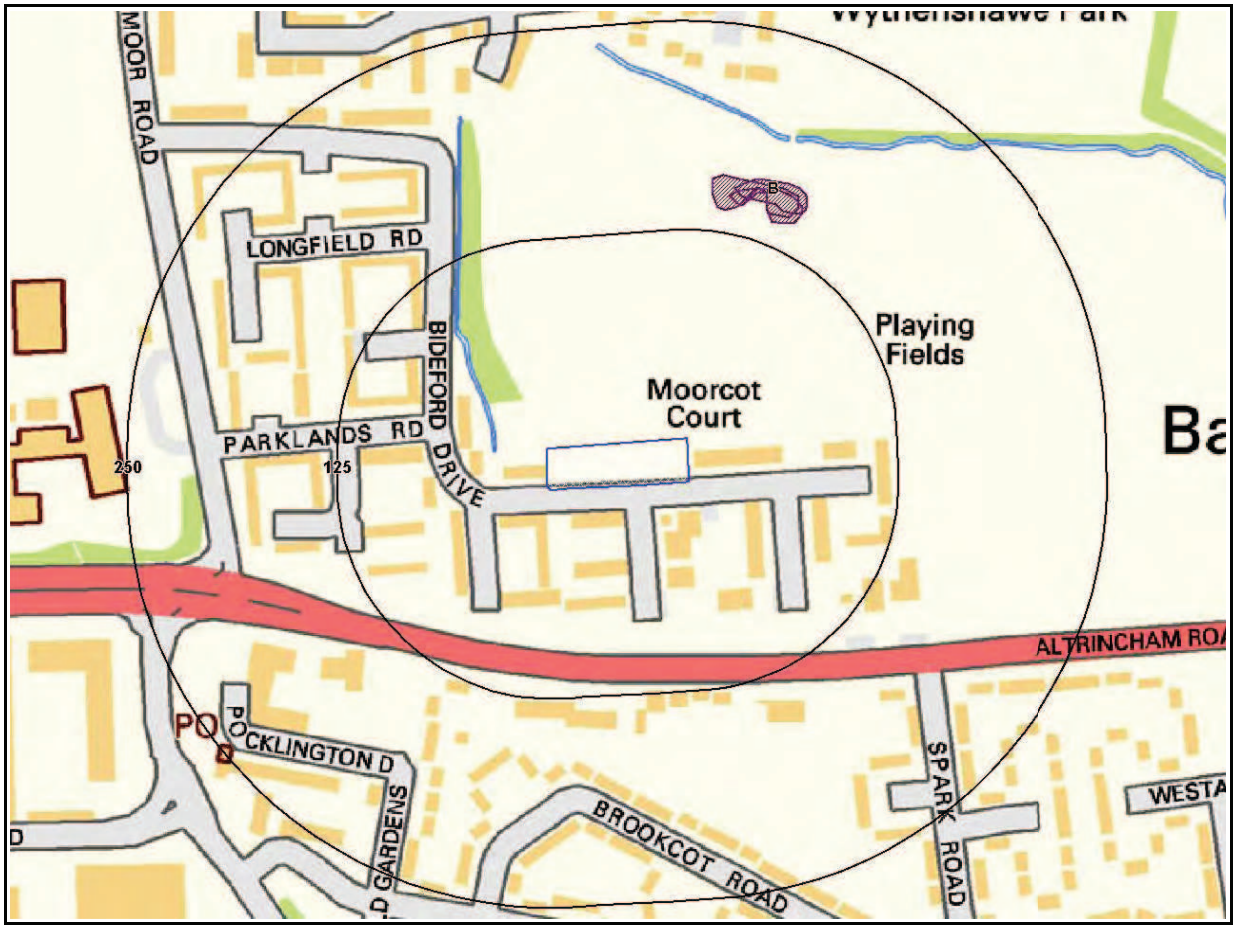
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary

* This includes an automatically generated 50m buffer zone around the site.

2. Ground Workings Map

NW N NE



W E

SW S SE

Ground Workings Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

2. Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1A	139.0	N	380837,389624	Ponds	1905
2A	139.0	N	380837,389624	Ponds	1923
3A	139.0	N	380837,389624	Ponds	1916
4B	139.0	N	380844,389618	Ponds	1938
5B	147.0	NE	380861,389624	Ponds	1949

2.2 Historical Underground Workings Features derived from Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

2.3 Current Ground Workings

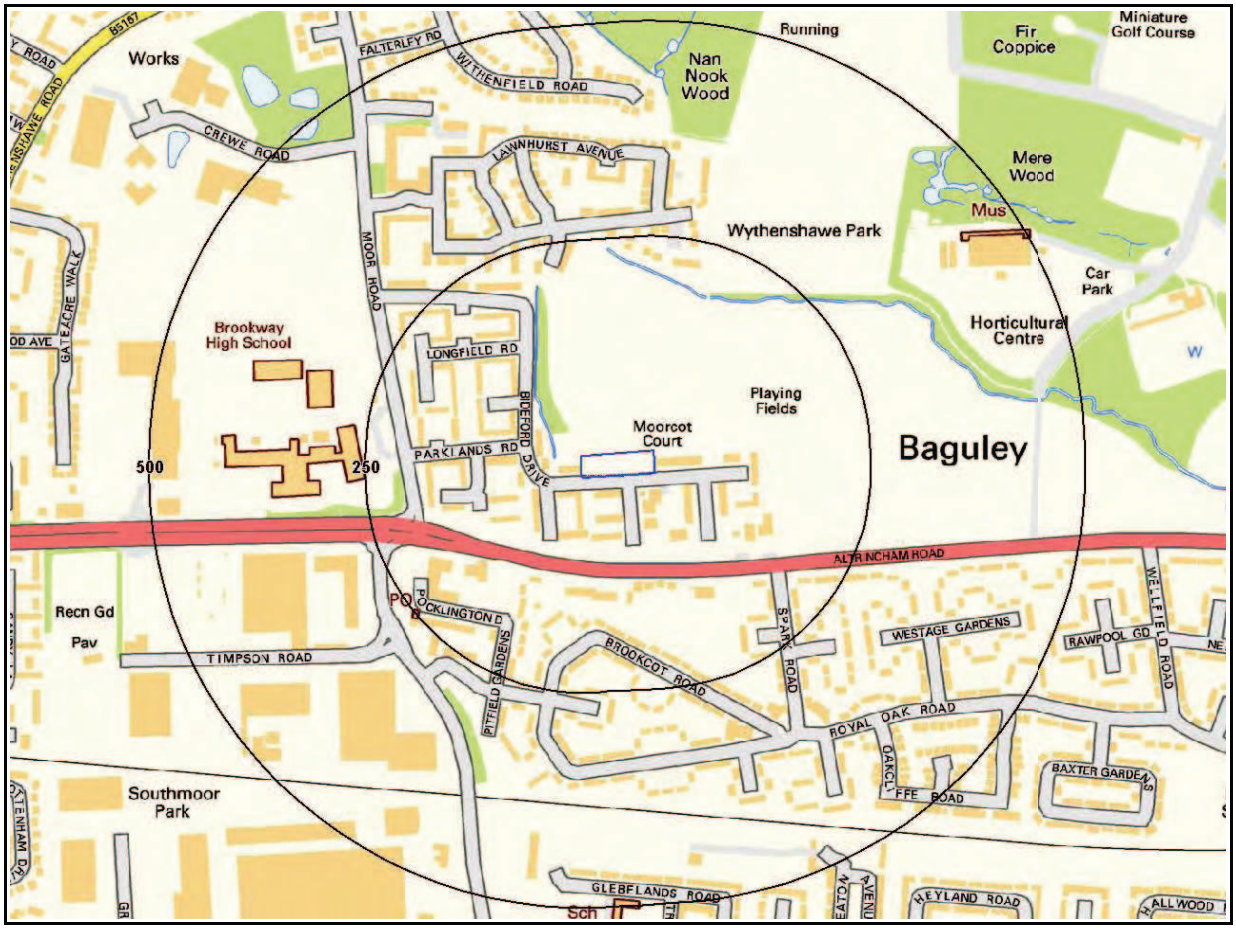
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? No

Database searched and no data found.

3. Mining, Extraction & Natural Cavities Map

NW N NE



SW S SE

Mining, Extraction & Natural Cavities Legend

Mapping sourced from Ordnance Survey

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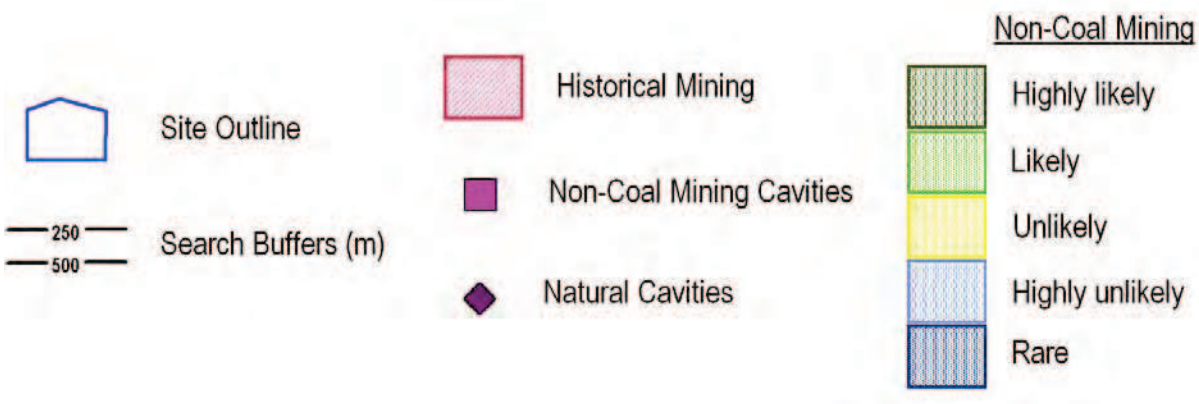


3.Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? **Yes**

The following information provided by JPB is not represented on Mapping:

Whilst outside of an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) have information such as mining plans and maps held within their archive of mining activities that have occurred within 1km of this property. Further details and a quote for services can be obtained by emailing this report to enquiries.gs@jpb.co.uk.

3.4 Non – Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.5 Non – Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great

Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? **No**

Database searched and no data found.

3.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? **No**

Database searched and no data found.

3.7 Brine Extraction

This dataset provides information from the Brine Compensation Board which has been discontinued and is now covered by the Coal Authority.

Are there any Brine Extraction areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level. More detailed information on potential Tin Mining may be found in Section 3.4 – Non-Coal Mining Hazards.

Are there any Tin Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

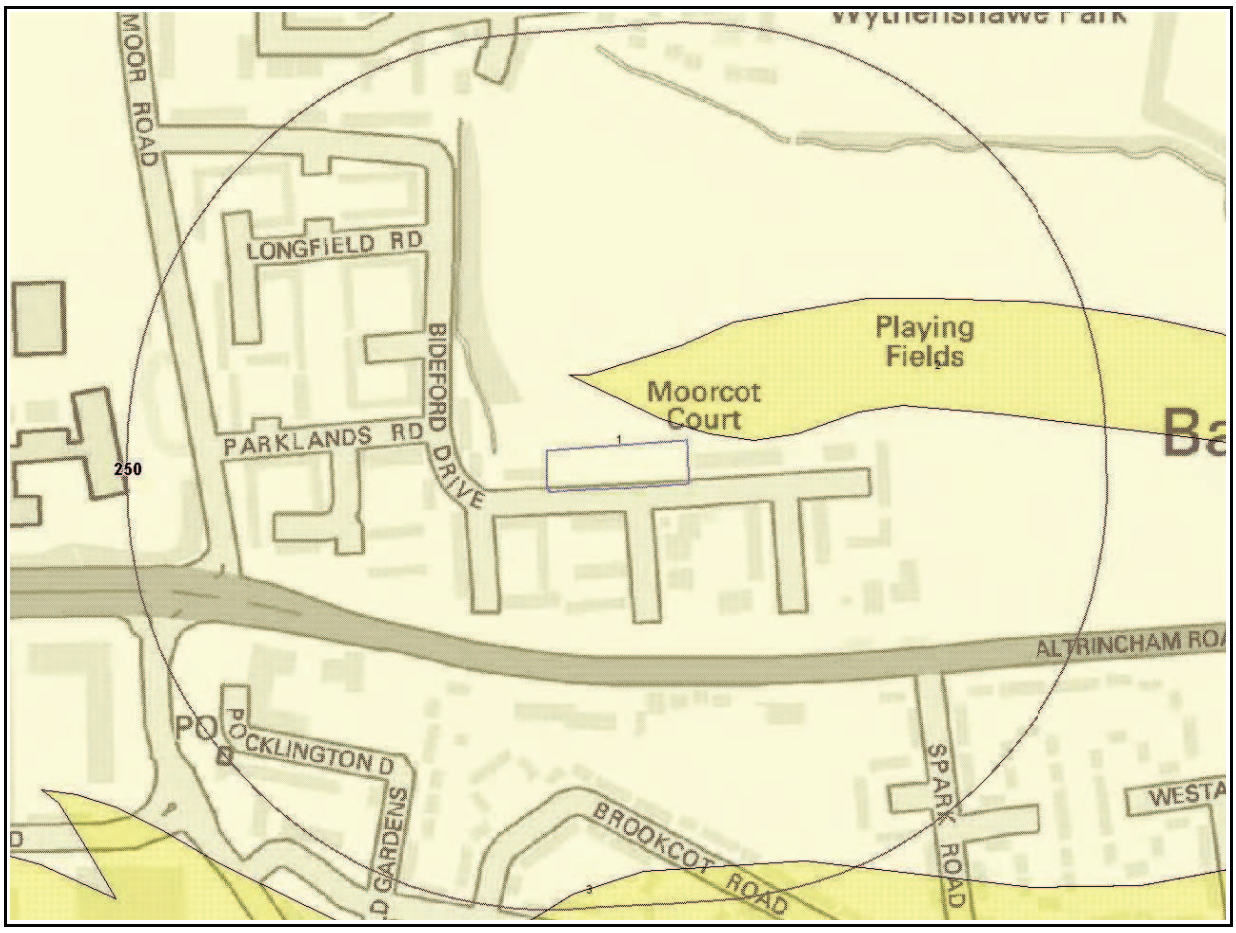
3.10 Clay Mining

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? **No**

4. Natural Ground Subsidence
4.1 Shrink-Swell Clay Map

NW N NE



W E

SW S SE

Shrink-Swell Clay Legend

Mapping sourced from Ordnance Survey

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Site Outline

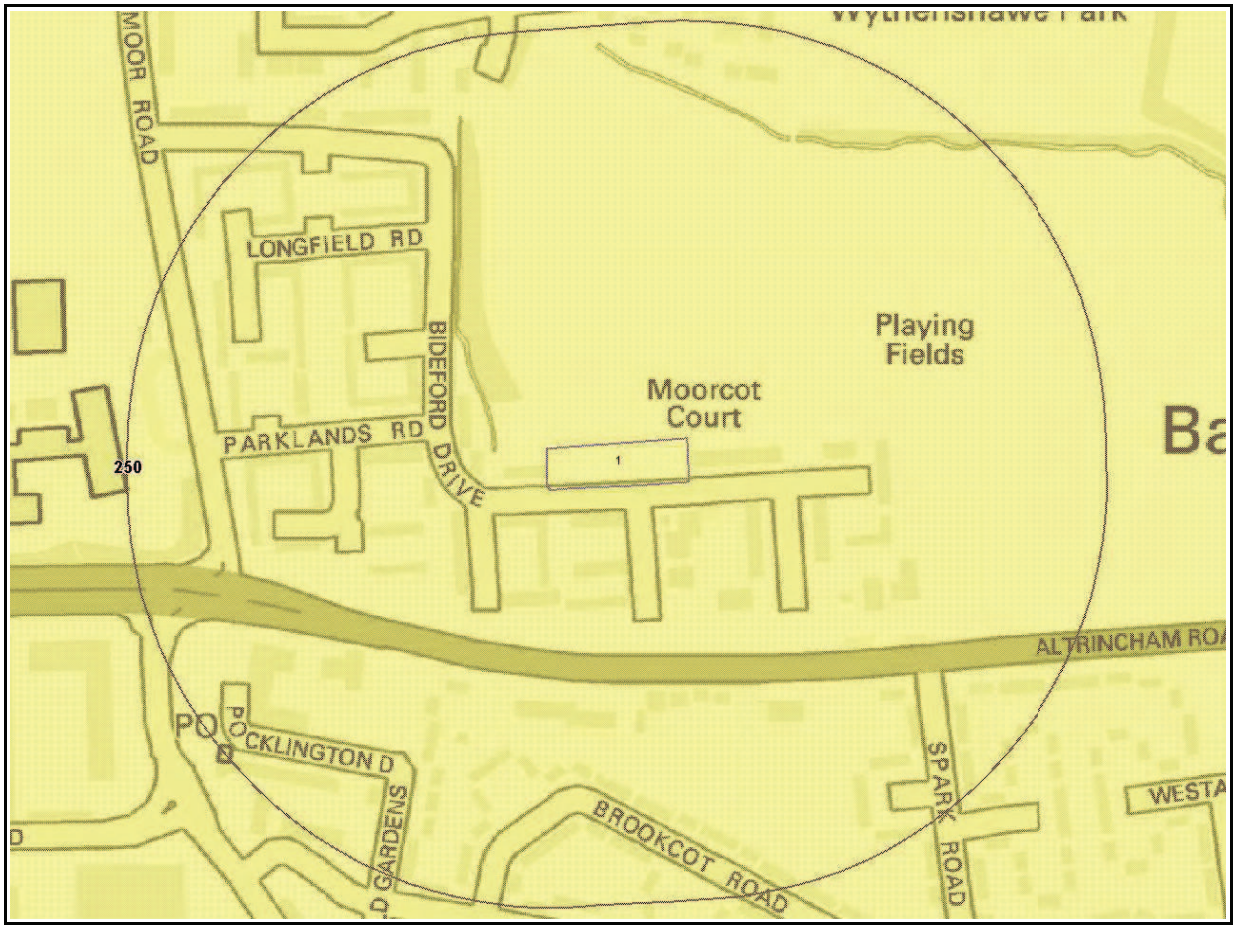
125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.2 Landslides Map

NW N NE



W E

SW S SE

Landslides Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

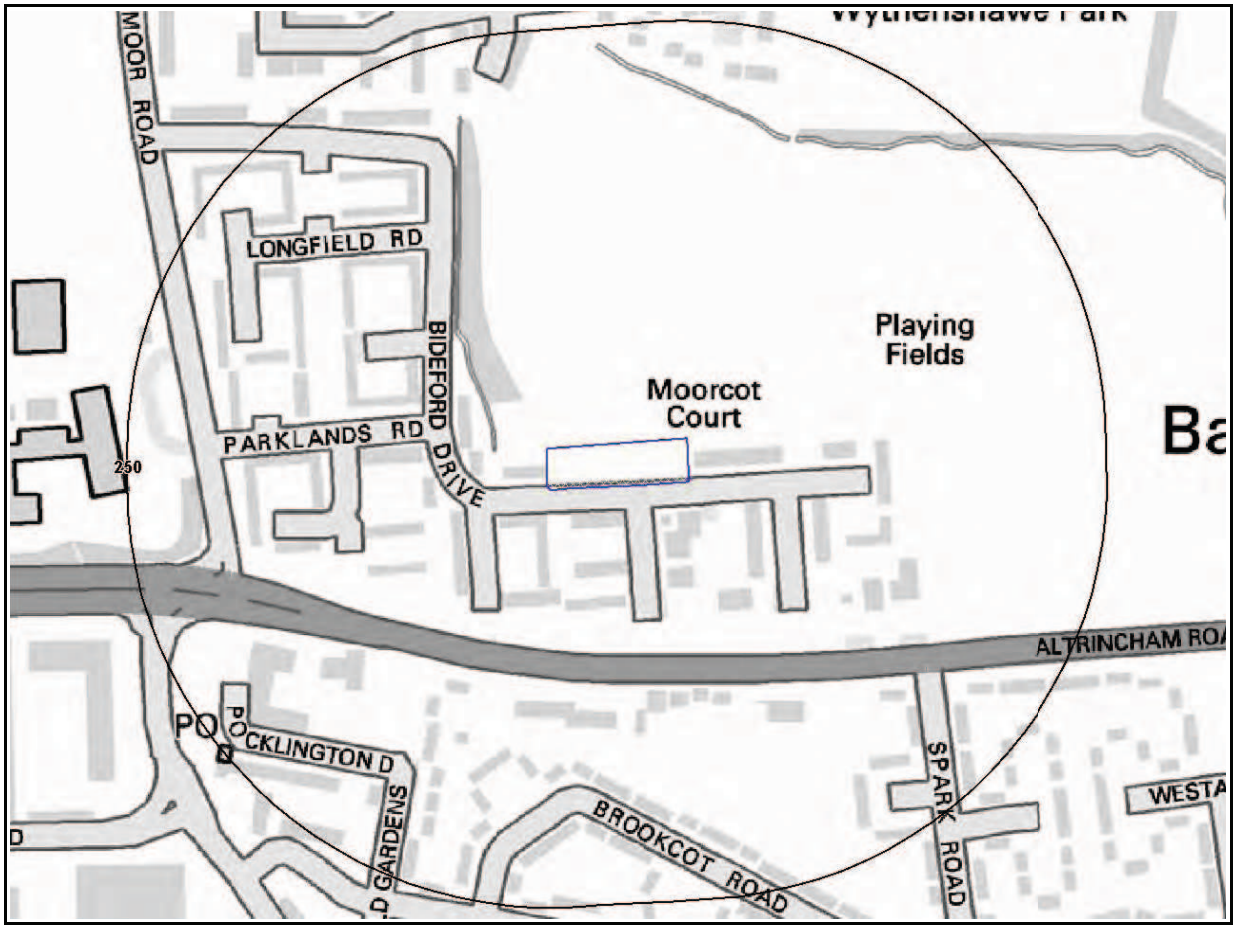
Low
Moderate
High

4.3 Ground Dissolution Soluble Rocks Map

NW N NE

W E

SW S SE



Ground Dissolution Soluble Rocks Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

Very Low

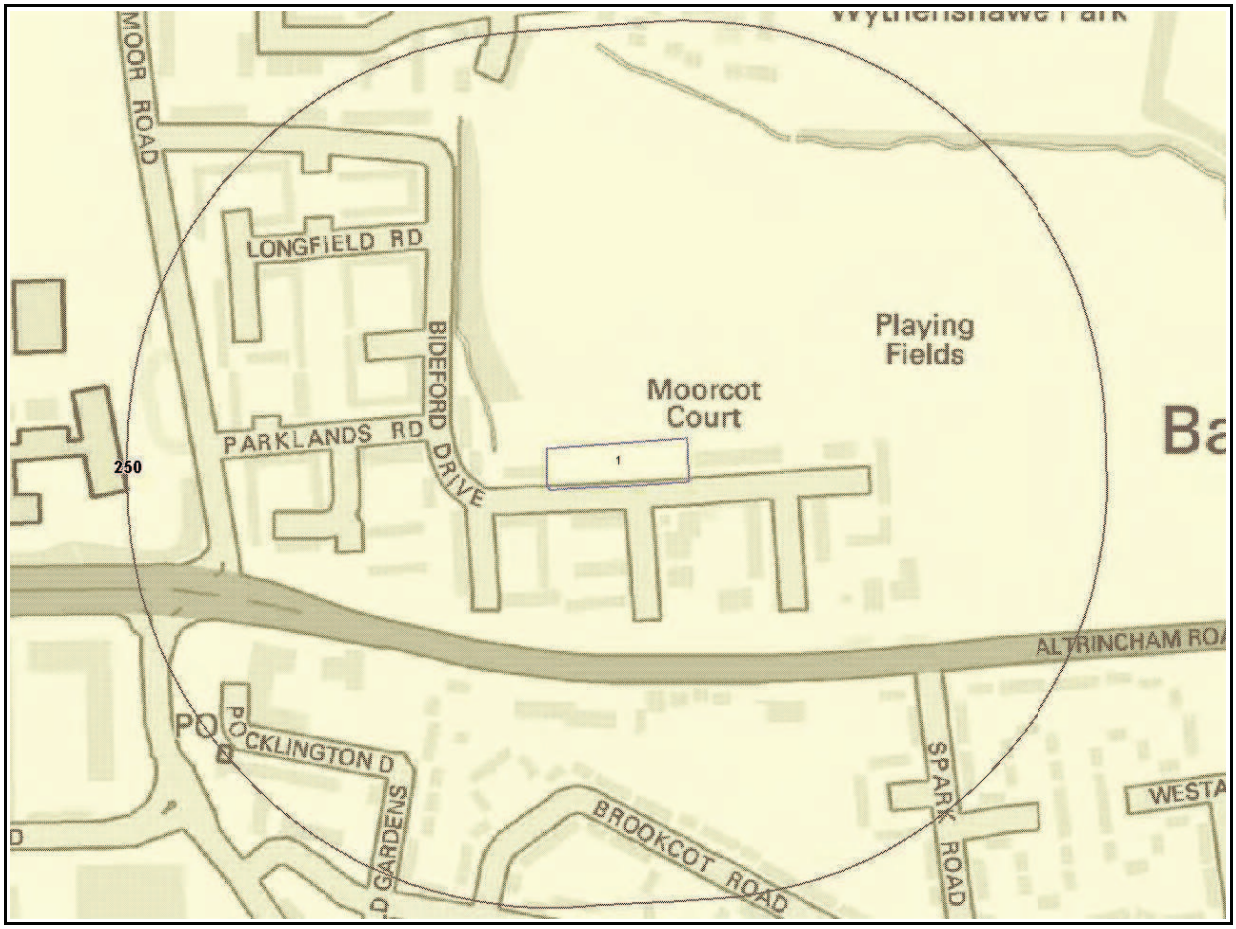
Low

Moderate

High

4.4 Compressible Deposits Map

NW N NE



W E

SW S SE

Compressible Deposits Legend

Mapping sourced from Ordnance Survey

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Site Outline

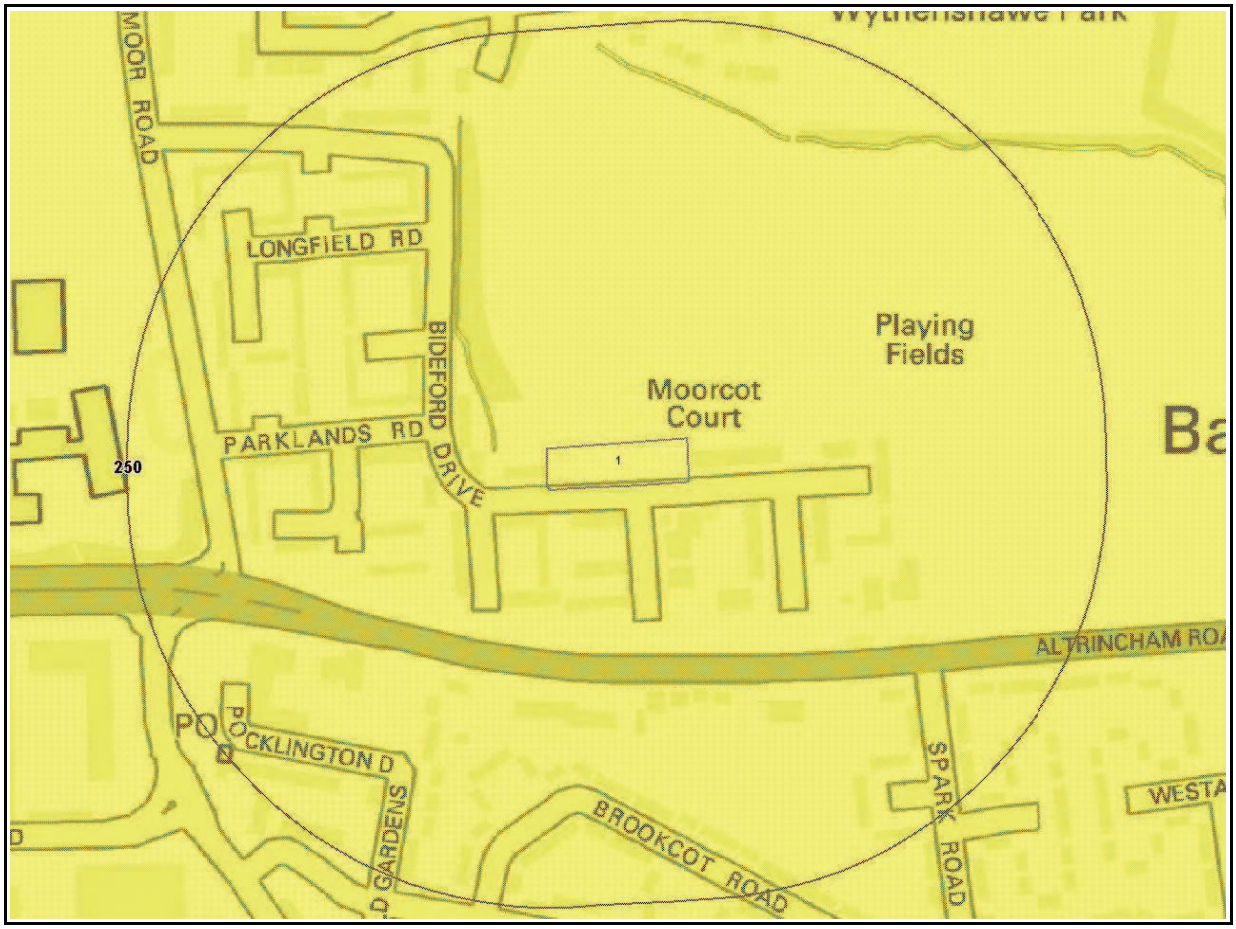
125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.5 Collapsible Deposits Map

NW N NE



W E

SW S SE

Collapsible Deposits Legend

Mapping sourced from Ordnance Survey

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Site Outline

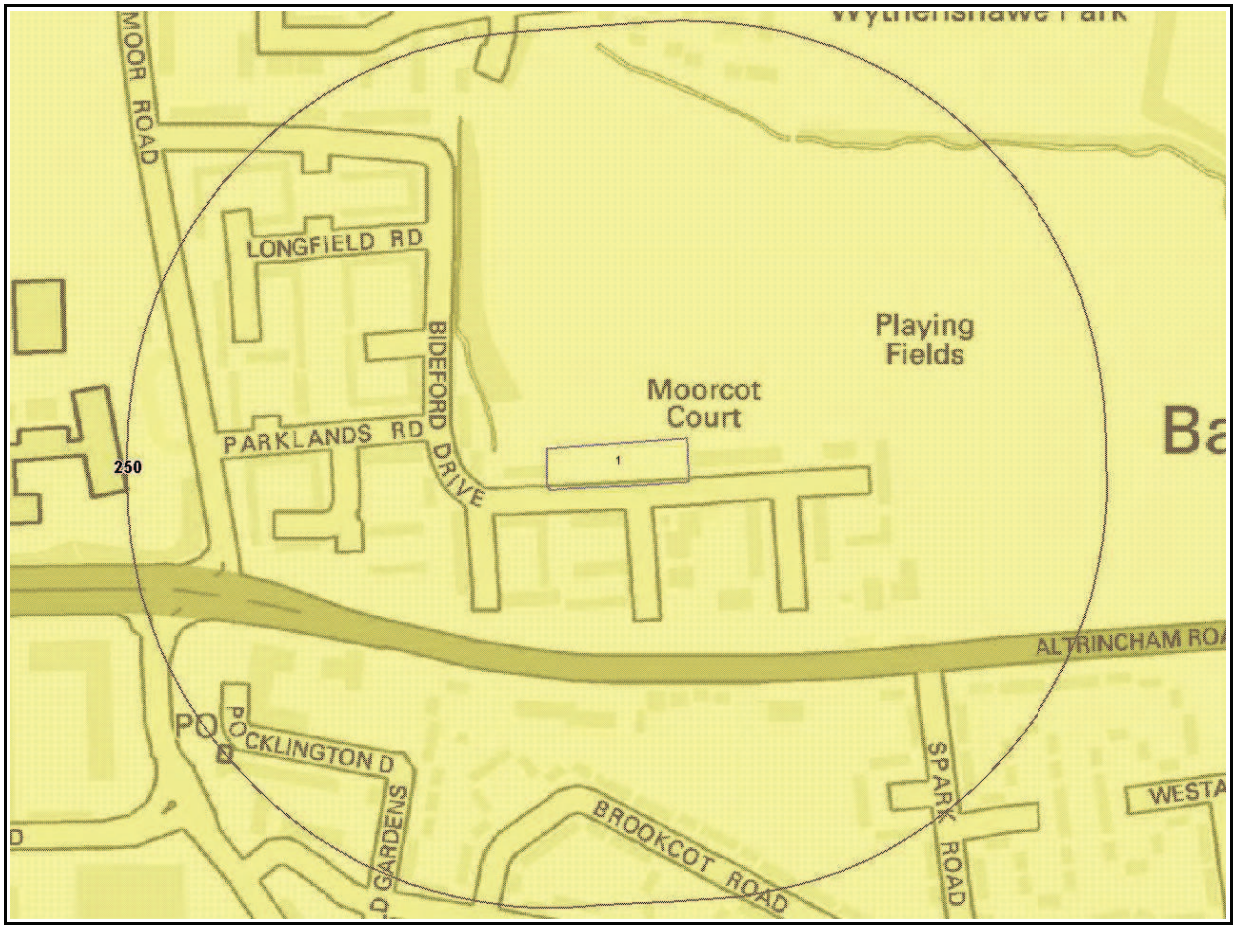
125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.6 Running Sand Map

NW N NE



W E

SW S SE

Running Sand Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

Moderate

High

4.Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? Very Low

4.1 Shrink – Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m) *	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	8.0	N	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

4.3 Ground Dissolution of Soluble Rocks

The following Soluble Rocks information provided by the British Geological Survey:

Distance (m)*	Direction	Hazard Rating	Details
0.0	On site	Null-Negligible	Soluble rocks are not present in the search area. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

4.4 Compressible Deposits

*This includes an automatically generated 50m buffer zone around the study site boundary.

The following Compressible Ground information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

4.5 Collapsible Deposits

The following Collapsible Rocks information is provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

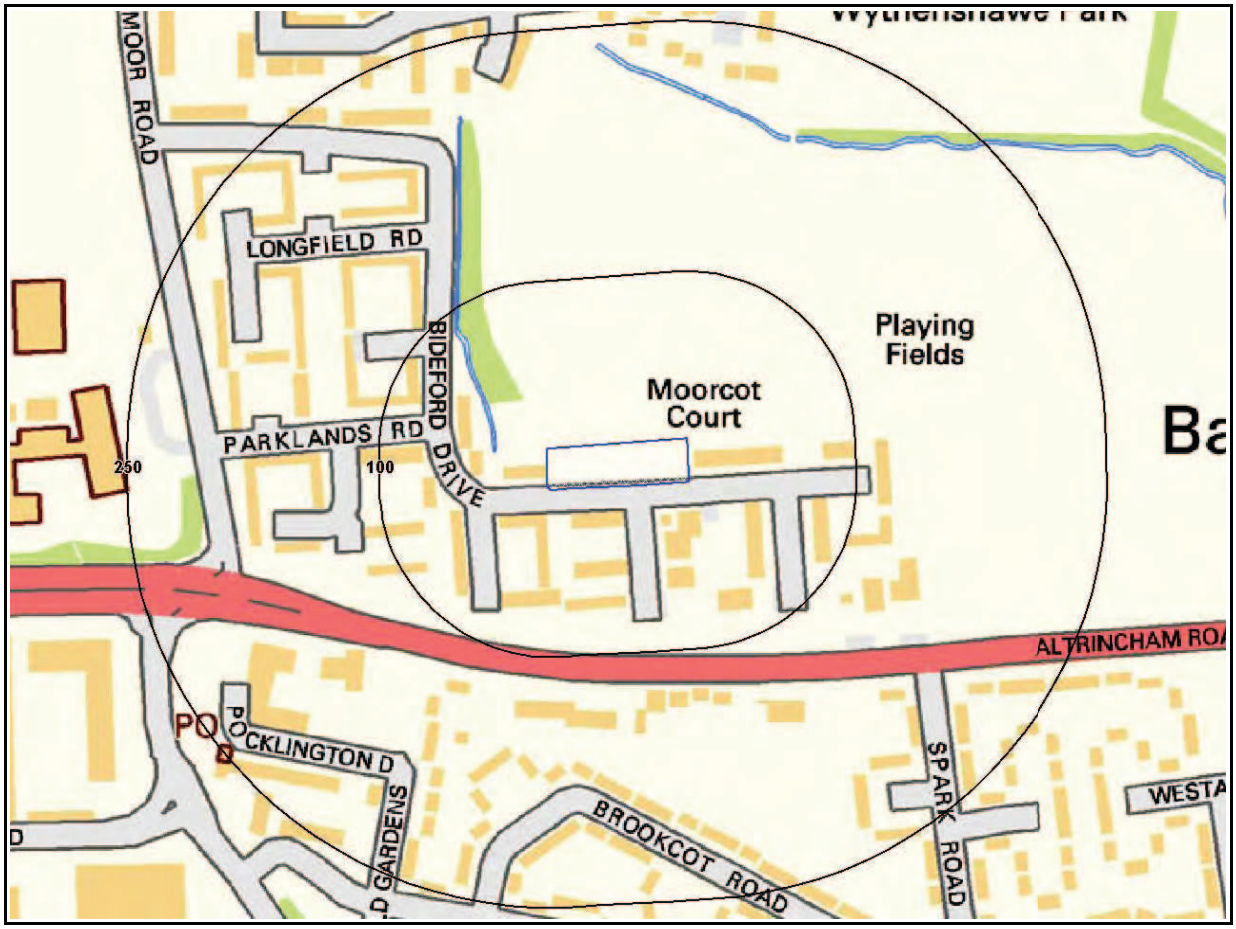
4.6 Running Sands

The following Running Sands information is provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

5. Borehole Records Map

NW N NE



W E

SW S SE

Borehole Records Legend

Mapping sourced from Ordnance Survey

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Site Outline

Borehole Locations

125
250
Search Buffers (m)

5.Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: **0**

Database searched and no data found.

6.Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary: 3

For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight User Guide, available on request.

			Estimated Geometric Mean Soil Concentrations (mg/kg)				
Distance (m)*	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<150 mg/kg
8.0	N	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
43.0	N	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<150 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

7. Contacts

CENTREMAPS
Telephone: #CustomerHelpLine#
groundsure@centremaps.co.uk

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

British Gypsum
British Gypsum Ltd, East Leake, Loughborough, Leicestershire, LE12 6HX
Tel: www.british-gypsum.com

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5 www.coal.gov.uk

Johnson Poole & Bloomer Limited
Harris and Pearson Building, Brettel Lane, Brierley Hill, West Midlands DY5 3LH
Tel: +44 (0) 1384 262 000
Email: enquiries.gs@jpb.co.uk
Website: www.jpb.co.uk

Ordnance Survey
Romsey Road, Southampton SO16 4GU
Tel: 08456 050505

Getmapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Peter Brett Associates
Caversham Bridge House, Waterman Place, Reading
Berkshire RG1 8DN
Tel: +44 (0)118 950 0761 E-mail: reading@pba.co.uk

Acknowledgements

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.
4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;
(i) the Beneficiary,
(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
(iv) the first purchaser or first tenant of the Site, and
(v) the professional advisers and lenders of the first purchaser or tenant of the Site.
4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.
4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").
5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.
5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to
(i) full payment of all relevant Fees and
(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.
6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.
6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.
6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:
(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;
(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;
(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
(iv) not combine the Services with or incorporate such Services into any other information data or service;
(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);
(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and
(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,
6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.
6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:
(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;
(ii) any use made of the Reports, Services, Materials or any part of them; and
(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.
7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.
7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.
7.4 GroundSure shall not be liable for
(i) loss of profits;
(ii) loss of business;
(iii) depletion of goodwill and/or similar losses;
(iv) loss of anticipated savings;
(v) loss of goods;
(vi) loss of contract;
(vii) loss of use;
(viii) loss or corruption of data or information;
(ix) business interruption;
(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;
(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
(xiii) loss or damage to a computer, software, modem, telephone or other property; and
(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.
7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.
7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.
8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:
(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or
(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.
9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:
(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and
(ii) the Reports and/or Mapping provided under this Contract are
(a) supplied to the Client's specification(s) and in any event
(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:
(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and
(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract. 11 Anti-Bribery
11.1 The Client warrants that it shall:
(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;
(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and
(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.
11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.
12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.
12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.
12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.
12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:
(i) the Client or Beneficiary's failure to provide facilities, access or information;
(ii) fire, storm, flood, tempest or epidemic;
(iii) Acts of God or the public enemy;
(iv) riot, civil commotion or war;
(v) strikes, labour disputes or industrial action;
(vi) acts or regulations of any governmental or other agency;
(vii) suspension or delay of services at public registries by Third Party Data Providers;
(viii) changes in law; or
(ix) any other reason beyond GroundSure's reasonable control.
In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.
12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.
12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.
12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.
12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.
12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.
12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

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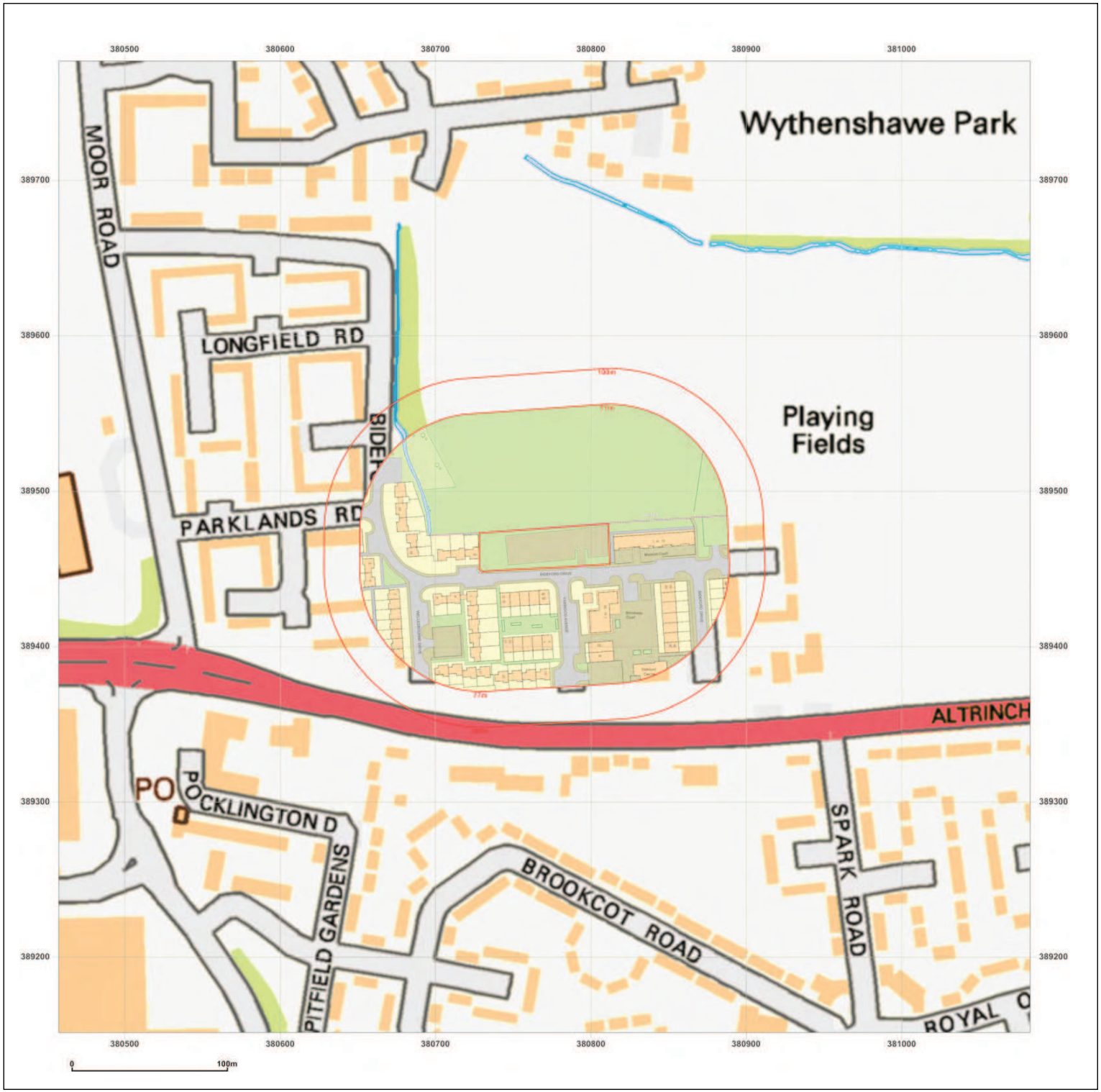

Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: MasterMap
Map date: 2012
Scale: 1:1,250
Printed at: 1:2,500

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Production date: 14 October 2013

To view map legend click here *Legend*



Site Details:

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DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1990-1992**

Scale: 1:1,250

Printed at: 1:2,500

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Surveyed 1958 Revised 1991 Edition N/A Copyright 1991 Levelled 1958	Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A
Surveyed 1957 Revised 1990 Edition N/A Copyright 1990 Levelled 1957	Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A

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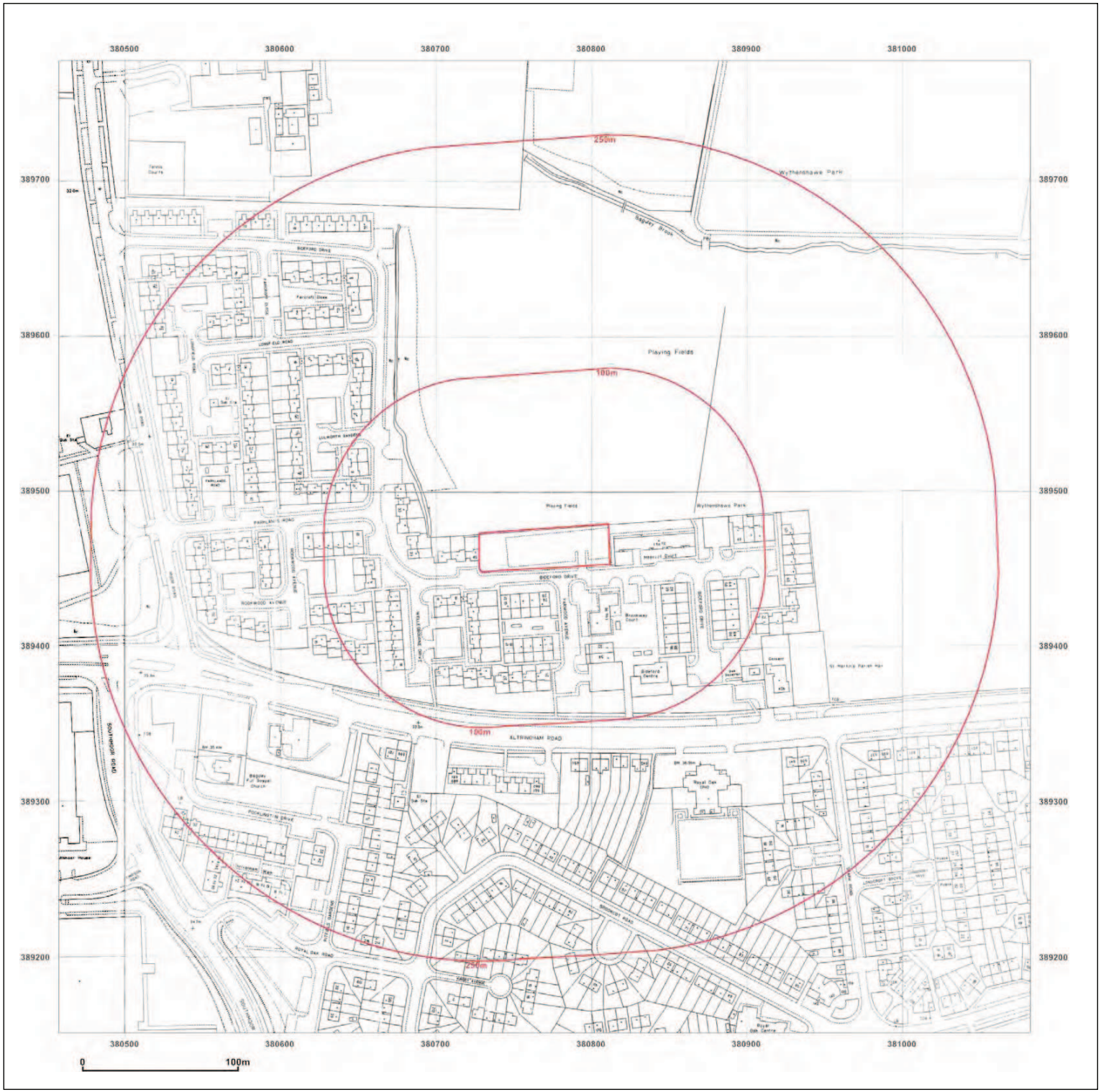

Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1992**

Scale: 1:1,250

Printed at: 1:2,500

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Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A	Surveyed 1992 Revised 1992 Edition NA Copyright NA Levelled NA	Surveyed 1992 Revised 1992 Edition NA Copyright NA Levelled NA
Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A	Surveyed 1992 Revised 1992 Edition NA Copyright NA Levelled NA	Surveyed 1992 Revised 1992 Edition NA Copyright NA Levelled NA

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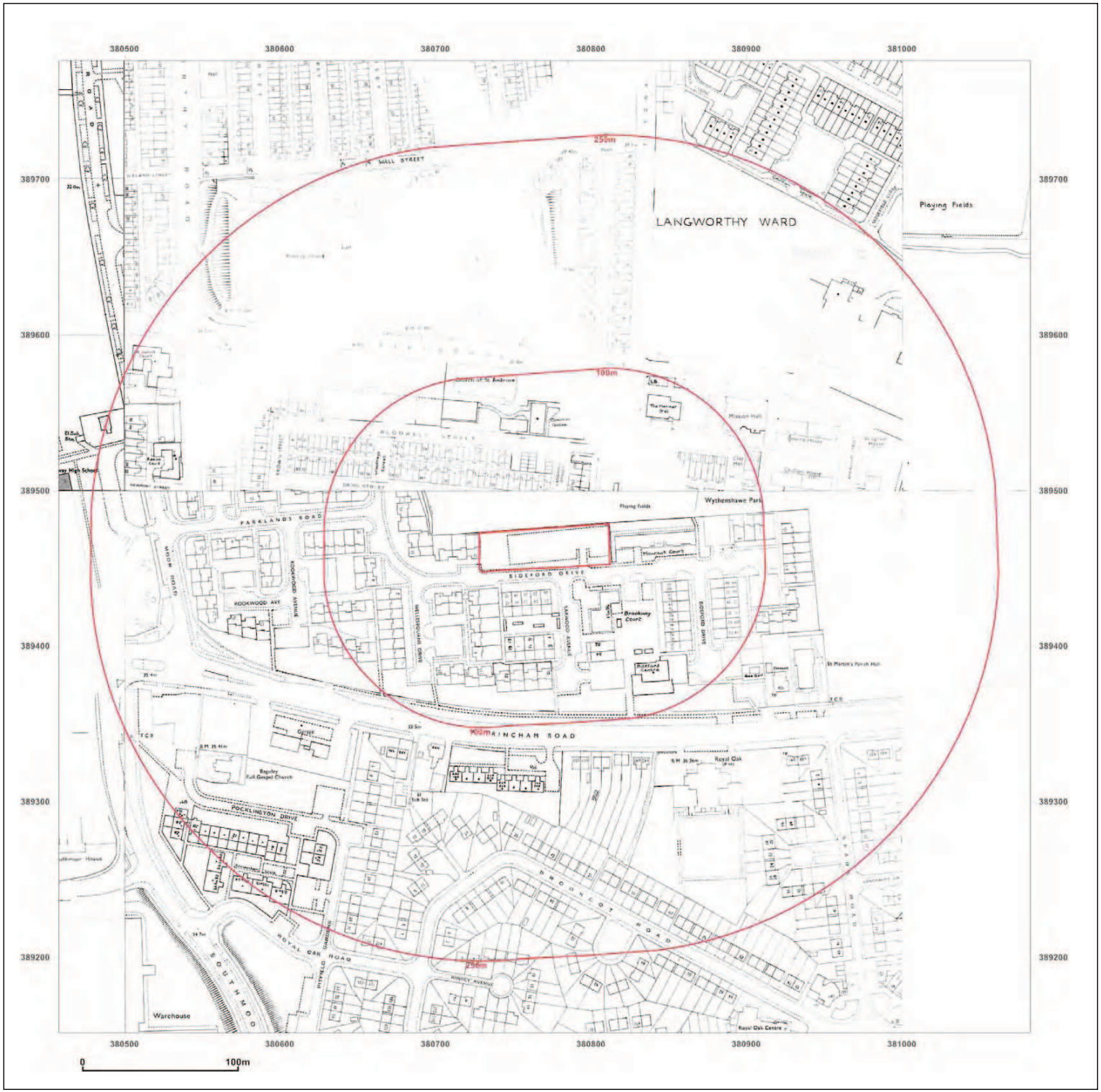

Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1985-1990**

Scale: 1:1,250

Printed at: 1:2,500

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Surveyed 1958
Revised 1987
Edition N/A
Copyright 1987
Levelled 1958

Surveyed 1963
Revised 1988
Edition N/A
Copyright 1988
Levelled 1963

Surveyed 1959
Revised 1985
Edition N/A
Copyright 1985
Levelled 1959

Surveyed 1957
Revised 1990
Edition N/A
Copyright 1990
Levelled 1957

Surveyed 1959
Revised 1985
Edition N/A
Copyright 1985
Levelled 1959

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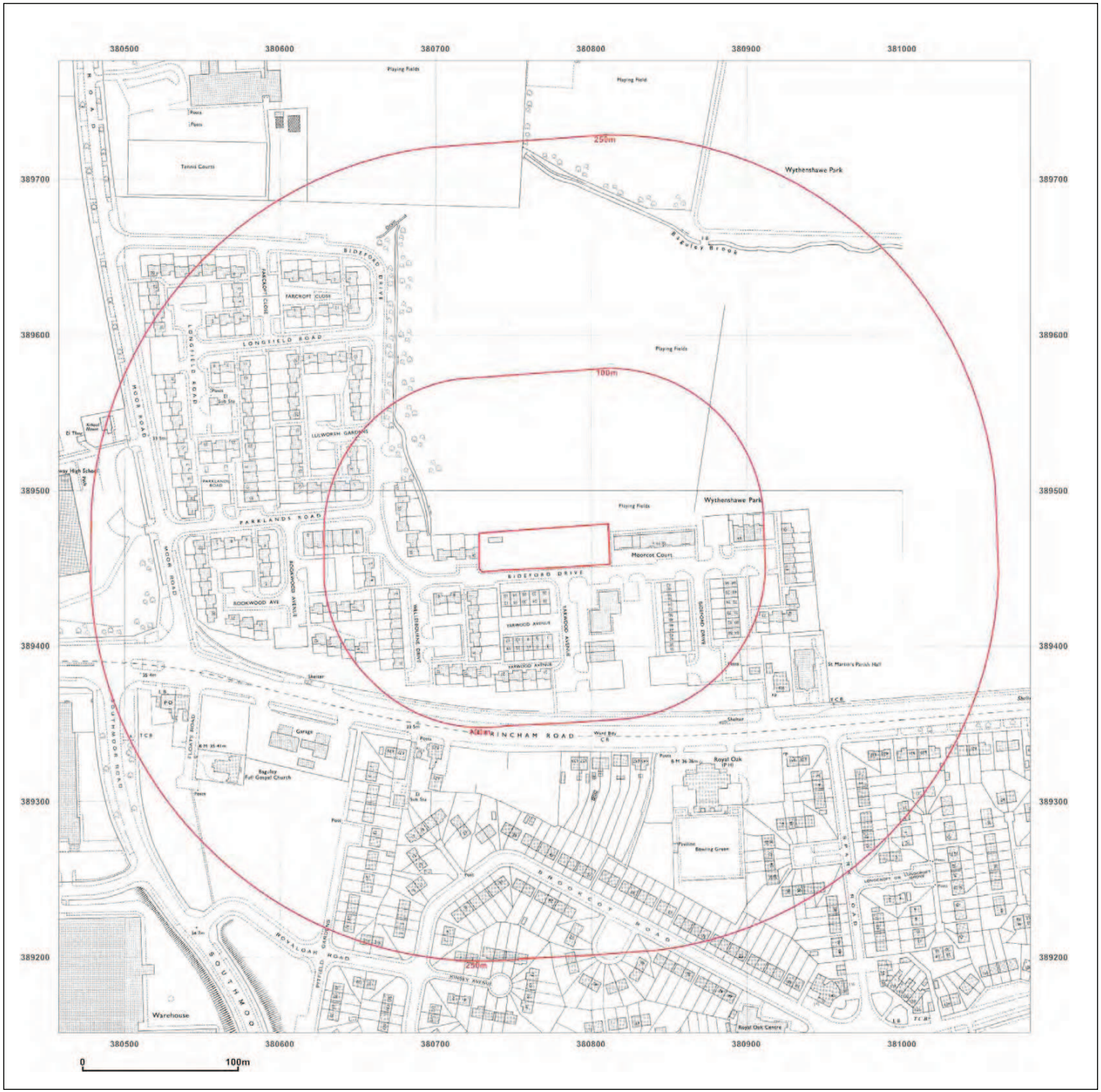

Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1972-1977**

Scale: 1:1,250

Printed at: 1:2,500

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Surveyed 1958
Revised 1975
Edition N/A
Copyright 1976
Levelled 1958

Surveyed 1958
Revised 1971
Edition N/A
Copyright 1972
Levelled 1958

Surveyed 1958
Revised 1974
Edition N/A
Copyright 1975
Levelled 1957

Surveyed 1958
Revised 1971
Edition N/A
Copyright 1972
Levelled 1959

Surveyed 1958
Revised 1976
Edition N/A
Copyright 1977
Levelled 1958

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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1959**

Scale: 1:1,250

Printed at: 1:2,500

N
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Surveyed 1958
Revised 1958
Edition N/A
Copyright 1959
Levelled 1949

Surveyed 1958
Revised 1958
Edition N/A
Copyright 1959
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Surveyed 1958
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Edition N/A
Copyright 1959
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Surveyed 1958
Revised 1958
Edition N/A
Copyright 1959
Levelled 1949

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Edition N/A
Copyright 1959
Levelled 1949

Surveyed 1958
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Edition N/A
Copyright 1959
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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1958**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1958
Revised 1958
Edition 1960
Copyright 1960
Levelled 1949

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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series

Map date: 1935

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1935
Revised 1935
Edition N/A
Copyright N/A
Levelled N/A

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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series
Map date: 1922
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1922
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

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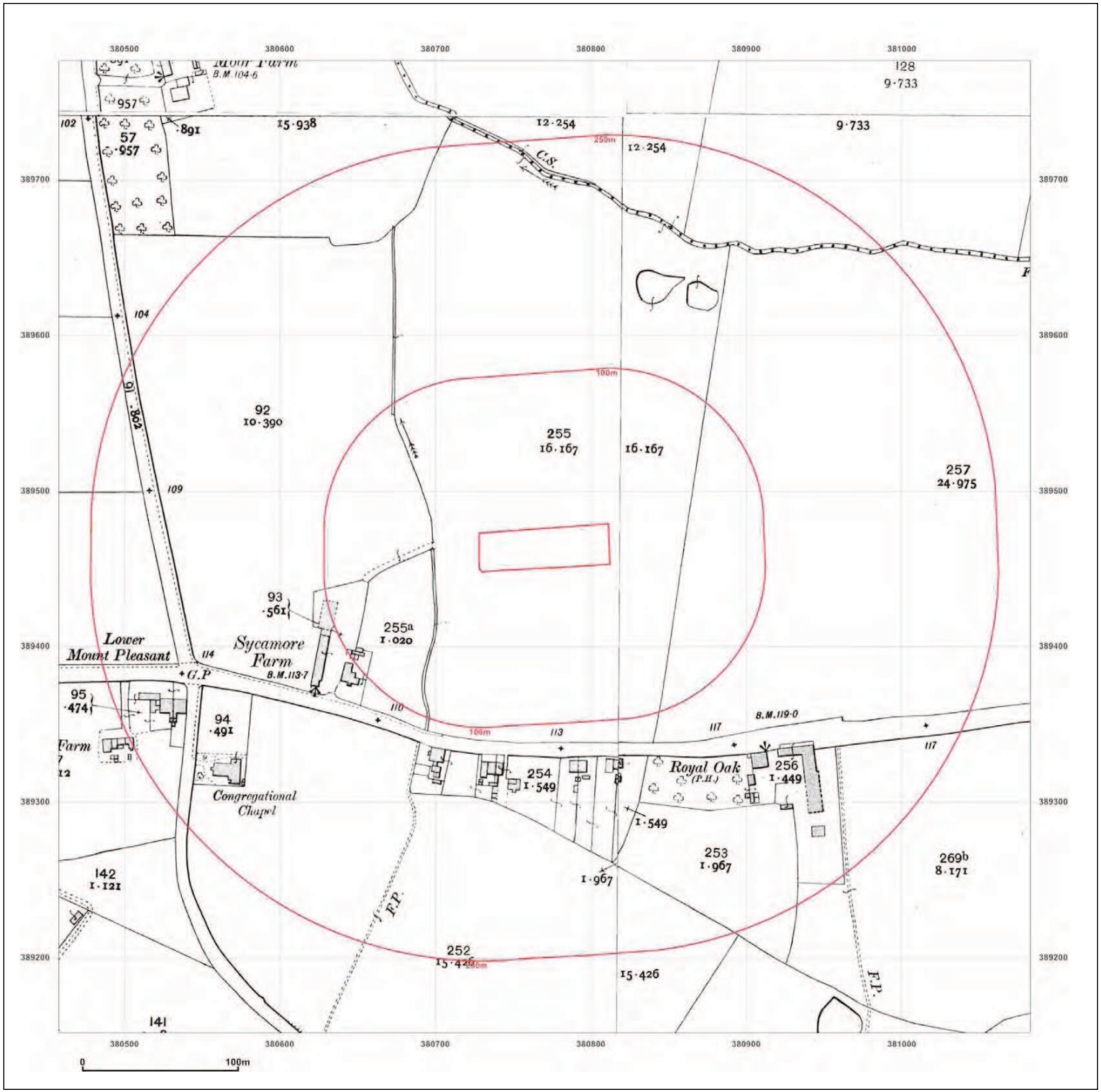

Site Details:

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STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series

Map date: **1910**

Scale: 1:2,500

Printed at: 1:2,500

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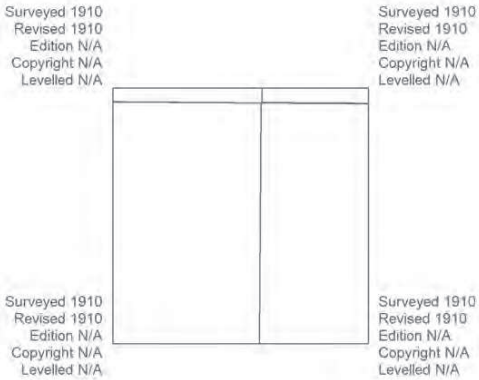

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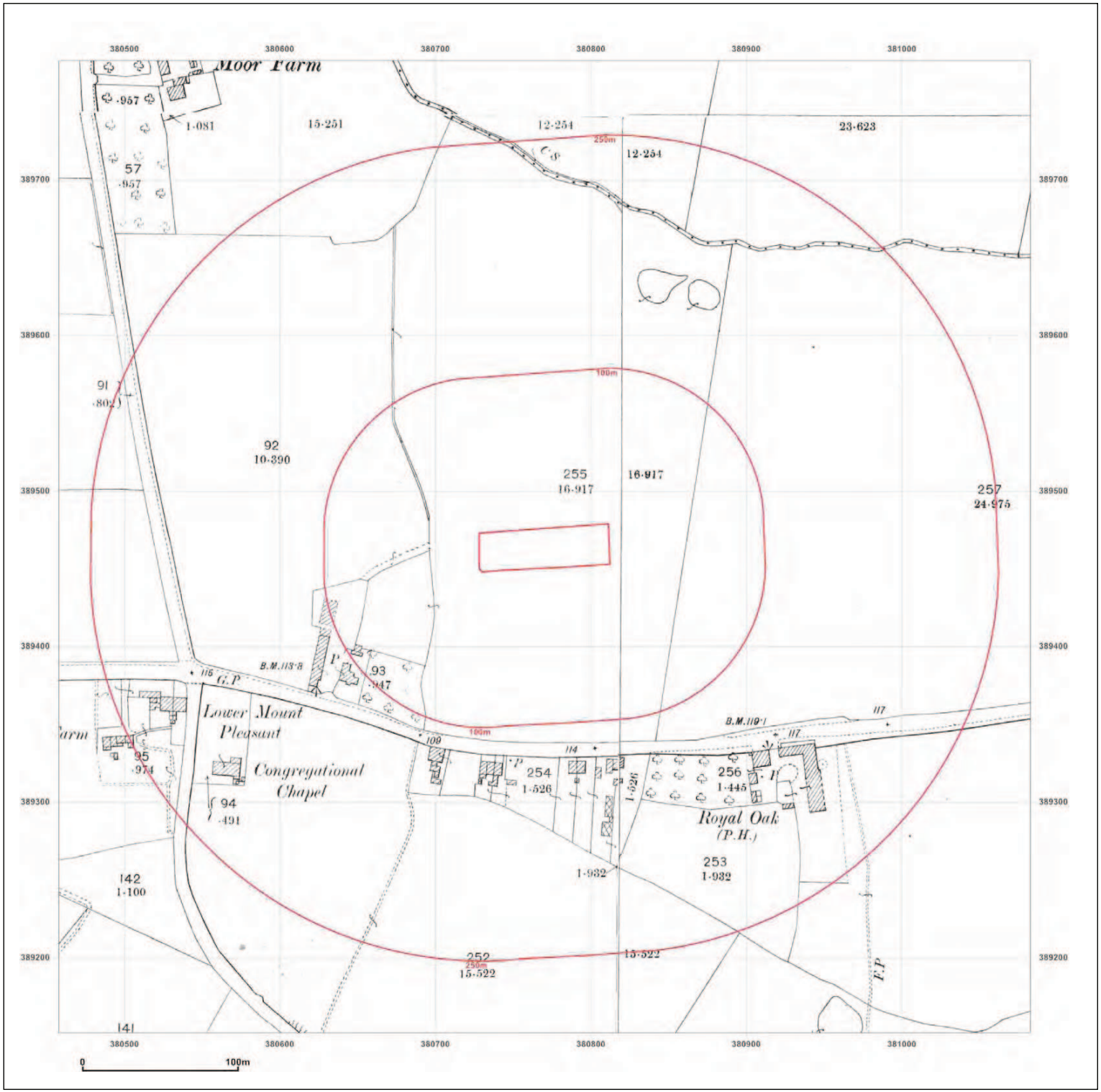

CCG

Site Details:

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DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series
Map date: **1898**
Scale: 1:2,500
Printed at: 1:2,500

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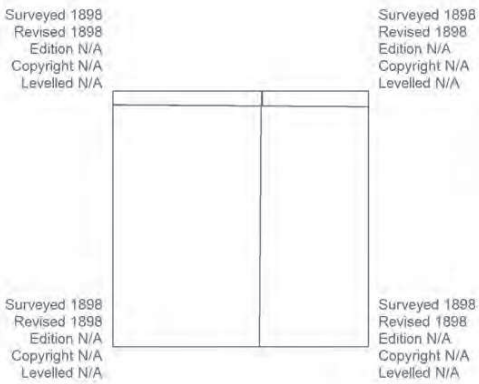

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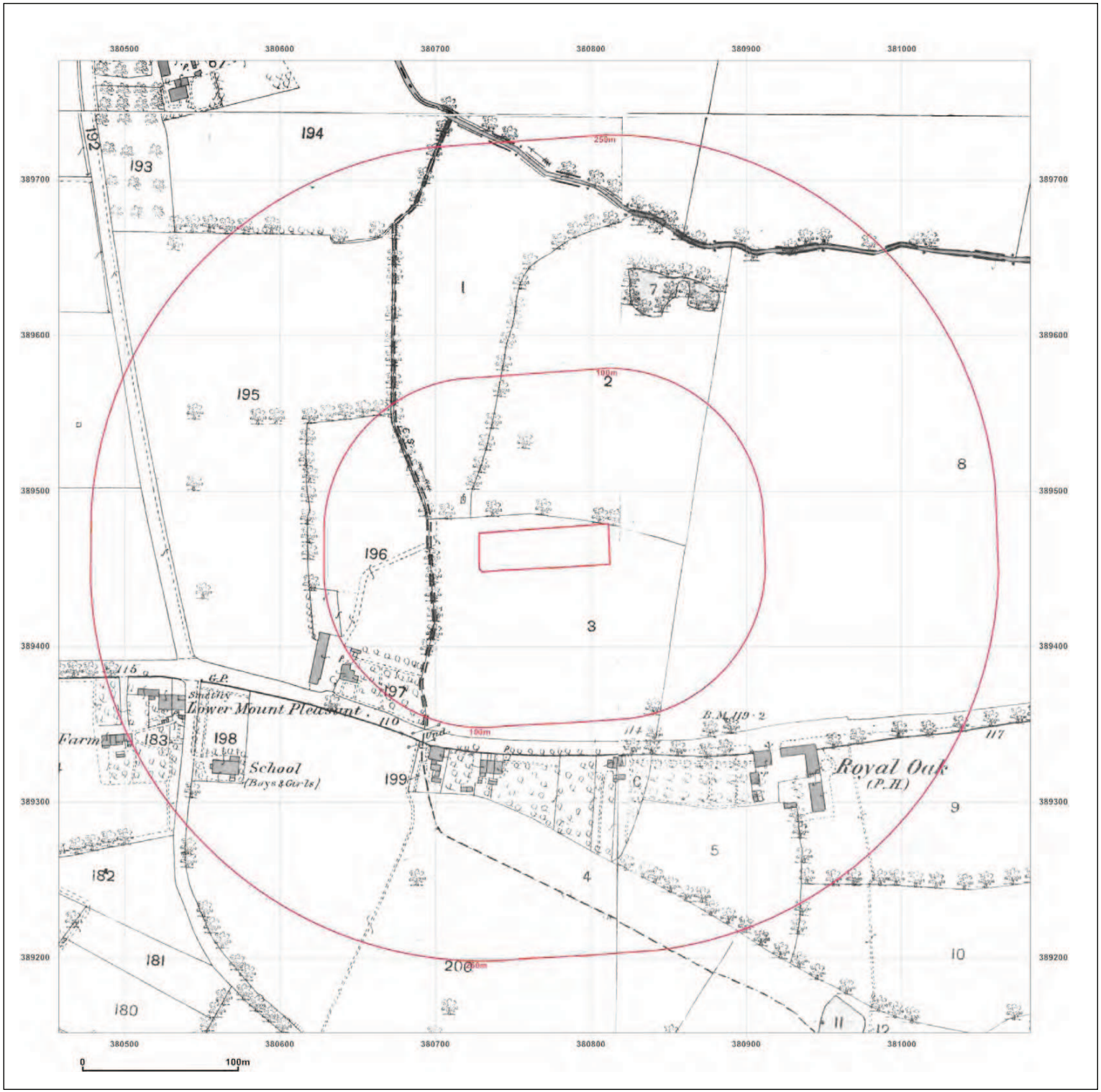

Site Details:

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STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series

Map date: **1874-1876**

Scale: 1:2,500

Printed at: 1:2,500

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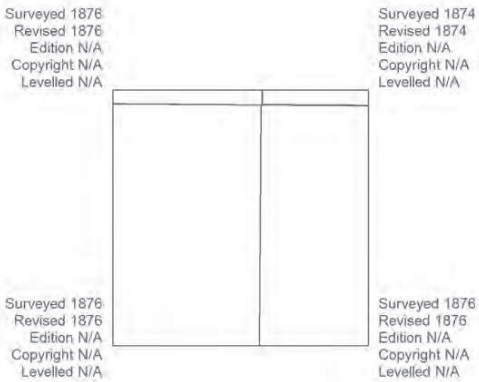

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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: 2012

Scale: 1:10,000

Printed at: 1:10,000

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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000

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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1995**

Scale: 1:10,000

Printed at: 1:10,000

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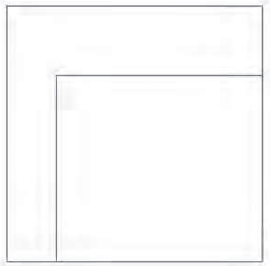

Surveyed 1984
Revised 1995
Edition N/A
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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1988-1990**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1989
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1985
Revised 1988
Edition N/A
Copyright N/A
Levelled N/A

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

Surveyed 1984
Revised 1989
Edition N/A
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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: National Grid

Map date: **1970-1975**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1969
Revised 1971
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1970
Revised 1970
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1975
Revised 1975
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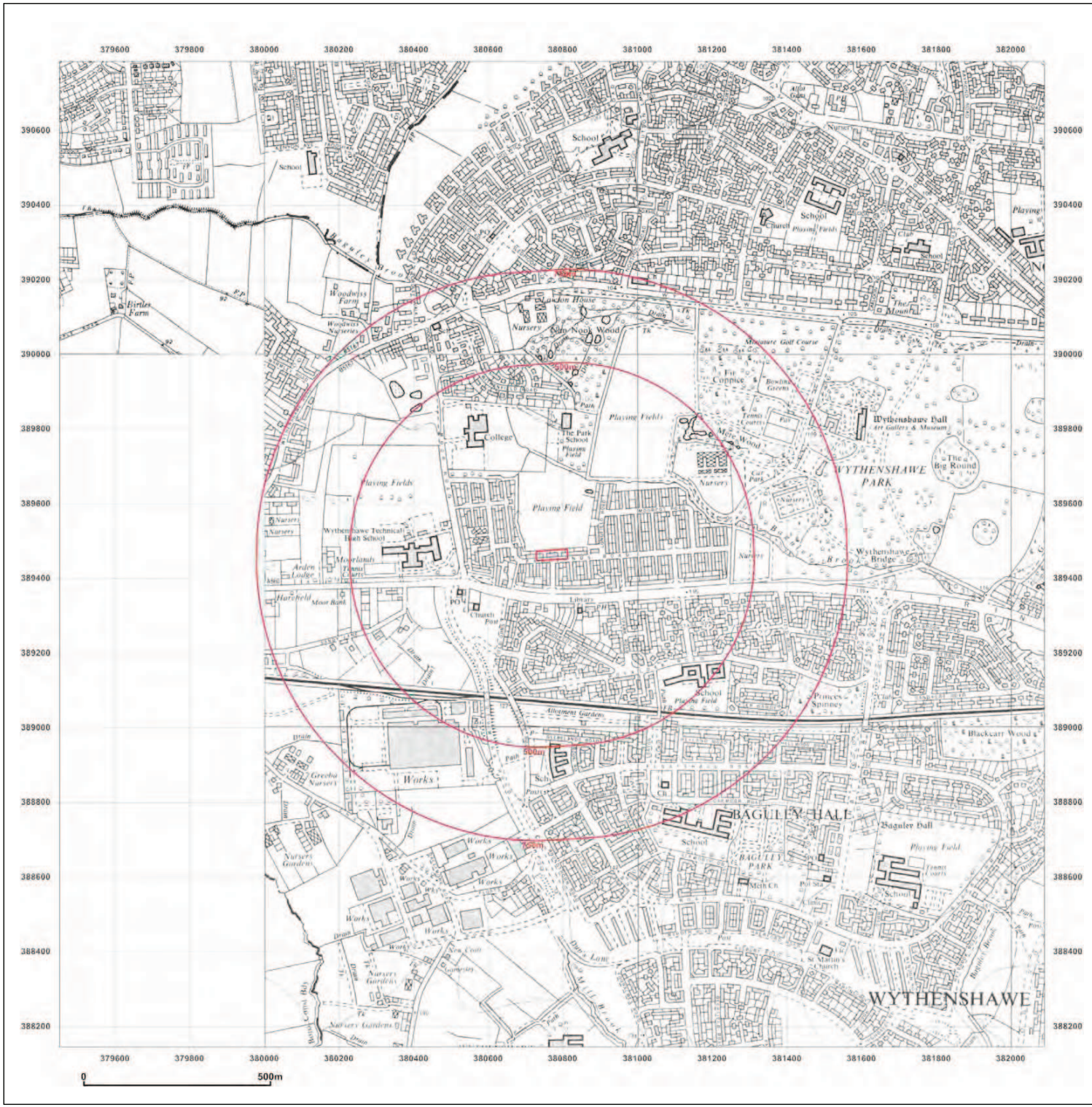

Site Details:

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STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: Provisional

Map date: **1964-1967**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1949
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1967
Revised 1967
Edition N/A
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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: Provisional

Map date: **1949-1955**

Scale: 1:10,560

Printed at: 1:10,560

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

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

Surveyed 1949
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1949
Revised 1954
Edition N/A
Copyright N/A
Levelled N/A

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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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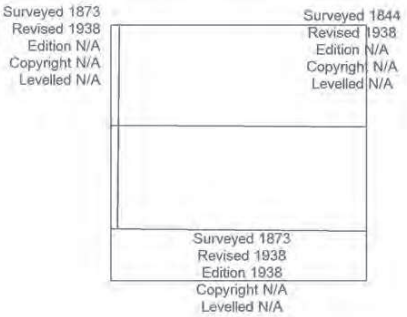

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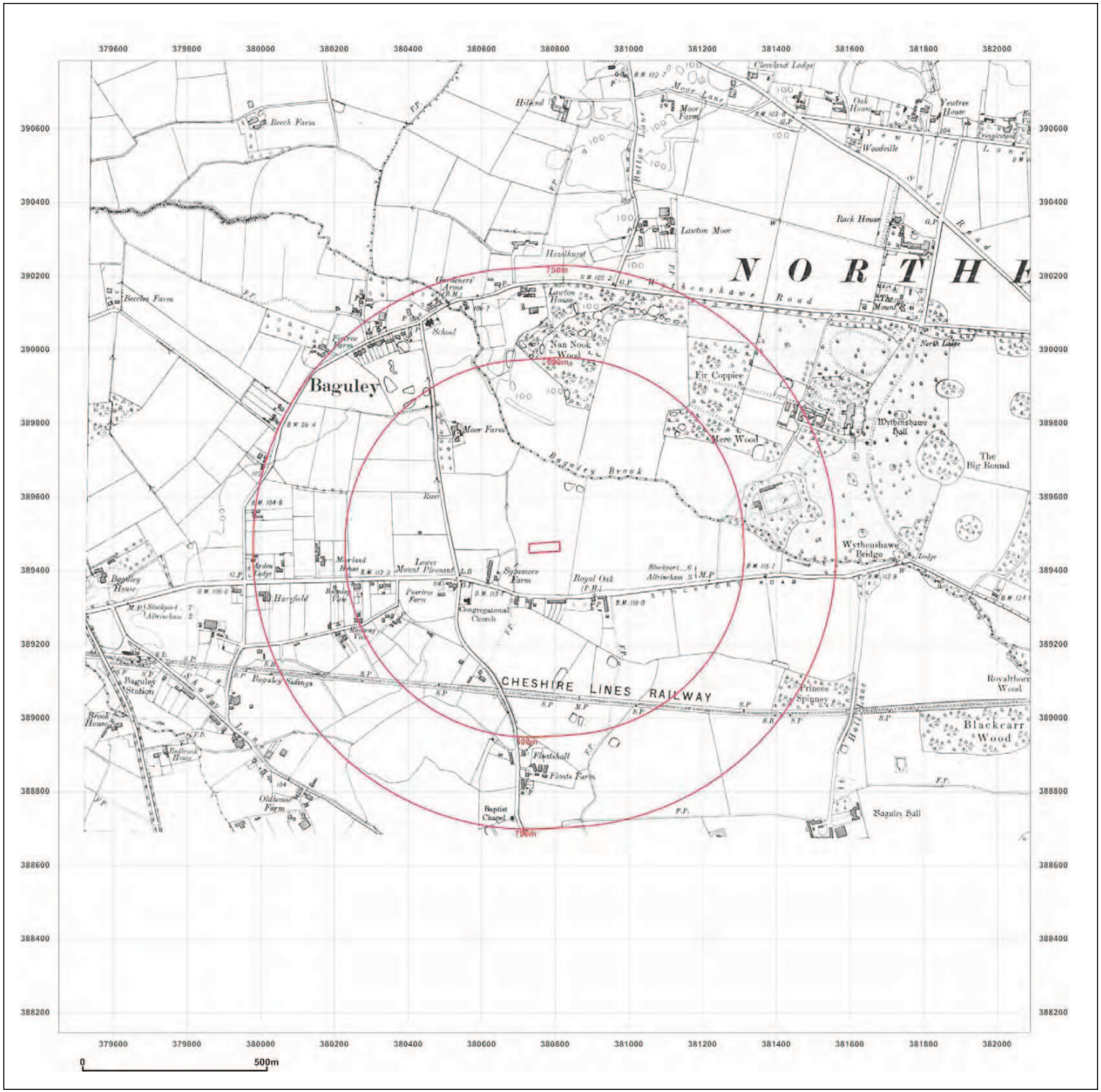

Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

N
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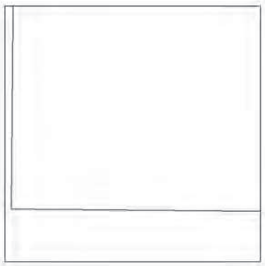
Surveyed 1844
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A



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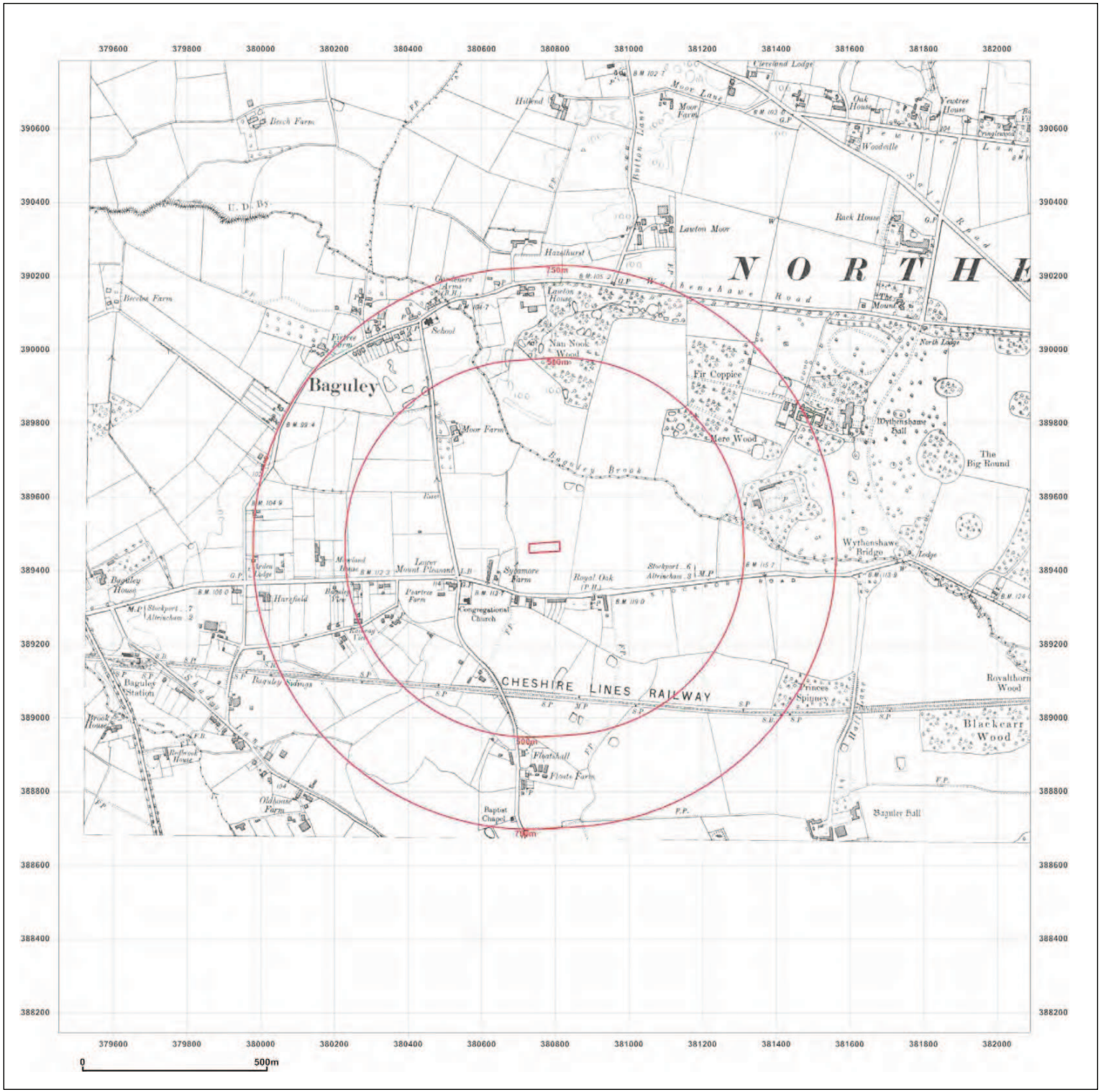

Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series

Map date: **1916**

Scale: 1:10,560

Printed at: 1:10,560

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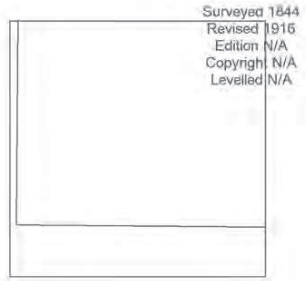

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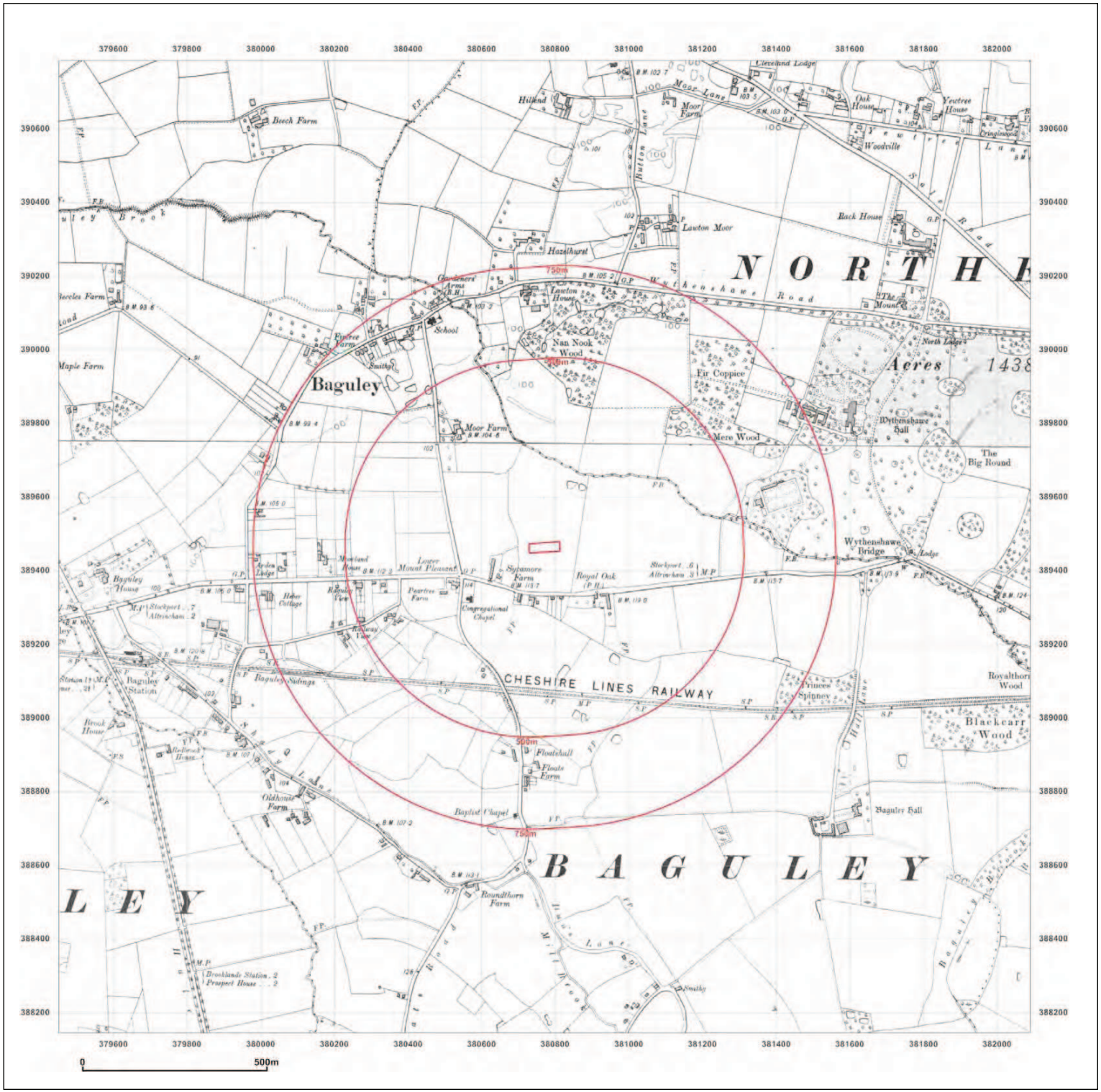

Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series
Map date: **1907-1911**
Scale: 1:10,560
Printed at: 1:10,560

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Surveyed 1873
Revised 1911
Edition 1911
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1907
Edition N/A
Copyright N/A
Levelled N/A

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Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series

Map date: **1907-1908**

Scale: 1:10,560

Printed at: 1:10,560

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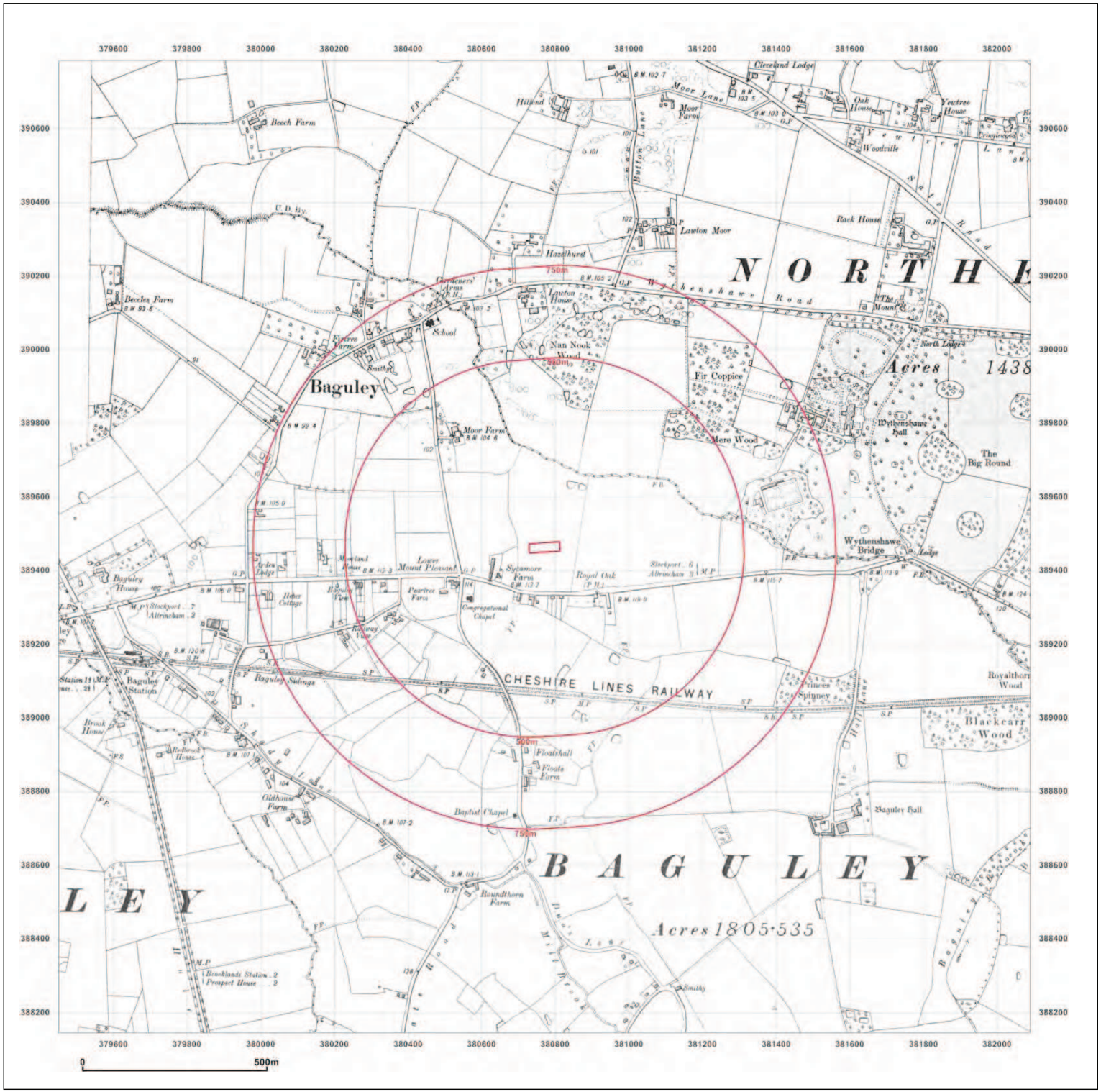

Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series
Map date: 1905-1907
Scale: 1:10,560
Printed at: 1:10,560

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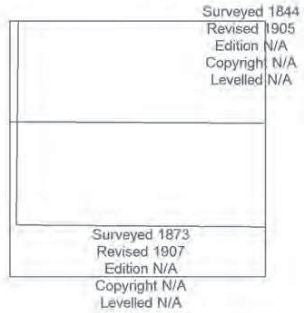

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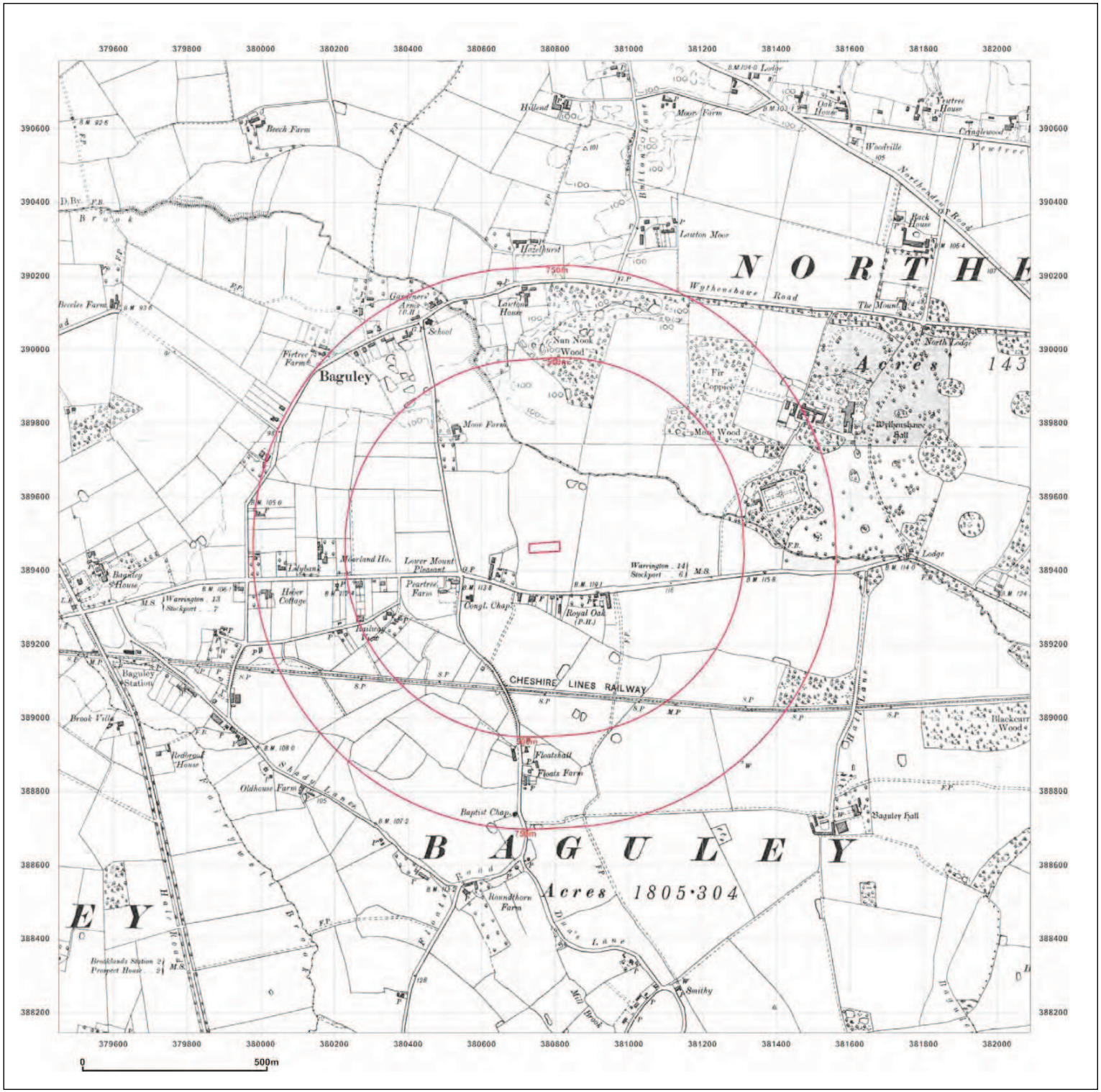
To view map legend click here *Legend*



Site Details:

BIDEFORD
DRIVE,BROOKLANDS,MANCHE
STER, M23 0QB

Client Ref: 4165
Report Ref: CMAPS-AAG-264997-4165-141013HIS
Grid Ref: 380770, 389464

Map Name: County Series

Map date: **1897**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1876
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1876
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 14 October 2013

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APPENDIX E: SITE PHOTOGRAPHS



1. Site & access road as seen from Bideford Drive, northerly aspect
2. Mature deciduous trees accommodating grassed lawns fronting Bideford Drive





3. Poorly maintained bituminous pavement accommodating patches of perennial herds
4. Rough grassed area accommodating mixed tall perennial ruderal species fronting boundary fence. Note residential dwellings to the rear





5. Development of high rise residential apartments to the south of the site
6. Development of high rise residential apartments immediately adjoining the site to the east





7. Stands of mature Sycamore accommodating grassed verge to the south of the site
8. Metal service cover set in soft landscaping

