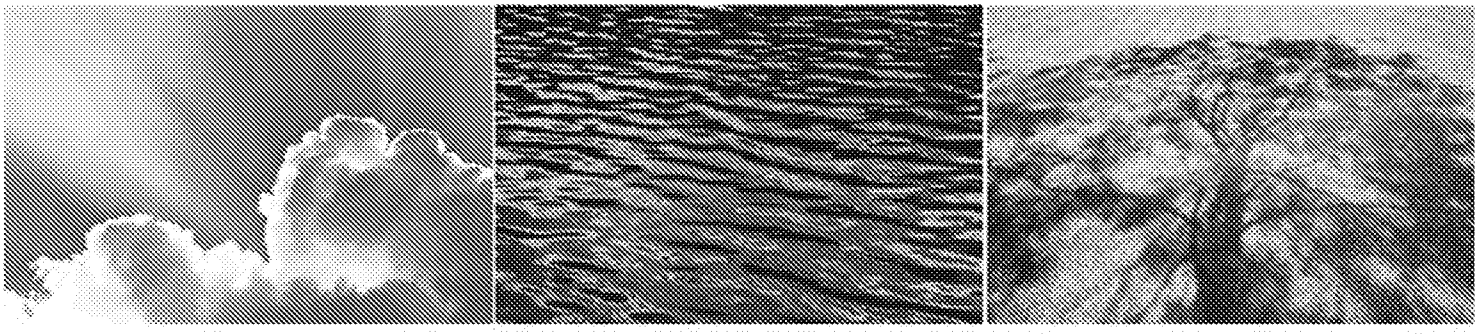
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Desk Study, Site Investigation & Risk Assessment Report



Desk Studies | Risk Assessments | Site Investigations | Geotechnical | Contamination Investigations | Remediation Design and Validation

Site: Land South of Mayflower Way, Angmering

Client: Angmering Community Land Trust

Report Date: 25 August 2017

Project Reference: J13227

[redacted]

ARUN DISTRICT COUNCIL A/219/17/PL

SUMMARY

The site, which extends to about 0.43 ha, comprises an open plot of agricultural land, which at the time of our investigation was not in use. It is proposed to redevelop the site with two to three storey residential properties with associated private gardens and areas of parking

Geological records indicate the site to be underlain by Brickearth over Terrace Gravel over New Pit Chalk Formation.

A historical Ordnance Survey map search and desk study was carried out and indicates that the site has a history of agricultural use and is situated in a predominantly rural/residential area.

A single phase of intrusive investigation was carried out.

The soils encountered comprised a shallow covering of topsoil/made ground, over orange brown silty sandy Clay (Brickearth) over gravelly Clay trending to sandy Gravel with depth (River Terrace) over a chalky sandy gravel.

At the locations of TP101, TP104, TP105 and TP106, made ground soils were encountered to depths of between 0.45m to 1.3m bgl. The made ground soils were variable and in general comprised brown sandy clay with abundant fine to coarse brick, tile, felt, barbed wire, timber, roofing felt, glass, rubber, plastics, metal fragments and whole reinforced concrete fence posts. Fragments of asbestos containing materials in the form of asbestos cement were also identified.

Groundwater was not encountered during the course of this investigation.

The sulphate content of the fill and natural soil was found to fall within Class DS-1. The ACEC classification for the site is AC-1.

An allowable bearing capacity of 125kPa is recommended. NHBC LOW Volume Change Potential precautions will apply.

Suspended floor slabs are advised due to the presence of made ground soils across the site.

There is evidence of soil contamination in the form of asbestos containing materials and loose fibres of asbestos. Preliminary recommendations are given for remediation of the site, however further work is required to define the extent of the contamination and enable design of the remediation. The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

A formal remediation strategy and verification plan should be agreed with the regulatory authorities prior to commencement of any remedial works.

The site investigation was conducted and this report has been prepared for the sole internal use and reliance of Angmering Community Land Trust and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

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The findings and opinions conveyed via this Site Investigation Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

[redacted]

J N Race MSc CGeol **Dr J Kelly BSc PhD DIC** **Darryl Kelly MGeol FGS**
(Countersigned) (Signed)

For and on behalf of Southern Testing Laboratories Limited

STL: J13227
25 August 2017

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a signed order form from Bruce Howse of The Howse Wallis Partnership on behalf of their client, the Angmering Community Land Trust.

2 Location

The site, which comprises an existing field, is located to the south of Mayflower Way, approximately 500m north east of Angmering Railway Station, Littlehampton, BN16 4AY. The approximate National Grid Reference of the site is TQ 07262 03274.

3 Proposed Construction

It is proposed to develop a 0.43 ha site with housing. Ground loadings have not been given at this stage

For the purposes of the contamination risk assessment, the proposed development land use is classified as Residential with plant uptake. The gas sensitivity of the site is rated as High (CIRIA C665[1]).

4 Object

This is a Phase 1 Desk Study and Walkover and Phase II geotechnical and contamination (risk estimation and evaluation) investigation (Tier 1).

The object of the investigation was to assess foundation bearing conditions and other soil parameters relevant to the proposed development, and to assess the likely nature and extent of any potential soil, groundwater and soil gas contamination on the site.

5 Scope

This report presents our desk study findings, exploratory hole logs and test results and our interpretation of these data.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The findings and opinions conveyed via this Site Investigation Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

[1] CIRIA C665 (2006) Assessing risks posed by hazardous ground gases to buildings.

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The site investigation was conducted and this report has been prepared for the sole internal use and reliance of Angmering Community Land Trust and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report may not be appropriate to alternative development schemes. The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

B DESK STUDY & WALKOVER SURVEY

6 Desk Study

A desk study has been carried out. Reference has been made to the following information sources.

- Geological Maps
- Hydrogeological/Groundwater Vulnerability maps
- Aerial Photographs
- Historical Ordnance Survey Maps
- Environmental Databases
- Previous Reports (reports by Southern Testing in the immediate area)
- Environment Agency website
- BRE Radon Atlas[2]

The environmental databases search report compiled for this desk study contains site-specific environmental data drawn from data sets that comprise publicly available information together with data from third parties, some of which is under review. Accordingly, Southern Testing Laboratories Limited does not warrant its accuracy, reliability or completeness.

The full report is included in Appendix F, a summary of the salient features is included in the following sections of this report.

6.1 Geology

The British Geological Survey Map indicates that the site geology consists of Brickearth over River Terrace deposits over New Pit Chalk Formation.

Brickearth

Brickearth (loess deposit) is a recent deposit which is so called as it is suited to brick manufacture. It is predominantly an Aeolian deposit; formed during cold, dry climatic conditions. There is evidence that Brickearth has been reworked as part of 'sheet flooding' which helped incorporate flint gravels into the deposit. Brickearth consists mainly of ferruginous silty clay, which is often sandy and may contain some finely divided chalk, scattered flints and gravely seams, or other locally derived material.

[2] BR 211 (2015) 'Radon: guidance on protective measures for new buildings'

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Terrace Gravels

Terrace gravels are sheets of irregular and sub-rounded gravel and sand, laid down as terraces alongside rivers. There is usually a covering of sandy silty clay, termed brickearth, and old backfilled gravel workings are sometimes found.

Middle Chalk

Chalk is a well-known soft white friable limestone consisting of over 95% of calcium carbonate. It is of organic origin and is composed of shell debris embedded in a fine matrix of microscopic calcareous bodies produced by planktonic algae (coccoliths).

Flints are largely absent in the Middle Chalk, except in the upper beds, and there is a hard band of chalk, the Melbourn Rock, at the base of the division.

While Upper Chalk frequently has excellent soakage properties, this is not the case in the Middle Chalk, where soakage may be poor.

6.2 Hydrology and Hydrogeology

Data from the Environment Agency and other information relating to controlled waters is summarised below.

Data		Remarks	Possible Hazard to/from Site Y/N
Aquifer Designation	Superficial Deposits	The site is mapped within a Secondary A Aquifer (River Terrace Deposits)	Y
	Bedrock	The site is mapped within a Principal Bedrock Aquifer (New Pit Chalk).	Y
Groundwater Vulnerability		The site is mapped within a Major Aquifer of high leaching potential.	Y
Abstractions		There are two groundwater abstraction licenses listed within 500m of the site (326m northeast and 327m east). Both relate to abstraction for spray irrigation at local nursery sites.	N
Source Protection Zones		The site is not mapped within a source protection zone. Furthermore no groundwater source protection zones are listed within 500m of the site.	N N
Surface Water Features		The nearest surface water feature is listed 195m west of the site. Which is related to the storm overflow ponds to the west.	N
Marine/Fluvial Flood Risk		The site is not shown within or adjacent an area mapped as being at risk.	N

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Data	Remarks	Possible Hazard to/from Site Y/N
Surface Water Flood Risk	The site is not shown within or adjacent to an area mapped as being at risk.	N
Reservoir Flood Risk	The site is not shown within or adjacent to an area mapped as being at risk.	N
Discharge Consents	The nearest discharge consent is listed 56m north of the site and is listed as final/treated effluent. A further 3 discharge consents for final/treated effluent are listed within 250m of the site.	N N

The site is located on both a Secondary A superficial aquifer and a Principal Bedrock aquifer and as such any potential sources of on site contamination could have an impact on the underlying groundwater table. However, there are no groundwater source protection zones or potable abstraction wells in close proximity to the site and as such the overall risk to groundwater is therefore considered to be low.

6.3 Historical Map Search

Copy extracts of historical Ordnance Survey plans dating from 1876 to 2014 were obtained and are presented in Appendix F together with a summary of the salient features.

In brief, the site was first shown on the 1876 map as an open plot of land and appears to have remained undeveloped land up to the most recent map (2014). Anecdotal evidence from a council employee suggest that the site was used as allotment gardens for a period of time which was not shown on the historical maps or aerial photography.

The surrounding area is shown on the 1876 map as predominantly open land, the only feature being a road to the south and Ivy Cottage to the south east. The surrounding area remained essentially unaltered up to the 1932 map, when a collection of greenhouses were constructed approximately 250m east of the site along with two small houses. By the 1942-1943 map the local area has been significantly developed with numerous large scale horticultural nurseries and associated greenhouses and tanks to the north, south and east of the site. The 1970 map shows the large nursery (Half Moon Nursery) to the south of the site has been demolished and redeveloped into residential properties. The land to the north of the site has further developed with new greenhouses and nurseries being constructed, with areas of ponds mapped along with tanks and chimneys. The land to the east and west of the site has been developed with residential properties and just off site to the south east a pet food packing station has been developed. The surrounding area appears to have remained essentially unaltered up to the 1994 map when it appears that several of the nursery sites to the north have been demolished. The 2002 map shows an area of land to the northwest of the site has been developed into some sort of earthworks feature. By the 2014 map the remaining nursery site to north appears to have been demolished and replaced by a residential development. Whilst this is the last map available, during the walkover survey it was apparent that the final nursery site to the east has also been demolished and is currently being developed into residential properties.

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6.31 Environmental Databases

	Distance (m)	Direction	Details	Possible Hazard to site
Historical Industrial Land Uses	0	Onsite	Nurseries	Y
			A further 12 entries for nursery sites were listed within 250m of the site.	Y
	81	NW	Unspecified Tanks	
	81	NW	A further 10 entries for unspecified tanks were listed within 250m of the site.	Y
Current Industrial Land Uses	32	SE	Furniture – Wood Design	N
	78	NE	Second-hand Vehicles	N
	80	NW	Tanks (Generic)	N
	81	NE	Scrap Metal Merchants	N
	81	NE	Vehicle Repair, Testing and Servicing	N
	89	NE	Vehicle Repair and Testing	N
	163	NE	Electrical substation	N
Current and Historical Landfills	-	-	No landfills listed within 1km of the site.	N
Fuel Sites	336	SE	John Cooper Garages - Obsolete	N
Pollution Incidents	31	S	Smoke- Category 3 Air/Land	N
	177	SE	Construction and Demolition Materials and Wastes- Category 3 Air/Land	N
IPC Part B Authorisations	-	-	None listed within 500m of the site	N
Hazardous Substances Consents	195	NE	Application under the Hazardous Substances Act 1992 for the storage of liquefied petroleum gas	N
	241	E	Historical NIHHS Site	N
Sensitive Land Use Designations	176	W	Nitrate Vulnerable Zone	N

The site has been mapped as open rural land since the first historical map upto the present day and as such the risk of on site contamination is expected to be low. The Groundsure report lists the site as being developed as nurseries, however the maps do not suggest the site was ever under nursery use and these entries may related to the close proximity of the adjacent nurseries to the site boundary.

In additional, anecdotal evidence from a local council worker suggests that the site was developed into allotments for a period of time, and as such there is a risk of on site contamination associated with this land use.

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The surrounding area has historically been developed into large scale horticultural plant nurseries and associated tanks, ponds and greenhouses. There is a low risk that residual contamination associated with the land use could impact the subject site. However, the recent redevelopment of these sites into residential estates suggests that any residual contamination encountered should have been remediated.

6.4 Geological Hazards and Mining Activities

Data from various sources relating to potential geological hazards at the site are summarized below. The Hazard Potentials listed for the BGS data are as presented in the Groundsure report, derived from various generic BGS sources, which are not considered as site-specific. It is important that this information is considered in context of the actual site topography, ground conditions encountered during future investigation, and development proposals.

Data Source	Hazard	Hazard Potential to Site	Remarks
BGS	Potential for Collapsible Ground Stability Hazard	Low	
	Potential for Compressible Ground Stability Hazard	Negligible	Brickearth potentially present on site and may have moderate to high compressibility.
	Potential for Ground Dissolution Stability Hazard	Very Low/ Negligible	
	Potential for Landslide Ground Stability Hazard	Very Low	
	Potential for Running Sand Ground Stability Hazard	Low	The underlying Terrace Gravel deposits are likely to be unstable below the water table.
	Potential for Swelling or Shrinking Clay Ground Stability Hazard	Low	Should be considered moderate to high given the likely presence of Brickearth materials at shallow depths on site.
	Non Coal Mining Hazard	Negligible	
ARUP	Mining Instability	Negligible	Nothing shown within 4km of site, chalk mining within Northeast of quadrant.
CSS/KURG*	Underground openings	Negligible	Nothing shown within 2km of site location.

**Chelsea Spelaeological Society/ Kent Underground Research Group*

6.5 Radon Risk

The property is in a Radon affected area, as between 1% and 3% of properties are above the action level.

With reference to BRE guidance, no radon protection is required on this site.

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7 Walkover Survey

A walkover survey was carried out on 24th July 2017.

7.1 General Description and Boundaries

The site comprises a broadly rectangular plot of land, which at the time of our investigation was predominantly overgrown grass.

The northern boundary of the site contains a soil bund approximately 1.2m in height, beyond which Mayflower Way is situated and to the north of this is an area of land, which is disused and is covered in piles of scrap metal, soil and demolition rubble. The western and eastern site boundaries comprise residential properties with associated garden areas while the southern site boundary comprises an overgrown section of woodland, with an old dirt BMX bike track.

7.2 Topography and Drainage

The site and immediate surrounding area is generally flat and level with no major changes in elevation observed. To the north west of the site is an area of land which appears to be used for storm water storage during periods of heavy rainfall.

7.3 Vegetation

The site at the time of our walkover was generally covered in long grass with occasional weeds and shrubs throughout. The southern site boundary comprised mixed deciduous trees and shrubs including Laurel, Hawthorn and other mixed deciduous species. To the north of Mayflower Way a row of mature Silver Birch and conifers are situated.

7.4 Buildings and Land Use on Site and Nearby

The site comprises an open plot of land with no existing structures. To the east and to the west of the site are existing brick built residential properties and associated garden areas. To the north east of the site is a collection of second hand car and van sales and to the southeast of the site is an existing furniture warehouse.

7.5 Photographs

A series of photographs showing the site at the time of our walkover survey is included in Appendix E.

C PRELIMINARY CONCEPTUAL MODEL

8 Introduction

In the context of this report, the conceptual model summarises the potential pollutant linkages identified for the site and forms the basis of the risk assessment for the site. The preliminary model comprises the potential sources of contamination, receptors that could be harmed and exposure pathways identified from the desk study and walkover survey. These potential linkages form the basis upon which the investigation is designed and reported.

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9 Potential Sources of Contamination

The site has a history of use as rural/agricultural land and based on anecdotal evidence may have also been allotments for a short period of time. In addition, whilst we do not believe the site was ever developed as part of the adjacent horticultural nurseries, there is a risk that residual contaminants associated with this land use may be encountered on site.

Only limited contaminative sources have been identified in the general locality and on the site.

Potential contaminants associated with these uses have been compiled from DoE industry profiles and our experience of such sites.

9.1 On Site Sources

Source	Potential Contaminants
Allotment Gardens	Metals, PAH's, asbestos containing materials, Pesticides/Herbicides
Rural Land	Made Ground – May contain variable materials such as Metals, PAH's, asbestos containing materials

The site has had as history open rural/agricultural land and as such there is a risk of residual contamination associated with the use of pesticides/herbicides on the site.

In addition, anecdotal evidence suggests that the site was used as an allotment gardens at some point in its history and as such there is also a low risk of on site contamination associated with the potential for made ground soils to be encountered on site.

The close proximity of the site to the large scale horticultural nurseries in the area may have also led to residual contamination associated with heavy metals from paintwork used on the greenhouses and the use of pesticides/herbicides.

9.2 Off Site Sources

The site may be impacted by contamination migrating from beyond the site boundary. The following potential off-site sources have been identified.

Source	Distance from Site Boundary	Direction	Potential Contaminants	Likely Hazard to Site
Potentially Infilled Land	7m	N	Land Gas	Low
Unspecified Tanks	58m	NW	Petroleum Hydrocarbons, BTEX	Low
Nurseries	79m	S	Metals (principally lead), Asbestos, Pesticides/Herbicides	Low

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The land to the north east of the site, where the Car and Van sales business are currently situated, contained a pond up to the 1994 map. Aerial imagery from 2000 shows that the pond has been backfilled and the site has been developed into a Car Sales Yard. Since 2000 the site has been redeveloped with new buildings and areas of hardstanding over the location of the former pond. Given the age of the backfilling and the fact that the site has been redeveloped since, we do not consider this feature to pose a significant risk of land gas generation and therefore do not consider there to be a need for land gas monitoring.

The unspecified tanks listed in the Groundsure Report are likely to be associated with the adjacent horticultural plant nurseries and could either be water tanks or potentially fuel tanks used for heating the greenhouses. The overall risk of these features is considered to be low given the distance from the site and small scale of the features. In addition, any potential spillages are likely to have been relatively small and given the fact that the shallow soils comprise Brickearth material, this would mitigate the spread of contaminants. Furthermore, all of the former nursery sites have now been or are in the process of being redeveloped into residential properties and as such the redevelop works would have led to the remediation of any potential pockets of contamination.

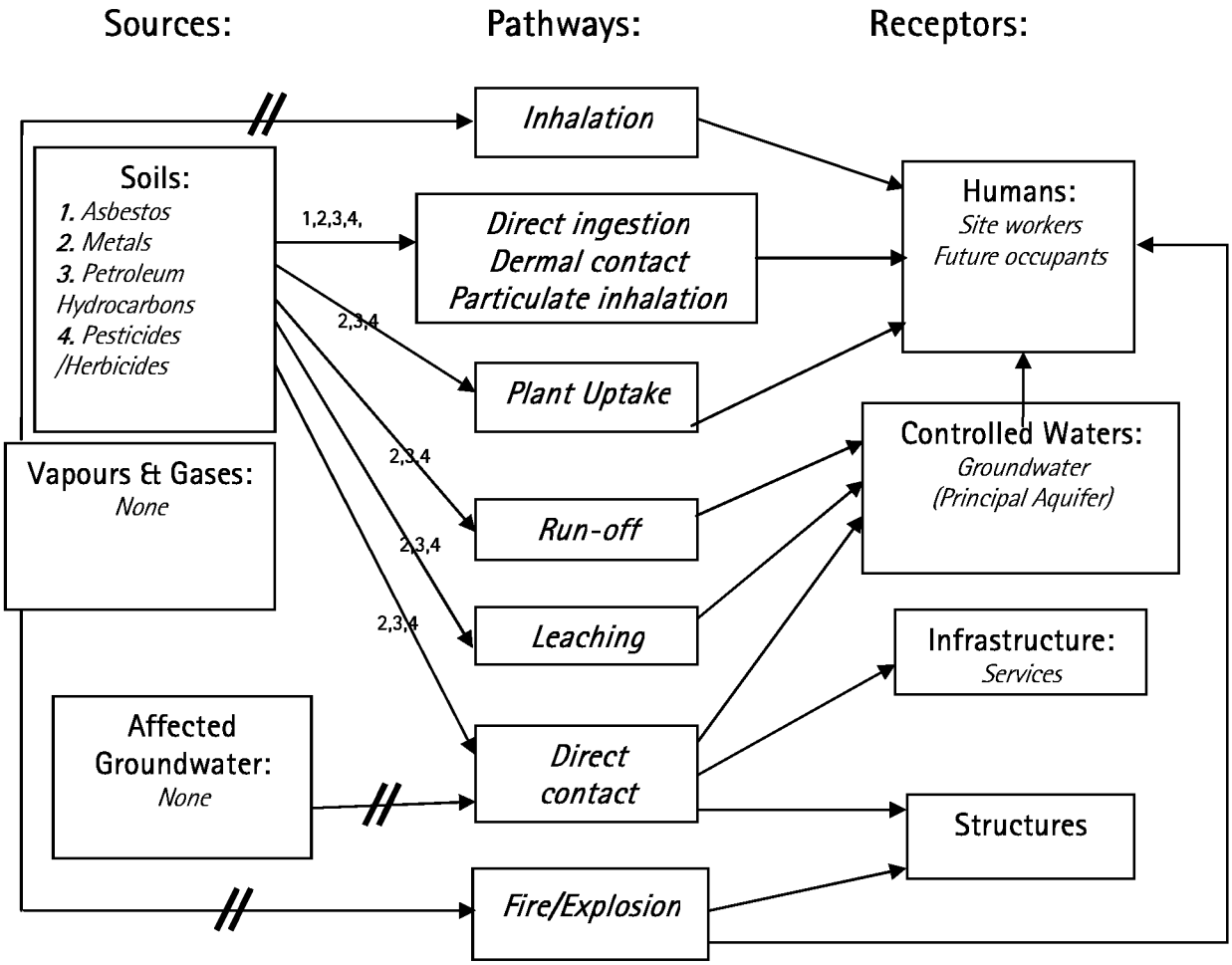
The Commercial Car Sales to the north east of the site are relatively small scale in operation and as such the risk of contamination associated with any spillages/leakages is considered to be low. In addition, the vehicles are mostly situated on hardstanding, reducing the possibility of any contaminants permeating the ground.

The surrounding area has historically been used as large scale horticultural plant nurseries there is a potential risk of heavy metals, namely the use of Lead paint on the Greenhouses which may have to residual contamination in shallow soils. In addition, there is also a risk of residual contamination associated with the use of pesticides/herbicides on the site.

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10 Pollutant Linkages and Model Summary

The following diagram shows the potential pollutant linkages identified for the site and summarises the preliminary conceptual model:



// Denotes potential pollutant linkage not complete

D SITE INVESTIGATION

11 Method

The strategy adopted for the intrusive investigation comprised the following:

- A series of six trial pits were excavated using a hydraulic backhoe excavator.
- 6 No. in situ DCP CBR tests were carried out along proposed roads/parking areas.
- 2 No. Gravel filled BRE365 soakage tests were carried out.

Exploratory hole locations are shown in Figure 1 in Appendix A.

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12 Weather Conditions

The fieldwork was carried out on 24th July 2017 at which time the weather was generally warm, with scattered clouds and sporadic rain showers.

13 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (Appendix A), but in general comprised a covering of Made Ground/Topsoil over gravelly Clay over sandy Gravels. A summary is given below.

Depth	Thickness	Soil Type	Description
GL to 0.25m/0.3m	0.25m to 0.3m	Topsoil	Grass over brown sandy clayey TOPSOIL with occasional roots and flint gravel.
0.25m/0.3m to 1.4m/3.0m	1.1m to 2.75m	Silty/Sandy Clay	Stiff, high strength pale orange brown gravelly sandy CLAY. Gravels comprise fine to coarse subrounded to subangular flint
1.4m/2.9m to 3.0m	1.6m	Gravelly Clay	Firm to stiff high strength orange brown, silty gravelly CLAY. Gravels comprise fine to coarse sub-rounded to sub-angular flint.
2.9m to 3.5m/3.9m+	0.6m to 1.0m+	Sandy Gravel	Medium dense, pale orange brown mottled white chalk fine to coarse sandy GRAVEL. Gravels comprise fine to coarse subrounded to subangular flint and fine to medium chalk.

At the locations of TP101, TP104, TP105 and TP106, made ground soils were encountered to depths of between 0.45m to 1.3m bgl. The made ground soils were variable and in general comprised brown sandy clay with abundant fine to coarse brick, tile, felt, barbed wire, timber, roofing felt, glass, rubber, plastics, metal fragments and whole reinforced concrete fence posts. Fragments of asbestos containing materials in the form of asbestos cement were also identified.

13.1 Visual and Old factory Evidence of Contamination

Evidence of possible contamination in the form of made ground soils including suspected asbestos containing materials was recorded at the location of TP101, TP104, TP105 and TP106.

These occurrences are discussed in Section H.

14 Groundwater Strikes

Groundwater was not encountered in any of the trial pits excavated on site to date. However we would anticipate groundwater levels to rise in this area during the wetter winter months.

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E FIELD TESTING AND SAMPLING

The following in-situ tests and sampling methods were employed. Descriptions are given in Appendix B together with the test results.

- BRE365 Soakage tests
- Hand Penetrometer
- Perth Penetrometer
- Dynamic Cone Penetrometer CBR's
- Disturbed sampling

F GEOTECHNICAL LABORATORY TESTS

The following tests were carried out on selected samples. Test method references and results are given in Appendix C.

- Moisture Content
- Atterberg Limit Tests
- Sulphate and pH

G DISCUSSION OF GEOTECHNICAL TEST RESULTS AND RECOMMENDATIONS

15 Soil Classification and Properties

Soil Type	Depth	Compressibility	VCP	Permeability	Frost Susceptible	CBR	Remarks
Made Ground	GL to 0.45m/1.3m	High and variable	N/A	N/A	N/A	N/A	Not suitable for foundations
Brickearth	0.25m/0.3m to 1.4m/3.0m	Moderate to high	Low	Low	Yes	Poor	
Gravelly Clay	1.4m/2.9m to 3.0m	Moderate to high	Medium	Fair (subject to insitu testing).	N/A	N/A	
Sandy Gravel	2.9m to 3.5m/3.9m +	Moderate	Negligible	Fair (subject to insitu testing).	N/A	N/A	

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16 Swelling and Shrinkage

Six out of the seven modified plasticity tests classified the clays as of NHBC LOW Volume Change Potential (VCP), with one result in the NHBC MEDIUM class. On balance it is considered that NHBC LOW would be appropriate as a general site classification. Full details of protective measures are given in NHBC Chapter 4.2, but for convenience the depth requirements are summarised below.

Certain trees have a very high water demand (Oak, Poplar, Willow, Elm, Hawthorn, Eucalyptus) and if these are planted then a greater increase will be required.

NHBC Chapter 4.2 Foundation Depth Chart for LOW Volume Change Potential Soils										
Water Demand	Tree Type (common examples)	Distance over Height Ratio (D/H)								
		0.0	0.1	0.2	0.3	0.4	0.5	0.6	1.0	1.25
		Foundation Depth (m)								
High	Broad Leaf (Elm, Eucalyptus, Hawthorn, Oak, Poplar, Willow or unknown species)	2.5	2.4	2.2	2.1	1.95	1.8	1.65	1.1	0.75
	Coniferous (Cypress)	2.5	2.2	1.9	1.65	1.35	1.05	0.75	0.75	0.75
Moderate	Broad Leaf (Ash, Beech, Fruit, Chestnut, Lime, Maple, Sycamore, Plane)	1.6	1.5	1.4	1.35	1.15	1.0	0.95	0.75	0.75
	Coniferous (Cedar, Pine, Spruce, Douglas Fir, Wellingtonia, & Yew)	1.6	1.35	1.1	0.85	0.75	0.75	0.75	0.75	0.75
Low	Broad Leaf (Birch, Hazel, Holly, Magnolia, Elder)	1.2	1.1	1.0	0.95	0.85	0.75	0.75	0.75	0.75

Minimum foundation depths of 0.75m bgl apply outside the zone of influence of new planting. Where new planting is proposed foundation depths should be calculated in accordance with NHBC Chapter 4.2, section D6.

17 Groundwater Levels

Groundwater levels vary considerably from season to season and year to year, often rising close to the ground surface in wet or winter weather, and falling in periods of drought. Long-term monitoring from boreholes or standpipes is required to assess the ground water regime and this was not possible during the course of this site investigation.

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Despite groundwater not being encountered during our investigation to a maximum depth of 3.9m bgl, our works were carried out in the drier summer months. Based on historical data from previous reports carried out in this area we would anticipate groundwater levels to rise within the wetter winter months which may have implications on the use of soakaways on the subject site.

18 Soakaways

A total of two gravel filled BRE365 soakage tests were carried out across the site, at the locations shown on the attached site plan (Figure 1). The full results of the soakage tests are appended, however, the soakage rate from each trial hole is summarised in the table below.

Results of BRE 365 Soakage tests				
Pit	Depth (m)	f $l/m^2/min$	BRE Units (m/sec)	Comments
TP101 (test1)	3.4	4.14	6.9E-5	
TP101 (test2)	3.4	2.85	4.74E-5	
TP101 (test3)	3.4	1.62	2.69E-5	
TP106 (test1)	3.0	5.21	8.68E-5	
TP106 (test2)	3.0	3.31	5.57E-5	
TP106 (test3)	3.0	3.01	5.02E-5	

Based on the results of the soakage testing carried out on site to date we would consider an overall design value of $2l/m^2/min$ to be appropriate. Due to the variability in the soils encountered on site consideration should be given to undertaking soakage tests at the proposed depth and location of any soakaways to confirm the design rate.

Any soakaway scheme will require the approval of the Environment Agency, Building Control and, where applicable, the adopting Highways Authority.

Groundwater levels can vary considerably from season to season and year to year, often rising in wet or winter weather, and falling in periods of drought. As such, a high groundwater table may affect the storage capacity of soakaways (where applicable). In addition, it should be noted that an unsaturated zone may be required between the base of soakaways and the groundwater table, by the Environment Agency.

19 Sulphates and Acidity

The recorded pH values are in the range of 7.9 to 8.1

The Design Sulphate Class is DS-1. Groundwater should be assumed to be mobile. The ACEC site classification is AC-1.

20 Bearing Capacity

Based on the soils encountered on site and results of the insitu testing an allowable bearing pressure of up to 125kPa is available for strip/trench fill foundation deepened through all made ground soils and set into underlying firm to stiff orange brown gravelly clay soils.

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21 Floor Slabs

Due to the presence of pockets of made ground soils across the site suspended floor slabs should be used.

22 Settlement

Settlement is expected to be within standard construction tolerance based on the loadings given above.

23 Excavations and Trenching

Statutory support will be required in all excavations where personnel must work.

Excavations within the drier summer months are likely to be dry and stable, however if groundworks are to take place during the wetter winter months it is likely that either perched water or groundwater may be encountered in excavations and some form of dewatering may be required.

Contamination in the form of asbestos containing materials within made ground soils has been identified on the site. This may have implications for earthworks.

24 Road Construction

Measured Values and Construction Options

The measured CBR values at the anticipated formation depth ranged from 16% to 20% and on the basis of these in situ test results and of the results of laboratory tests a design CBR value of 4% is recommended. The subsoil often contains more than 10% fines and is considered potentially frost susceptible. It is recommended that a minimum construction thickness of 450mm be adopted to give frost protection.

General

The most important element of any road construction is drainage and attention must be given not only to the drainage of the subsoil, but to the various layers of construction. To this end the formation should be shaped to a camber or crossfall to allow water movement out of the sub-base. Silty soils soften extremely quickly if allowed to become wet or if they are excavated below the water table and this softening can give rise to a very substantial increase in costs.

Sub-base and coarse capping materials tend to segregate during placing operations, particularly when end tipped. On soft clay subgrades this can lead to punching and softening of the formation. The use of a layer of sand or geofabric will minimise the problem.

Construction traffic should be kept off formations and it is often advisable to leave a protective layer of soil above formation level until the last moment before placing the sub-base.

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H LAND QUALITY

25 Analytical Framework

There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

The CLEA model[3] provides a methodology for quantitative assessment of the long term risks posed to human health by exposure to contaminated soils. Toxicological data is used to calculate a Soil Guideline Value (SGV) for an individual contaminant, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.

In the absence of any published SGVs for certain substances, Southern Testing have derived or adopted Tier 1 screening values for initial assessment of the soil, based on available current UK guidance including the LQM/CIEH[4] S4UL's and CL:AIRE[5] generic assessment criteria. In addition, in March 2014, DEFRA[6] published the results of a research programme to develop screening values to assist decision making under Part 2A of the Environmental Protection Act. Category 4 screening levels were published for 6 substances, with reference to human health risk only. This guidance includes revisions of the CLEA exposure parameters, presenting parameters for public open space land use scenarios, and also of the toxicological approach. The screening levels represent a low risk scenario, based on a 'Low Level of Toxicological Concern' rather than the 'Minimal Risk' of CLEA, and the analytical results of this investigation may be considered relative to these levels.

The values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. Their validity should be confirmed at the time of site development.

Site-specific assessments are undertaken wherever possible and/or applicable.

CLEA requires a statistical treatment of the test results to take into account the normal variations in concentration of potential contaminants in the soil and allow comparisons to be made with published guidance.

26 Site Investigation – Soil

26.1 Sampling Regime

The number of sample locations was designed to provide general coverage.

26.2 Testing

The potential for contamination by heavy metals, PAH's, asbestos containing materials and pesticides/herbicides were identified in the preliminary conceptual model and observations made on site and, therefore, the following tests were selected.

[3] Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).
[4] The LQM/CIEH S4ULs for Human Health Risk Assessment. (2014).
[5] The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment (2009).
[6] SP1010 Development of Category 4 Screening Levels foe Assessment of Land Affected by Contamination. DEFRA, 2014.

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Test Suite	Number of Samples	Soil Tested
STL Key Contaminant Suite	5	Made Ground
	1	Topsoil
	1	Natural Soil
Asbestos Identification	5	Made Ground
	1	Topsoil
	1	Natural Soil
Pesticides/Herbicides	2	Topsoil
	1	Made Ground

The test results are presented in full in Appendix D. A summary and discussion of the significance of the results and identified contamination sources is given below.

26.3 Test Results and Identified Contamination Sources

26.3.1 General Contaminants

The results of the key contaminant tests have been analysed in accordance with the CLEA methodology. The samples have been grouped into three populations comprising made ground, natural soil and topsoil. For each parameter in each population the sample mean is calculated and compared to a Tier 1 screening value. If the sample mean exceeds the screening value, the soil may be regarded as contaminated and further assessment may be required. If neither the sample mean nor any single value exceeds the screening value, the soil may be regarded as not contaminated, though further confirmatory assessment may be required. Where any single parameter value exceeds the screening value but the sample mean does not, further statistical analysis may be applied to that parameter if the available data is suitable. Such analysis would include an assessment of the Normality of the distribution of the data, consideration of the presence of outliers, and the calculation of a UCL estimate of the mean.

Summary data is presented in the tables below and the laboratory analysis is included in Appendix D. The screening values and source notes are presented in Table 1 "Tier 1 Screening Values" at the front of Appendix D.

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Soil Type: Made Ground

Contaminants	Units	No of Samples Tested	Range	Sample Mean	Residential with Homegrown Produce Consumption Tier 1 Screening Value
Arsenic (As)	mg/kg	5	9.3 - 17	11	37
Cadmium (Cd)	mg/kg	5	0.4-0.6	0.48	11
Total Chromium (Cr)	mg/kg	5	<4	4	910
Hexavalent Chromium (CrVI)	mg/kg	-	-	-	-
Lead (Pb)	mg/kg	5	67 - 130	95	200
Mercury (Hg)	mg/kg	5	<0.3	0.3	7.6-11
Selenium (Se)	mg/kg	5	<1 – 1.1	1.0	250
Nickel (Ni)	mg/kg	5	14 - 17	15	130
Copper (Cu)	mg/kg	5	18 - 28	23	2400
Zinc (Zn)	mg/kg	5	87 – 180	141	3700
Phenol	mg/kg	5	<1	<1	120-380
Benzo[a]pyrene	mg/kg	5	0.18 – 2.1	1.1	1.7-2.4
Naphthalene	mg/kg	5	<0.05	0.05	2.3-13
Total Cyanide (CN)	mg/kg	5	<1	1	-
Acidity (pH value)	Units	5	6.6 – 8.6	7.6	-
Soil Organic Matter	%	5	3.3 – 4.2	4.2	-

Five samples of made ground soils from various depths were taken and sent for analysis. The results are attached in full and summarised in the table above. In general the made ground soils were found to be free from significant contamination.

Soil Type: Topsoil

One sample of the existing Topsoil was taken from TP102 at 0.15m. The sample was found to be free from significant contamination.

Soil Type: Natural Soil

One sample of the natural soil was taken from TP103 at 0.3m. The sample was found to be free from significant contamination.

26.3.2 Asbestos

Asbestos containing materials in the form of suspected asbestos cement fragments were observed in the made ground soils at the location of TP101 and TP105.

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In addition, loose fibres of chrysotile asbestos were detected in the samples of made ground from TP101 @ 1.0m bgl and from TP103 @ 0.3m bgl, which was in natural soil beneath the existing topsoil layer.

The samples were subsequently quantified and the results show that the volume of loose asbestos fibres in the samples tested were below the laboratory detection limit of <0.001%.

26.3.3 Pesticides and Herbicides

Two samples of Topsoil (TP102 @ 0.15m and TP103 @1.0m) and one sample of made ground (TP104 @ 0.15m bgl) were screened for the presence of pesticides/herbicides. The two samples of topsoil were screened and the presence of pesticides/herbicides recorded as absent. The sample of made ground from TP104 @ 0.15m was found to contain pesticides/herbicides compounds.

The sample was subsequently screened for speciated compounds and the results are attached. In general the concentrations recorded are well below any screening criteria for pesticides and as such are not considered to pose a risk to the end users of the development.

27 Summary of Identified Contamination

Based on the limited testing carried out to date the soils from across the site have been found to be free from significant contamination with respect to heavy metals and PAH's.

The made ground soils from across the site were found to contain fragments of asbestos containing materials and loose fibres of chrysotile asbestos. Whilst the laboratory analysis indicates that the concentrations of loose fibres are below the laboratory detection limit of 0.001%, there is still a potential risk to the end users of the site.

28 Risk Evaluation

The object of the risk evaluation is to assess the pollution linkages for specific contaminant groups considered in the conceptual model, identify any unacceptable risks and, therefore establish whether there is a need for further investigation and/or remedial action.

The risks are considered in the context of the specific development proposals for the site and, therefore, the conclusions may not be appropriate for alternative schemes.

28.1 Asbestos

Both fragments of asbestos containing materials and loose fibres of chrysotile asbestos were detected in the made ground samples tested to date. These material are not considered suitable to remain on site and will require further delineation and removal from site.

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28.2 Revised Conceptual Model

The preliminary site model has been refined in light of the findings of this investigation and is summarised below.

Metals	*Petroleum Hydrocarbons*	*PAH's*	*Landfill Gas*	*Asbestos*	PATHWAYS	RECEPTORS
N	N	n	n/a	Y	Ingestion and inhalation of contaminated soil and dust	Human Health
N	N	N	N	n/a	Dermal contact with contaminated soil and dust	
N	N	N	N	n/a	Inhalation of vapours or gases	
N	N	N	n/a	n/a	Uptake into edible fruit and vegetables	
N	N	N	n/a	n/a	Surface water run-off into surface water features	Water Environment
N	N	N	n/a	n/a	Migration through ground into surface water or groundwater	
N	N	N	N	n/a	Off-site migration of contaminated groundwater	
N	N	N	N	n/a	Vegetation on site growing in contaminated soil	Flora and Fauna
N	N	N	n/a	n/a	Aquatic life in affected waters	
N	n	N	n/a	n/a	Contact with contaminated soil	Building materials/ buried services
N	N	N	n	n/a	Fire or explosion	

Key:

Y	Pollutant linkage likely
N	Pollutant linkage not likely
P	Pollutant linkage possible
n/a	Pathway not applicable to contaminant

28.3 Relevant Pollutant Linkages

A number of Relevant Pollutant Linkages for which remedial action will be required have been identified in the revised conceptual model, as follows.

Contaminant/Source	Pathways	Receptors
Asbestos in Made Ground	Soil/dust Dermal exposure Soil/dust Ingestion/inhalation	Site/ Construction workers Future residents

Further investigation is required to determine the extent of the made ground soils across the site and additional testing to determine whether remediation, with regards to the asbestos containing materials will be required, see below.

29 Discussion and Conclusions

Further investigation is required to is further assess the extent and composition of the made ground soils encountered across the site in order to provide an accurate risk assessment and remediation proposal for the redevelopment of the site.

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At this stage, without any further works, we would recommend that the shallow soils from across the subject site be stripped down onto natural soils and removed from site. In areas where made ground soils are in excess of 600mm thick, these soils, in areas of private gardens, should be stripped down to 600mm below finished levels and a deter to dig layer installed, with levels made up with site won clean soils and imported clean, certified topsoil.

As with any site, areas of contamination not identified during site investigation works may come to light in the course of redevelopment. Accordingly, a discovery strategy must be in place during the redevelopment to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner. Depending on the nature of any such contamination, it may prove necessary to reassess the remedial strategy for the site.

A formal remediation strategy and verification plan should be agreed with the regulatory authorities prior to commencement of any remedial works.

30 General Guidance

Allowance should be made for experienced verification of any remedial works.

It may be that specific local requirements apply to this site, of which we are not aware at this time.

In general terms, the workforce and general public should be protected from contact with contaminated material. There is a range of relevant documents published by the Health and Safety Executive, and organisations such as CIRIA, and the BRE.

Some soils will require removal from site and disposal to suitably licensed landfills. Different guidelines and charges will apply to different waste classification. As waste producers, the Developer holds responsibilities under the various governing regulations. The chemical analyses appended to this report should be forwarded to tip operators for their own assessment, to confirm classification of the soils for offsite disposal, and whether they can accept the material. Waste Acceptance Criteria (WAC) testing may be requested for confirmation of the material's classification.

All hazardous and non-hazardous soils leaving site will need to be pre-treated. Waste minimisation by selective excavation is a recognised form of pre-treatment.

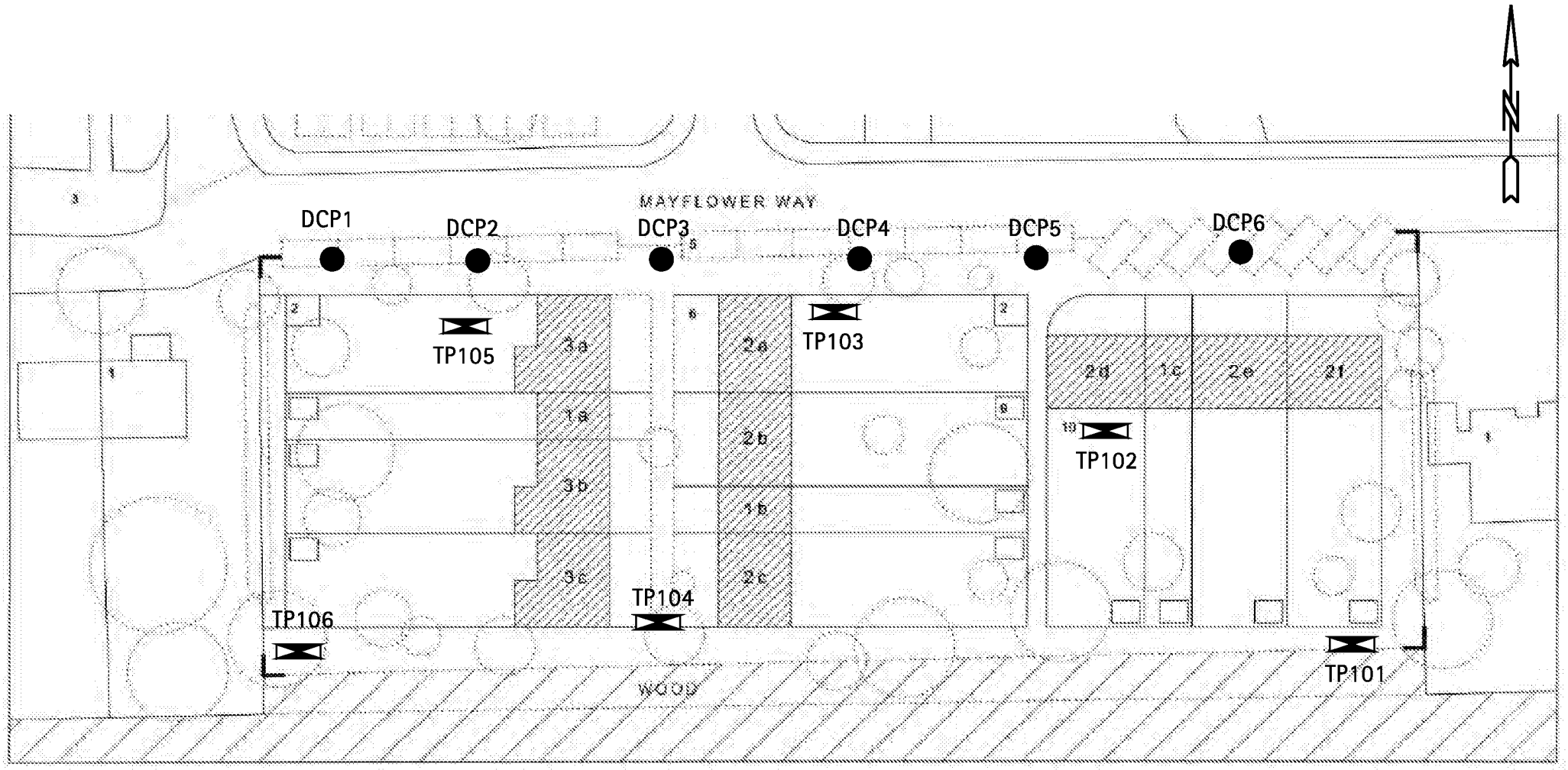
Many water supply companies now require higher specification pipe on contaminated sites, even following remediation.

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APPENDIX A

Site Plans and Exploratory Hole Logs

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NB: Positions of Trial Pits are only indicative unless dimensioned

Site: Land Off Mayflower Way, Angmering	STL: J13227	Fig No: 1
Date: 24 August 2017	Exploratory trial holes on proposed layout plan	

Southern Testing [redacted] ST Consult

Key to Exploratory Hole Logs

General

All soil & rock descriptions in general accordance with BS5930, BS EN ISO 14688 and BS EN ISO 14689
The Geology Code is only provided where positive identification of the sampled strata has been made.

Sampling

ES	Environmental Sample (taken in appropriate sampling container)
D	Disturbed Sample
B	Bulk Sample
LB	Large Bulk for Earthworks testing
C	Core Sample
U	Undisturbed Sample (number of blows indicated in results column)
SPTLS	SPT Liner Sampler
P	Piston Sample
W	Water Sample

Insitu Tests

SPT	Standard Penetration Test in accordance with BS EN ISO 22476-3
SPT (C)	Cone Penetration Test in accordance with BS EN ISO 22476-3
PT	Penetration Test - STL documented equivalent SPT N Value
PPT	Perth Penetration Test - STL in house documented method (N Value)
UCS (⊥)	Unconfined Compressive Strength measure by hand penetrometer (kN/m^2)
IVN	Hand Vane (kPa)
PID	Photo Ionisation Detector Results (ppm)
MEXE	Mexecone CBR Result

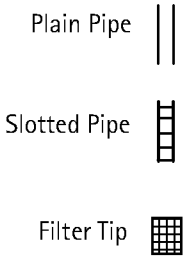
Drilling Records

Depth to standing water level	▽
Depth to water strike	▽
TCR	Total Core Recovery (%)
SCR	Solid Core Recovery (%)
RQD	Rock Quality Index (%)
FI	Fracture Index

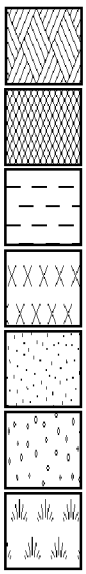
Backfill Symbols



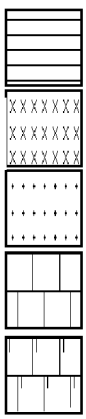
Pipe Symbols



Principal Soil Types



Principal Rock Types



Southern Testing ST Consult	Start - End Date:	Project ID:	Machine Type:	TP101
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	24/07/2017	J13227	JCB 3CX	Sheet 1 of 1

Project Name:	Land Off Mayflower Way	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
Location:	Angmering				DK
Client:	Angmering Community Land Trust				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
0.15	ES			(1.30)			Grass over MADE GROUND comprising brown sandy gravelly CLAY with abundant fine to coarse brick, tile, felt, concrete, barbed wire, timber, plastic fragments and whole re-inforced concrete fence posts. Fragments of asbestos containing materials in the form of cement sheeting were observed.
0.15	ES						
1.00	ES						
1.00	ES					1.30	
1.50	D			(1.10)			Firm to stiff, high strength orange brown gravelly sandy CLAY. Gravels comprise fine to coarse subrounded to subangular flint.
1.50	HP	UCS(kPa)=270.00					
2.00	D						Becoming increasingly gravelly
2.00	PPT	N=12(450)				2.40	
2.50	PPT	N=13(450)		(0.50)			Medium dense orange brown clayey sandy GRAVEL. Gravels comprise fine to coarse subrounded to subangular flint.
3.00	D			(0.60)		2.90	Medium dense, pale orange brown mottled white chalky fine to coarse sandy GRAVEL. Gravels comprise fine to coarse subrounded to subangular flint and fine to medium subrounded chalk.
3.50	D					3.50	Pit terminated at 3.50m.

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.45	Unstable to 1.3m bgl due to the presence of made ground soils	Dry
Length:	2.20		
Depth:	3.50		

Southern Testing ST Consult	Start - End Date:	Project ID:	Machine Type:	TP102
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	24/07/2017	J13227	JCB 3CX	Sheet 1 of 1

Project Name:	Land Off Mayflower Way	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
Location:	Angmering				DK
Client:	Angmering Community Land Trust				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
0.15	ES			(0.30)			Grass over dry brown sandy clayey TOPSOIL with frequent fine roots and occasional fine to medium flint gravel.
0.15	ES					0.30	
0.40	ES						Dry, pale orange brown sandy CLAY with abundant fine to medium chalk gravel and fine to coarse flint gravel.
0.40	ES			(0.40)			
						0.70	
1.00	D						Stiff, high strength orange brown sandy CLAY with rare fine to medium flint gravel.
1.00	HP	UCS(kPa)=310.00					
1.50	D						
1.50	HP	UCS(kPa)=250.00					Pockets of firm to stiff grey clay.
				(2.10)			
2.00	D						
2.00	HP	UCS(kPa)=180.00					
2.50	D						
2.50	HP	UCS(kPa)=160.00					
						2.80	
				(0.20)			Firm high strength orange brown gravelly CLAY. Gravels comprise fine to coarse subangular to subrounded flint.
3.00	D					3.00	
3.00	HP	UCS(kPa)=140.00					Pit terminated at 3.00m.

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.45	Pit sides stable in the short term	Dry
Length:	2.10		
Depth:	3.00		

Southern Testing ST Consult	Start - End Date:	Project ID:	Machine Type:	TP103
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	24/07/2017	J13227	JCB 3CX	Sheet 1 of 1

Project Name:	Land Off Mayflower Way	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
Location:	Angmering				DK
Client:	Angmering Community Land Trust				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
0.10	ES			(0.25)			Grass over brown sandy clayey TOPSOIL with occasional roots and flint gravel.
0.10	ES					0.25	
0.30	ES			(0.15)			Dry, pale brown silty CLAY with occasional flint gravel, weak chalk gravel and fine roots.
0.30	ES					0.40	
				(0.40)			Stiff, pale orange brown silty CLAY with rare roots.
						0.80	
1.00	D						Stiff, high strength orange brown silty sandy CLAY with occasional flint gravel and rare fine roots.
1.00	HP	UCS(kPa)=410.00					
1.50	HP	UCS(kPa)=250.00					
				(2.10)			
2.00	D						
2.00	HP	UCS(kPa)=170.00					
2.50	HP	UCS(kPa)=150.00					
						2.90	
3.00	D						Firm to stiff, pale grey mottled orange brown silty gravelly SAND. Gravels comprise fine to medium subrounded chalk and fine to coarse subrounded flint.
				(0.80)			
						3.70	
							Pit terminated at 3.70m.

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.45	Pit sides stable in the short term	Dry
Length:	2.00		
Depth:	3.70		

Southern Testing ST Consult	Start - End Date:	Project ID:	Machine Type:	TP104
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	24/07/2017	J13227	JCB 3CX	Sheet 1 of 1

Project Name:	Land Off Mayflower Way	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
Location:	Angmering				DK
Client:	Angmering Community Land Trust				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description	
Depth (m)	Type	Results						
0.15	ES			(0.90)			Grass over MADE GROUND comprising brown sandy clayey TOPSOIL with abundant fine to coarse flint gravel, brick, metal and occasional timber fragments.	
0.15	ES							
0.60	ES							
0.60	ES					0.90		
1.00	D						Firm to stiff, high to very high strength orange brown silty CLAY with occasional fine to medium subrounded flint gravel.	1
1.00	HP	UCS(kPa)=410.00						
1.50	HP	UCS(kPa)=210.00						
2.00	D			(2.00)				2
2.00	HP	UCS(kPa)=160.00						
2.50	PPT	N=12(450)						
						2.90		
3.00	D						Medium dense, pale grey gravelly fine to coarse SAND. Gravels comprise fine to coarse subrounded flint and fine to medium subrounded chalk.	3
3.00	PPT	N=26(450)						
				(1.00)				
						3.90		
							Pit terminated at 3.90m.	4

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.45	Pit sides stable in the short term	Dry
Length:	2.10		
Depth:	3.90		

Southern Testing ST Consult	Start - End Date:	Project ID:	Machine Type:	TP105
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	24/07/2017	J13227	JCB 3CX	Sheet 1 of 1

Project Name:	Land Off Mayflower Way	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
Location:	Angmering				DK
Client:	Angmering Community Land Trust				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
0.40	ES			(0.75)			Grass over MADE GROUND comprising grey-brown mottled black silty sandy CLAY with abundant re-inforced concrete posts, metal fragments, rubber tyres, glass, timber and plastic. Fragments of asbestos containing materials in the form of cement sheeting were observed.
0.40	ES					0.75	
1.00	HP	UCS(kPa)=250.00					Firm high strength orange brown gravelly CLAY. Gravels comprise fine to coarse subangular to subrounded flint.
1.20	D						
1.50	HP	UCS(kPa)=220.00					
				(2.25)			
2.00	D						
2.00	HP	UCS(kPa)=160.00					
2.30	D						
2.50	HP	UCS(kPa)=120.00					
3.00	HP	UCS(kPa)=110.00				3.00	Pit terminated at 3.00m.

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.45	Pit sides stable in the short term	Dry
Length:	2.00		
Depth:	3.00		

Southern Testing ST Consult	Start - End Date:	Project ID:	Machine Type:	TP106
www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020	24/07/2017	J13227	JCB 3CX	Sheet 1 of 1

Project Name:	Land Off Mayflower Way	Remarks:	Co-ordinates:	Level (m AOD):	Logger:
Location:	Angmering				DK
Client:	Angmering Community Land Trust				

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m)	Type	Results					
0.15	ES			(0.45)			Grass over MADE GROUND comprising brown sandy gravelly CLAY with abundant fine to coarse brick, tile, felt, concrete, timber, plastic fragments.
0.15	ES					0.45	
0.60	D			(0.35)			Stiff, high strength, pale orange brown silty fine sandy CLAY.
0.60	HP	UCS(kPa)=360.00				0.80	
1.00	D			(0.60)			Stiff, high to very high strength orange brown sandy silty CLAY.
1.00	HP	UCS(kPa)=350.00				1.40	
1.50	D						Stiff/Medium dense, orange brown silty CLAY/GRAVEL. Gravels comprise fine to coarse subrounded to subangular flint.
1.50	PPT	N=17(450)					Becoming increasingly gravelly
2.00	D			(1.60)			
2.00	PPT	N=14(450)					
2.50	D						Lenses of orange brown sandy CLAY
2.50	PPT	N=9(450)				3.00	Pit terminated at 3.00m.

Pit Dimension (m)		Pit Stability:	Water Strikes:
Width:	0.45	Pit sides stable in the short term	Dry
Length:	2.10		
Depth:	3.00		

APPENDIX B

Field Sampling and in-situ Test Methods & Results

Field Sampling and in-situ Test Methods

Disturbed Samples

Disturbed samples were taken from the trial holes at intervals and stored in sealed glass jars and polythene bags, as appropriate.

Hand Penetrometer Test

The hand penetrometer consists of a spring loaded and calibrated plunger which is forced into the soil. A reading of unconfined compression strength (equal-twice cohesion) is given on a calibrated scale. In common with other hand methods of strength assessment (eg. the shear vane) it does not give an accurate indication of bearing capacity in stiff or fissured soils, because of the small test area. The figures are used for strength classification according-the table below.

Hand Penetrometer Value (kPa)	Undrained Shear Strength cu (kPa)	Undrained Shear Strength of Clays
<20	<10	Extremely Low
20 40	10-20	Very Low
40-80	20-40	Low
80-150	40-75	Medium
150-300	75-150	High
300-600	150-300	Very High
600>	300>	Extremely High

Dynamic Cone Penetrometer (DCP) CBR Test (Modified)

The CBR value is the result of an empirical test on soil that can be used for road design purposes. In the field the definitive test requires the use of a reaction load, usually a four-wheel drive vehicle, excavating plant, a CBR jack, and load measuring equipment. The dynamic cone CBR test uses light portable equipment and is used to provide a continuous record of the penetration resistance of each layer in the ground for a depth of a metre from the surface. The penetration resistance provides a measure from which CBR values may be calculated using formulae published by the Transport Research Laboratory.

In the test a 22 mm diameter 60° cone is driven into the ground to a depth of up to one metre by a 9 kg weight, freely falling over 600 mm. The number of blows is recorded for each successive 50mm penetration increment.

A plot of the cumulative number of blows versus depth penetrated is drawn. This plot usually takes the form of a series of straight lines, the slopes of which are measured and expressed as penetration in mm per blow. Several authors have prepared relationships between the DCP readings and the CBR and it is the practice of this laboratory to adopt the lower of two values derived from formulae established by Kleyn & Van Heerden, and by the TRL.

$$CBR = 10^{(2.632 - 1.28\mathrm{Log}_{10}(mm/blow))} \quad \text{(K\&tVH)}^1$$

$$CBR = 10^{(2.48 - 1.057\mathrm{Log}_{10}(mm/blow))} \quad \text{(TRL)}^2$$

[1] Kleyn & Van Heerden

The test is an adaptation of the Perth Penetrometer Test developed for the granular soils in Perth West Australia in the 1960s, and in the UK by this laboratory since 1973. It is similar to the Victoria Country Roads Board Penetrometer, the Transvaal Road Department Penetrometer, and the TRL dynamic cone penetrometer. It has been used for the determination of CBR values, after calibration for the local soil, and for compaction comparisons. In UK conditions it has been found to give consistent results for granular soils. It has the advantage that, as it can be driven through bituminous surfacings, granular road base, sub base and hardcore, the strength and thickness of each layer can be estimated.

Soakage Tests after BRE 365 (1991)

The BRE 365 paper on soakaway design allows for the design of trench soakaways as well as traditional square and circular soakaways.

The test to measure the soil infiltration rate is carried out in pits which are excavated to the full depth of the proposed soakaway. The trial pits are filled and allowed to drain to empty or near empty, three times, on the same day or on consecutive days.

The pit is considered full when the water level is the same as the proposed inlet invert. The time for the water level to fall from ¾ full to ¼ full is obtained and the soil infiltration rate is obtained from the following formula:

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

Where: f = soil infiltration rate (in this case expressed in l/m²/minute)

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} = the internal surface area of the trial pit up to 50% effective depth and including the base area;

t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth.

The soakage rate in this report in expressed as l/m²/minute, which is a convenient rate to use. The BRE use a unit of m/sec, which is the value in l/m²/minute divided by 60,000.

BRE 365 stipulates that the pit should be refilled three times in all, on the same day, or on successive days. Where the sides are unstable the pit should be filled with granular material to provide stability. Where trench soakaways are to be constructed, and the design length is between 10 and 25m a repeat test should be carried out at the end of the proposed soakaway. Where the length is more than 25m the test should be carried out at 25m c/c.

Because of time and cost constraints testing was restricted to 1 day.

As it is a full scale test the BRE 365 test may be expected to give more reliable results than the superseded BRE 151 test, but it is more expensive, takes longer, requires large volumes of water, together with pumps and a specially equipped bowser, and requires a computer program for analysis. It is impractical in areas of restricted access, particularly in the back gardens of existing properties.

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Perth Penetrometer Test

Perth Penetrometer tests were carried out. The Perth Penetrometer is a device used for measuring the relative density of sands. It consists of a 16 mm diameter hardened steel probe, which is driven into the soil by successive blows of a 9 kg weight, which freely falls over a distance of 600 mm. The number of blows required for each 50 mm of penetration is recorded, and the test is continued for a depth of 450 mm, according to soil type. Useful information can be obtained by carrying the test past the standard depth, and 2,000 mm and 3,000 mm extensions are used to probe the depth of loose fill or other soil, or to make an estimate of the strength of soils or rock in an auger hole or in the base of an unsupported test pit.

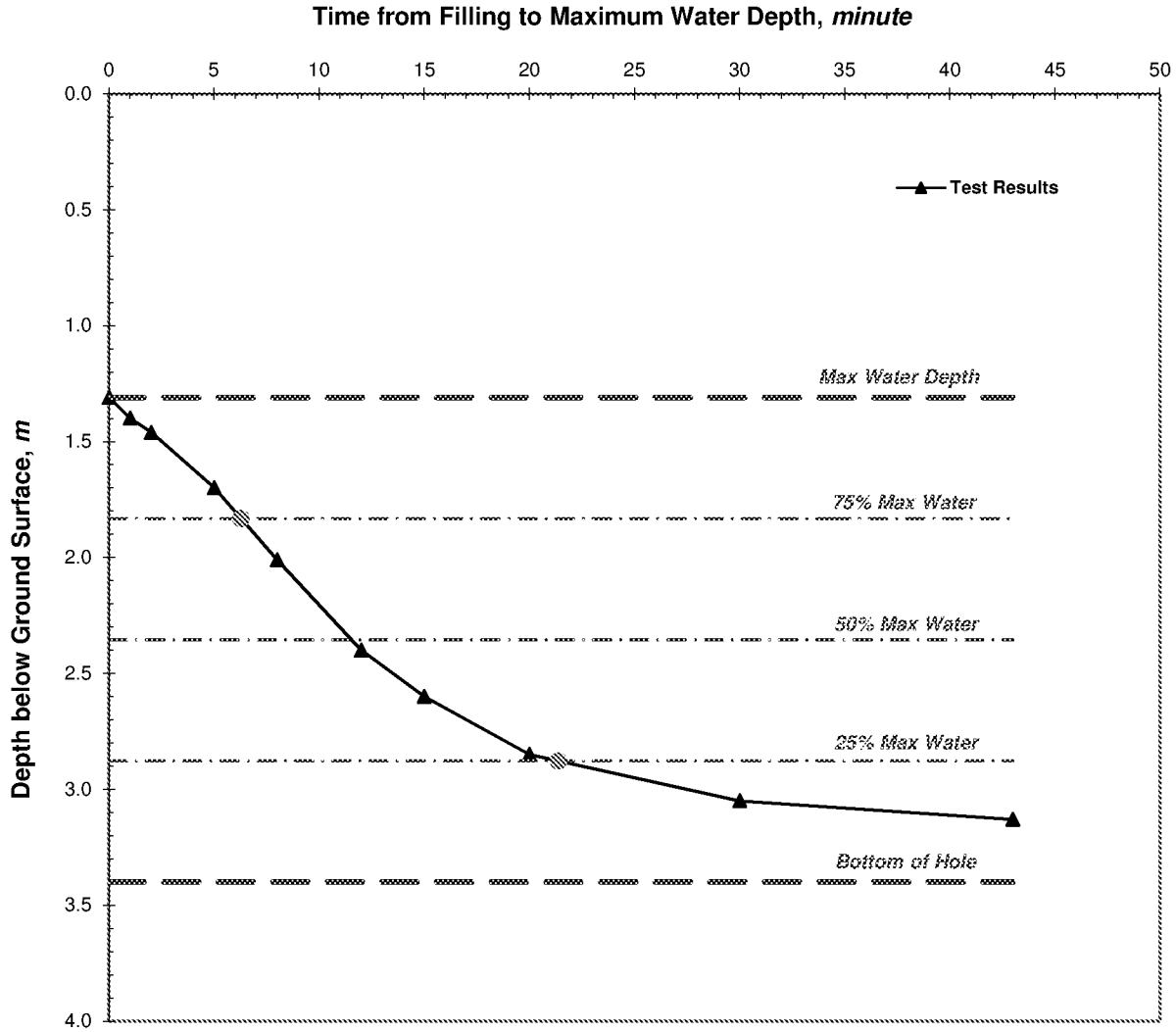
The energy input per square metre is roughly the same as the energy input from the Standard Penetration Test (SPT), and the blow counts recorded in sand are roughly the same as SPT blow counts (but this relationship does not hold for coarse soils). The SPT test is a similar type of test except that much heavier driving weights (63.5 kg) are used. The relative density relationship given for the SPT test is:

Number of Blows (N)	Density
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
Over 50	Very Dense

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BRE Digest 365 Soakage Test

Test Hole No: TP101
Test No: Test No 1 (Initial)



Pit Length, m	2.000	Depth to Water at Start of Test, *m*	1.310
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	1.820
Depth to Pit Base, m	3.400	Total Soakage Test Time, *min*	43.0
Depth to Top of Permeable Soils, *m*	1.400	Mean Internal Discharge Area, m^2	6.021
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	24.926
Depth to Top of Granular Fill, *m*	1.500	Soakage Rate, *litre/m^2/min*	**4.14**
Voids Assumed for Granular Fill, %	40%	BRE Soil Infiltration Rate, *m/sec*	**6.90E-05**

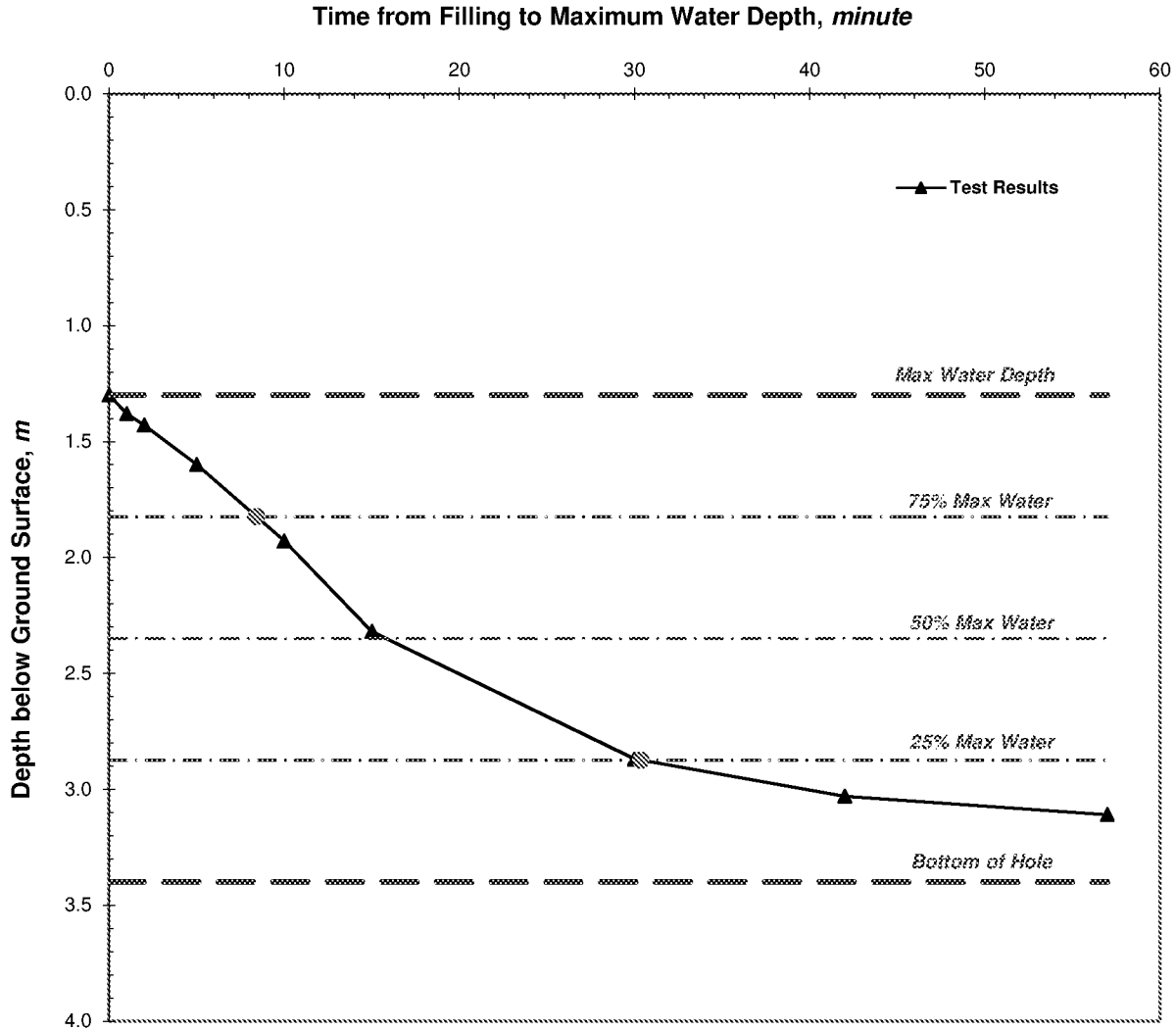
Comments: *1550l used*
Pit was nearly emptied at finish of test.

Client: The Angmering Community Land Trust	**Job No:** J13227	**Test Date:** 24/Jul/2017	
Site: Mayflower Way, Angmering	**Tested By:** AA	**Engineer:** DK	**Fig. S1**

Southern Testing [redacted] ST Consult

BRE Digest 365 Soakage Test

Test Hole No: TP101
Test No: Test No 2 (Repeated)



Pit Length, m	2.000	Depth to Water at Start of Test, *m*	1.300
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	1.810
Depth to Pit Base, m	3.400	Total Soakage Test Time, *min*	57.0
Depth to Top of Permeable Soils, *m*	1.400	Mean Internal Discharge Area, m^2	6.045
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	17.208
Depth to Top of Granular Fill, *m*	1.500	Soakage Rate, *litre/m^2/min*	**2.85**
Voids Assumed for Granular Fill, %	40%	BRE Soil Infiltration Rate, *m/sec*	**4.74E-05**

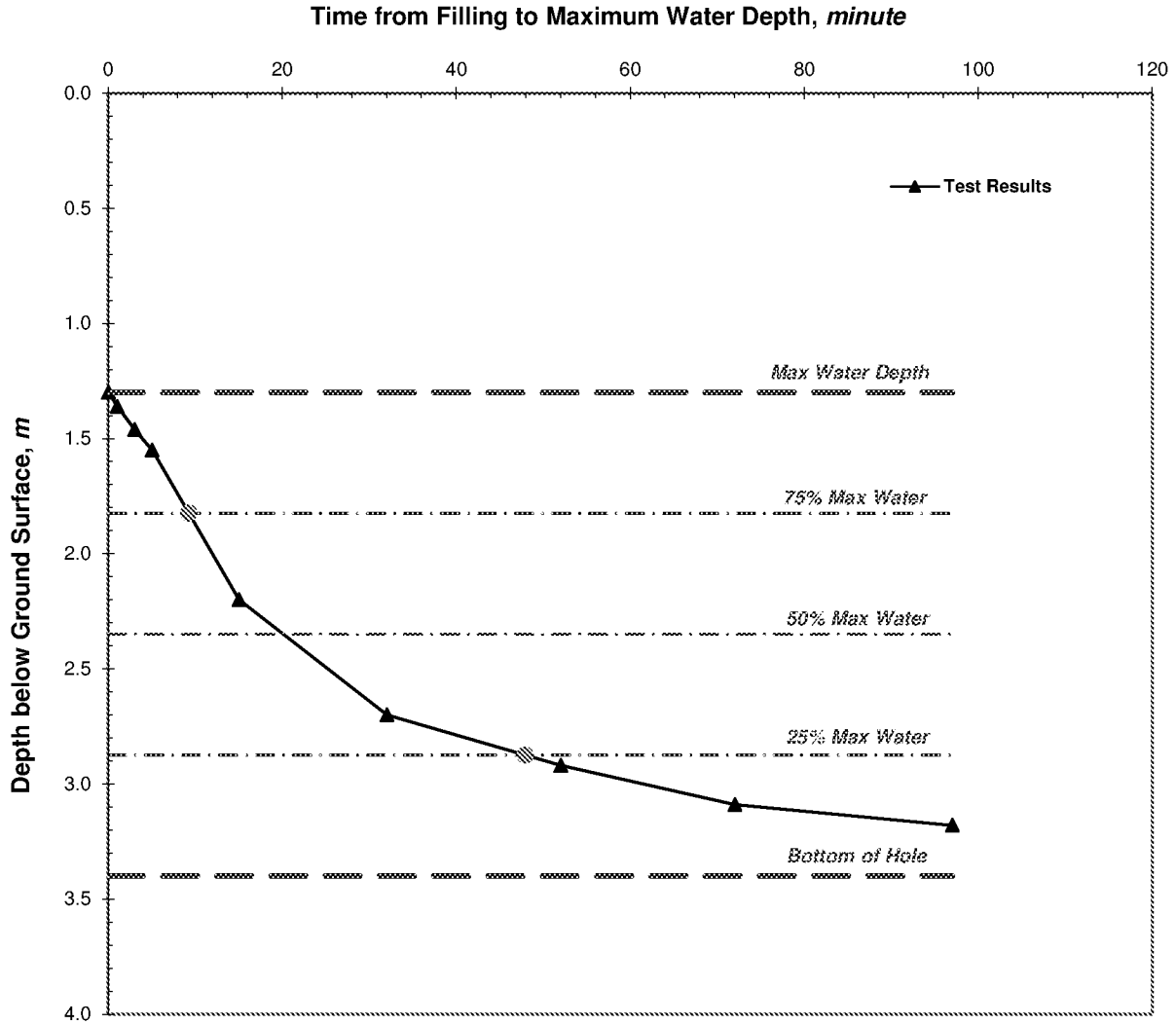
Comments: *1400l used*
Pit was nearly emptied at finish of test.

Client: The Angmering Community Land Trust	**Job No:** J13227	**Test Date:** 24/Jul/2017	
Site: Mayflower Way, Angmering	**Tested By:** AA	**Engineer:** DK	**Fig. S2**

Southern Testing [redacted] ST Consult

BRE Digest 365 Soakage Test

Test Hole No: TP101
Test No: Test No 3 (Repeated)



Pit Length, m	2.000	Depth to Water at Start of Test, *m*	1.300
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	1.880
Depth to Pit Base, m	3.400	Total Soakage Test Time, *min*	97.0
Depth to Top of Permeable Soils, *m*	1.400	Mean Internal Discharge Area, m^2	6.045
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	9.773
Depth to Top of Granular Fill, *m*	1.500	Soakage Rate, *litre/m^2/min*	**1.62**
Voids Assumed for Granular Fill, %	40%	BRE Soil Infiltration Rate, *m/sec*	**2.69E-05**

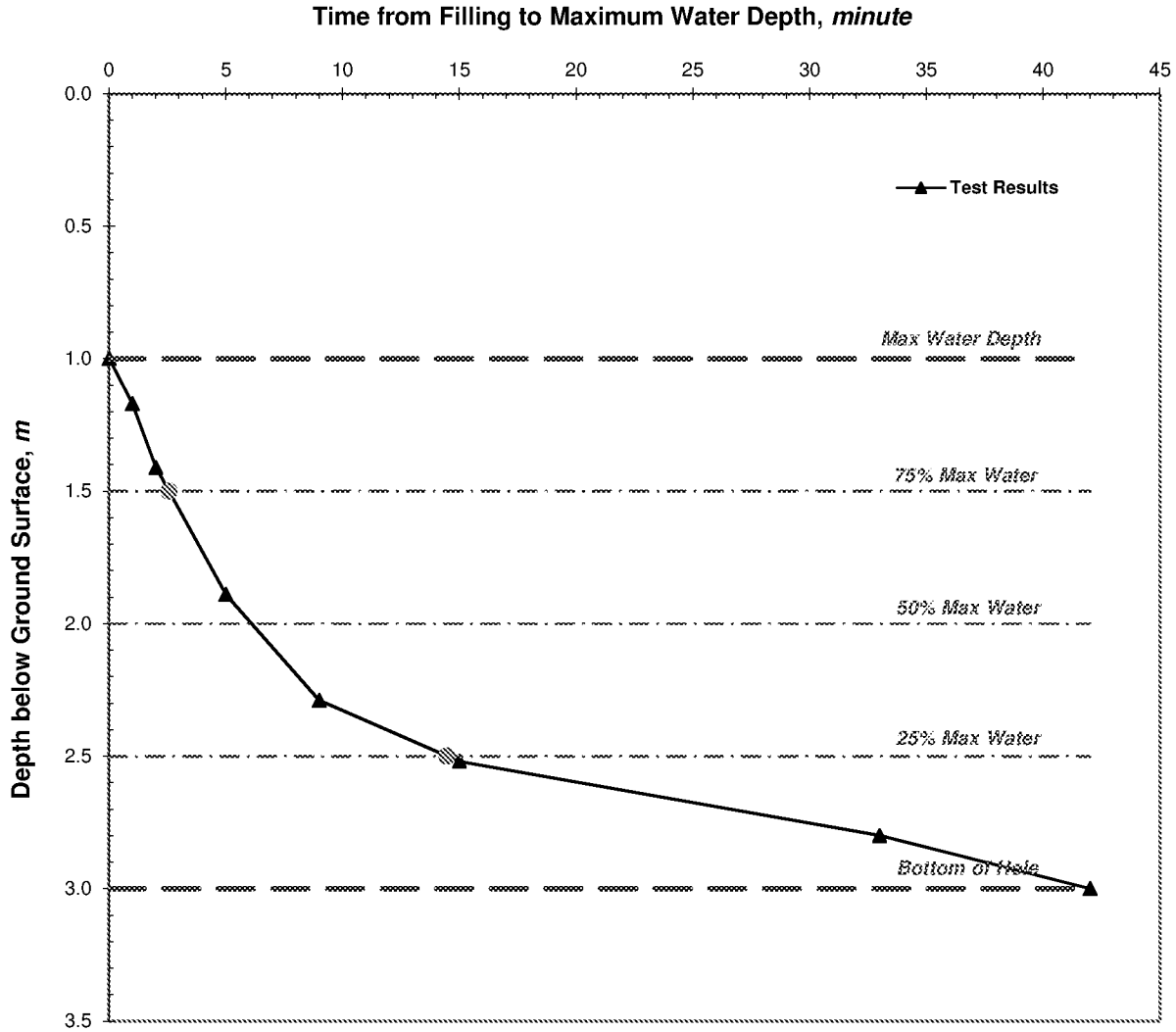
Comments: *1400l used*
Pit was nearly emptied at finish of test.

Client: The Angmering Community Land Trust	**Job No:** J13227	**Test Date:** 24/Jul/2017	
Site: Mayflower Way, Angmering	**Tested By:** AA	**Engineer:** DK	**Fig. S3**

Southern Testing [redacted] ST Consult

BRE Digest 365 Soakage Test

Test Hole No: TP106
Test No: Test No 1 (Initial)



Pit Length, m	2.000	Depth to Water at Start of Test, *m*	1.000
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	2.000
Depth to Pit Base, m	3.000	Total Soakage Test Time, *min*	42.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	5.800
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	30.212
Depth to Top of Granular Fill, *m*	1.100	Soakage Rate, *litre/m^2/min*	**5.21**
Voids Assumed for Granular Fill, %	40%	BRE Soil Infiltration Rate, *m/sec*	**8.68E-05**

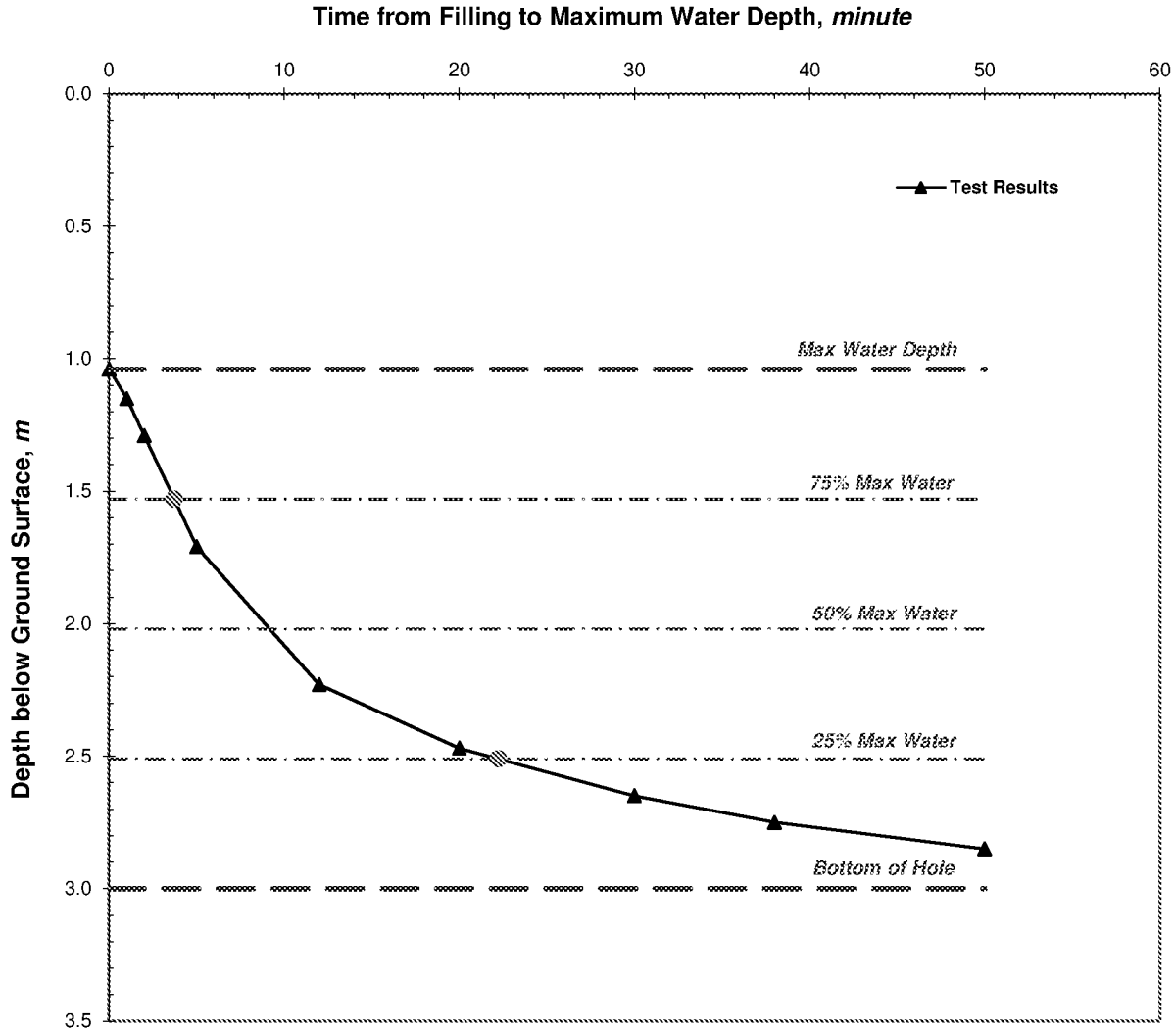
Comments: *1200l used*
Pit was emptied at finish of test.

Client: The Angmering Community Land Trust	**Job No:** J13227	**Test Date:** 24/Jul/2017	
Site: Mayflower Way, Angmering	**Tested By:** AA	**Engineer:** DK	**Fig. S4**

Southern Testing [redacted] ST Consult

BRE Digest 365 Soakage Test

Test Hole No: TP106
Test No: Test No 2 (Repeated)



Pit Length, m	2.000	Depth to Water at Start of Test, *m*	1.040
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	1.810
Depth to Pit Base, m	3.000	Total Soakage Test Time, *min*	50.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	5.702
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	19.062
Depth to Top of Granular Fill, *m*	1.100	Soakage Rate, *litre/m^2/min*	**3.34**
Voids Assumed for Granular Fill, %	40%	BRE Soil Infiltration Rate, *m/sec*	**5.57E-05**

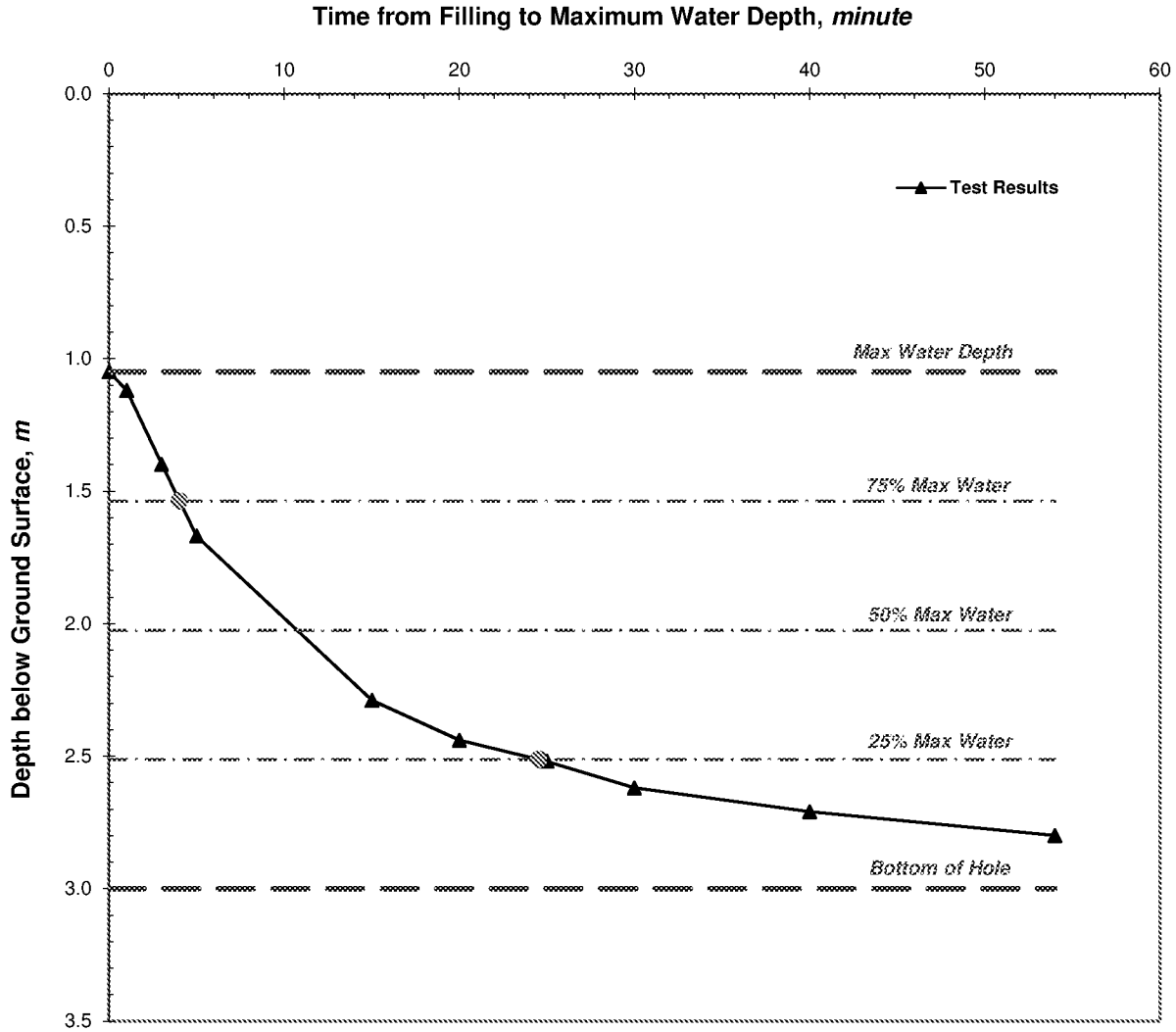
Comments: *1200l used*
Pit was nearly emptied at finish of test.

Client: The Angmering Community Land Trust	**Job No:** J13227	**Test Date:** 24/Jul/2017	
Site: Mayflower Way, Angmering	**Tested By:** AA	**Engineer:** DK	**Fig. S5**

Southern Testing [redacted] ST Consult

BRE Digest 365 Soakage Test

Test Hole No: TP106
Test No: Test No 3 (Repeated)



Pit Length, m	2.000	Depth to Water at Start of Test, *m*	1.050
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	1.750
Depth to Pit Base, m	3.000	Total Soakage Test Time, *min*	54.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	5.678
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	17.111
Depth to Top of Granular Fill, *m*	1.100	Soakage Rate, $litre/m^2/min$	**3.01**
Voids Assumed for Granular Fill, %	40%	BRE Soil Infiltration Rate, *m/sec*	**5.02E-05**

Comments: *1200l used*
Pit was nearly emptied at finish of test.

Client: The Angmering Community Land Trust	**Job No:** J13227	**Test Date:** 24/Jul/2017	
Site: Mayflower Way, Angmering	**Tested By:** AA	**Engineer:** DK	**Fig. S6**

Southern Testing [redacted] ST Consult

Summary Sheet

Results of BRE Digest 365 Soakage Tests

Site :	Mayflower Way, Angmering	**Job No :**	J13227
Client :	The Angmering Community Land Trust	**O S Reference :**	TQ 07262 03274
Tested By :	AA	**Engineer:** DK	**Test Date :** 24/07/2017

Hole No	Test No	Hole Depth *m*	Soakage Rate for Each Test *litre/m²/min*	Soakage Rate for Each Hole *litre/m²/min*	Soakage Rate for Each Hole *m/sec*	Water Level at Finish of Test	Remarks
TP101	No 1	3.40	4.14	1.62	2.69E-5	Nearly empty pit.	1550l used Depth to top of permeable soils was 1.4m.
TP101	No 2	3.40	2.85			Nearly empty pit.	1400l used
TP101	No 3	3.40	1.62			Nearly empty pit.	1400l used
TP106	No 1	3.00	5.21	3.01	5.02E-5	Empty pit.	1200l used
TP106	No 2	3.00	3.34			Nearly empty pit.	1200l used
TP106	No 3	3.00	3.01			Nearly empty pit.	1200l used
Mean Value of All Calculated Soakage Rates :				**2.32** *litre/m²/min*	**3.86E-5** *m/sec*		

Southern Testing [redacted] ST Consult

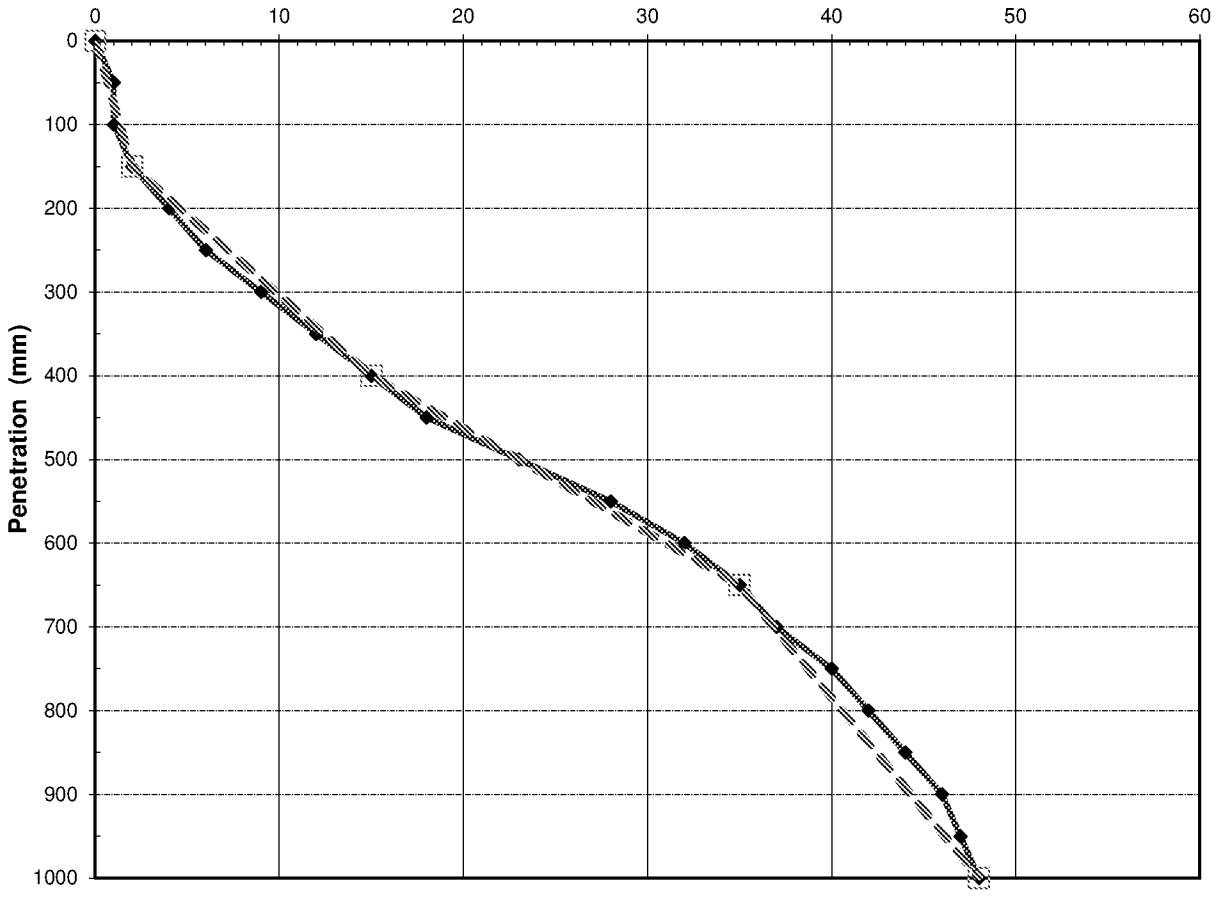
Dynamic Cone Penetrometer (DCP) Test Results

Test No: DCP1

Chainage:
Start Layer: GL
Soil Condition:
Notes:

Tested By: N H
Checked By: DK
Test Date: 24-Jul-17

Perth Cone CBR Penetration *vs* Cumulative Blow Count



Evaluated CBR Values from DCP Test Results

Layer No	From (mm)	To (mm)	Depth (mm)	Blow Count	No. of Blows	DCP mm/blow	CBR %	Soil Type	Remarks
1	0	150	150	2	2	75.0	1.7		
2	150	400	250	15	13	19.2	9.7		
3	400	650	250	35	20	12.5	17		
4	650	1000	350	48	13	26.9	6.3		

Client:	**The Howse Wallis Partnership**	**Job No:**	J13227	
Site:	**Mayflower Way, Angmering**	**Date:**	09/08/2017	**Fig.**

ARUN DISTRICT COUNCIL ACTIVITY

Southern Testing [redacted] ST Consult

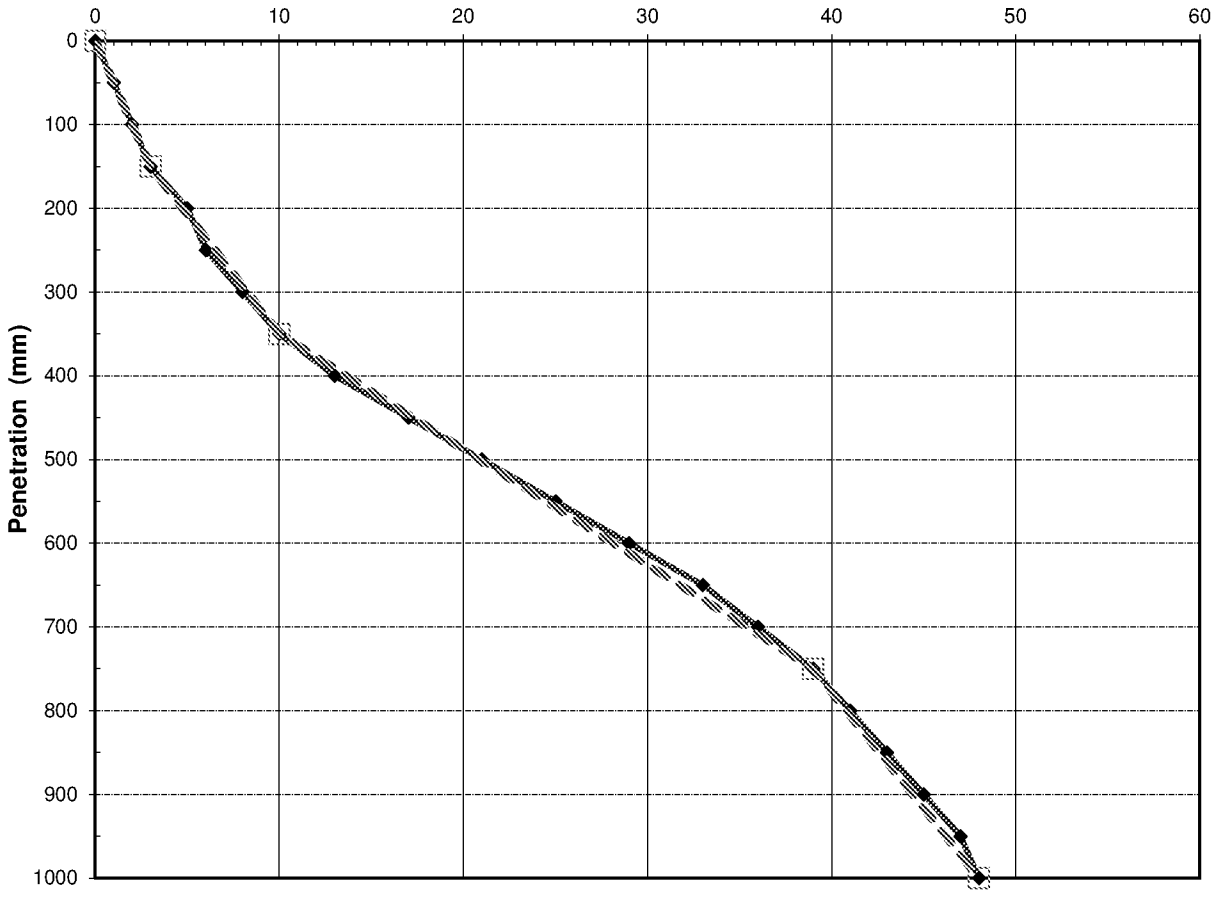
Dynamic Cone Penetrometer (DCP) Test Results

Test No: DCP2

Chainage:
Start Layer: GL
Soil Condition:
Notes:

Tested By: N H
Checked By: DK
Test Date: 24-Jul-17

Perth Cone CBR Penetration *vs* Cumulative Blow Count



Evaluated CBR Values from DCP Test Results

Layer No	From (mm)	To (mm)	Depth (mm)	Blow Count	No. of Blows	DCP mm/blow	CBR %	Soil Type	Remarks
1	0	150	150	3	3	50.0	2.9		
2	150	350	200	10	7	28.6	5.9		
3	350	750	400	39	29	13.8	15		
4	750	1000	250	48	9	27.8	6.1		

Client:	**The Howse Wallis Partnership**	**Job No:**	J13227	
Site:	**Mayflower Way, Angmering**	**Date:**	09/08/2017	**Fig.**

ARUN DISTRICT COUNCIL

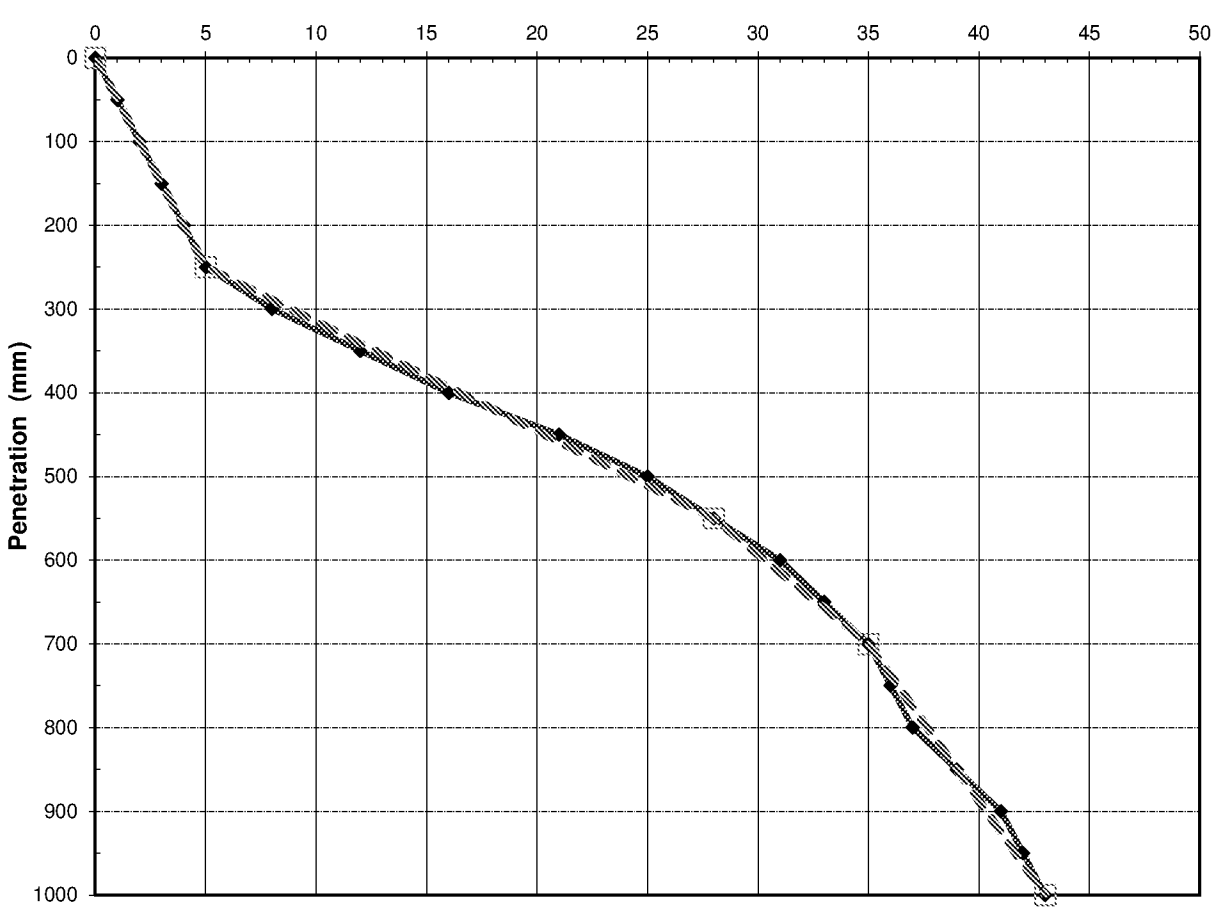
Southern Testing [redacted] ST Consult

Dynamic Cone Penetrometer (DCP) Test Results

Test No: DCP3

Chainage:		Tested By:	N H
Start Layer:	GL	Checked By:	DK
Soil Condition:		Test Date:	24-Jul-17
Notes:			

Perth Cone CBR Penetration *vs* Cumulative Blow Count



Evaluated CBR Values from DCP Test Results

Layer No	From (mm)	To (mm)	Depth (mm)	Blow Count	No. of Blows	DCP mm/blow	CBR %	Soil Type	Remarks
1	0	250	250	5	5	50.0	2.9		
2	250	550	300	28	23	13.0	16		
3	550	700	150	35	7	21.4	8.5		
4	700	1000	300	43	8	37.5	4.1		

Client:	**The Howse Wallis Partnership**	**Job No:**	J13227	
Site:	**Mayflower Way, Angmering**	**Date:**	09/08/2017	**Fig.**

ARUN DISTRICT COUNCIL ACTIVITY

Southern Testing [redacted] ST Consult

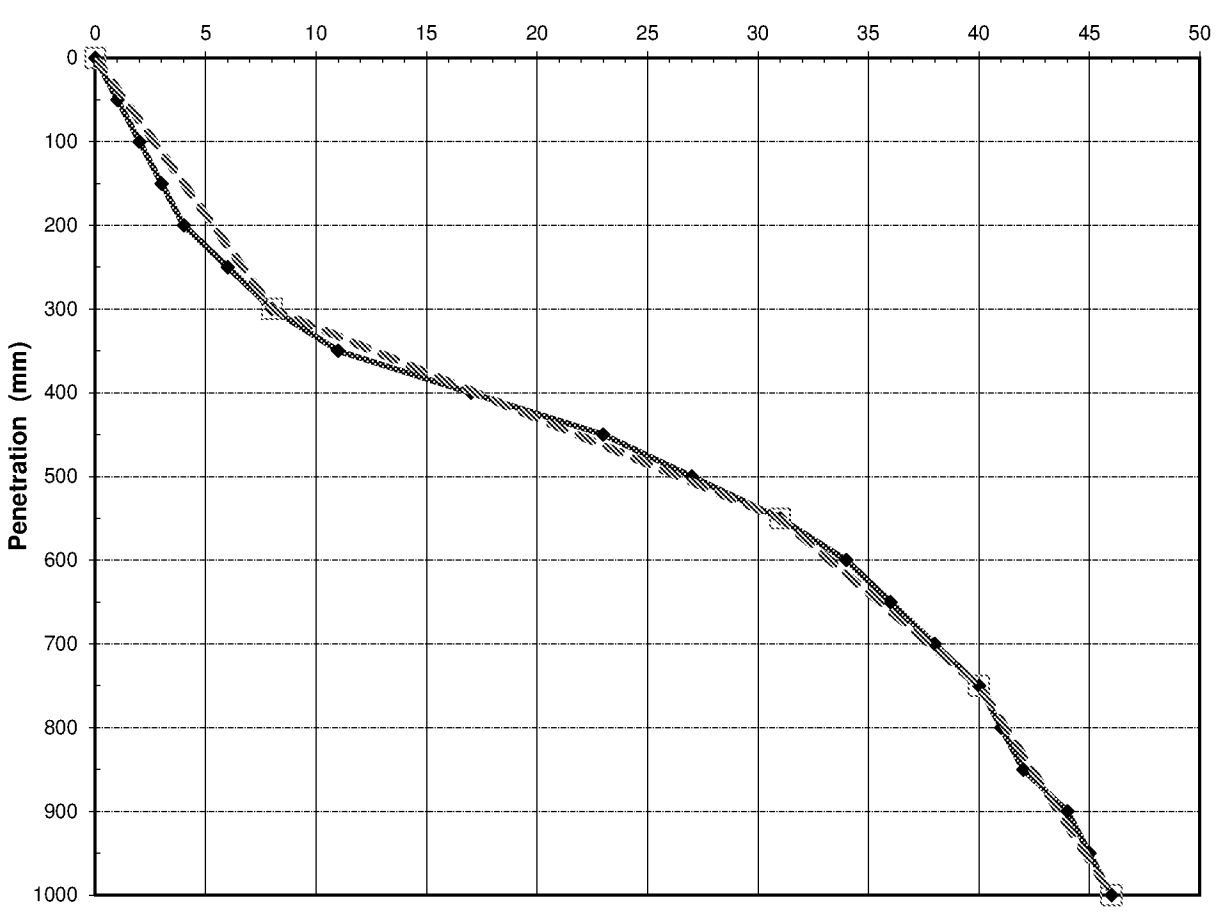
Dynamic Cone Penetrometer (DCP) Test Results

Test No: DCP4

Chainage:
Start Layer: GL
Soil Condition:
Notes:

Tested By: N H
Checked By: DK
Test Date: 24-Jul-17

Perth Cone CBR Penetration *vs* Cumulative Blow Count



Evaluated CBR Values from DCP Test Results

Layer No	From (mm)	To (mm)	Depth (mm)	Blow Count	No. of Blows	DCP mm/blow	CBR %	Soil Type	Remarks
1	0	300	300	8	8	37.5	4.1		
2	300	550	250	31	23	10.9	20		
3	550	750	200	40	9	22.2	8.1		
4	750	1000	250	46	6	41.7	3.6		

Client:	**The Howse Wallis Partnership**	**Job No:**	J13227	
Site:	**Mayflower Way, Angmering**	**Date:**	09/08/2017	**Fig.**

ARUN DISTRICT COUNCIL

Southern Testing [redacted] ST Consult

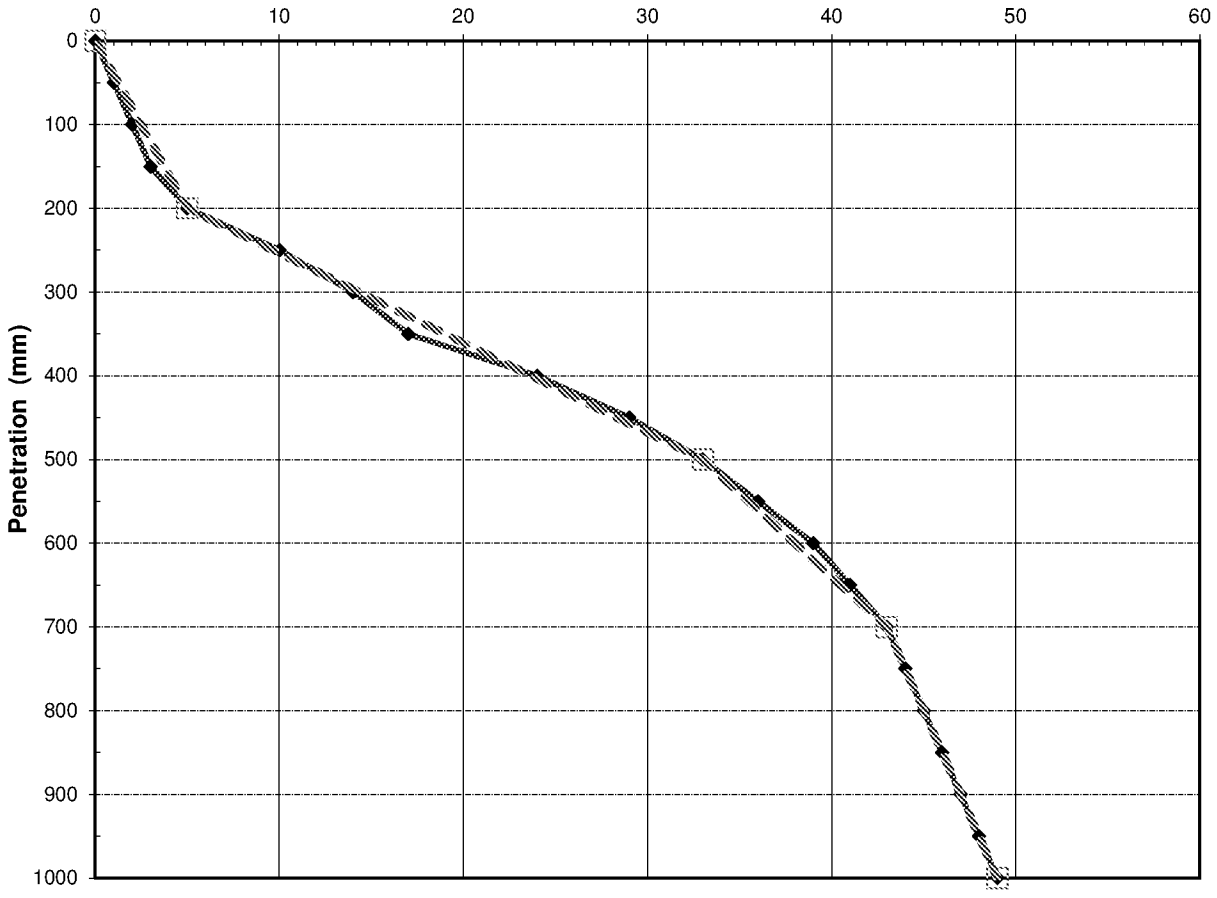
Dynamic Cone Penetrometer (DCP) Test Results

Test No: DCP5

Chainage:
Start Layer: GL
Soil Condition:
Notes:

Tested By: N H
Checked By: DK
Test Date: 24-Jul-17

Perth Cone CBR Penetration *vs* Cumulative Blow Count



Evaluated CBR Values from DCP Test Results

Layer No	From (mm)	To (mm)	Depth (mm)	Blow Count	No. of Blows	DCP mm/blow	CBR %	Soil Type	Remarks
1	0	200	200	5	5	40.0	3.8		
2	200	500	300	33	28	10.7	21		
3	500	700	200	43	10	20.0	9.3		
4	700	1000	300	49	6	50.0	2.9		

Client:	**The Howse Wallis Partnership**	**Job No:**	J13227	
Site:	**Mayflower Way, Angmering**	**Date:**	09/08/2017	**Fig.**

ARUN DISTRICT COUNCIL ACTIVITY

Southern Testing [redacted] ST Consult

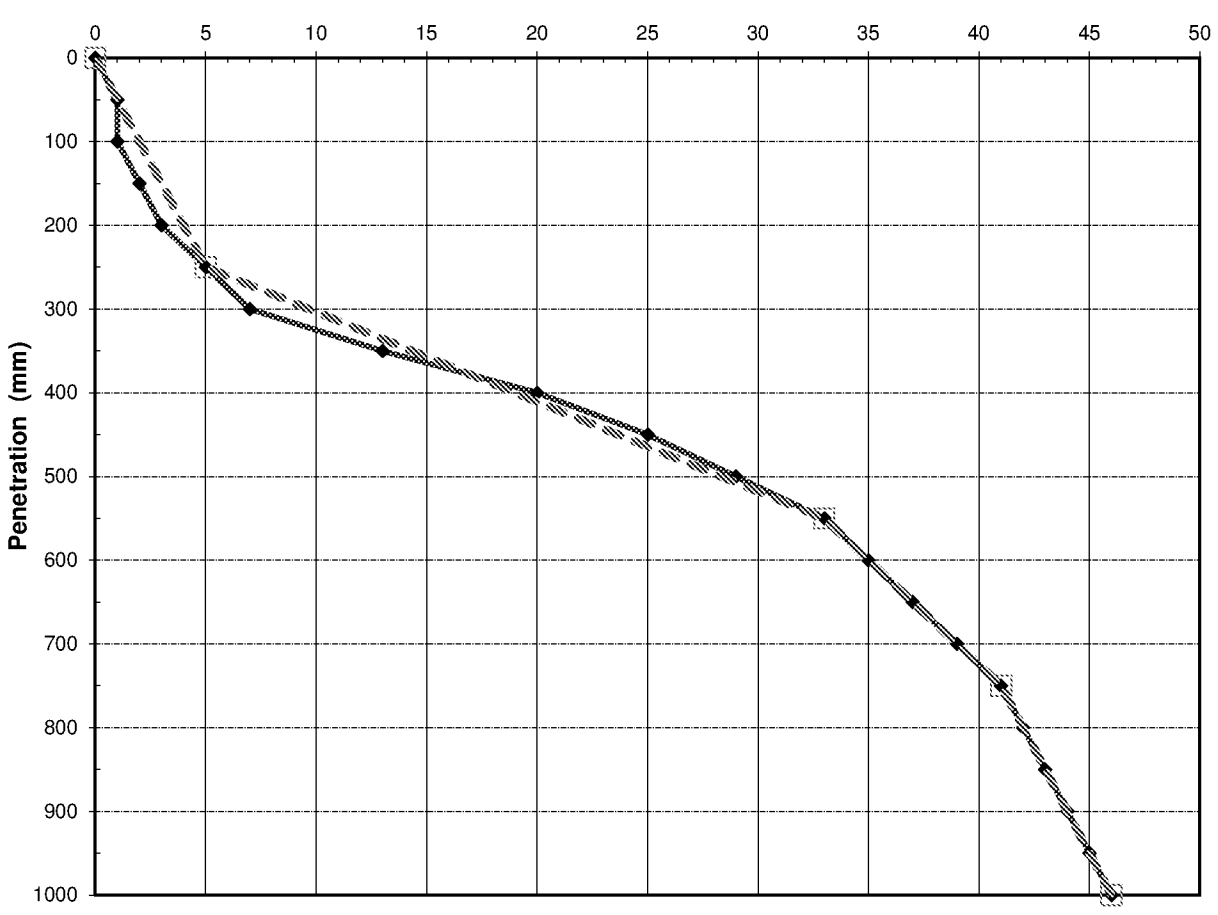
Dynamic Cone Penetrometer (DCP) Test Results

Test No: DCP6

Chainage:
Start Layer: GL
Soil Condition:
Notes:

Tested By: N H
Checked By: DK
Test Date: 24-Jul-17

Perth Cone CBR Penetration *vs* Cumulative Blow Count



Evaluated CBR Values from DCP Test Results

Layer No	From (mm)	To (mm)	Depth (mm)	Blow Count	No. of Blows	DCP mm/blow	CBR %	Soil Type	Remarks
1	0	250	250	5	5	50.0	2.9		
2	250	550	300	33	28	10.7	21		
3	550	750	200	41	8	25.0	7.0		
4	750	1000	250	46	5	50.0	2.9		

Client:	**The Howse Wallis Partnership**	**Job No:**	J13227	
Site:	**Mayflower Way, Angmering**	**Date:**	09/08/2017	**Fig.**

ARUN DISTRICT COUNCIL ACTIVITY

APPENDIX C

Geotechnical Laboratory Test References & Results

Southern Testing | ST Consult

Atterberg and Moisture Content Summary

To BS1377-2:1990(2003) cl.3.2, 3.3, 4.2, 4.3

Project Name	*Land south of Mayflower Way, Angmering*					**Project Number**		*J13227*	
Client	*Angmering Community Land Trust*			**PE**	*DK*	**Date Issued**		*07-Aug-17*	

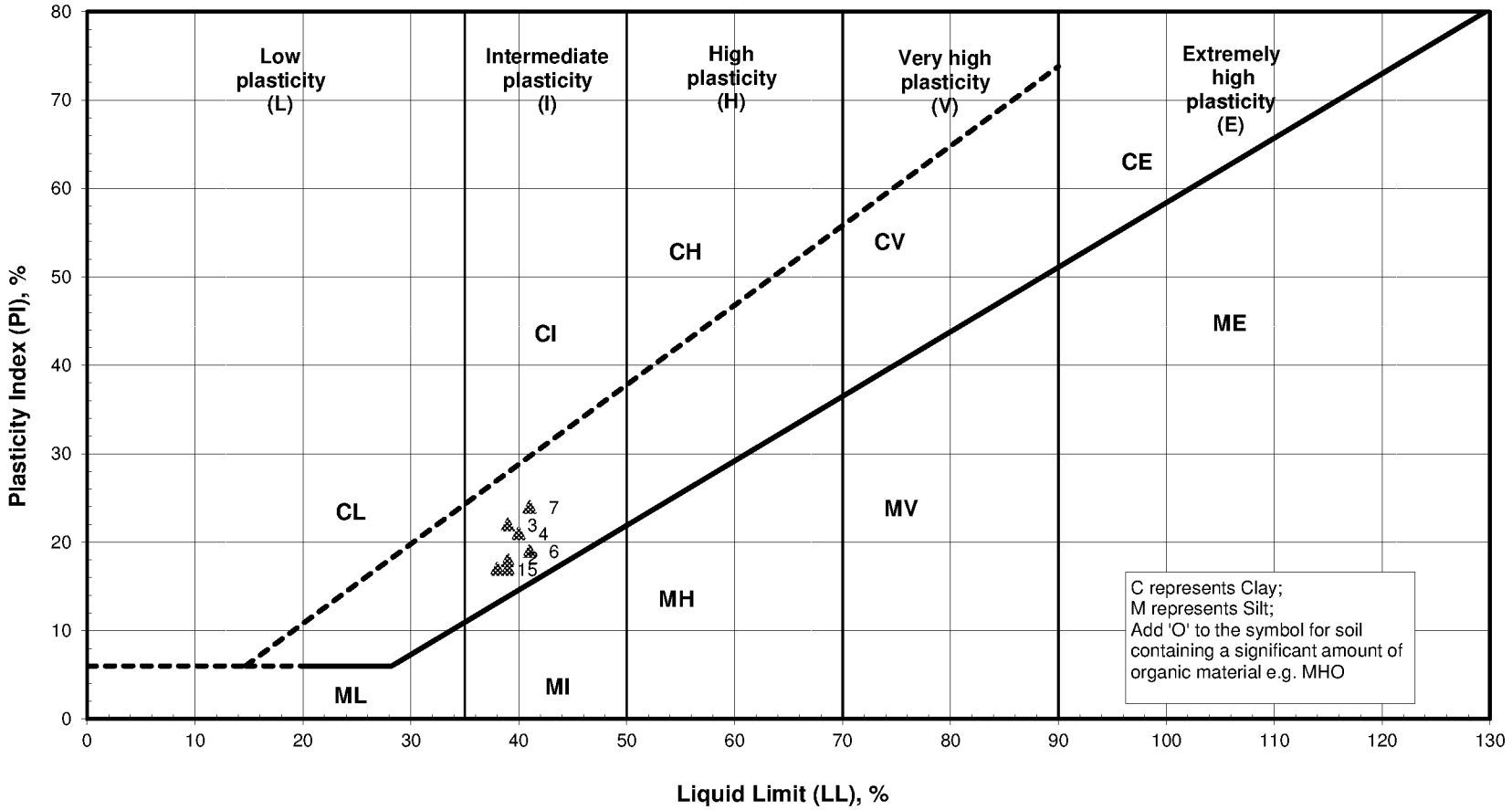
Location	Depth m	Sample Type	Visual Description	Comments	Natural MC %	Liquid Limit %	Plastic Limit %	Plasticity Index	Classi-fication	Passing 425 micron %
TP101	2.00	D	*Stiff light brown sandy CLAY.*		*22*	*38*	*21*	*17*	*CI*	*100*
TP102	1.00	D	*Stiff dark brown sandy CLAY.*		*20*	*39*	*21*	*18*	*CI*	*100*
TP103	2.00	D	*Stiff brown slightly sandy slightly gravelly CLAY. Gravel consists of fine and medium angular flint.*	*Sample passed through 425µm sieve*	*19*	*39*	*17*	*22*	*CI*	*76*
TP104	1.00	D	*Very stiff brown slightly sandy slightly gravelly CLAY. Gravel consists of fine and medium angular flint.*		*20*	*40*	*19*	*21*	*CI*	*99*
TP105	2.00	D	*Firm brown sandy slightly gravelly CLAY. Gravel consists of fine subangular flint.*		*21*	*39*	*22*	*17*	*CI*	*99*
TP106	1.00	D	*Stiff light brown sandy CLAY.*		*22*	*41*	*22*	*19*	*CI*	*100*
TP106	1.50	D	*Firm brown slightly sandy gravelly CLAY. Gravel consists of fine to coarse angular flint.*	*Sample passed through 425µm sieve*	*15*	*41*	*17*	*24*	*CI*	*43*

Plasticity Chart for Atterberg Limit Tests

Project Name	*Land south of Mayflower Way, Angmering*			**Project Number**	*J13227*
Client Name	*Angmering Community Land Trust*	**PE**	*DK*	**Date Issued**	*07-Aug-17*

Key

No.	TH No.	Depth
1	TP101	2.00
2	TP102	1.00
3	TP103	2.00
4	TP104	1.00
5	TP105	2.00
6	TP106	1.00
7	TP106	1.50



Liquid Limit		**Plastic Limit**		**Plasticity Index**	
Maximum Value	41	Maximum Value	22	Maximum Value	24
Minimum Value	38	Minimum Value	17	Minimum Value	17
Average Value	40	Average Value	20	Average Value	20

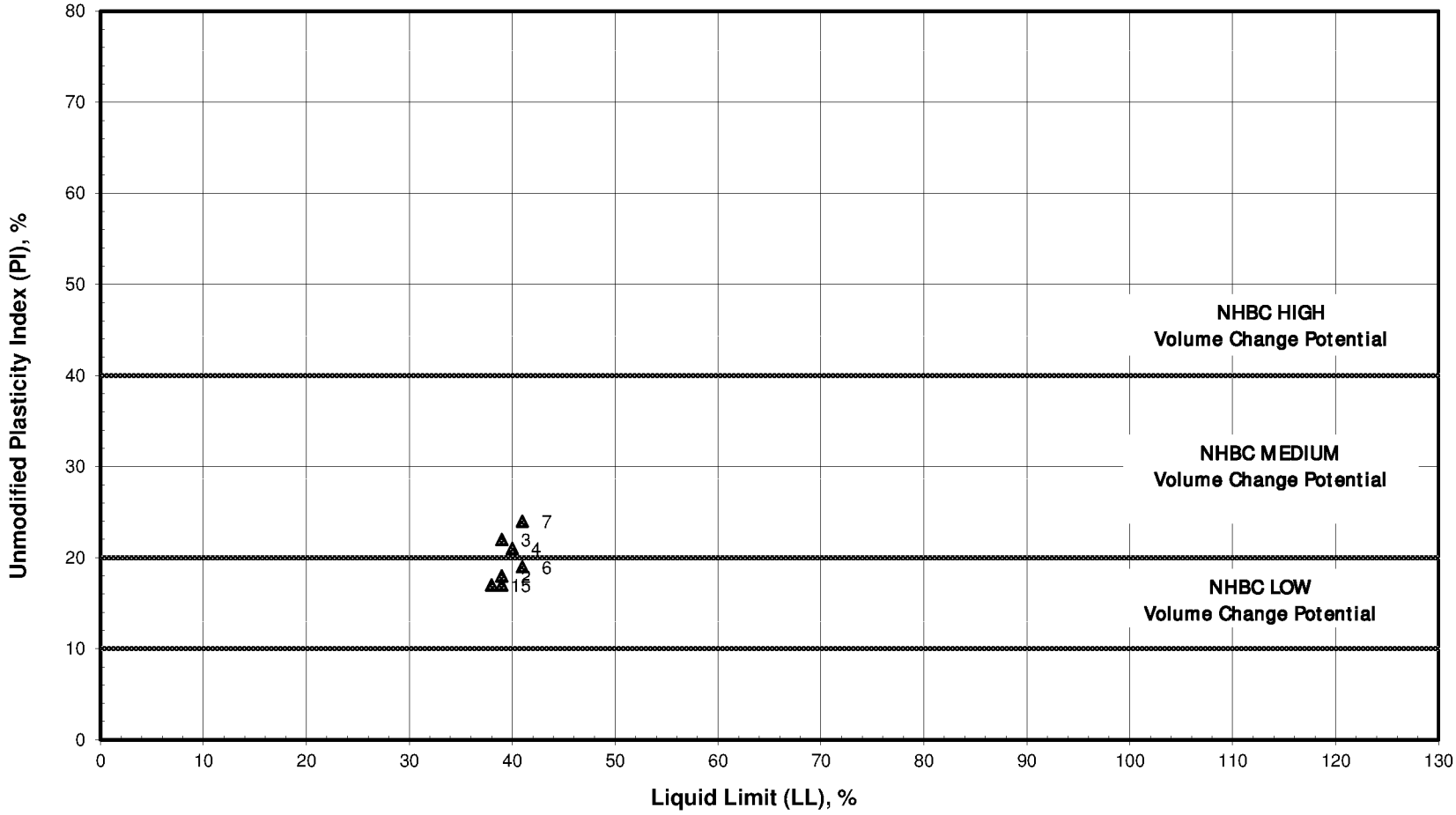
ARUN DISTRICT COUNCIL A/219/17/PL

NHBC Classification for Volume Change Potential

Project Name	*Land south of Mayflower Way, Angmering*			**Project Number**	*J13227*
Client Name	*Angmering Community Land Trust*	**PE**	*DK*	**Date Issued**	*07-Aug-17*

Key

No.	TH No.	Depth
1	TP101	2.00
2	TP102	1.00
3	TP103	2.00
4	TP104	1.00
5	TP105	2.00
6	TP106	1.00
7	TP106	1.50



Liquid Limit		**Plastic Limit**		**Unmodified Plasticity Index**	
Maximum Value	41	Maximum Value	22	Maximum Value	24
Minimum Value	38	Minimum Value	17	Minimum Value	17
Average Value	40	Average Value	20	Average Value	20

Southern Testing | ST Consult

PARTICLE SIZE DISTRIBUTION REPORT

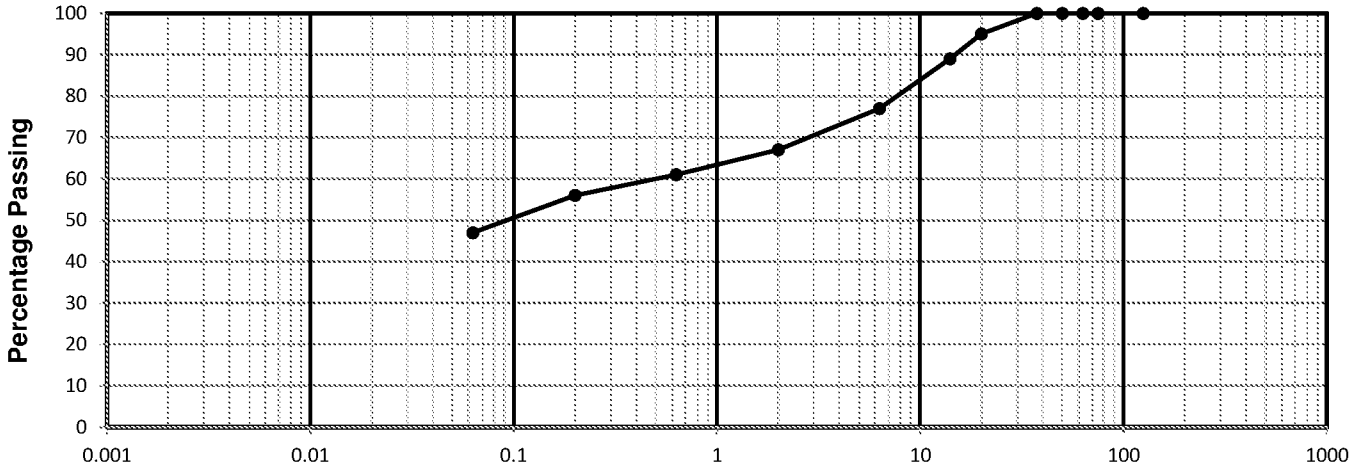
To BS1377-2:1990(2003) cl. 9.2-9.5

AGS

Project Name	*Land south of Mayflower Way, Angmering*			**Project Number**	***J13227***
Client Name	*Angmering Community Land Trust*	**PE**	*DK*	**Date Issued**	*07-Aug-17*

Particle Size	% Passing
125mm	100
75mm	100
63mm	100
50mm	100
37.5mm	100
20mm	95
14mm	89
6.3mm	77
2mm	67
630µm	61
200µm	56
63µm	47

Particle Size Distribution Chart



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			
	47			21			33			0

Visual Description of Sample:

Firm buff patched brown slightly sandy slightly gravelly CLAY. Gravel consists of fine to coarse angular and subangular flint.

Comments:

Particle Density (Assumed) Mg/m³	**N/A**
Coefficient of Uniformity	

Test Methods:

Wet & Dry Grading BS1377-2: 1990(2003) cl.9.2 & 9.3

Location	TP103
Depth (m)	3.00
Sample Type	D

Tested By	STL Lab
Checked By	Timon

ARUN DISTRICT COUNCIL A/219/17/PL

Southern Testing | ST Consult

CHEMICAL & ELECTROCHEMICAL TESTING SUMMARY

To BS1377-3:1990(2003) cl 5.6 & 9.5

AGS

Project Name	*Land south of Mayflower Way, Angmering*			Project Number	*J13227*
Client	*Angmering Community Land Trust*	PE	*DK*	Date Issued	*07-Aug-17*

TH No.	Depth m	Sample Type	Visual Description	Comments	Passing 2mm %	pH Value	Soil Sulphate 2:1 Water Extract		Groundwater Sulphate	
							g/l SO_3	BRE mg/l SO_4	g/l SO_3	BRE mg/l SO_4
TP101	1.50	D	*Stiff light brown slightly sandy slightly gravelly CLAY. Gravel consists of fine to coarse angular and subangular flint.*		*68*	*7.9*	*0.02*	*29*		
TP102	2.00	D	*Firm light brown slightly sandy slightly gravelly CLAY. Gravel consists of fine and medium angular and subangular flint.*		*85*	*8.1*	*0.02*	*29*		
TP104	2.00	D	*Stiff light brown sandy slightly gravelly CLAY. Gravel consists of fine and medium angular flint.*		*88*	*7.9*	*0.02*	*19*		
TP105	1.20	D	*Stiff dark brown sandy CLAY.*		*100*	*7.9*	*0.02*	*19*		

APPENDIX D

Contamination Laboratory Test Results

Table 1 - Tier 1 Screening Values

Contaminant	Units	Proposed Land Use					
		Residential with homegrown produce consumption	Residential without homegrown produce consumption	Open Space* (Residential)	Open Space* (Park)	Allotments	Commercial / Industrial
Arsenic (As) [2]	mg/kg	37	40	79	170	43	640
Cadmium (Cd) [2]	mg/kg	11	85	120	555	1.9	190
Trivalent Chromium (CrIII) [2]	mg/kg	910	910	1,500	33,000	18,000	8600
Hexavalent Chromium (CrVI) [2]	mg/kg	6	6	7.7	220	1.8	33
Lead (Pb) [3]	mg/kg	200	310	630	1300	80	2330
Mercury (Hg) [1,2,7]	mg/kg	7.6-11	9.2-15	40	68-71	6.0	29-320
Selenium (Se) [2]	mg/kg	250	430	1,100	1,800	88	12,000
Nickel (Ni) [2,4]	mg/kg	130	180	230	800	53	980
Copper (Cu) [2,4]	mg/kg	2,400	7,100	12,000	44,000	520	68,000
Zinc (Zn) [2,4]	mg/kg	3,700	40,000	81,000	170,000	620	730,000
Phenol [1,2]	mg/kg	120-380	440-1200	440-1300	440-1300	23-83	440-1300
Benzo[a]pyrene [1,5]	mg/kg	1.7-2.4	2.6	4.9	10	0.67-2.7	36
Naphthalene [1,2]	mg/kg	2.3-13	2.3-13	77-430^{+}	77-430^{+}	4.1-24	77-430^{+}
Total Cyanide (CN) [6]	mg/kg	/	/	/	/	/	/
Free Cyanide [6]	mg/kg	/	/	/	/	/	/
Complex Cyanides [6]	mg/kg	/	/	/	/	/	/
Thiocyanate [6]	mg/kg	/	/	/	/	/	/

Notes:

* Open Space levels calculated on the basis of the exposure modelling developed in the C4SL research.

+ Screening values constrained to saturation limit. Higher values may be acceptable on a site specific basis.

[1] Where ranges of values are given for organic contaminants the screening value is dependant on the Soil $^{+}$Organic Matter.

[2] LQM/CIEH S4UL (2014). Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4UL 3116. All rights reserved.

[3] C4SL (DEFRA 2014).

[4] Copper, Zinc and Nickel may have phototoxic effects at the given concentrations. Alternative criteria should be adopted for importation of Topsoil or other soils for cultivation. BS3882:2015 and BS8601:2013 suggest values of 200 to 300mg/kg for Zn, 100 to 200mg/kg for Cu, and 60 to 110mg/kg for Ni, for topsoil and subsoil, depending on pH.

[5] Based on the Surrogate Marker approach and modelled using the modified exposure parameters of C4SL but retaining 'minimal risk' HCV.

[6] Screening criteria derived on a site specific basis if test results indicate.

[7] S4UL for Methyl Mercury, higher concentrations may be tolerable if inorganic mercury is the only species present. Lower concentrations apply for elemental Mercury.

These screening values are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

[redacted]

[redacted]

Analytical Report Number : 17-55680

Replaces Analytical Report Number : 17-55680, issue no. 1

Project / Site name:	Land South of Mayflower Way, Angmering	**Samples received on:**	27/07/2017
Your job number:	J13227	**Samples instructed on:**	27/07/2017
Your order number:	J13227-1	**Analysis completed by:**	10/08/2017
Report Issue Number:	2	**Report issued on:**	10/08/2017
Samples Analysed:	9 soil samples		

Signed: [redacted]

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 17-55680

Project / Site name: Land South of Mayflower Way, Angmering
Your Order No: J13227-1

Lab Sample Number				790201	790202	790203	790204	790205
Sample Reference				TP101	TP101	TP102	TP103	TP103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.15	1.00	0.15	0.10	0.30
Date Sampled				24/07/2017	24/07/2017	24/07/2017	24/07/2017	24/07/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	18	14	17	16	7.7
Total mass of sample received	kg	0.001	NONE	0.49	0.48	0.45	0.43	0.41
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	-	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	< 0.001	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	< 0.001	-	-	< 0.001
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.6	7.8	7.4	-	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	-	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.017	0.047	0.0076	-	0.0053
Sulphide	mg/kg	1	MCERTS	1.2	7.7	< 1.0	-	< 1.0
Organic Matter	%	0.1	MCERTS	4.6	3.3	4.5	-	2.4
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.18	0.21	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.79	0.67	0.54	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.28	0.37	0.17	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	2.3	2.9	1.6	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	2.2	2.8	1.6	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.2	1.9	0.87	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.2	1.6	0.78	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.2	1.9	0.97	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	1.8	0.55	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.2	2.1	0.79	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.90	1.4	0.59	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.25	0.41	0.13	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.96	1.5	0.63	-	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	13.7	19.5	9.18	-	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.9	9.3	6.7	-	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	0.4	0.3	-	0.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	-	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	24	24	-	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	22	16	-	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120	130	53	-	43
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	15	14	-	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.1	< 1.0	1.4	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	87	140	63	-	57
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	-	-	Absent	Absent	-
Organochlorine Pesticides (OCP)								
DDD	mg/kg	0.01	NONE	-	-	-	-	-
DDE	mg/kg	0.01	NONE	-	-	-	-	-

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Analytical Report Number: 17-55680

Project / Site name: Land South of Mayflower Way, Angmering
Your Order No: J13227-1

Lab Sample Number				790206	790207	790208	790209	
Sample Reference				TP104	TP104	TP105	TP106	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.15	0.60	0.40	0.15	
Date Sampled				24/07/2017	24/07/2017	24/07/2017	24/07/2017	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	12	15	10	18	
Total mass of sample received	kg	0.001	NONE	0.45	0.46	0.42	0.43	
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	Not-detected	Not-detected	
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	7.6	7.6	6.6	
Total Cyanide	mg/kg	1	MCERTS	-	< 1	< 1	< 1	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.016	0.011	0.022	
Sulphide	mg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	
Organic Matter	%	0.1	MCERTS	-	4.4	4.3	4.5	
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	0.22	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	0.14	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	1.9	0.32	
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	0.61	0.09	
Fluoranthene	mg/kg	0.05	MCERTS	-	0.31	4.9	0.69	
Pyrene	mg/kg	0.05	MCERTS	-	0.28	4.4	0.63	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.19	2.3	0.33	
Chrysene	mg/kg	0.05	MCERTS	-	0.20	2.1	0.33	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	0.22	2.5	0.31	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	0.11	1.1	0.30	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	0.18	1.8	0.29	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.16	1.3	0.23	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	0.33	< 0.05	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.20	1.2	0.25	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	1.85	24.6	3.77	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	17	9.3	11	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	0.6	0.4	0.6	
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	< 4.0	< 4.0	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	29	22	26	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	28	25	21	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	79	77	67	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	< 0.3	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	17	14	14	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	150	180	150	
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	Present	-	-	-	
Organochlorine Pesticides (OCP)								
DDD	mg/kg	0.01	NONE	0.04	-	-	-	
DDE	mg/kg	0.01	NONE	0.14	-	-	-	

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Analytical Report Number: 17-55680
Project / Site name: Land South of Mayflower Way, Angmering
Your Order No: J13227-1

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
790202	TP101	1.00	142	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
790205	TP103	0.30	114	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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Analytical Report Number : 17-55680

Project / Site name: Land South of Mayflower Way, Angmering

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
790201	TP101	None Supplied	0.15	Light brown loam and clay with gravel and vegetation.
790202	TP101	None Supplied	1.00	Light brown clay and sand with gravel and vegetation.
790203	TP102	None Supplied	0.15	Light brown loam and clay with gravel and vegetation.
790204	TP103	None Supplied	0.10	Light brown loam and clay with gravel and vegetation.
790205	TP103	None Supplied	0.30	Light brown clay and sand with vegetation.
790206	TP104	None Supplied	0.15	Light brown loam and clay with gravel and vegetation.
790207	TP104	None Supplied	0.60	Brown loam and clay with gravel and vegetation.
790208	TP105	None Supplied	0.40	Brown loam and sand with gravel and vegetation.
790209	TP106	None Supplied	0.15	Brown loam and clay with gravel and vegetation.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 17-55680

Project / Site name: Land South of Mayflower Way, Angmering

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in ouse method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
Organochlorine pesticides in soil	Determination of organochlorine pesticides in soil by GC-MS	In-house method		W	NONE
Pesticides and Herbicides in soil screening	In-house method	In-house method		W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

APPENDIX E

Photographs



Entrance into site from Mayflower Way



BRE365 test in progress



View looking south east across the site



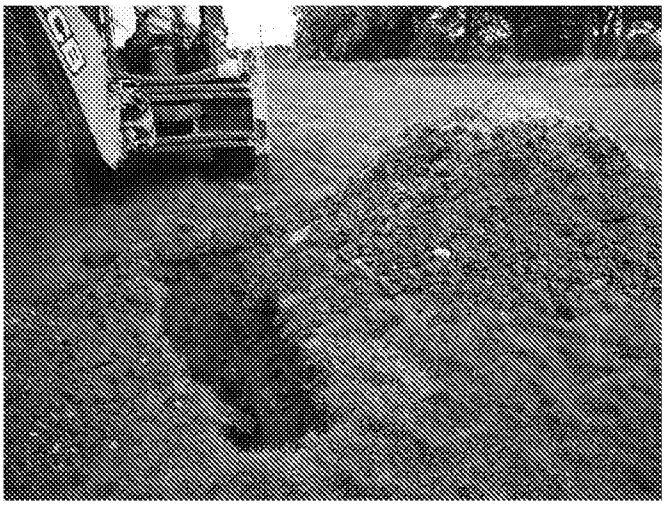
View looking north east along Mayflower Way



View looking north west along Mayflower Way



Land to the north of the site

	
TP101	TP101
	
TP102	TP102
	
TP105	TP105

APPENDIX F

Desk Study Results

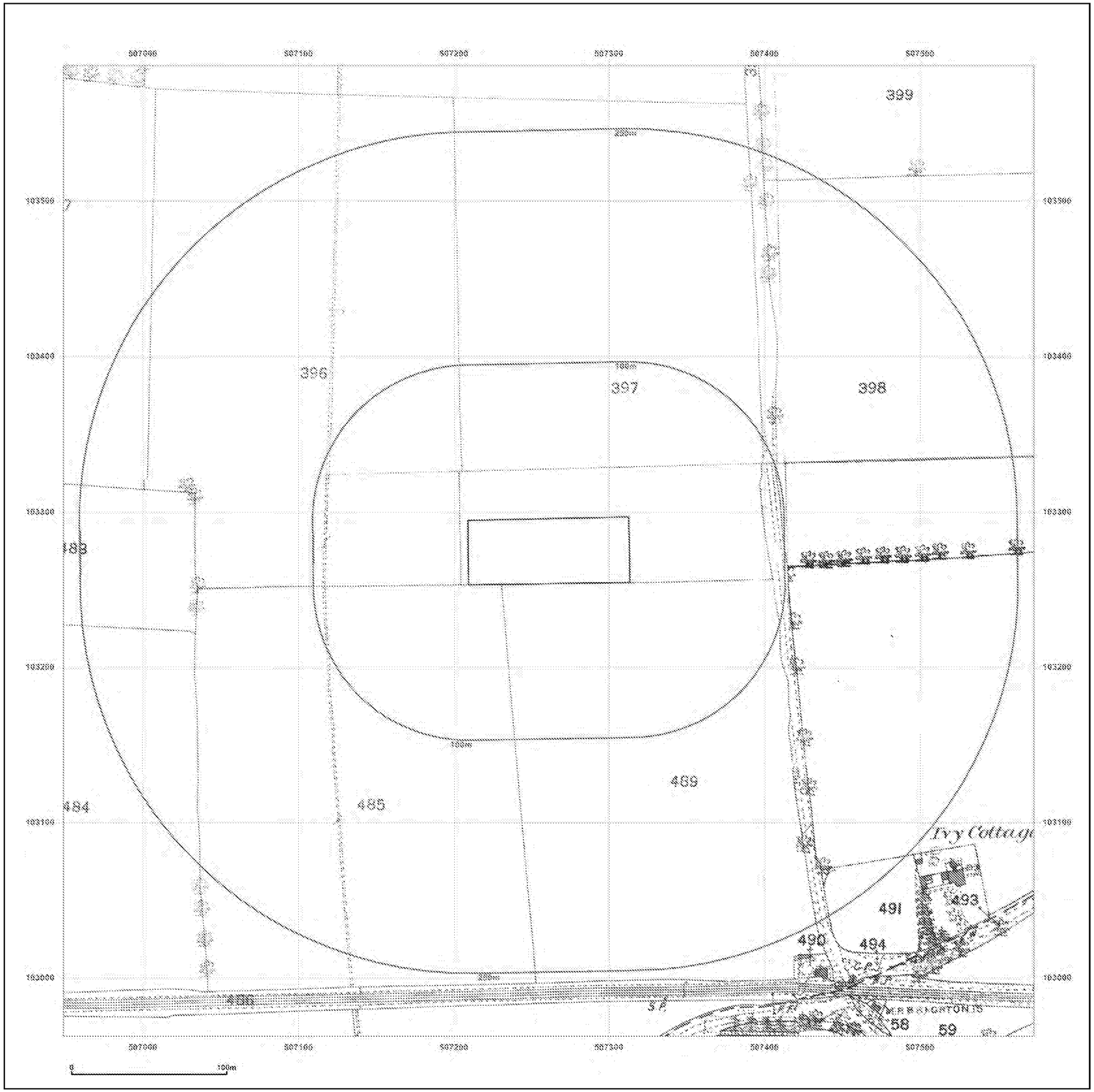
Historical Ordnance Survey Map Interpretation				
Map Date	Scale	Features on site	Features in surrounding area	Significant Potential Contamination Sources
1876	1:10,560	The site is situated in Agricultural Land, a field boundary passes north to south through site at its eastern end.	The surrounding area appears similar to the site itself, agricultural in nature. There is a railway line running east west to the south of the site 250m away.	None.
1878	1:2500	No apparent changes since 1876.	No apparent changes since 1876.	None.
1896	1:10,560	No apparent changes since 1878.	No apparent changes since 1878.	None.
1898	1:2500	No apparent changes since 1896.	No apparent changes since 1896.	None.
1910	1:10,560	No apparent changes since 1898.	No apparent changes since 1898	None.
1911	1:2500	No apparent changes since 1910.	Public path is shown 350m southwest form site going in a north to south General direction	None.
1932	1:2500	No apparent changes since 1911.	Between 100-200m to the east of the site, three houses have been built during 1911-1932. Beyond these houses, greenhouses have been built during this time frame.	None.
1943	1:2500	There are no apparent changes on the site itself, however an access road has be built bordering the north of the site.	Nurseries, comprising of multiple Greenhouses have been built to the immediate north west, about 90m to the south, about 200m to the north east, and about 250m to the south east. Tanks are shown within the nurseries to the northeast and south. A259 main road has been built 80 meters to the south of the site going east to west.	Storage Tanks.
1957	1:10,560	No apparent changes to the site itself.	Narrow driveway from Mayflower way on the west side of the site shown going in a North to South direction with a house built 10m West from the site and 40m East of the site.	Storage Tanks.
1970	1:1250	No apparent changes on the site itself.	A new nursery has been built to the immediate north of the site containing Green houses, other out buildings and ponds.	Storage Tanks.

Historical Ordnance Survey Map Interpretation				
Map Date	Scale	Features on site	Features in surrounding area	Significant Potential Contamination Sources
			Pet food packing station built to the south east around 25m away. Houses are shown to the south of the Roundstone bypass, replacing earlier greenhouses. Additional house built 40m East between 1957-1970	
1972	1:2500	No apparent changes on the site itself.	No apparent changes since 1970.	Storage Tanks.
1974	1:1250	The map is of poor quality, however, there are no apparent changes to the site itself	A new house built on the immediate eastern border of the site.	Storage Tanks.
1985	1:2500	No apparent changes on the site itself.		Storage Tanks.
1990	1:2500	No significant changes on the site itself.	Greenhouses about 250m to the north east have been removed.	Storage Tanks
1994	1:1250	No apparent changes on the site itself.	Earthworks surrounding a property northeast to the site. Green houses to the north and northwest are no longer shown on map.	Storage Tanks.
2001	Aerial Image	No apparent changes to the site itself. Hedgerow/Treeline shown on South, West, East and north Boundaries of the site. Clusters of trees/Hedge grows shown on the West of the site.	Ponds 10m to the northeast to the site have been filled in and developed into hard standings. About 75m to the northeast of the site, commercial building under construction. One green house about 230m north east from site redeveloped as commercial building.	Storage Tanks, Car Storage.
2002	1:10,000	No apparent changes to the site itself	Earthworks and a pond are shown to the immediate northwest of the site. School built between 1994 – 2002 about 300m northwest from the site.	Storage tanks, Car Storage.
2007	Aerial Image	Trees/Hedges on border appear to be trimmed and maintained, Trees/Hedges in field appear to have been removed between 2001-2007, leaving as cleared land.	New construction possibly associated with drainage/water supply are shown 50m to the west and 75m to the north west of the site.	Storage Tanks, Car Storage.

Historical Ordnance Survey Map Interpretation				
Map Date	Scale	Features on site	Features in surrounding area	Significant Potential Contamination Sources
2010	1:10000	No apparent changes to the site itself.	Much of the land beyond 250m to the north has been developed to housing.	Storage Tanks, Car Storage.
2012	Aerial Image	No apparent changes to site itself	No apparent changes to the surrounding site area within 500m. Area of broken earth on the North side of Mayflower way opposite site. A new large commercial/industrial building is shown about 250m to the east of the site in place of Greenhouses. Minor Earthworks appear to be done during 2007 – 2012 just south of the site boundary.	Storage Tanks, Car Storage.
2013	Aerial Image	No apparent changes to site itself	Area of broken earth on North side of Mayflower Way opposite to the site has increased in size in a Northwards direction.	Storage Tanks, Car Storage
2014	1:10,000	No apparent changes to the site itself.	No apparent changes to the surrounding site area within 500m.	Storage Tanks, Car Storage.
2015	Aerial Image	Worn grassed pathway shown through site from northwest boundary travelling in a southeast direction.	Earthen recreation facility built 1750m to the northwest of the site.	Storage Tanks, Car Storage.
2016	Aerial Image	No apparent changes to the site itself	Greenhouses and commercial buildings about 200m northeast to the site have been demolished and left as broken ground.	Storage tanks, Car storage.

NOTE: Additional maps at 1:10,560 and 1:10000 scale of similar age have been obtained. These maps are appended but do not provide much additional information.

ARUN DISTRICT COUNCIL A/219/17/PL



Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: County Series

Map date: **1876-1878**

Scale: 1:2,500

Printed at: 1:2,500

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

Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1878
Revised 1878
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

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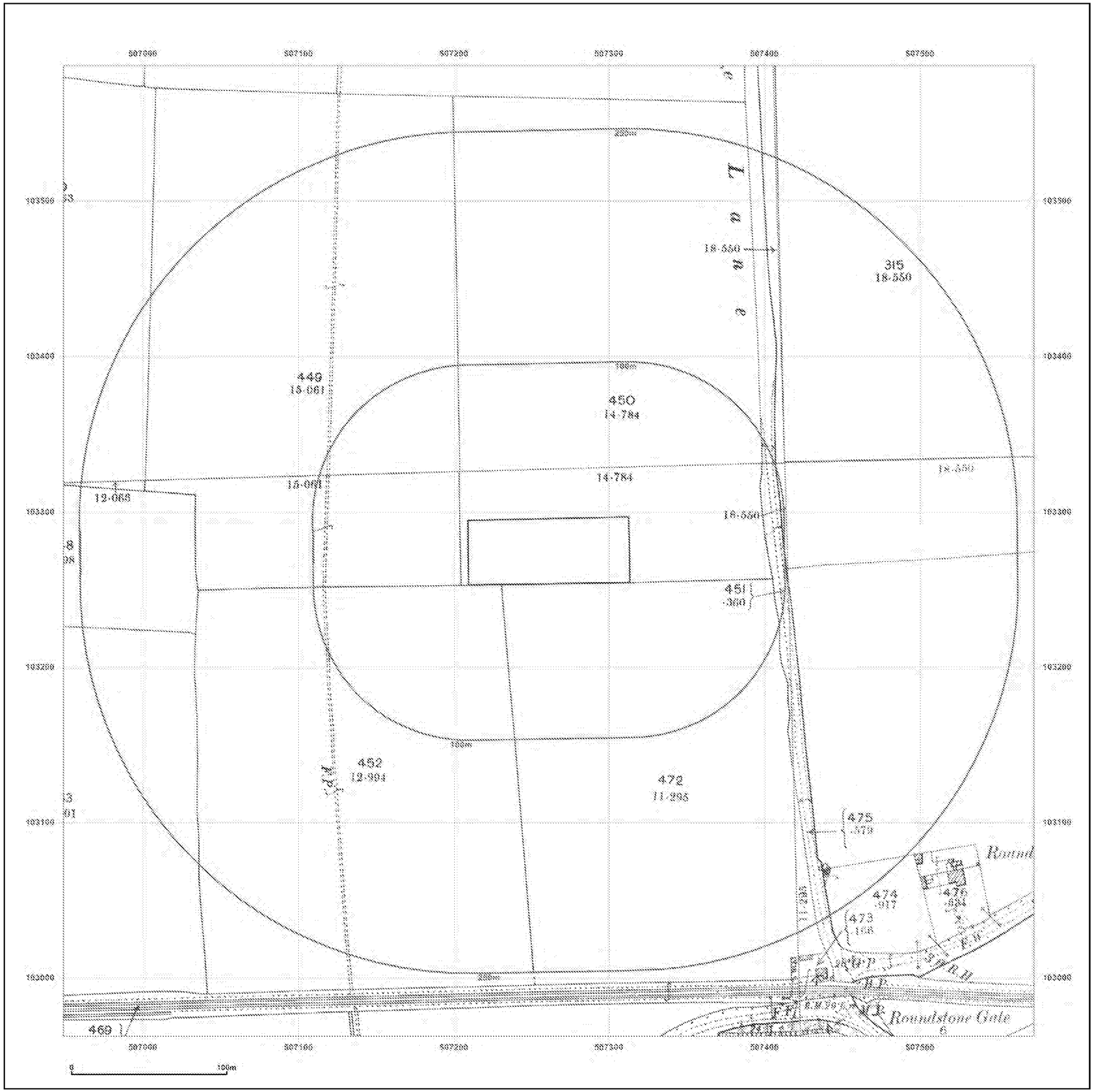
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Production date: 17 July 2017

To view map legend click here *Legend*

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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

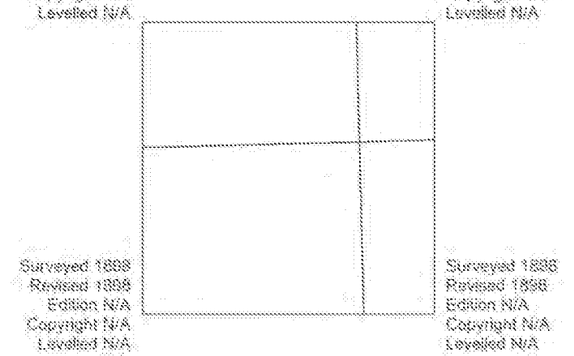
Map Name: County Series

Map date: **1897-1898**

Scale: 1:2,500

Printed at: 1:2,500

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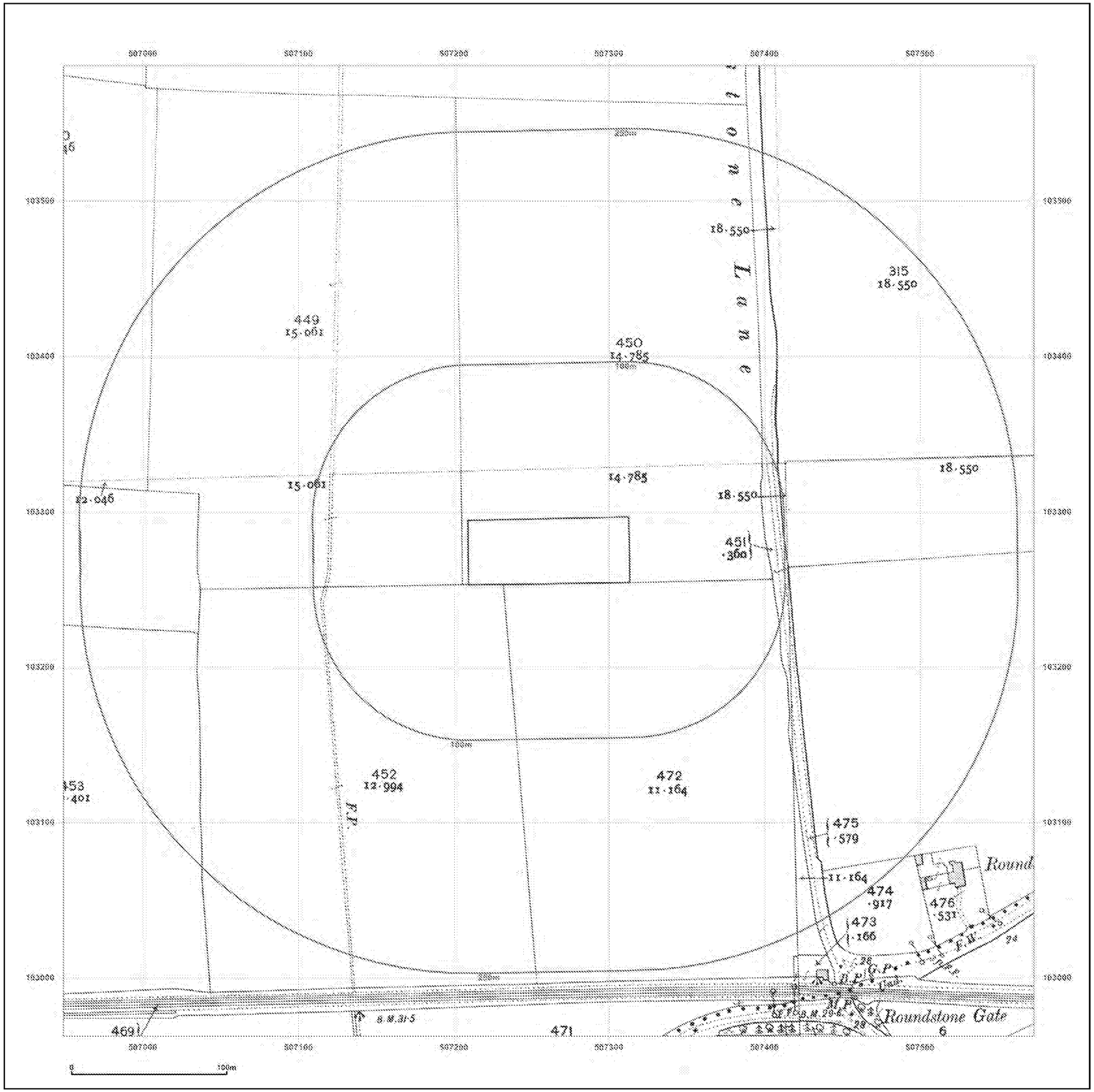
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Production date: 17 July 2017

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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

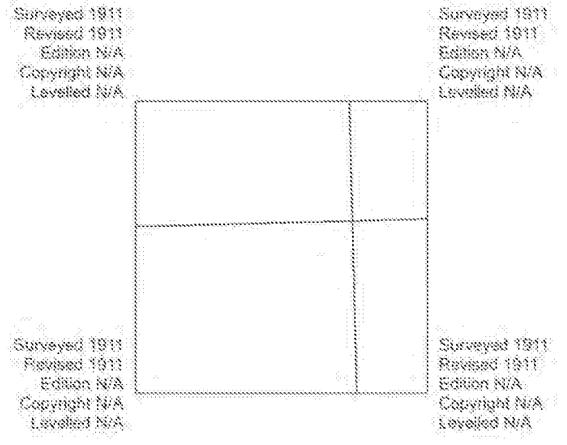
Map Name: County Series

Map date: 1911

Scale: 1:2,500

Printed at: 1:2,500

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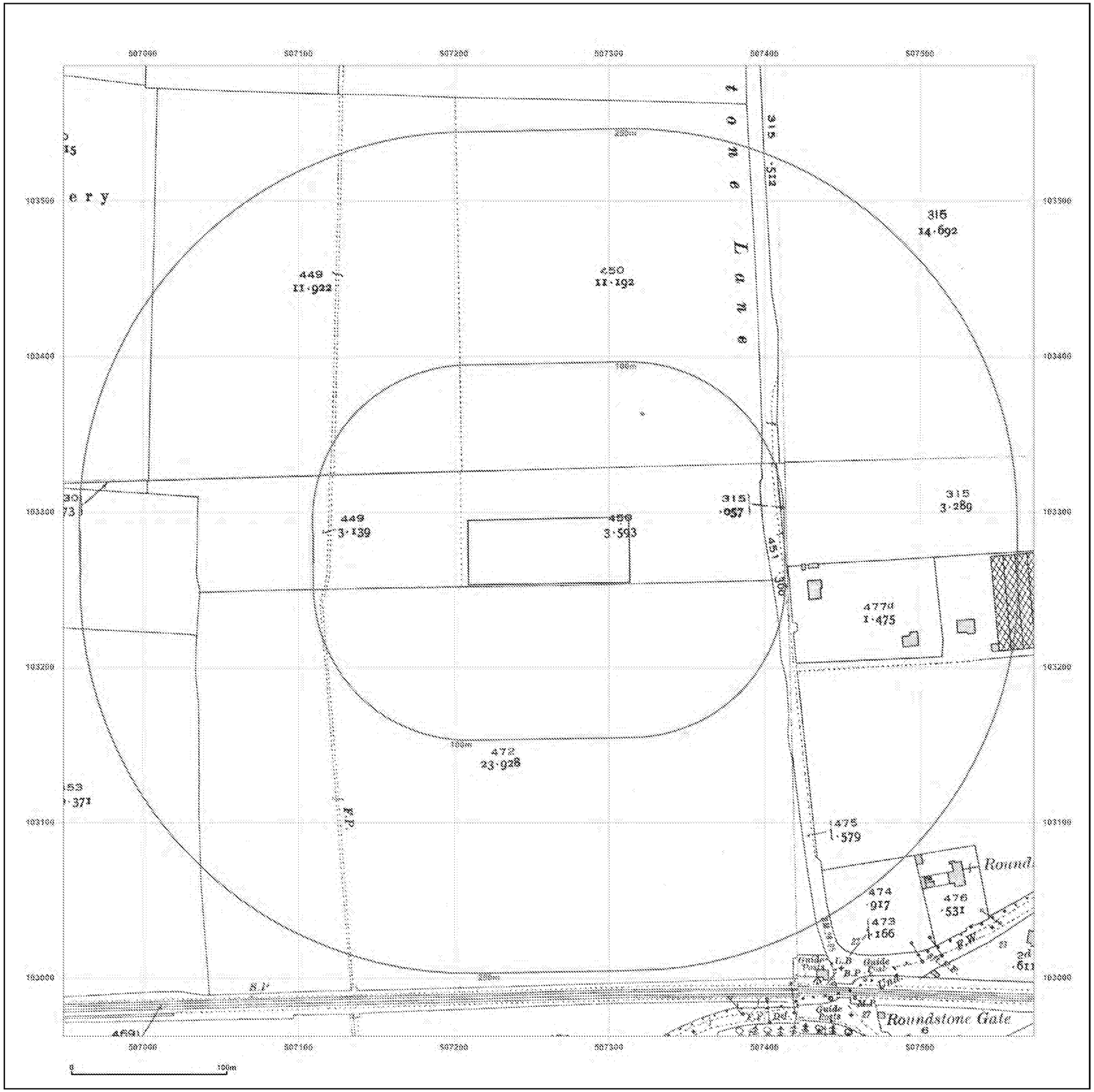
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: County Series

Map date: 1932

Scale: 1:2,500

Printed at: 1:2,500

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

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

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

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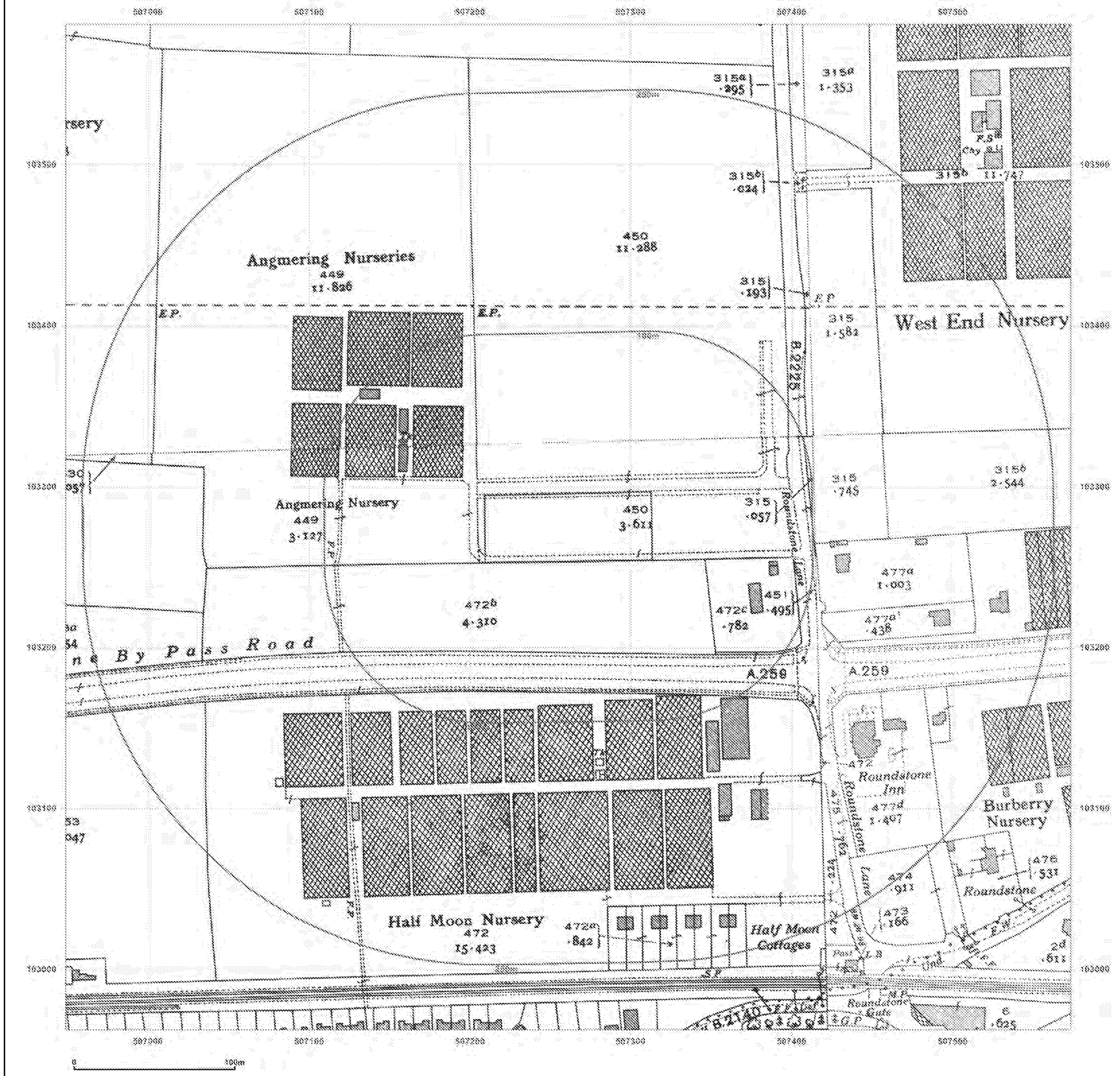
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Production date: 17 July 2017

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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

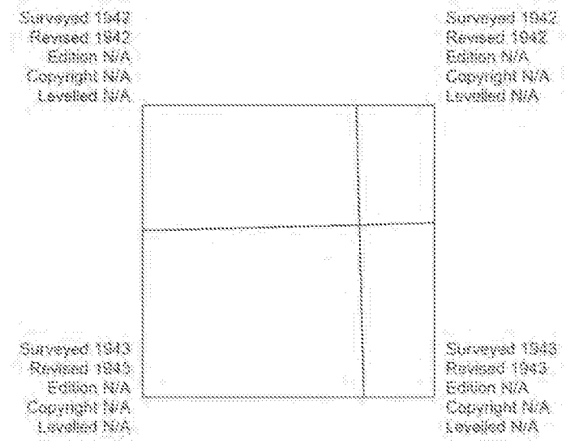
Map Name: County Series

Map date: 1942-1943

Scale: 1:2,500

Printed at: 1:2,500

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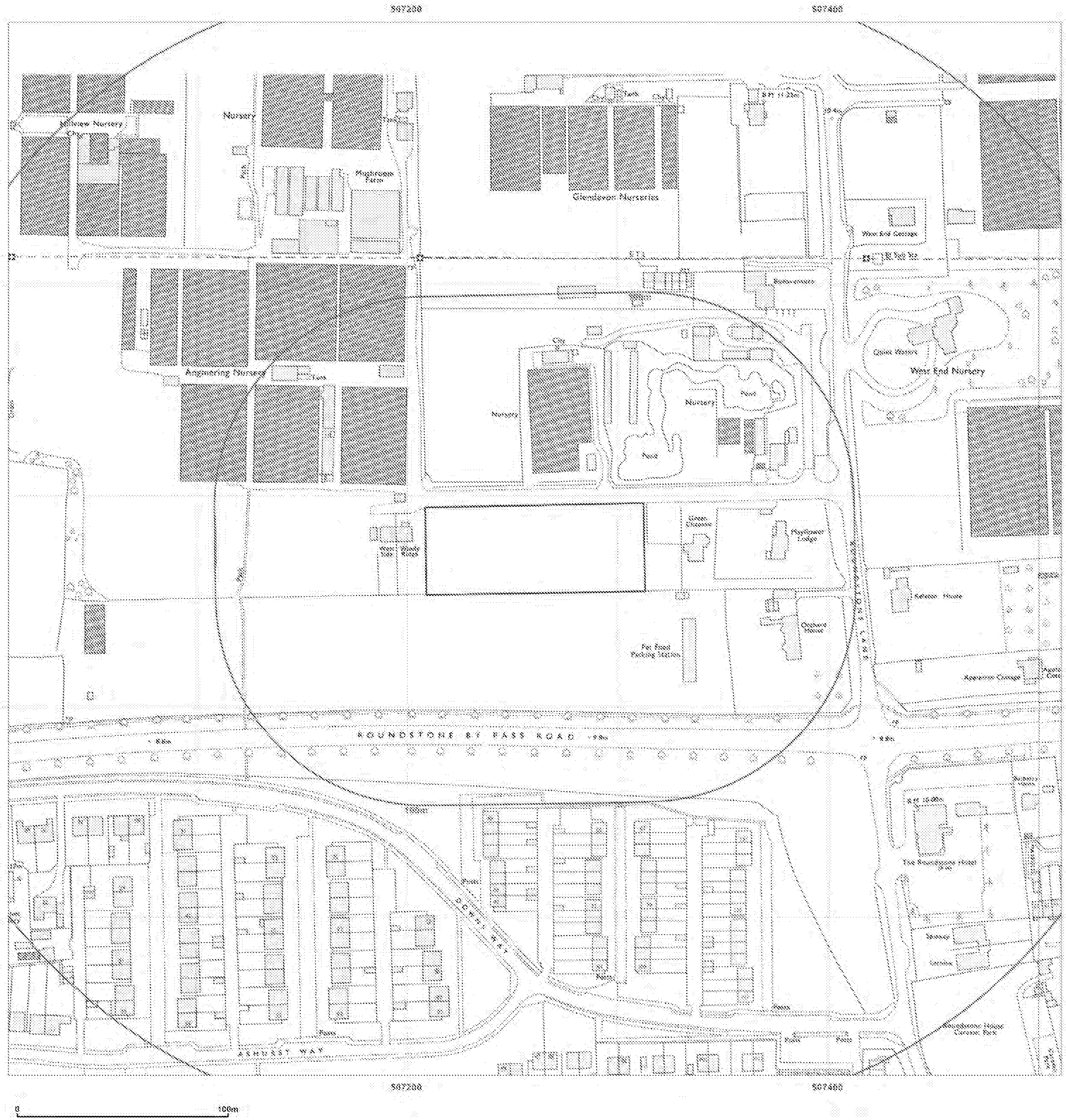
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Production date: 17 July 2017

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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: National Grid

Map date: **1970**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1969
Revised 1969
Edition N/A
Copyright 1970
Levelled 1966

Surveyed 1969
Revised 1969
Edition N/A
Copyright 1970
Levelled 1966

Powered by OS

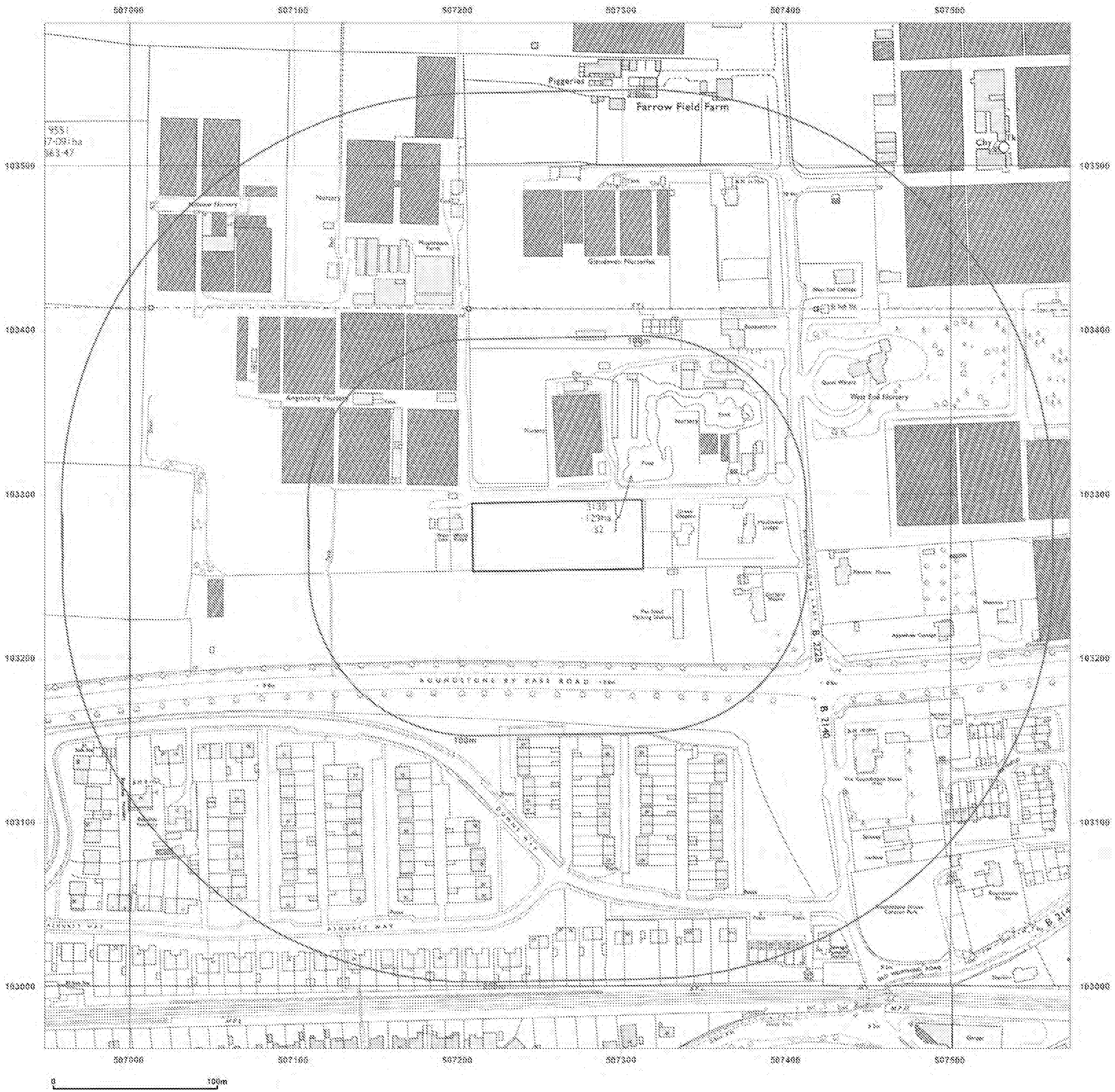
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Production date: 17 July 2017

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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: National Grid

Map date: **1969-1970**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1969
Revised 1970
Edition N/A
Copyright 1972
Levelled 1956

Surveyed 1969
Revised 1969
Edition N/A
Copyright 1971
Levelled 1956

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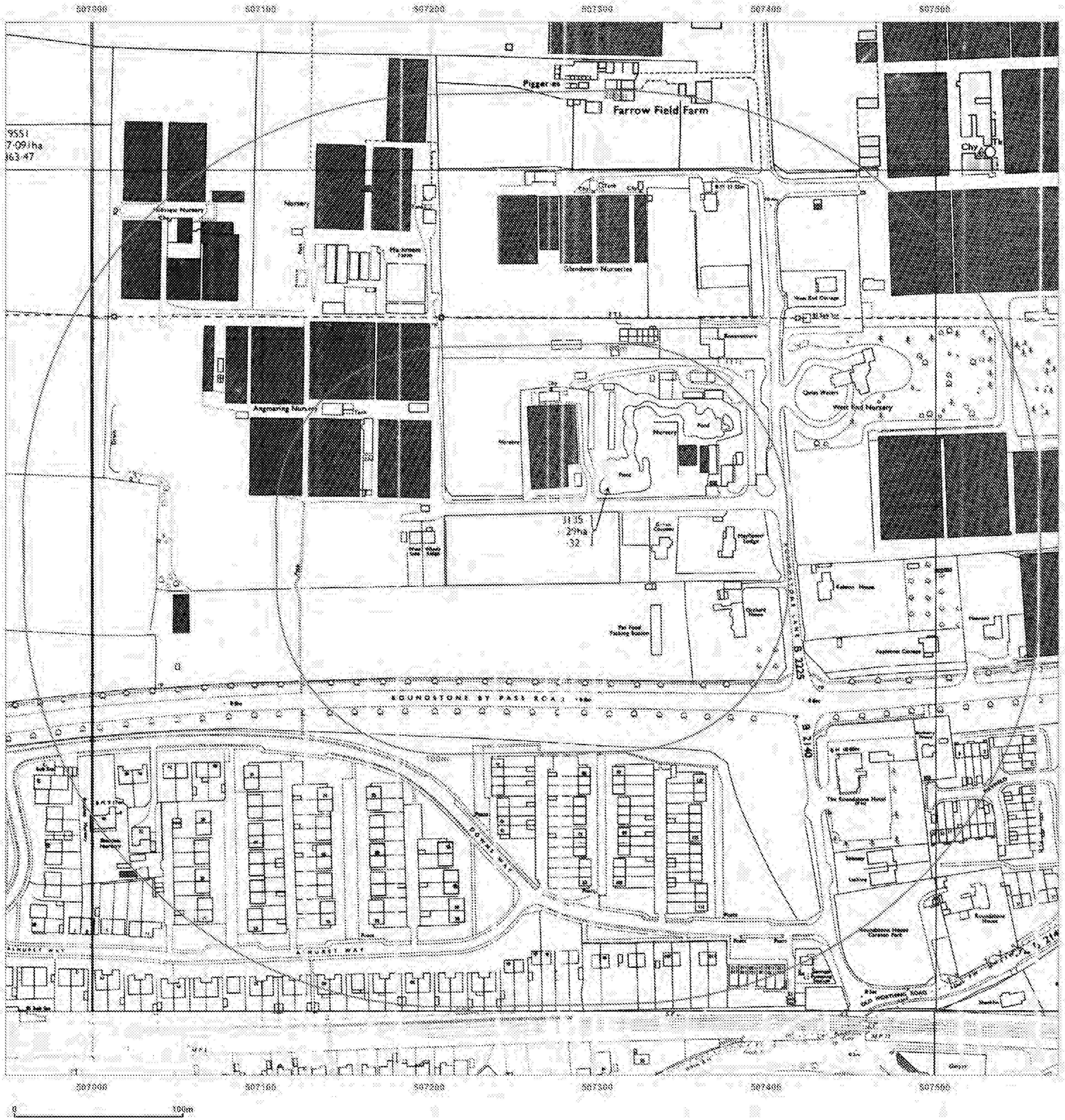
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Production date: 17 July 2017

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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

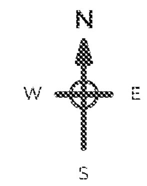
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Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

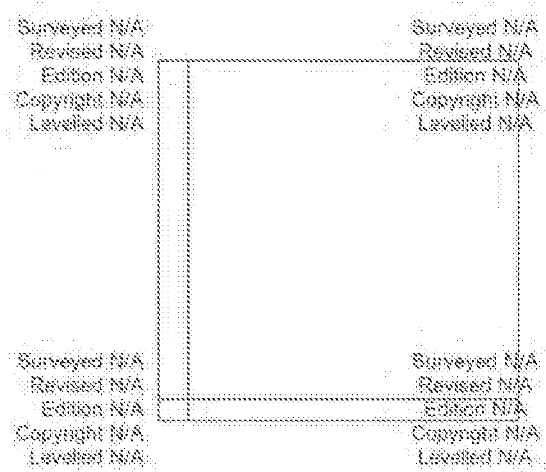
Map Name: National Grid

Map date: **1971-1972**

Scale: 1:2,500

Printed at: 1:2,500





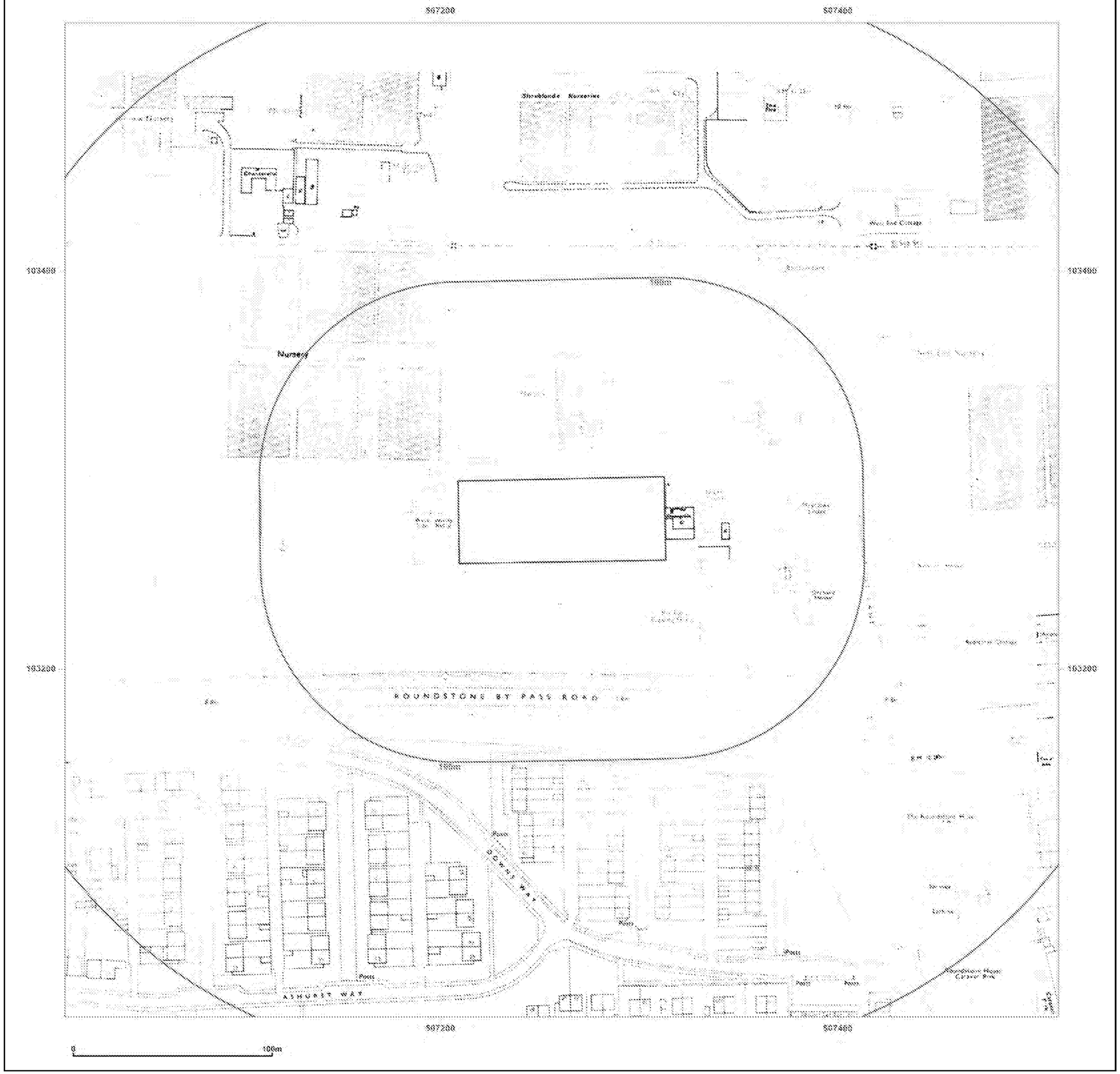
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: National Grid

Map date: **1974**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1974
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1974
Levelled N/A

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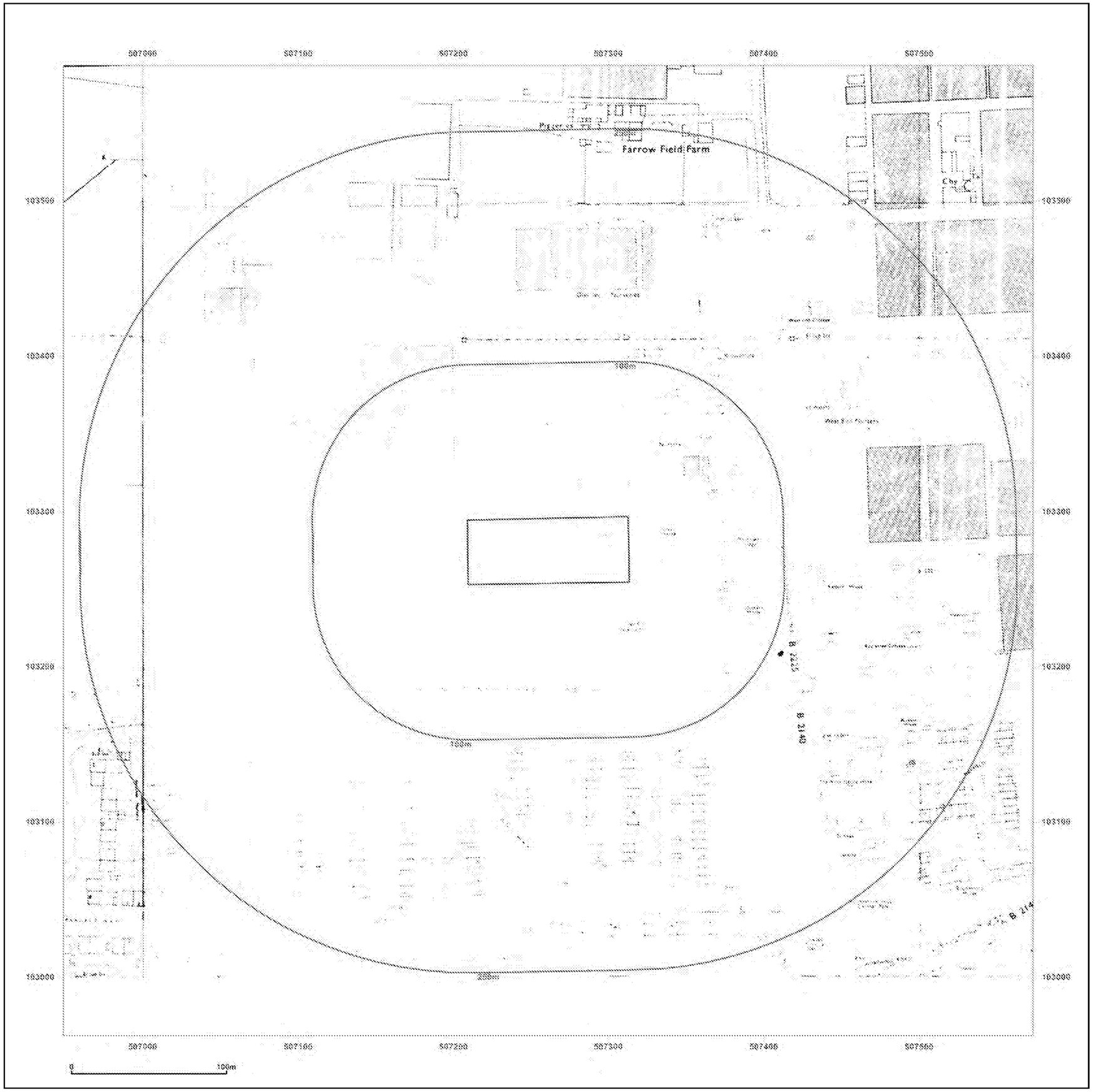
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Production date: 17 July 2017

To view map legend click here *Legend*

ARUN DISTRICT COUNCIL A/219/17/PL



Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: National Grid

Map date: **1974**

Scale: 1:2,500

Printed at: 1:2,500

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

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

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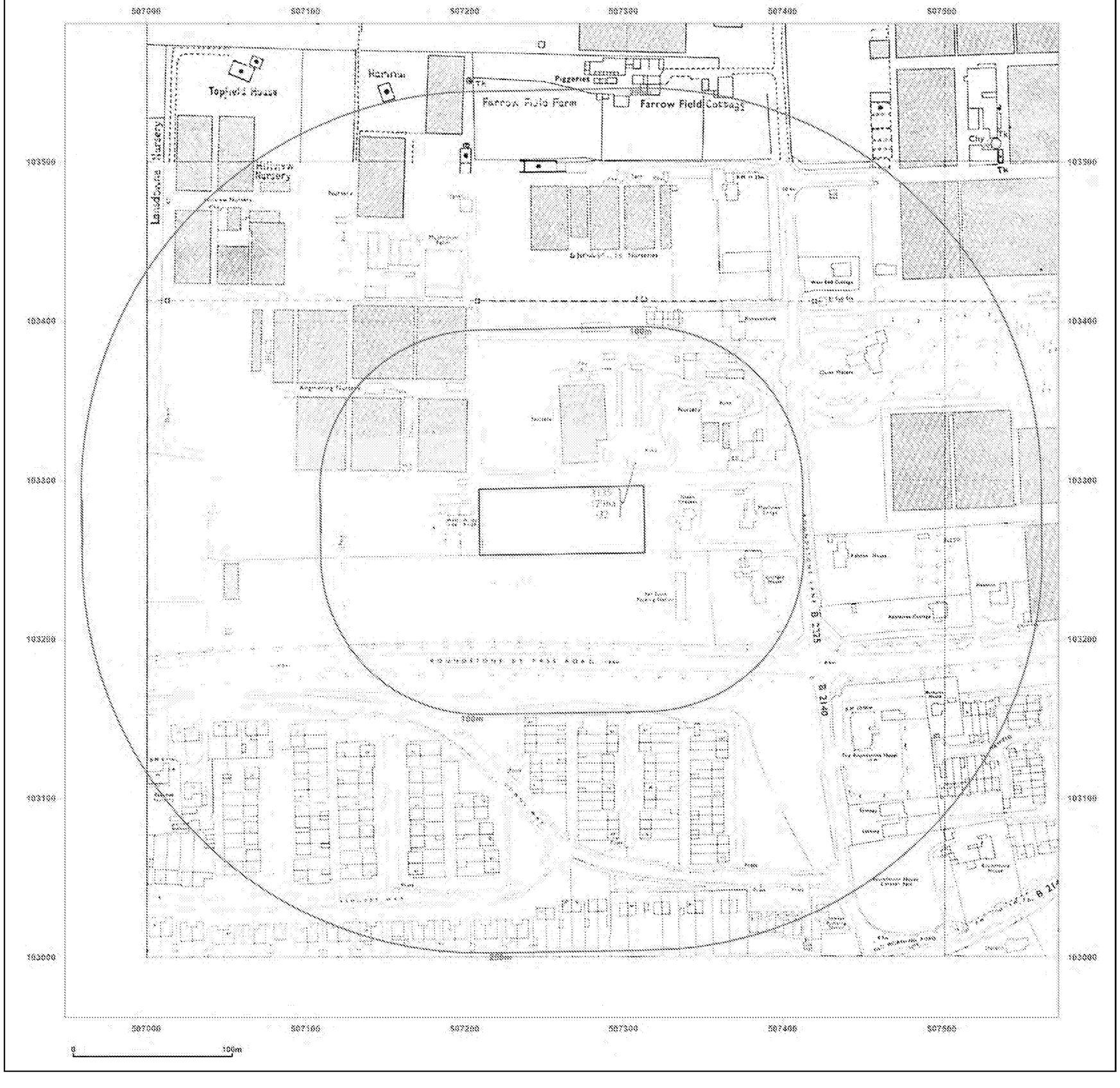
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Production date: 17 July 2017

To view map legend click here *Legend*

ARUN DISTRICT COUNCIL A/219/17/PL



Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

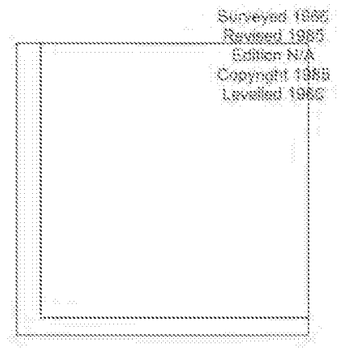
Map Name: National Grid

Map date: 1985

Scale: 1:2,500

Printed at: 1:2,500

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Powered by OS

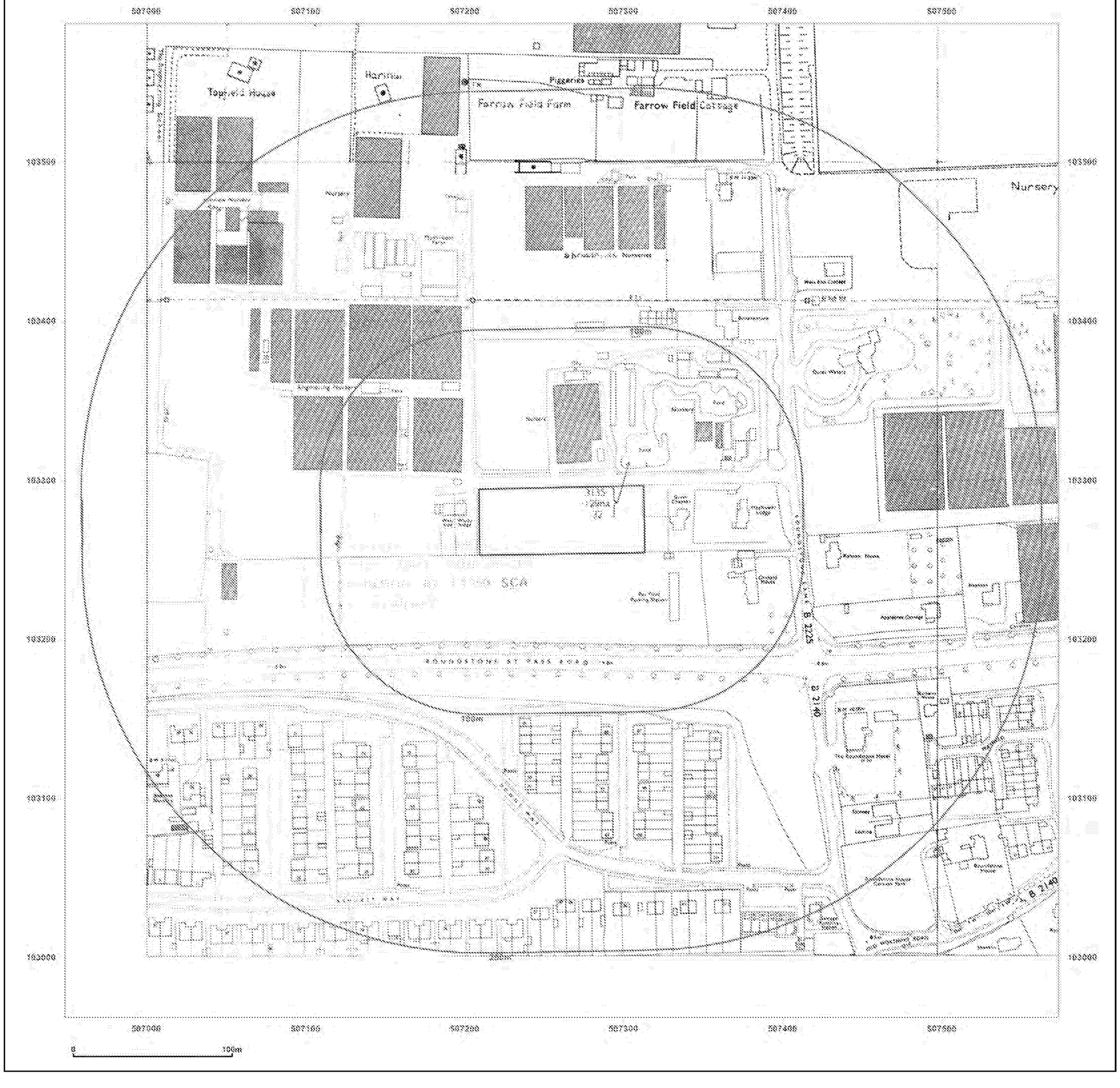
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Production date: 17 July 2017

To view map legend click here *Legend*

ARUN DISTRICT COUNCIL A/219/17/PL



Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

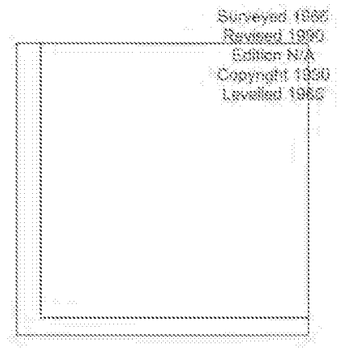
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Map date: 1990

Scale: 1:2,500

Printed at: 1:2,500

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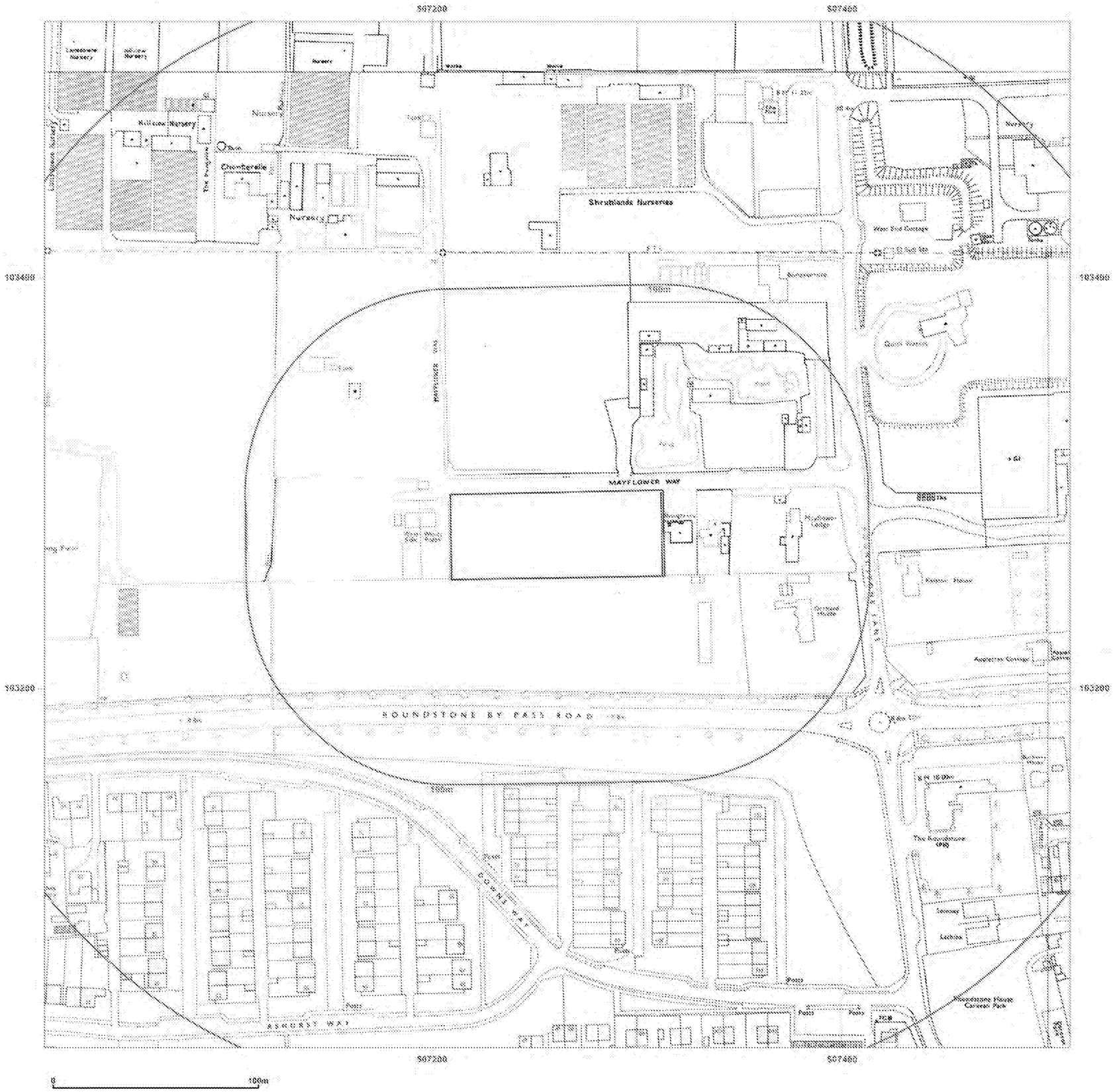
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Production date: 17 July 2017

To view map legend click here *Legend*

ARUN DISTRICT COUNCIL A/219/17/PL



Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: National Grid

Map date: **1990-1994**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

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

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

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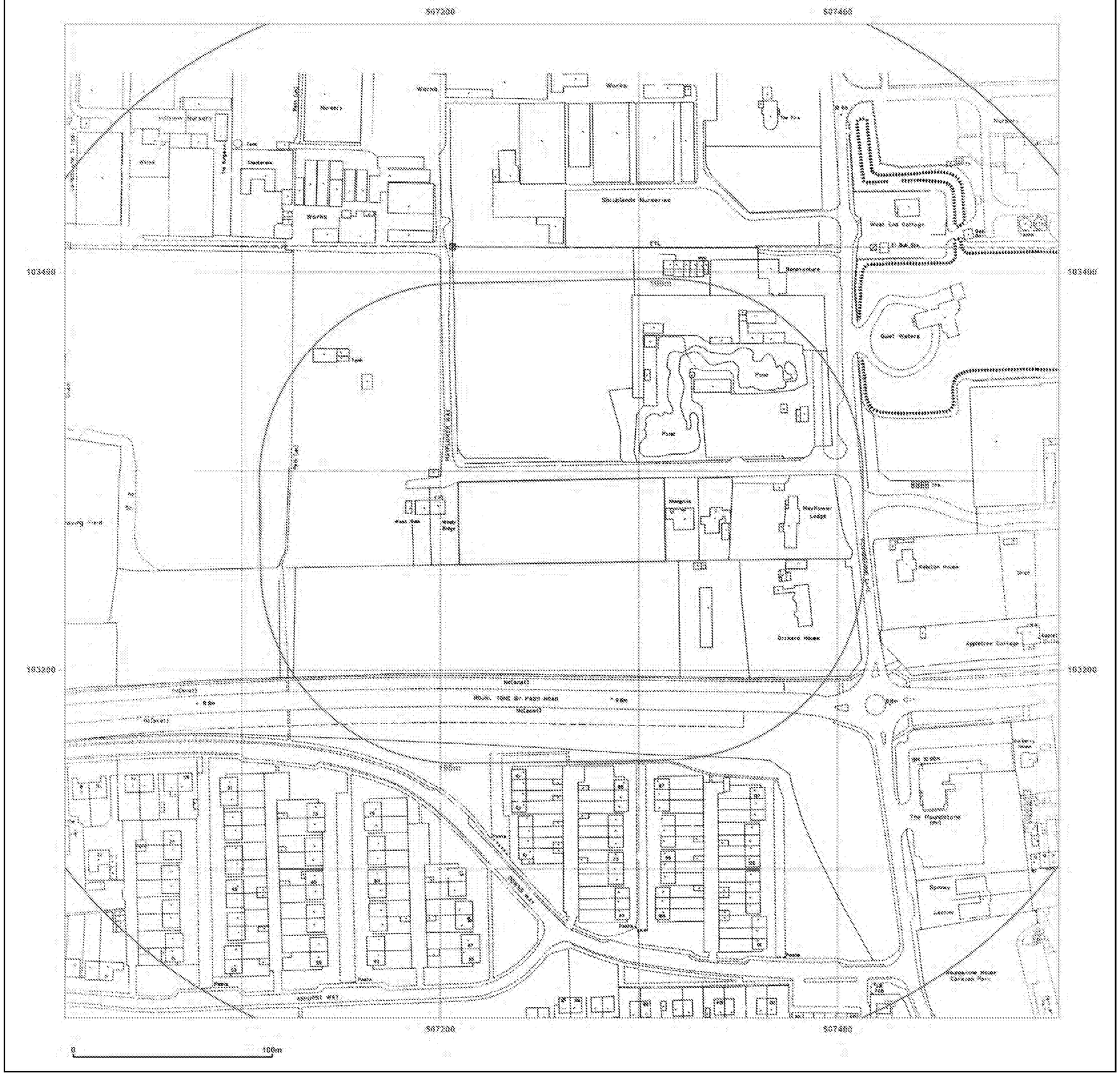
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ARUN DISTRICT COUNCIL A/219/17/PL



Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: National Grid

Map date: 1994

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

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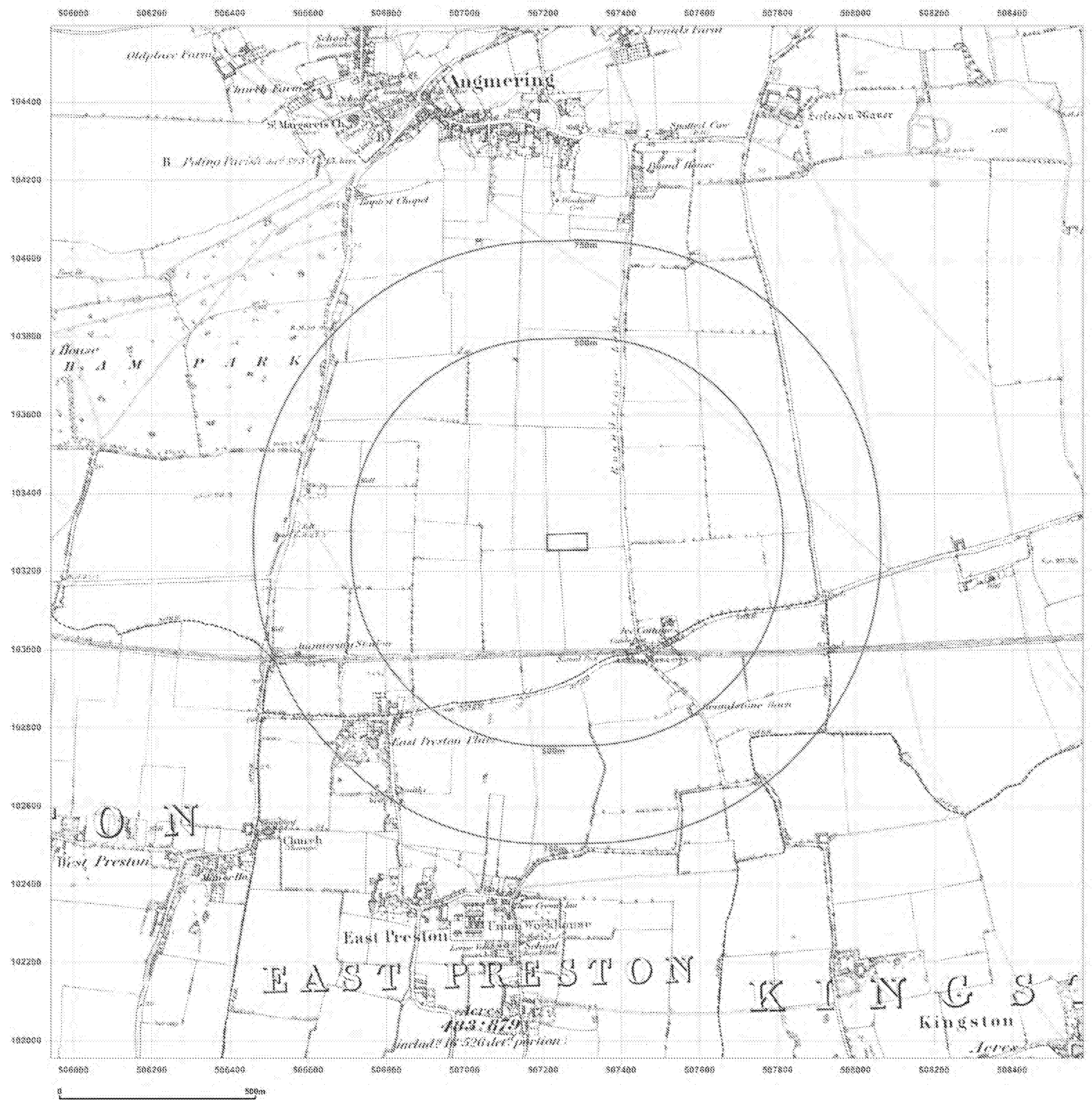
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Groundsure
INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: County Series

Map date: **1876**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1876
Revised 1876
Edition N/A
Copyright N/A
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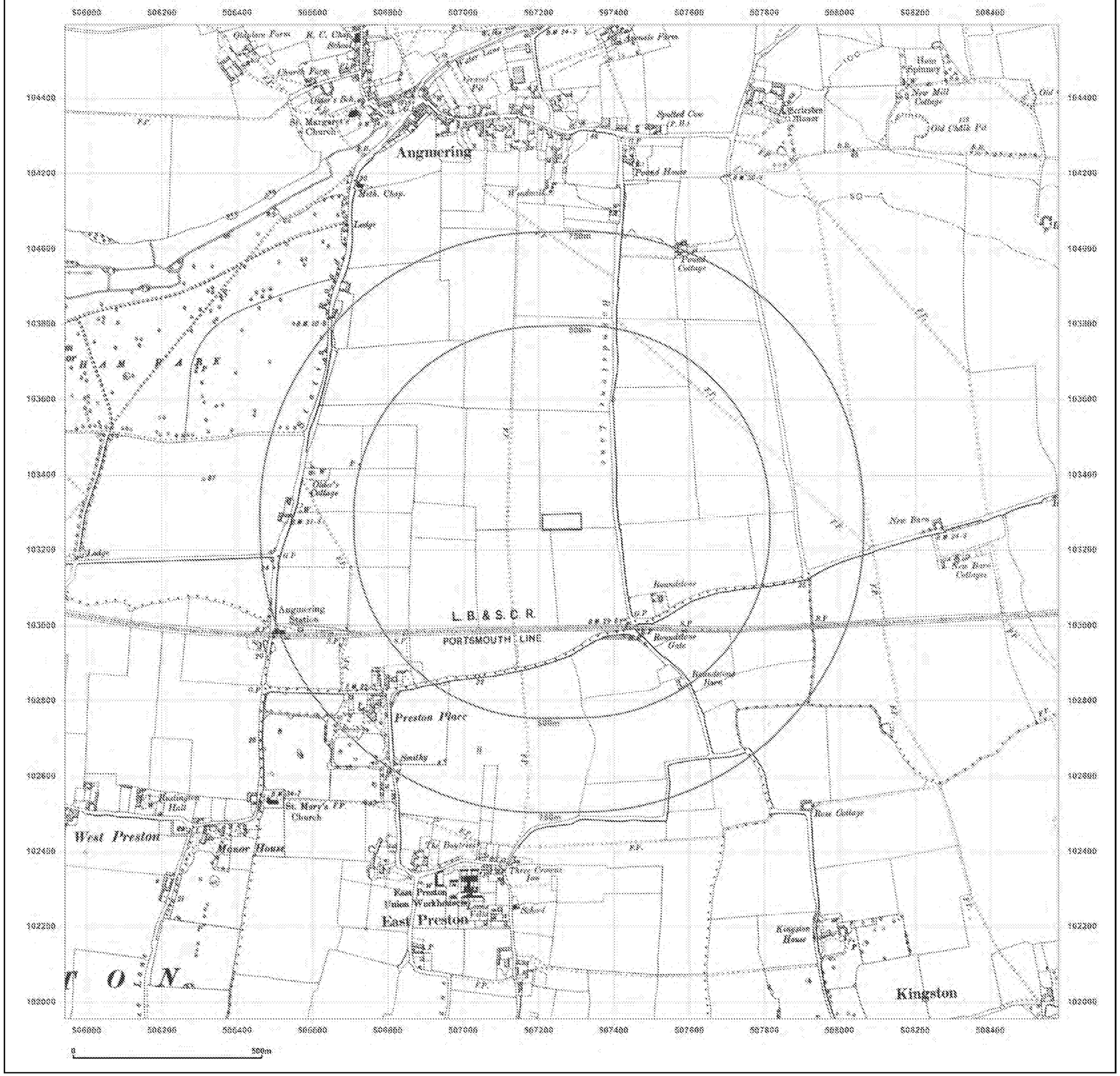
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
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Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: County Series

Map date: 1896

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1870
Revised 1896
Edition N/A
Copyright N/A
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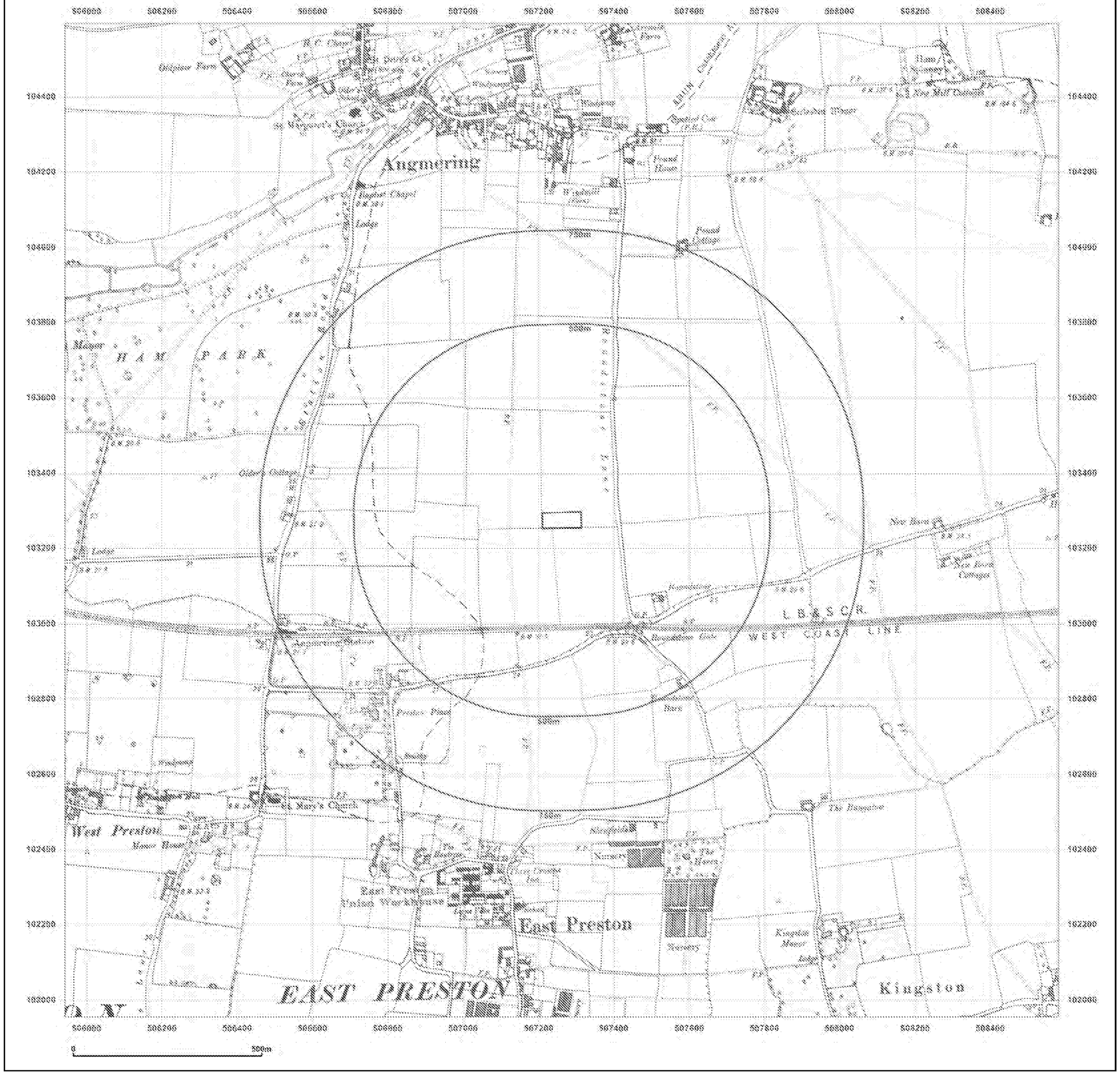
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
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Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: County Series

Map date: **1910**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1875
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

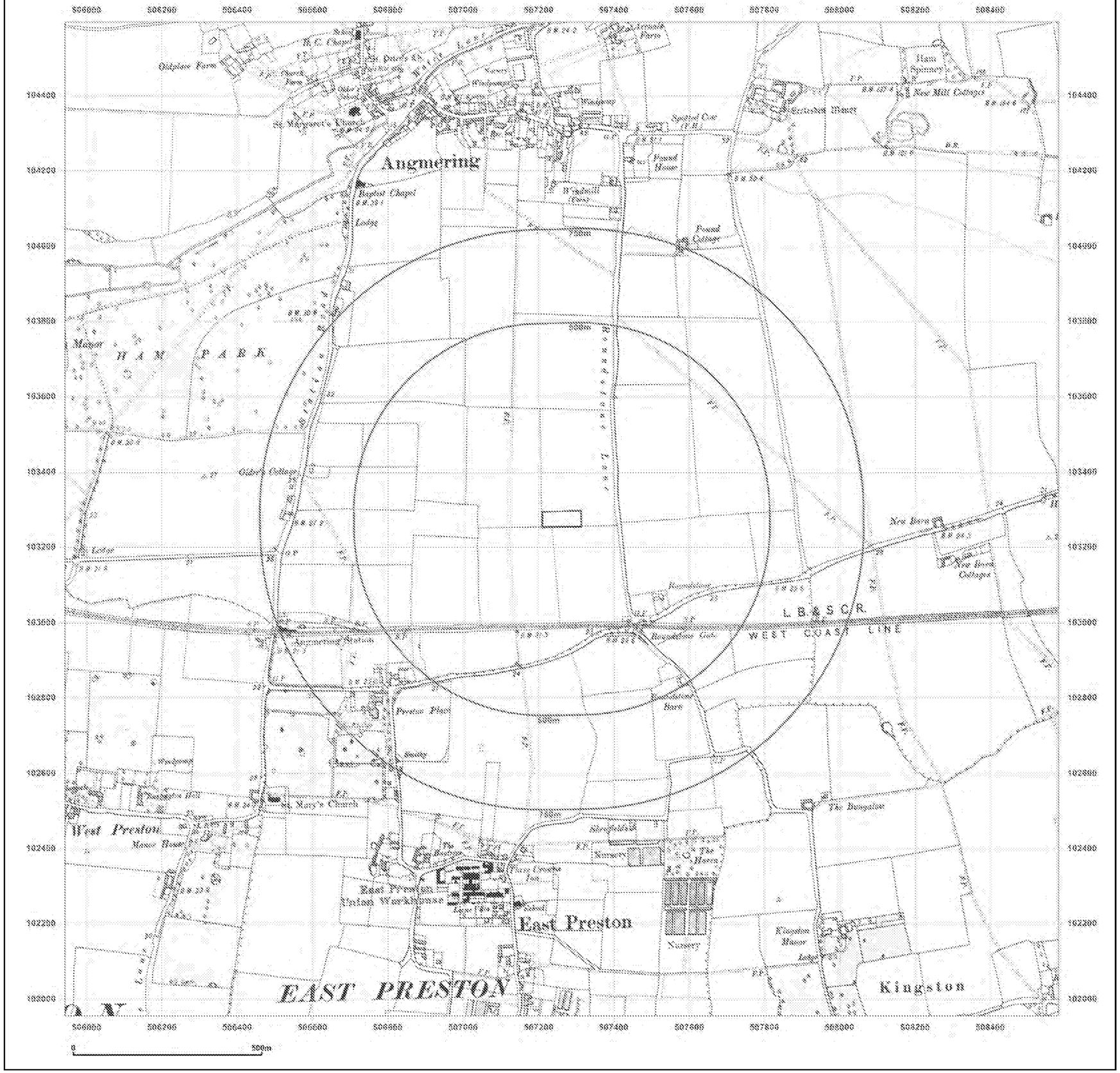
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: County Series

Map date: **1910**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1875
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

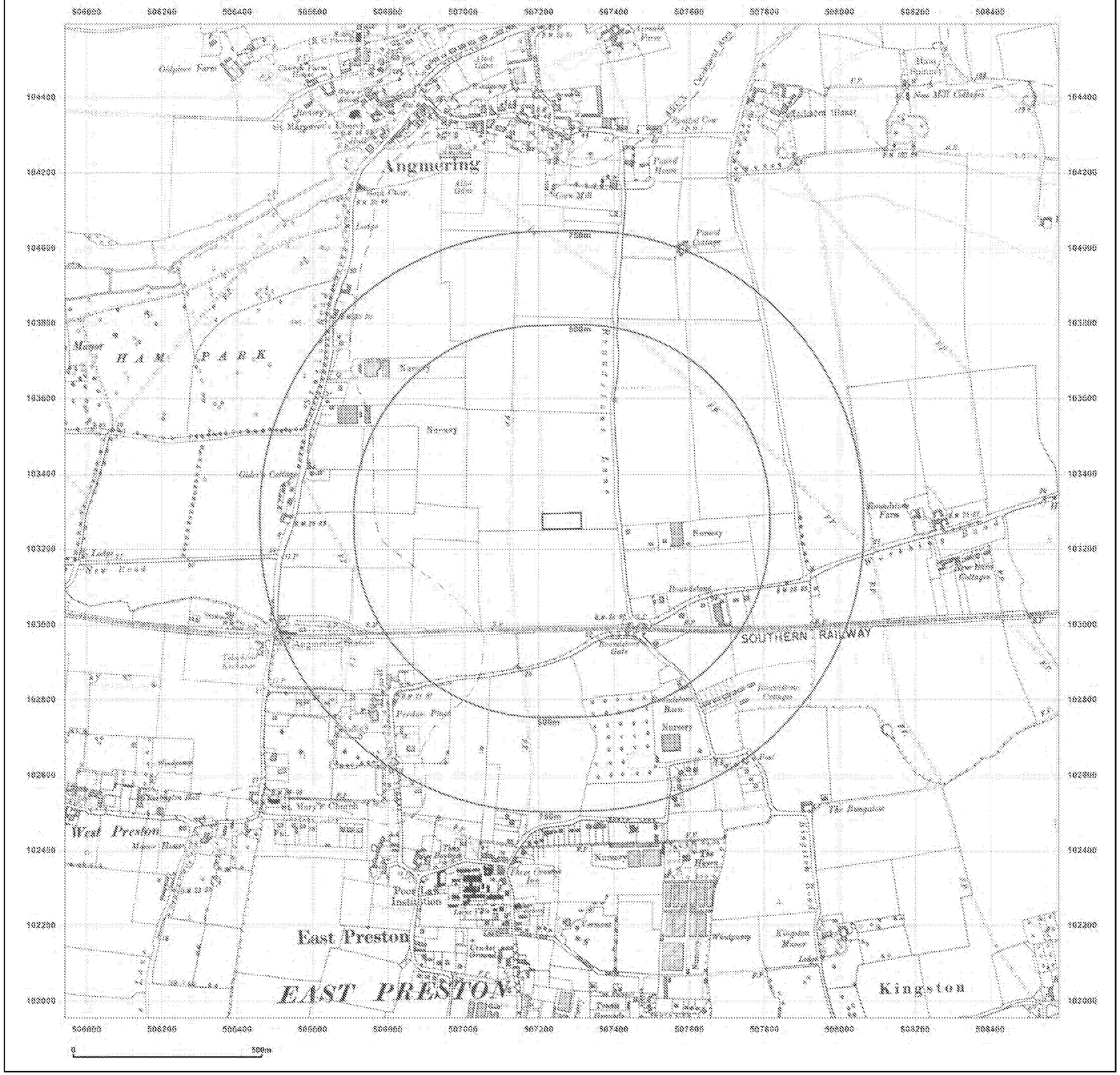
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: County Series

Map date: 1932

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1875
Revised 1932
Edition N/A
Copyright N/A
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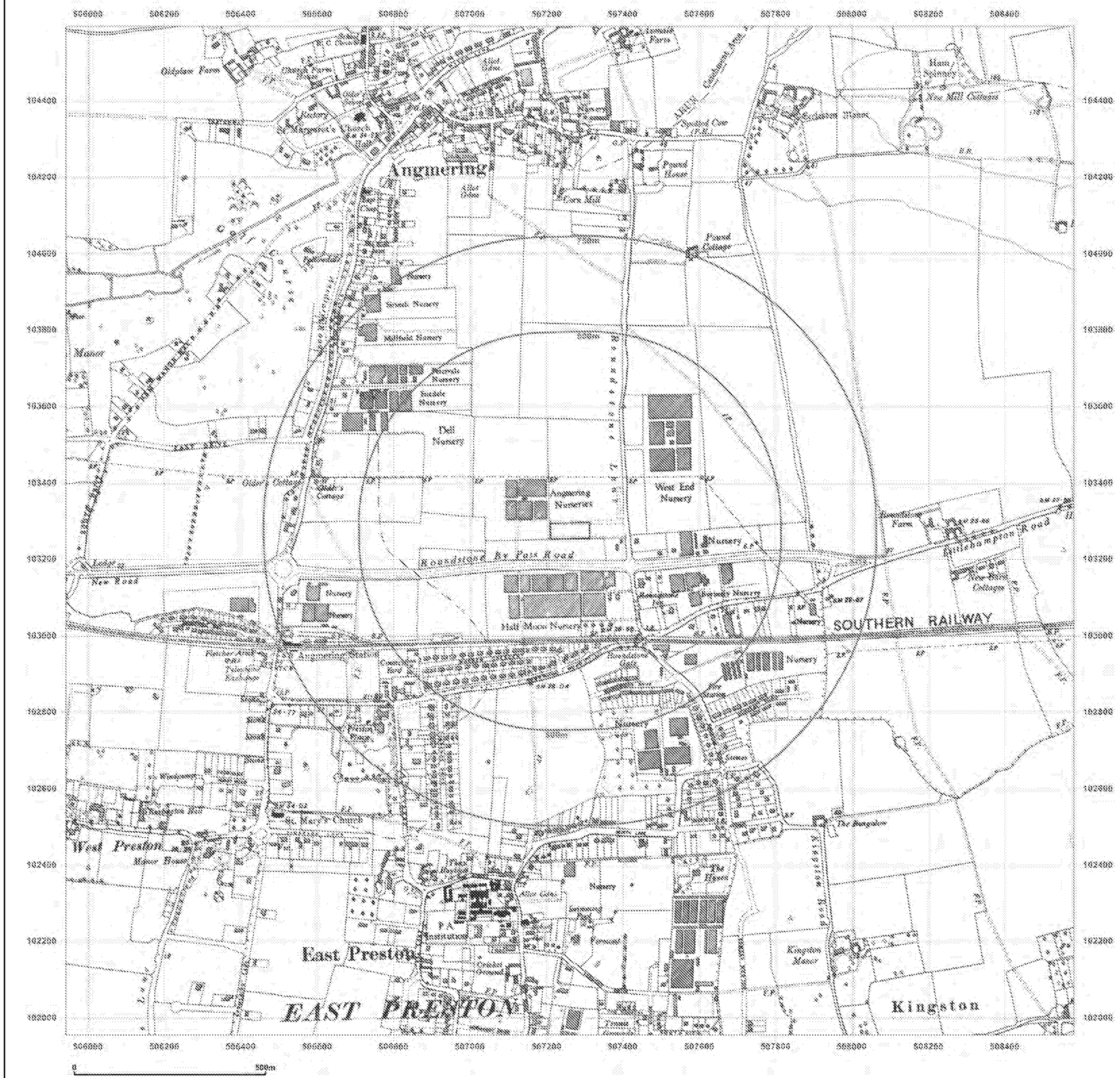
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: County Series

Map date: **1943**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1875
Revised 1943
Edition N/A
Copyright N/A
Levelled N/A

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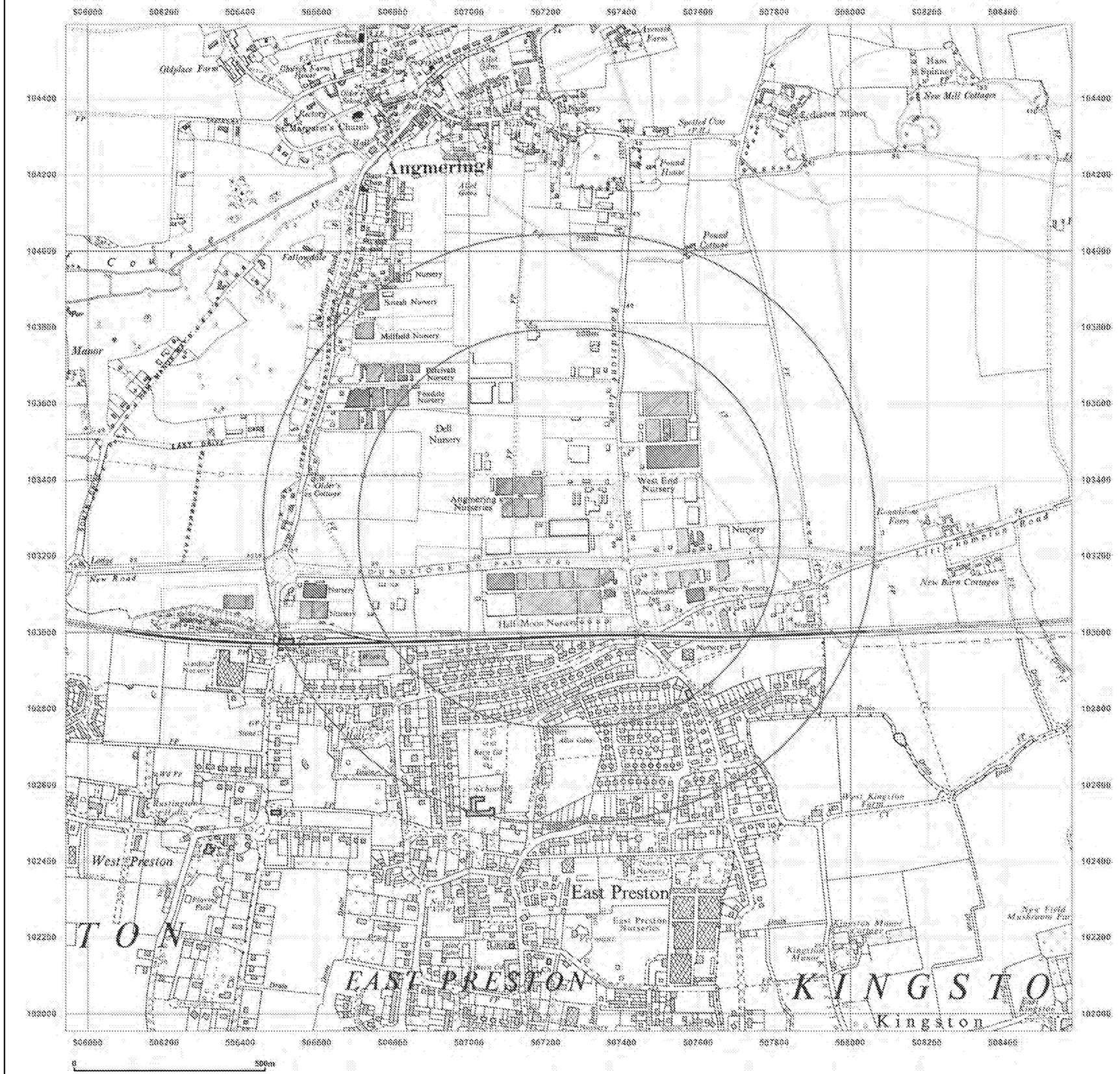
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Groundsure INSIGHTS

Site Details:

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LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: Provisional

Map date: 1957

Scale: 1:10,560

Printed at: 1:10,560

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

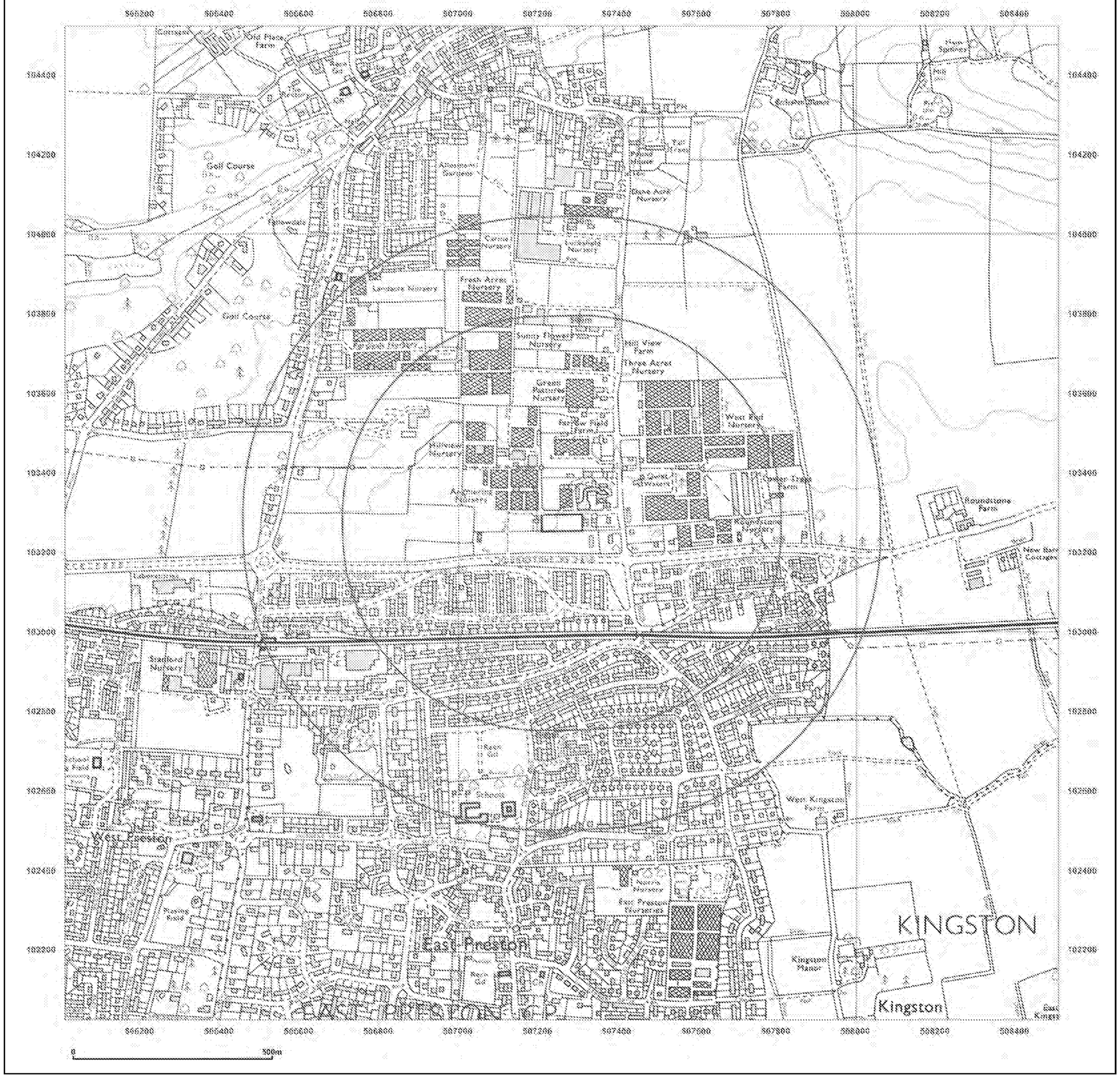
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: National Grid

Map date: **1974**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1973
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

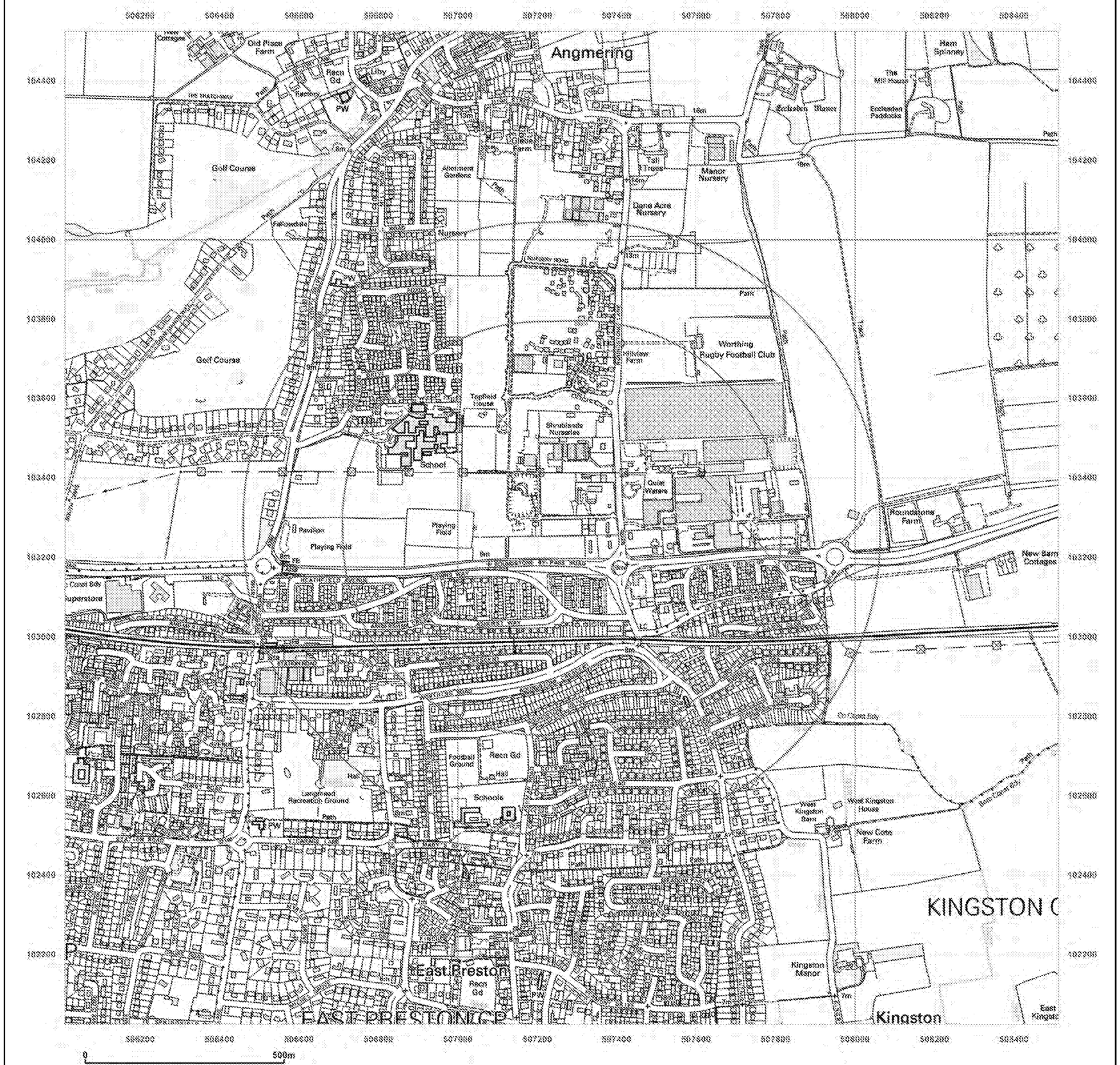
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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000

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Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

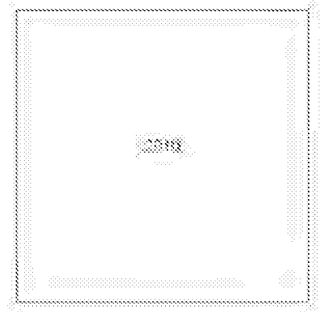
Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000

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ARUN DISTRICT COUNCIL A/219/17/PL



Groundsure INSIGHTS

Site Details:

Land at, MAYFLOWER WAY,
LITTLEHAMPTON, BN16 4AY

Client Ref: J13227DK_ANGMERING
Report Ref: HMD-137-4090050
Grid Ref: 507261, 103275

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000

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Production date: 17 July 2017

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[redacted]

Groundsure Reference:	HMD-137-4090048
Your Reference:	J13227DK_ANGMERING
Report Date	17 Jul 2017
Report Delivery Method:	Email - pdf

Enviro Insight

Address: Land at, MAYFLOWER WAY, LITTLEHAMPTON, BN16 4AY

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

[redacted]

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Groundsure
LOCATION INTELLIGENCE

Enviro Insight

Address:	Land at, MAYFLOWER WAY, LITTLEHAMPTON, BN16 4AY
Date:	17 Jul 2017
Reference:	HMD-137-4090048
Client:	Southern Testing Laboratories Ltd HQ

NW N NE



W E

SW S SE

Aerial Photograph Capture date: 07-Jun-2015
Grid Reference: 507262,103274
Site Size: 0.43ha

Report Reference: HMD-137-4090048
Client Reference: J13227DK_ANGMERING

ARUN DISTRICT COUNCIL A/219/17/PL

Groundsure
LOCATION INTELLIGENCE

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Overview of Findings

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Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	3	0	16	23
1.2 Additional Information – Historical Tank Database	0	0	26	23
1.3 Additional Information – Historical Energy Features Database	0	0	11	25
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	9
1.6 Potentially Infilled Land	0	1	0	0

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	1	1
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	4	2
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	1	0
2.2 Records of COMAH and NIHHS sites	0	0	1	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	1	4	1
2.3.2 National Incidents Recording System, List 1	0	0	1	1
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	0	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	2	0

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	1	21	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	1
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology

5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	2	1	5
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	1
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	0	1	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	0	0	0	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	No
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	No
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	1
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	1	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	1	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Very Low
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Low
9.2 Radon	
9.2.1 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 in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.
9.2.2 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.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	No
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	Yes
10.3 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. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. 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.

3. 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.

4. 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 gas pipelines and underground electricity transmission lines.

5. Geology

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

6. 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.

7. Flooding

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

8. 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.

9. 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 and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. 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.

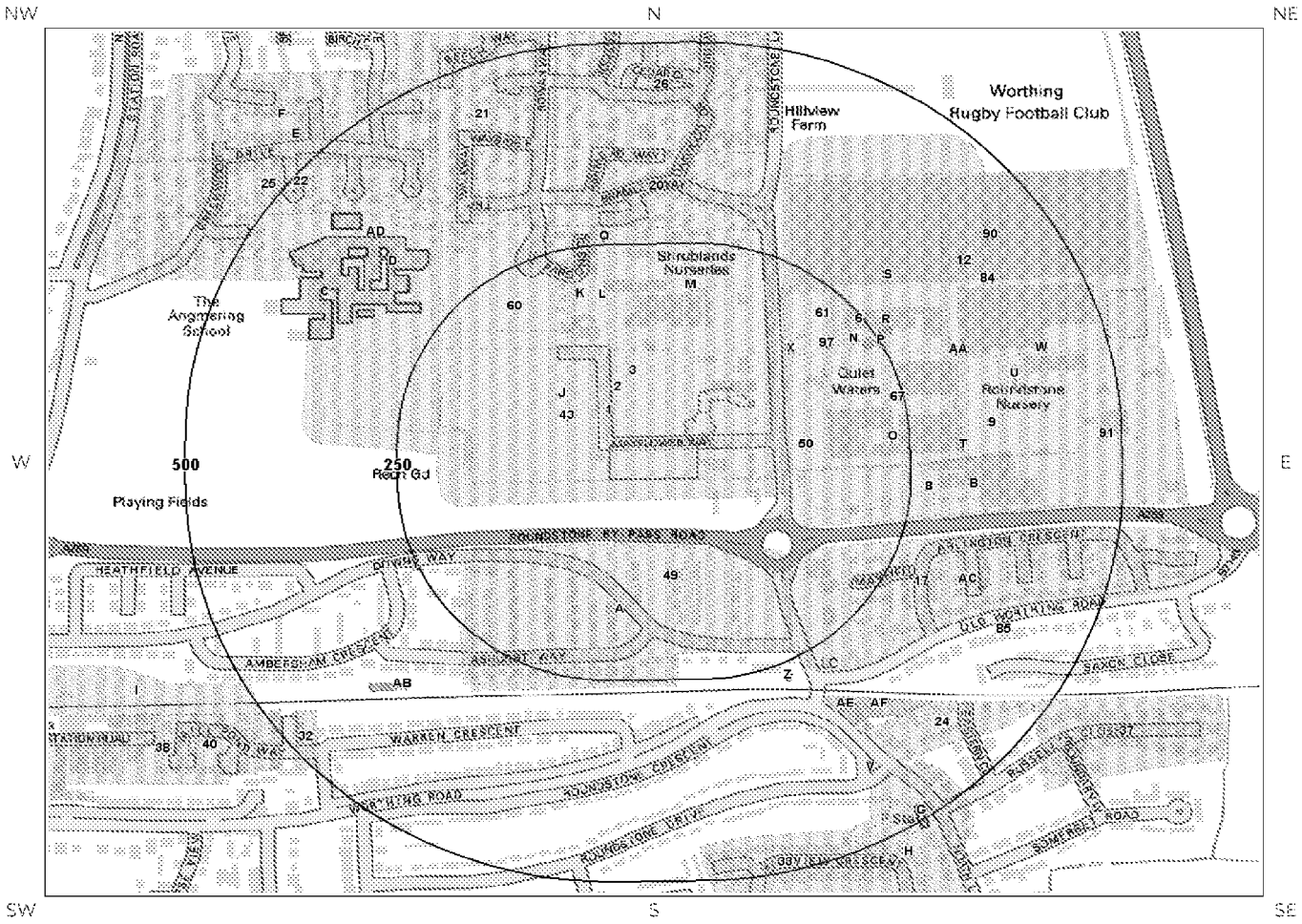
Note: Maps

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. Historical Land Use



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Historical 1:10,000 and 1:10,560 scale mapping

Industrial Land Use

Potentially Infilled Land

Site Outline

Search Buffers (m)
250
500

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 42

ID	Distance [m]	Direction	Use	Date
1	0	On Site	Nursery	1974
2	0	On Site	Nurseries	1957
3	0	On Site	Nurseries	1943
4A	79	S	Nursery	1943
5A	81	S	Nursery	1957
6	95	E	Nursery	1957
7R	98	E	Nursery	1943
8	99	E	Nursery	1957
9	103	E	Nursery	1974
10K	116	N	Nursery	1974
11AC	143	SE	Nursery	1957
12	149	NE	Nursery	1974
13C	177	W	Nursery	1932
14B	199	E	Nursery	1943
15B	199	E	Nursery	1932
16C	203	W	Nursery	1943
17	203	SE	Nursery	1943
18D	239	NW	Nursery	1957
19D	239	NW	Nursery	1974
20	268	N	Nursery	1974
21	286	N	Nursery	1974
22	349	NW	Nursery	1943
23AB	350	SW	Railway Building	1943
24	358	SE	Nursery	1957
25	363	NW	Nursery	1957
26	365	N	Nursery	1974
27E	415	NW	Nursery	1932
28E	416	NW	Nursery	1943
29F	417	NW	Nursery	1974
30F	417	NW	Nursery	1957
31G	427	SE	Fire Station	1943
32	449	SW	Council Yard	1943
33	450	S	Nursery	1943
34H	465	SE	Nursery	1932

35G	477	SE	Fire Engine Station	1957
36G	477	SE	Fire Engine Station	1974
37	482	SE	Nursery	1943
38	482	SW	Unspecified Commercial/Industrial	1974
39H	483	SE	Unspecified Commercial/Industrial	1943
40	487	SW	Unspecified Works	1957
41I	493	SW	Railway Sidings	1974
42I	493	SW	Railway Sidings	1957

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 49

ID	Distance (m)	Direction	Use	Date
43	58	NW	Unspecified Tank	1942
44J	81	NW	Unspecified Tank	1990
45J	81	NW	Unspecified Tank	1985
46J	81	NW	Unspecified Tank	1970
47J	82	NW	Unspecified Tank	1970
48J	82	NW	Unspecified Tank	1990
49	123	S	Unspecified Tank	1943
50	123	E	Tanks	1990
51K	182	N	Unspecified Tank	1990
52L	183	N	Unspecified Tank	1990
53L	183	N	Unspecified Tank	1985
54L	183	N	Unspecified Tank	1970
55L	183	N	Unspecified Tank	1970
56M	192	N	Unspecified Tank	1990
57M	192	N	Unspecified Tank	1985
58M	193	N	Unspecified Tank	1970
59M	193	N	Unspecified Tank	1970
60	201	NW	Unspecified Tank	1990
61	215	NE	Unspecified Tank	1990
62N	218	NE	Tanks	1990
63N	225	NE	Unspecified Tank	1990
64O	226	E	Unspecified Tank	1990
65O	226	E	Unspecified Tank	1985
66N	230	NE	Unspecified Tank	1990
67	241	E	Unspecified Tank	1978

68P	242	NE	Unspecified Tank	1990
69P	253	NE	Unspecified Tank	1990
70Q	254	N	Unspecified Tank	1990
71Q	254	N	Unspecified Tank	1985
72R	255	NE	Unspecified Tank	1990
73S	302	NE	Unspecified Tank	1985
74S	305	NE	Unspecified Tank	1970
75S	306	NE	Unspecified Tank	1985
76T	312	E	Sewage Tanks	1985
77T	317	E	Unspecified Tank	1970
78T	317	E	Unspecified Tank	1978
79T	317	E	Unspecified Tank	1970
80T	318	E	Unspecified Tank	1990
81T	318	E	Unspecified Tank	1985
82U	379	E	Tanks	1985
83U	379	E	Tanks	1990
84	396	NE	Unspecified Tank	1985
85	406	SE	Unspecified Tank	1943
86V	413	SE	Unspecified Tank	1959
87V	413	SE	Unspecified Tank	1959
88W	420	E	Unspecified Tank	1990
89W	425	E	Unspecified Tank	1990
90	426	NE	Unspecified Tank	1985
91	481	E	Unspecified Tank	1990

1.3 Additional Information - Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 36

ID	Distance (m)	Direction	Use	Date
92X	156	NE	Electricity Substation	1990
93X	157	NE	Electricity Substation	1970
94X	157	NE	Electricity Substation	1970
95X	158	NE	Electricity Substation	1985
96X	158	NE	Electricity Substation	1990
97	192	NE	Gas Governor	1990
98Y	250	SW	Electricity Substation	1982
99Y	250	SW	Electricity Substation	1970
100Y	250	SW	Electricity Substation	1969
101Y	250	SW	Electricity Substation	1974
102Y	250	SW	Electricity Substation	1994

103Z	265	SE	Electricity Substation	1990
104Z	265	SE	Electricity Substation	1970
105Z	265	SE	Electricity Substation	1990
106Z	265	SE	Electricity Substation	1985
107Z	265	SE	Electricity Substation	1970
108AA	323	E	Electricity Substation	1978
109AA	323	E	Electricity Substation	1990
110AA	323	E	Electricity Substation	1985
111AB	349	SW	Electricity Substation	1997
112AB	354	SW	Electricity Substation	1970
113AB	354	SW	Electricity Substation	1982
114AB	354	SW	Electricity Substation	1969
115AB	354	SW	Electricity Substation	1974
116AB	354	SW	Electricity Substation	1994
117AC	356	E	Electricity Substation	1985
118AC	356	E	Electricity Substation	1990
119AC	357	E	Electricity Substation	1970
120AC	357	E	Electricity Substation	1978
121AC	357	E	Electricity Substation	1970
122AC	358	E	Electricity Substation	1990
123AC	358	E	Electricity Substation	1985
124AB	358	SW	Electricity Substation	1984
125AB	358	SW	Electricity Substation	1989
126AD	377	NW	Electricity Substation	1994
127AD	378	NW	Electricity Substation	

1.4 Additional Information - Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information - Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 9

ID	Distance (m)	Direction	Use	Date
128AE	308	SE	Garage	1979

129AE	308	SE	Garage	1959
130AE	308	SE	Garage	1969
131AF	317	SE	Garage	1959
132AF	317	SE	Garage	1969
133AF	330	SE	Garage	1994
134AF	333	SE	Garage	1959
135AF	333	SE	Garage	1965
136AE	336	SE	Garage	1976

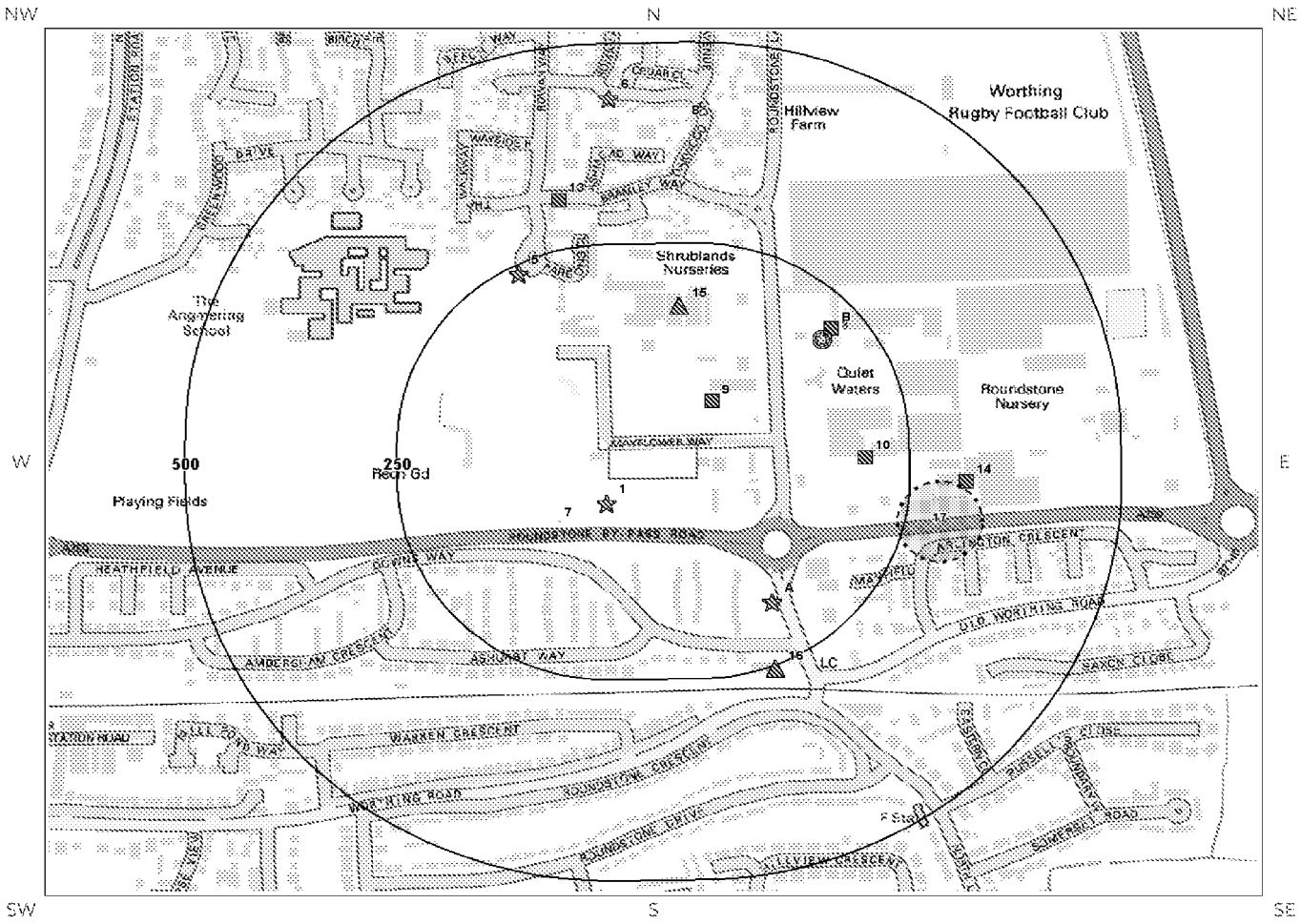
1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 1

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
137	7	N	Pond	1974

2. Environmental Permits, Incidents and Registers Map



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- Site Outline
- Search Buffers (m) — 250, 500
- 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

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.1.3 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.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

2

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

ID	Distance (m)	Direction	NGR	Details	
15	171	N	507291 103467	Address: Town & Country Paving Ltd, Shrublands Nurseries, Roundstone Lane, BN16 4AT Process: concrete & crushing process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
16	257	S	507405 103015	Address: East Preston Laudrette, 132 Downs Way, East Preston, BN16 1AF Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

6

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
9	56	N	507330 103350	Address: T & H MOTOR SERVICES, T & H MOTOR SERVICES, MAYFLOWER WAY, ANGMERING, WEST SUSSEX Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P02859 Permit Version: 1	Receiving Water: INTO LAND Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 04/04/1990 Effective Date: 04-Apr-1990 Revocation Date: -
10	197	E	507510 103280	Address: ROUNDSTONE NURSERY, ROUNDSTONE NURSERY, ROUNDSTONE LANE, LITTLEHAMPTON WEST SUSSEX Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P02730 Permit Version: 1	Receiving Water: INTO LAND Status: REVOKED UNDER EPR 2010 Issue date: 25/01/1990 Effective Date: 25-Jan-1990 Revocation Date: 08/10/2013

ID	Distance (m)	Direction	NGR	Details	
11B	213	NE	507470 103440	Address: A SEWAGE TREATMENT PLANT SERVNG, A SEWAGE TREATMENT PLANT SERVNG, "WEST END NURSERY",HUMBER VHB LT, ROUNDSTONE LANE, ANGMERING, WEST SUSSEX Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P09757 Permit Version: 2	Receiving Water: INTO LAND Status: VARIED UNDER EPR 2010 Issue date: 21/12/2012 Effective Date: 21-Dec-2012 Revocation Date: -
12B	213	NE	507470 103440	Address: A SEWAGE TREATMENT PLANT SERVNG, A SEWAGE TREATMENT PLANT SERVNG, "WEST END NURSERY",HUMBER VHB LT, ROUNDSTONE LANE, ANGMERING, WEST SUSSEX Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P09757 Permit Version: 1	Receiving Water: INTO LAND Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 10/08/2001 Effective Date: 10-Aug-2001 Revocation Date: 20/12/2012
13	311	N	507150 103600	Address: GREEN PASTURES NURSERY, GREEN PASTURES NURSERY, OFF ROUNDSTONE LANE, EAST PRESTON, LITTLEHAMPTON WEST SUSSEX Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: P00873 Permit Version: 1	Receiving Water: INTO LAND Status: LAPSED UNDER SCHEDULE 23 ENVIRONMENT ACT 1995 Issue date: 17/03/1987 Effective Date: 17-Mar-1987 Revocation Date: 31/03/1997
14	317	E	507630 103250	Address: ROUNDSTONE GARDEN CENTRE, ROUNDSTONE GARDEN CENTRE, ANGMERING, LITTLEHAMPTON, WEST SUSSEX Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: N01461 Permit Version: 1	Receiving Water: FRESHWATER STREAM OR RIVER Status: SURRENDERED UNDER EPR 2010 Issue date: 11/04/1983 Effective Date: 11-Apr-1983 Revocation Date: 26/07/2012

2.1.9 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.

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

1

The following records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	Application Reference Number	NGR	Application Status	Application Date	Address	Details	Details of Enforcement Action
198	195	NE	A/148/92/HS	507459 103426	Approved	01/01/1992	Roundstone Nurseries, Roundstone Lane, Angmering, BN16 4AT	Application under the Hazardous Substances Act 1992 for the storage of liquified petroleum gas.	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 1

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	Company	Address	Operational Status	Tier
17	241	E	Roundstone Nurseries	Roundstone Nurseries, Roundstone Lane, Angmering	Historical NIHHS Site	-

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

6

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	31	S	507205 103222	Incident Date: 09-Feb-2002 Incident Identification: 57414 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)

ID	Distance (m)	Direction	NGR	Details	
2A	177	SE	507400 103100	Incident Date: 18-Mar-2003 Incident Identification: 143932 Pollutant: Inert Materials and Wastes:Other Pollutant Pollutant Description: Construction and Demolition Materials and Wastes:Other	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
3A	177	SE	507400 103100	Incident Date: 18-Mar-2003 Incident Identification: 143932 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
4A	177	SE	507400 103100	Incident Date: 18-Mar-2003 Incident Identification: 143932 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
5	239	NW	507102 103508	Incident Date: 17-Oct-2003 Incident Identification: 196731 Pollutant: Contaminated Water Pollutant Description: Urban Run-Off	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
6	431	N	507207 103726	Incident Date: 11-May-2002 Incident Identification: 78070 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

2

The following NIRS List 1 records are represented as points on the Environmental Permits, Incidents and Registers Map:

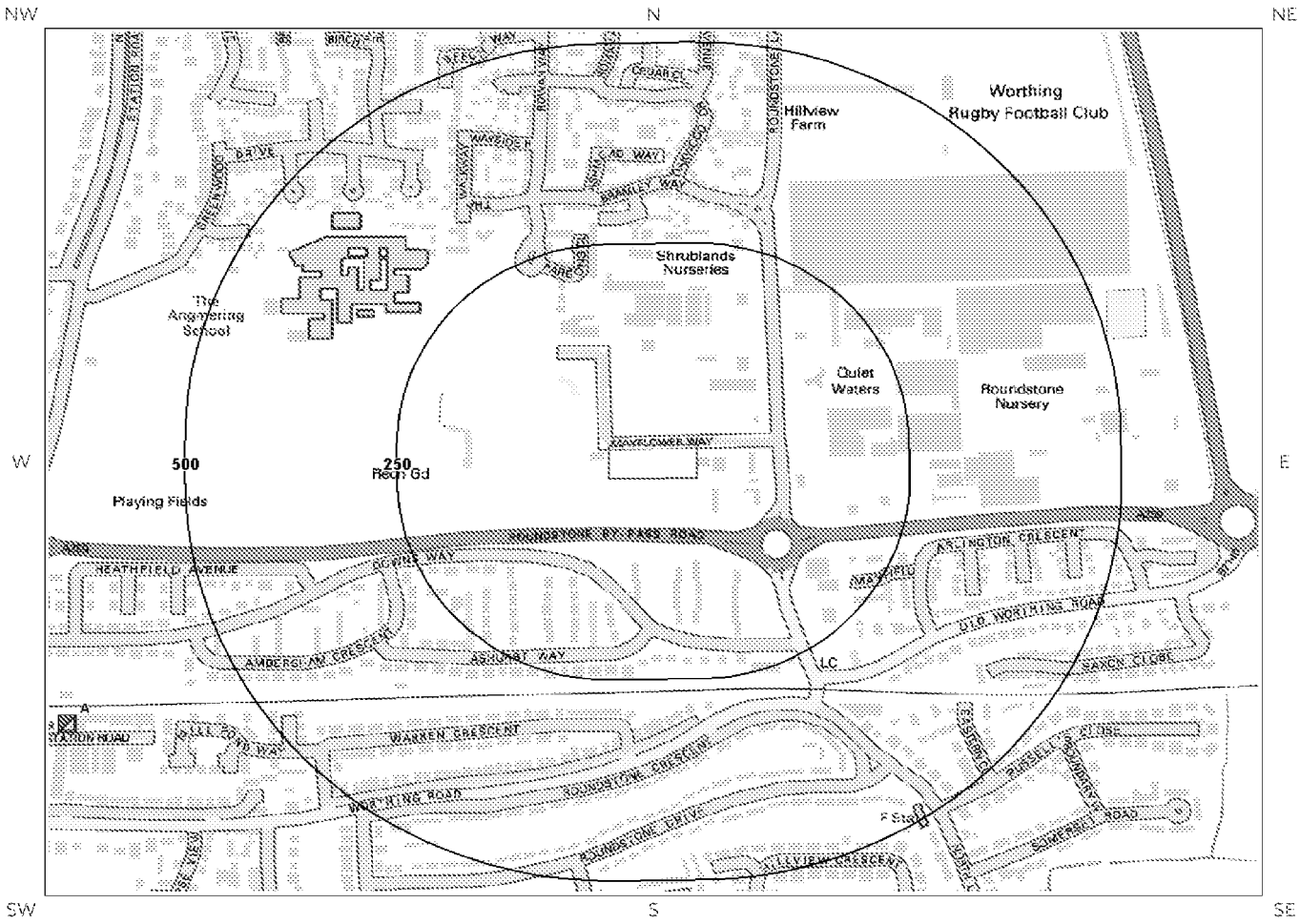
ID	Distance(m)	Direction	NGR	Details	
7	80	SW		Incident Date: 30-Jun-2000 Incident Identification: 6666.0 Catchments Name: ARUN Water Description: RIVER STRETCH (FRESHWATER) Water Course: A2 Incident Substantiated: Yes	Priority Description: Immediate (2 Hours) Waste Description: Not Available Water Impact: Minor Impact Land Impact: Minor Impact Air Impact: Significant Impact Action Taken: Not Available
8	403	N		Incident Date: 26-May-2001 Incident Identification: 15209.0 Catchments Name: COLNE Water Description: RIVER STRETCH (FRESHWATER) Water Course: GADE / G.U.C. Incident Substantiated: N/A	Priority Description: 1 Day (24 Hours) Waste Description: Not Available Water Impact: Significant Impact Land Impact: No Impact Air Impact: No Impact Action Taken: Not Available

2.4 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.

3. Landfill and Other Waste Sites Map



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Site Outline

250 / 500 Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

0

Database searched and no data found.

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

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

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

0

Database searched and no data found.

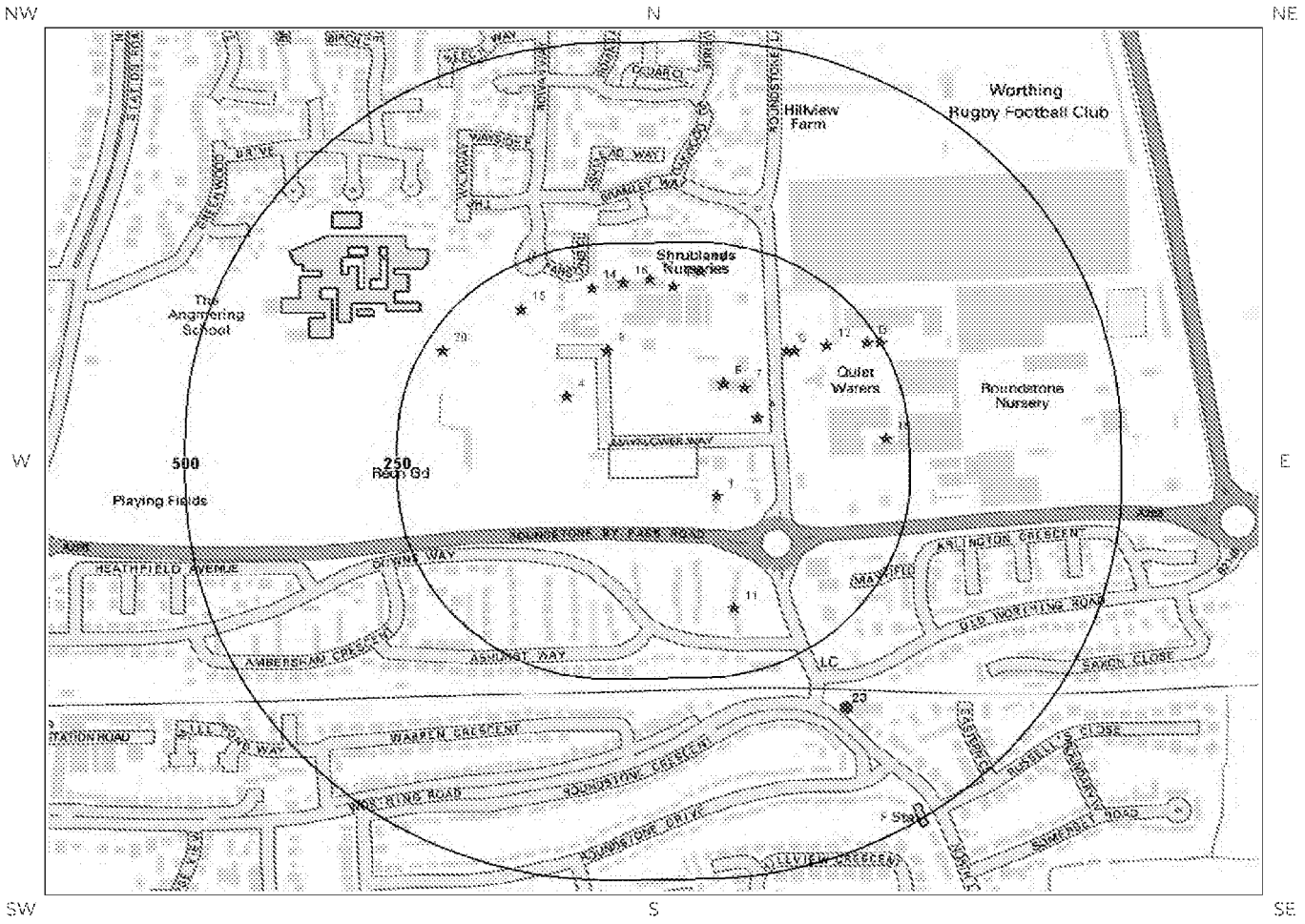
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

2

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	NGR	Details	
1A	707	SW	506570 102950	Site Address: Arun Works Services, Station Road, East Preston, West Sussex, BN16 3AA Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ARU001 EPR reference: - Operator: Arun District Council Waste Management licence No: 10107 Annual Tonnage: 4999.0	Issue Date: 03/11/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Arun Works Services Correspondence Address: Arun District Council, Station Road, East Preston, West Sussex, BN16 3AA
2A	707	SW	506570 102950	Site Address: Arun Works Services, Station Road, East Preston, West Sussex, BN16 3AA Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ARU001 EPR reference: EA/EPR/AP3790LE/S002 Operator: Arun District Council Waste Management licence No: 10107 Annual Tonnage: 0.0	Issue Date: 03/11/1999 Effective Date: - Modified: - Surrendered Date: 07/05/2009 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Arun Works Services Correspondence Address: -

4. Current Land Use Map



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Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 22

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	32	SE	Wood Design	507335 103231	Wood Design, Roundstone by-Pass, Angmering, Littlehampton, BN16 4BD	Furniture	Consumer Products
2A	78	NE	Love Cars Sussex Ltd	507383 103328	Love Cars Sussex Ltd, Mayflower Way, Angmering, Littlehampton, BN16 4AY	Secondhand Vehicles	Motoring
3A	78	NE	Roundstone Car Sales	507383 103328	Roundstone Car Sales, Mayflower Way, Angmering, Littlehampton, BN16 4AY	Secondhand Vehicles	Motoring
4	80	NW	Tank	507158 103356	Tank, BN16	Tanks (Generic)	Industrial Features
5B	81	NE	P H N Motors	507343 103371	P H N Motors, Mayflower Way, Angmering, Littlehampton, BN16 4AY	Scrap Metal Merchants	Recycling Services
6B	81	NE	D & A Motors	507343 103371	D & A Motors, Mayflower Way, Angmering, Littlehampton, BN16 4AY	Vehicle Repair, Testing and Servicing	Repair and Servicing
7	89	NE	Hillsons Ltd	507367 103367	Hillsons Ltd, Roundstone Lane, Angmering, Littlehampton, BN16 4AT	Vehicle Repair, Testing and Servicing	Repair and Servicing
8	118	N	Pylon	507206 103413	Pylon, BN16	Electrical Features	Infrastructure and Facilities
9C	156	NE	Pylon	507418 103412	Pylon, BN16	Electrical Features	Infrastructure and Facilities
10C	163	NE	Electricity Sub Station	507427 103413	Electricity Sub Station, BN16	Electrical Features	Infrastructure and Facilities
11	168	S	The Service Centre	507355 103092	The Service Centre, 121, Downs Way, East Preston, Littlehampton, BN16 1AD	Electrical Equipment Repair and Servicing	Repair and Servicing
12	196	NE	Gas Governor Station	507465 103419	Gas Governor Station, BN16	Gas Features	Infrastructure and Facilities
13	197	N	Works	507284 103493	Works, BN16	Unspecified Works Or Factories	Industrial Features
14	198	N	Works	507188 103491	Works, BN16	Unspecified Works Or Factories	Industrial Features
15	199	NW	Tank	507105 103464	Tank, BN16	Tanks (Generic)	Industrial Features
16	202	N	Works	507225 103497	Works, BN16	Unspecified Works Or Factories	Industrial Features

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
17	206	N	Works	507256 103502	Works, BN16	Unspecified Works Or Factories	Industrial Features
18	215	N	Overland Travel (Sussex) Ltd	507316 103511	Overland Travel (Sussex) Ltd, Roundstone Lane, Angmering, Littlehampton, BN16 4AT	Bus and Coach Stations, Depots and Companies	Public Transport, Stations and Infrastructure
19	223	E	Tank	507535 103303	Tank, BN16	Tanks (Generic)	Industrial Features
20	230	NW	Pylon	507012 103413	Pylon, BN16	Electrical Features	Infrastructure and Facilities
21D	236	NE	Tank	507513 103422	Tank, BN16	Tanks (Generic)	Industrial Features
22D	249	NE	Tank	507528 103422	Tank, BN16	Tanks (Generic)	Industrial Features

4.2 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 (m)	Direction	NGR	Company	Address	LPG	Status
23	336	SE	507488 102968	Obsolete	John Cooper Garages, North Lane, North Lane, Worthing Road, East Preston, Littlehampton, West Sussex, BN16 1BN	Not Applicable	Obsolete

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

---

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

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

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
RTDU-XSZC	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND, SILT AND CLAY

5.3 Bedrock and Solid Geology

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

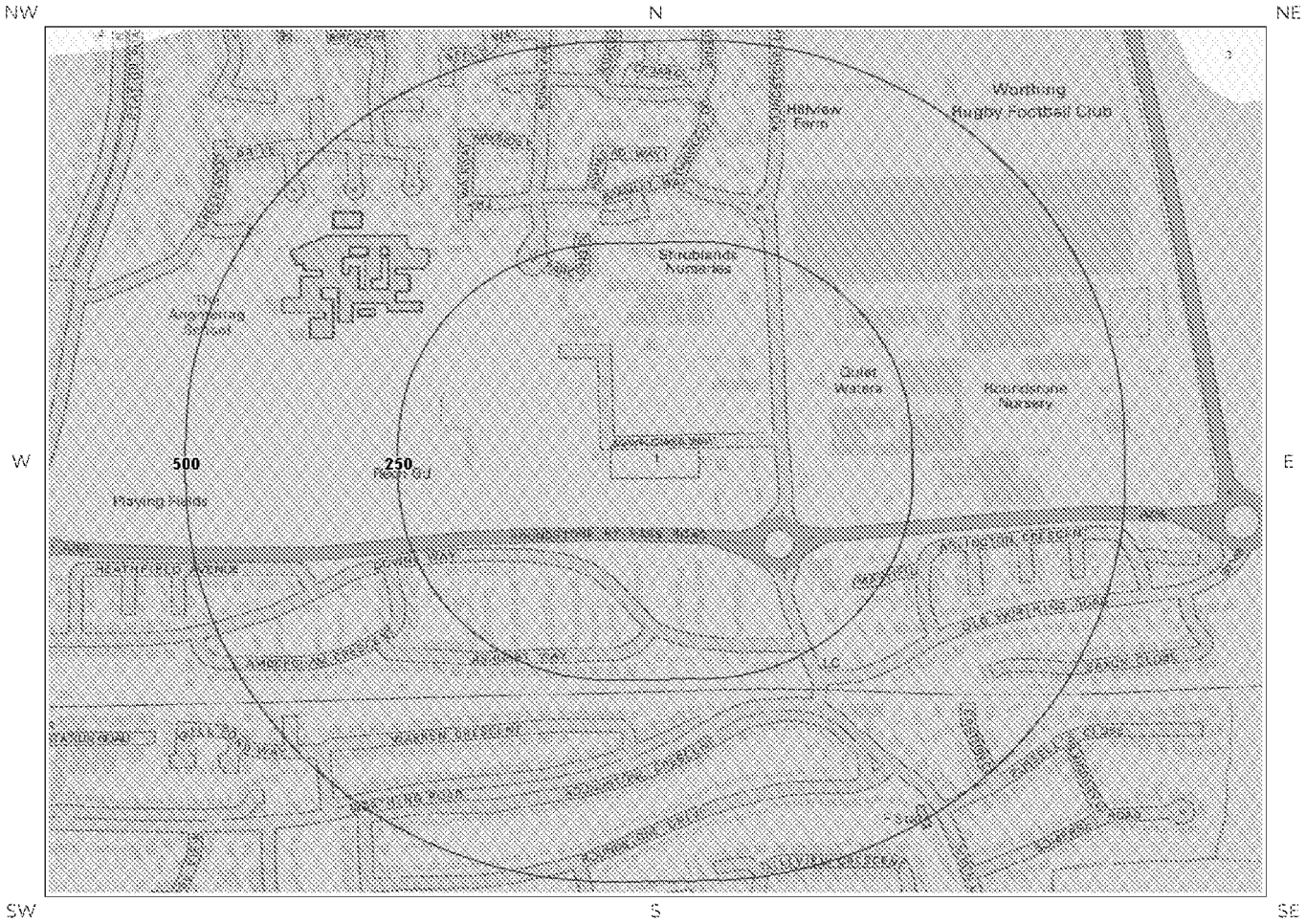
Lex Code	Description	Rock Type
NPCH-CHLK	NEW PIT CHALK FORMATION	CHALK

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

---

6 Hydrogeology and Hydrology

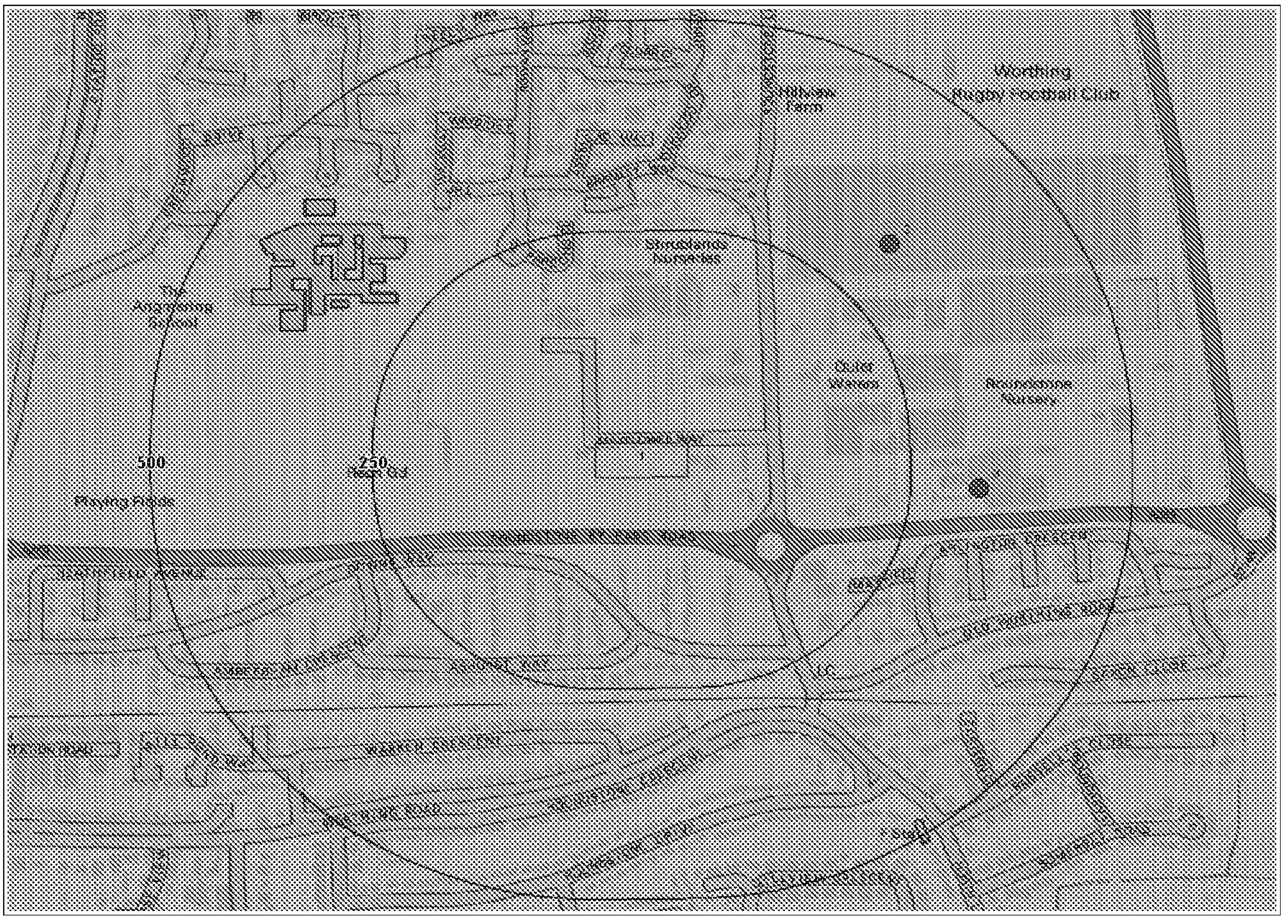
6a. Aquifer Within Superficial Geology



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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)

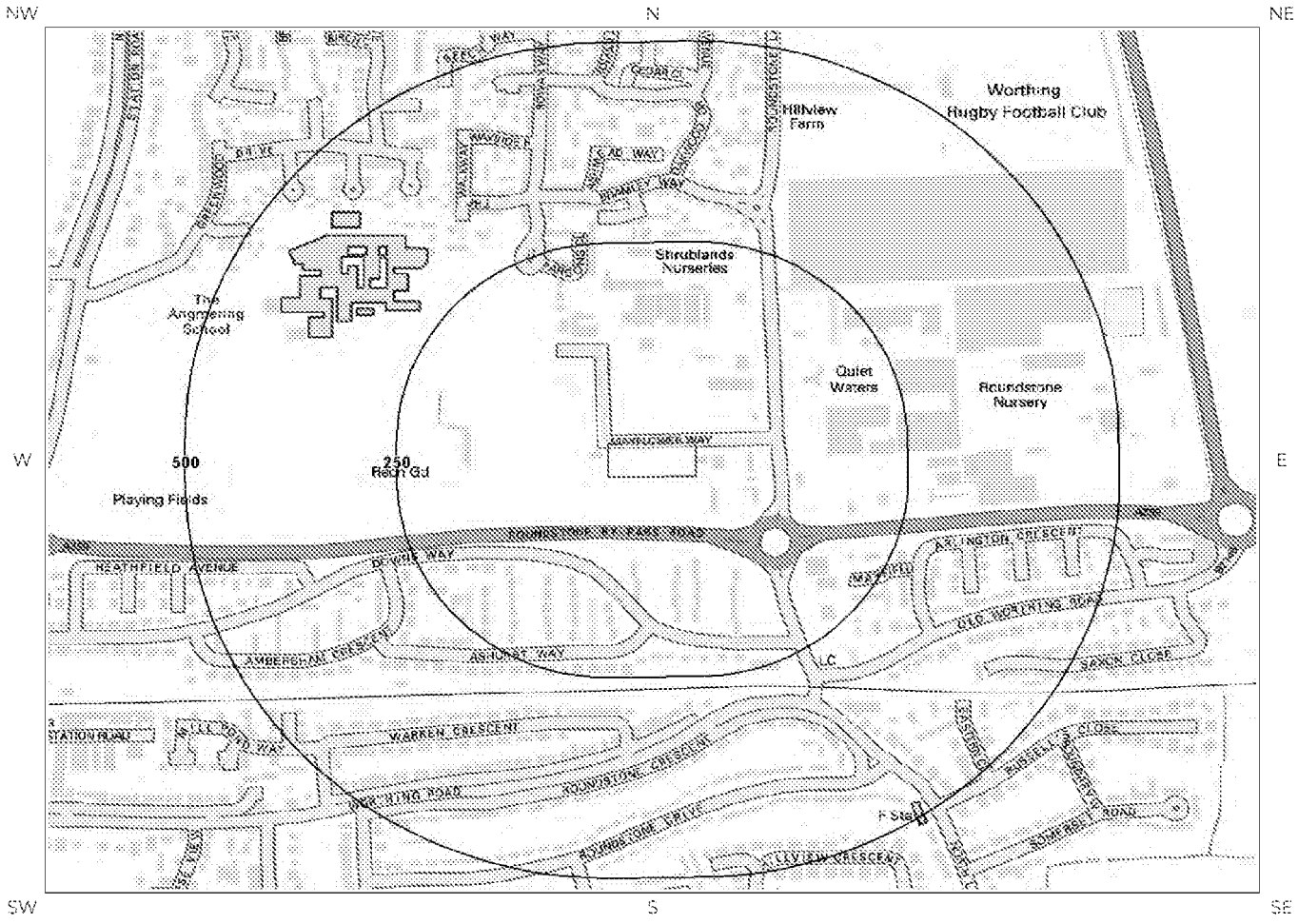
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



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- Site Outline
- Search Buffers (m): 250, 500
- Principal Aquifer
- Secondary (A) Aquifer - Permeable Layers
- Secondary (B) Aquifer - Lower Permeability Layers
- Groundwater Abstraction Licence
- Secondary Aquifer - Undifferentiated Layers
- Unproductive
- Unknown (lakes and landslip)
- Surface Water Abstraction Licence

6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



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Site Outline

250 / 500 Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2 - Outer Catchment

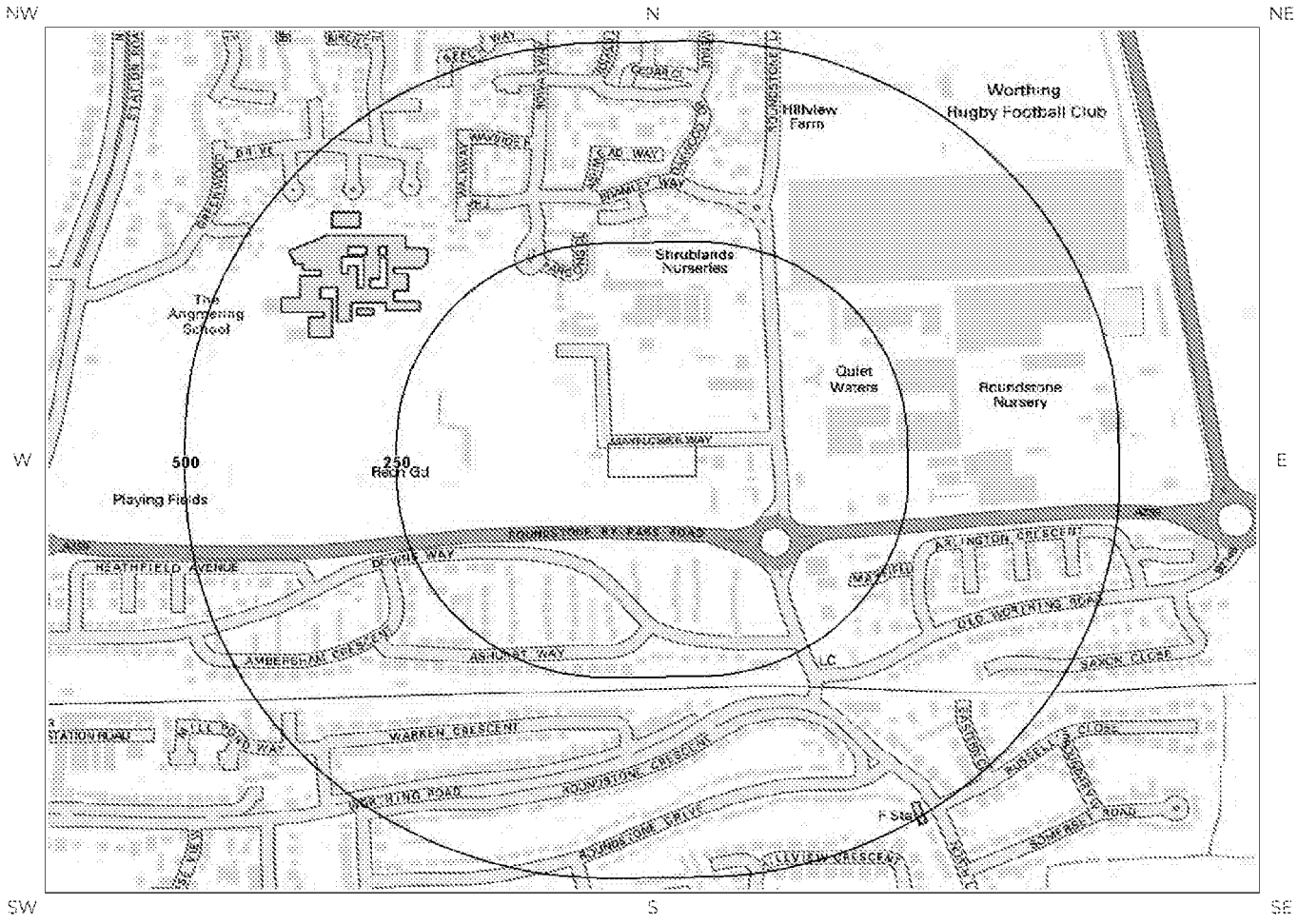
Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

Groundsure
LOCATION INTELLIGENCE

6d. Hydrogeology – Source Protection Zones within confined aquifer



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Site Outline

250 / 500 Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

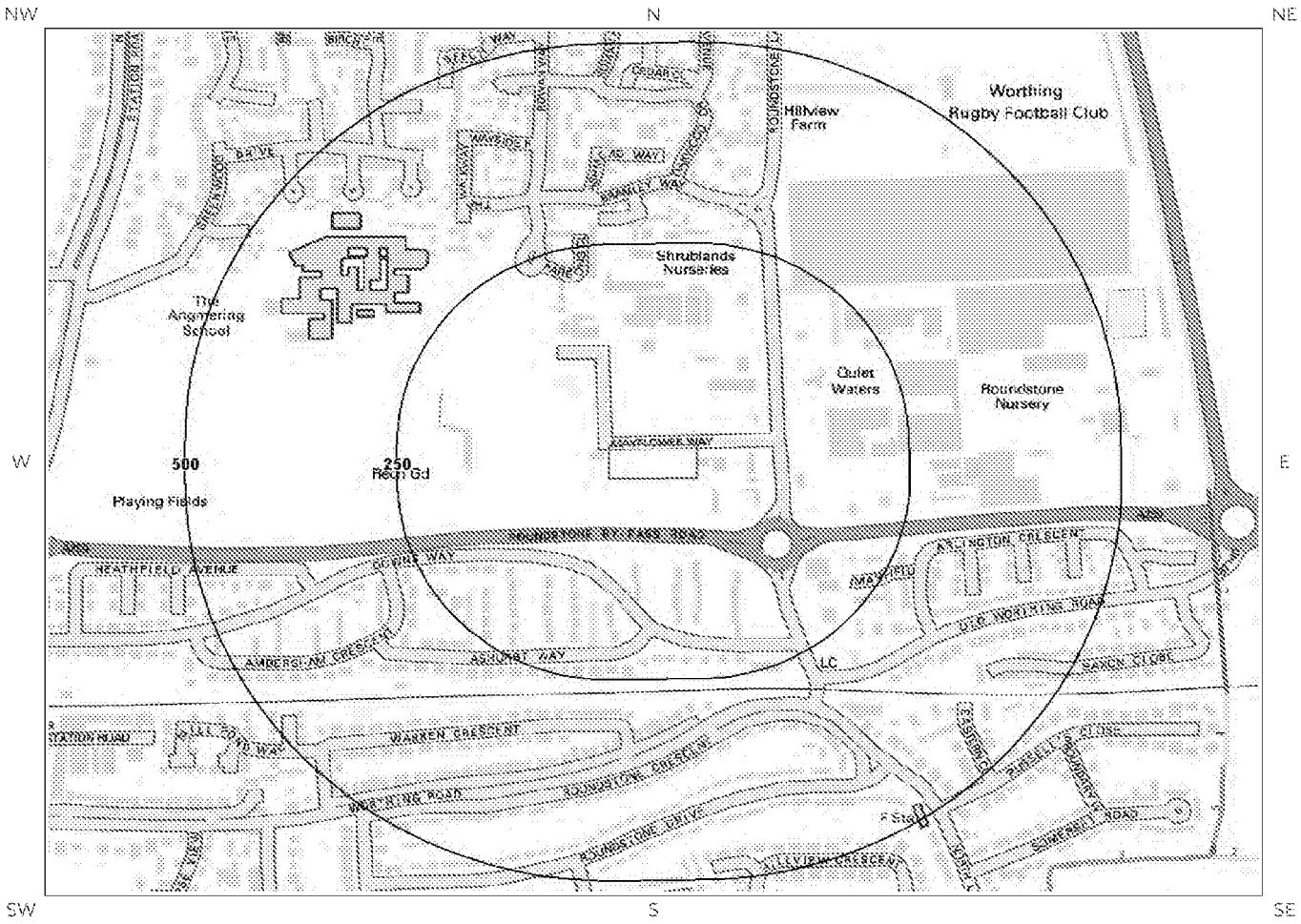
Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

Groundsure
LOCATION INTELLIGENCE

6e. Hydrology – Detailed River Network and River Quality



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Site Outline
250 Search Buffers (m)
500
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)

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

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

From 1 April 2010, the Environment Agency/Natural Resources Wales'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 Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	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

6.2 Aquifer within Bedrock Deposits

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

From 1 April 2010, the Environment Agency/Natural Resources Wales'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 Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

ARUN DISTRICT COUNCIL A/219/17/PL

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
2	326	NE	507540 103530	Status: Historical Licence No: 10/41/414002 Details: Horticultural Watering Direct Source: Southern Region Groundwater Point: West End Nurseries Data Type: Point Name: Van Heyningen Bros. Ltd	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WR.0392 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 11/1/1966 Version End Date:
3	327	E	507640 103240	Status: Active Licence No: 10/41/310106 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: Roundstone Nursery Data Type: Point Name: Roundstone Garden Centre Ltd	Annual Volume (m^3): 18200 Max Daily Volume (m^3): 191 Original Application No: WR.0596 Original Start Date: 27/1/1966 Expiry Date: - Issue No: 101 Version Start Date: 8/5/2015 Version End Date:
Not shown	530	N	507140 103820	Status: Historical Licence No: 10/41/414018 Details: Horticultural Watering Direct Source: Southern Region Groundwater Point: Fresh Acres Nurseries Data Type: Point Name: Fresh Acres Nurseries Ltd	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WR.0295 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 19/7/1967 Version End Date:
Not shown	1465	NW	505870 103890	Status: Active Licence No: 10/41/414009 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: Black Ditch At Ham Manor Golf Club Data Type: Point Name: Ham Manor Golf Club Ltd	Annual Volume (m^3): 11783 Max Daily Volume (m^3): 109.1 Original Application No: WR.0187 Original Start Date: 7/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/3/2016 Version End Date:
Not shown	1511	NE	508580 104120	Status: Active Licence No: 10/41/310112 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: Roundstone Farm Ferring Data Type: Point Name: Langmead	Annual Volume (m^3): 77270 Max Daily Volume (m^3): 1820 Original Application No: 169/0753 Original Start Date: 3/11/1987 Expiry Date: - Issue No: 100 Version Start Date: 8/6/2009 Version End Date:
Not shown	1611	E	508900 103570	Status: Historical Licence No: 10/41/310103 Details: General Farming & Domestic Direct Source: Southern Region Groundwater Point: Reynards Nursery Data Type: Point Name: Fox Esq	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WR.0061 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 1/1/1971 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1772	SW	505630 102450	Status: Historical Licence No: 10/41/310009 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: Aquadom Station Road Rustington Borehole 1 Data Type: Point Name: Southern Water Services Ltd	Annual Volume (m^3): 150018 Max Daily Volume (m^3): 636.4 Original Application No: WR.0683 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 8/6/2009 Version End Date:
Not shown	1772	SW	505630 102450	Status: Historical Licence No: 10/41/310009 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Southern Region Groundwater Point: Aquadom Station Road Rustington Borehole 2 Data Type: Point Name: Southern Water Services Ltd	Annual Volume (m^3): 150018 Max Daily Volume (m^3): 636.4 Original Application No: WR.0683 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 8/6/2009 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1571	W	505620 104190	Status: Active Licence No: 10/41/414021 Details: Spray Irrigation - Direct Direct Source: Southern Region Surface Waters Point: Black Ditch At Ham Manor Farm Rustington Data Type: Line Name: Rustington Golf Centre Ltd	Annual Volume (m^3): 31822 Max Daily Volume (m^3): 3000 Application No: WR.0761 Original Start Date: 8/3/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/4/2016 Version End Date:
Not shown	1571	W	505620 104190	Status: Active Licence No: 10/41/414021 Details: Spray Irrigation - Storage Direct Source: Southern Region Surface Waters Point: Black Ditch At Ham Manor Farm Rustington Data Type: Line Name: Rustington Golf Centre Ltd	Annual Volume (m^3): 31822 Max Daily Volume (m^3): 3000 Application No: WR.0761 Original Start Date: 8/3/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/4/2016 Version End Date:

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (6c):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1772	SW	505630 102450	Status: Historical Licence No: 10/41/310009 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: Aquadom Station Road Rustington Borehole 1 Data Type: Point Name: Southern Water Services Ltd	Annual Volume (m^3): 150018 Max Daily Volume (m^3): 636.4 Original Application No: WR.0683 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

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

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

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

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
319	W	Major Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.

6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? No

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? No

Database searched and no data found.

6.11 Surface Water Features

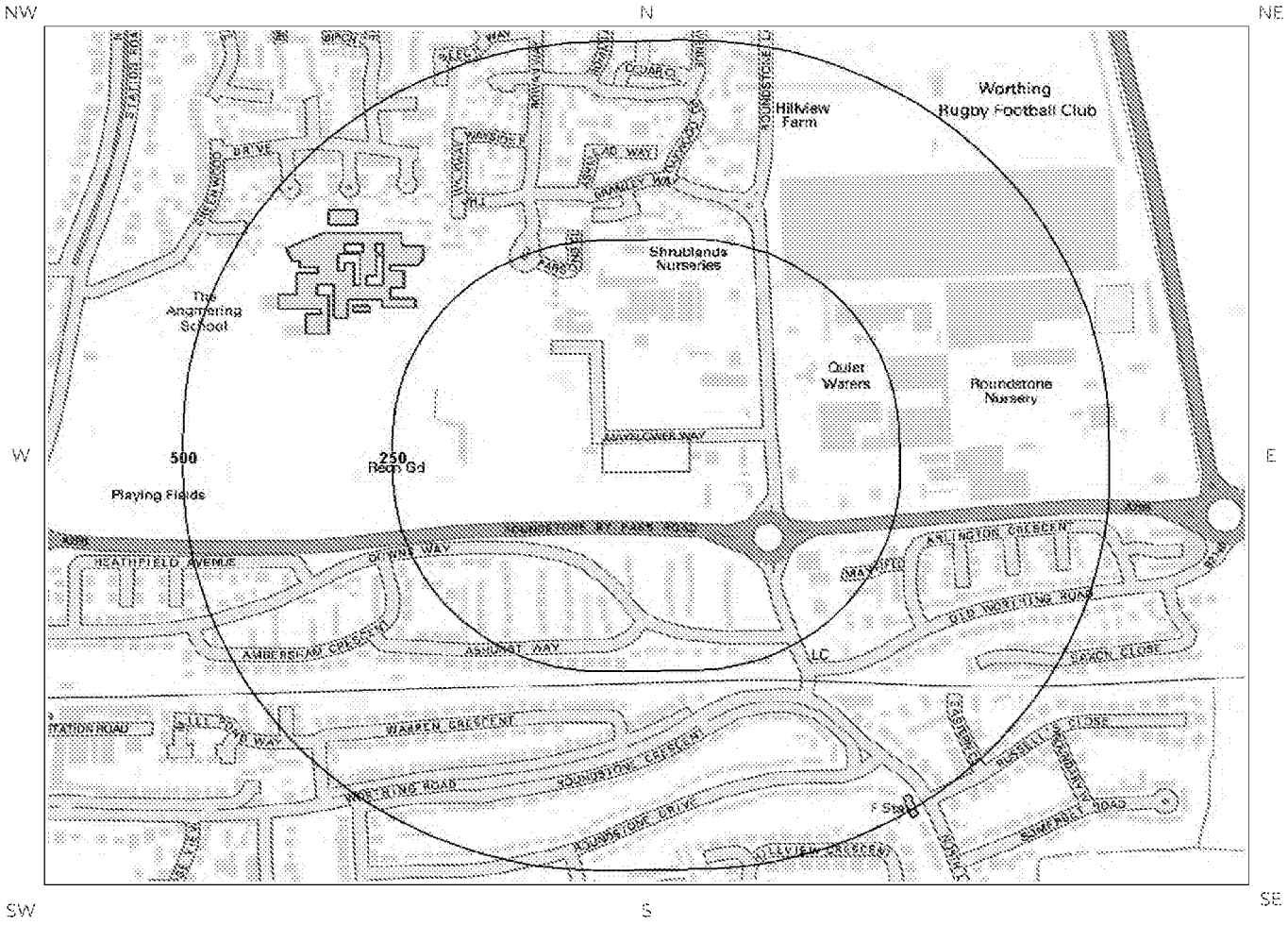
Are there any surface water features within 250m of the study site? Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
195	W

Groundsure
LOCATION INTELLIGENCE

7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



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Site Outline

Search Buffers (m)

Zone 2 Floodplain

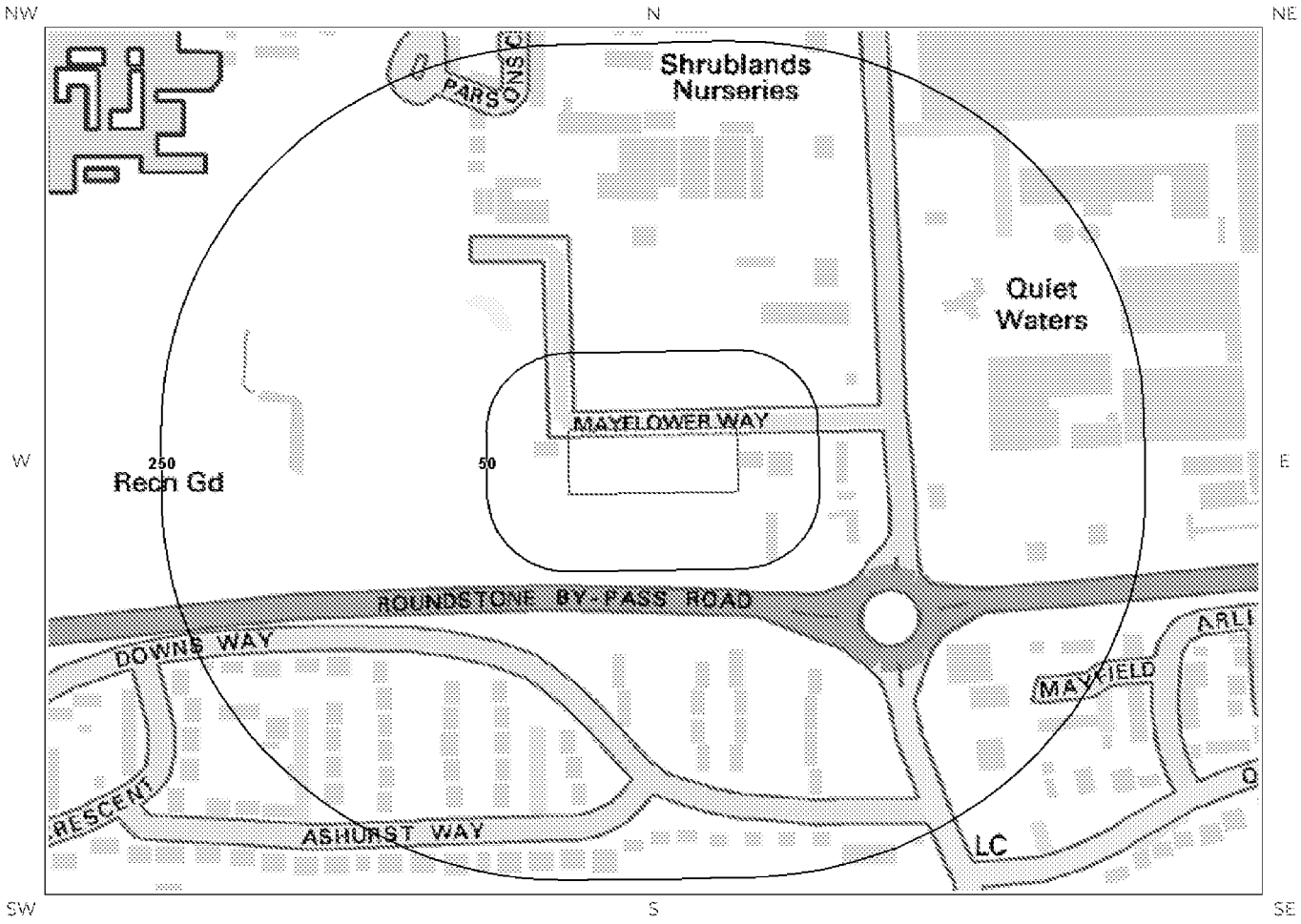
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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Site Outline

Search Buffers (m)

RoFRaS Rating

Very Low

Low

Medium

High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? No

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? No

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

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

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

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

7.6 Areas benefiting from Flood Storage

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

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

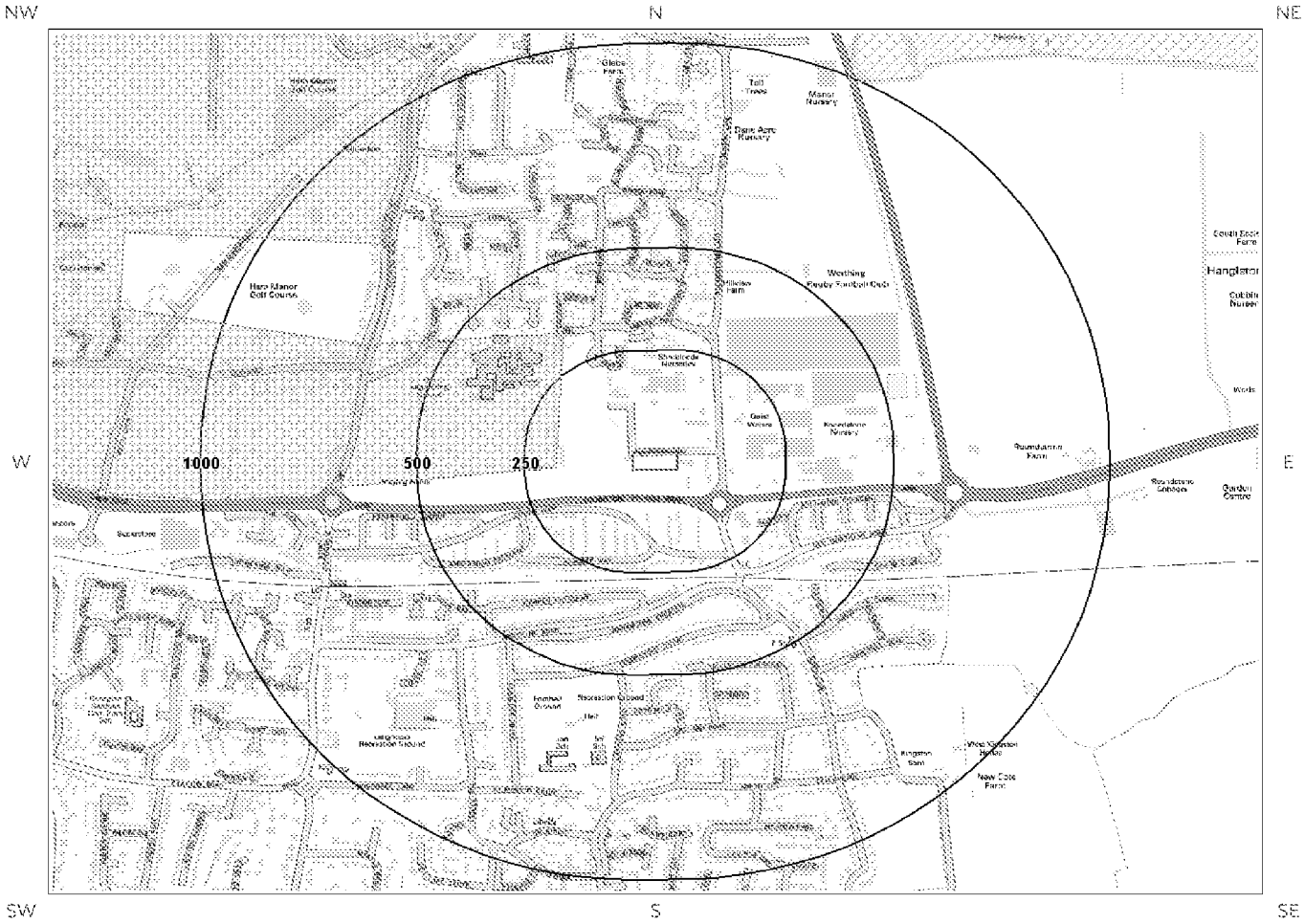
7.8 Groundwater Flooding Confidence Areas

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

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.

8. Designated Environmentally Sensitive Sites Map



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Site Outline

Search Radius (mile)

AONB
National Park
SSSI
Special Protection Areas
Nitrate Vulnerable Zones
Green Belt
Environmentally Sensitive Areas
Special Areas of Conservation
World Heritage Sites
Nitrate Sensitive Areas
Ancient Woodland
National Nature Reserve
Local Nature Reserves
Ramsar Sites

8. Designated Environmentally Sensitive Sites

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

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

1

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1833	N	UNKNOWN	Ancient and Semi-Natural Woodland

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

1

The following National Park records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NP Name	Data Source
1	988	NE	South Downs	Natural England

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	NVZ Name	Data Source
2	176	W	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 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 Geo Insight, available from our website. The following information has been found:

9.1.1 Shrink Swell

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

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

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 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.

9.1.3 Soluble Rocks

What is the maximum Soluble 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
Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.

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

9.1.4 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.

9.1.5 Collapsible Rocks

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

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

Hazard
Slight possibility for collapsible deposit problems after major changes in loading or groundwater conditions. Normal maintenance to avoid large amounts of water entering the ground through pipe leakage or soak-aways should reduce the likelihood of problems due to collapsible deposits. For new build, assess the possibility of collapsible (loessic) deposits in ground investigation. For existing property, no significant increase in insurance risk from collapsible deposits is likely.

9.1.6 Running Sand

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

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

Hazard
Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property no significant increase in insurance risk due to running sand problems is likely.

9.2 Radon

9.2.1 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 in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

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

9.2.2 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.

10. Mining

10.1 Coal Mining

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

Database searched and no data found.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

Distance (m)	Direction	Name	Commodity	Assessment of likelihood
0.0	On Site	Not available	Chalk	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

Past underground mine workings are uncommon, localised and of limited area. The rock types present in this area are such that minor mineral veins may be present within them on which it is possible that there have been attempts to work these by underground methods and/or it is possible that small scale underground extraction of other materials may have occurred. All such occurrences are likely to be restricted in size and infrequent. It should be noted, however, that there is always the possibility of the existence of other sub-surface excavations, such as wells, cess pits, follies, air raid shelters/bunkers and other military structures etc. that could affect surface ground stability but which are outside the scope of this dataset. However, if in a coalfield area you should still consider a Coal Authority mining search for the area of interest.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No
Guidance: No Guidance Required.

Contact Details

[redacted]

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British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

Public Health England

The Coal Authority

OS Data

getmapping

Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.
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https://www.groundsure.com/terms-and-conditions-sept-2016

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[redacted]

Groundsure Reference:	HMD-137-4090049
Your Reference:	J13227DK_ANGMERING
Report Date	17 Jul 2017
Report Delivery Method:	Email - pdf

Geo Insight

Address: Land at, MAYFLOWER WAY, LITTLEHAMPTON, BN16 4AY

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

[redacted]

Managing Director
Groundsure Limited

Enc.
Groundsure Geo Insight

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Geo Insight

Address:	Land at, MAYFLOWER WAY, LITTLEHAMPTON, BN16 4AY
Date:	17 Jul 2017
Reference:	HMD-137-4090049
Client:	Southern Testing Laboratories Ltd HQ

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	07-Jun-2015
Grid Reference:	507262,103274
Site Size:	0.43ha

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Overview of Findings

The Groundsure Geo Insight 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 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal 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.

Section 1: Geology 1:10,000 Scale

1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	Yes
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and 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 of faults within 500m of the study site boundary at 1:10,000 scale?	Yes

Section 2: Geology 1:50,000 Scale

2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

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Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and Faults	2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?	Yes
	2.3.3 Are there any records of faults within 500m of the study site boundary?	Yes

Section 3: Radon

3. Radon	3.1Is 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 in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.
	3.2Radon Protection	No radon protective measures are necessary.

Section 4: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	1	0	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	1	0	0	0	0
5.5 Non-Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

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Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0

Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Low
6.2 Landslides	Very Low
6.3 Ground Dissolution of Soluble Rocks	Very Low
6.4 Compressible Deposits	Negligible
6.5 Collapsible Deposits	Low
6.5 Running Sand	Low

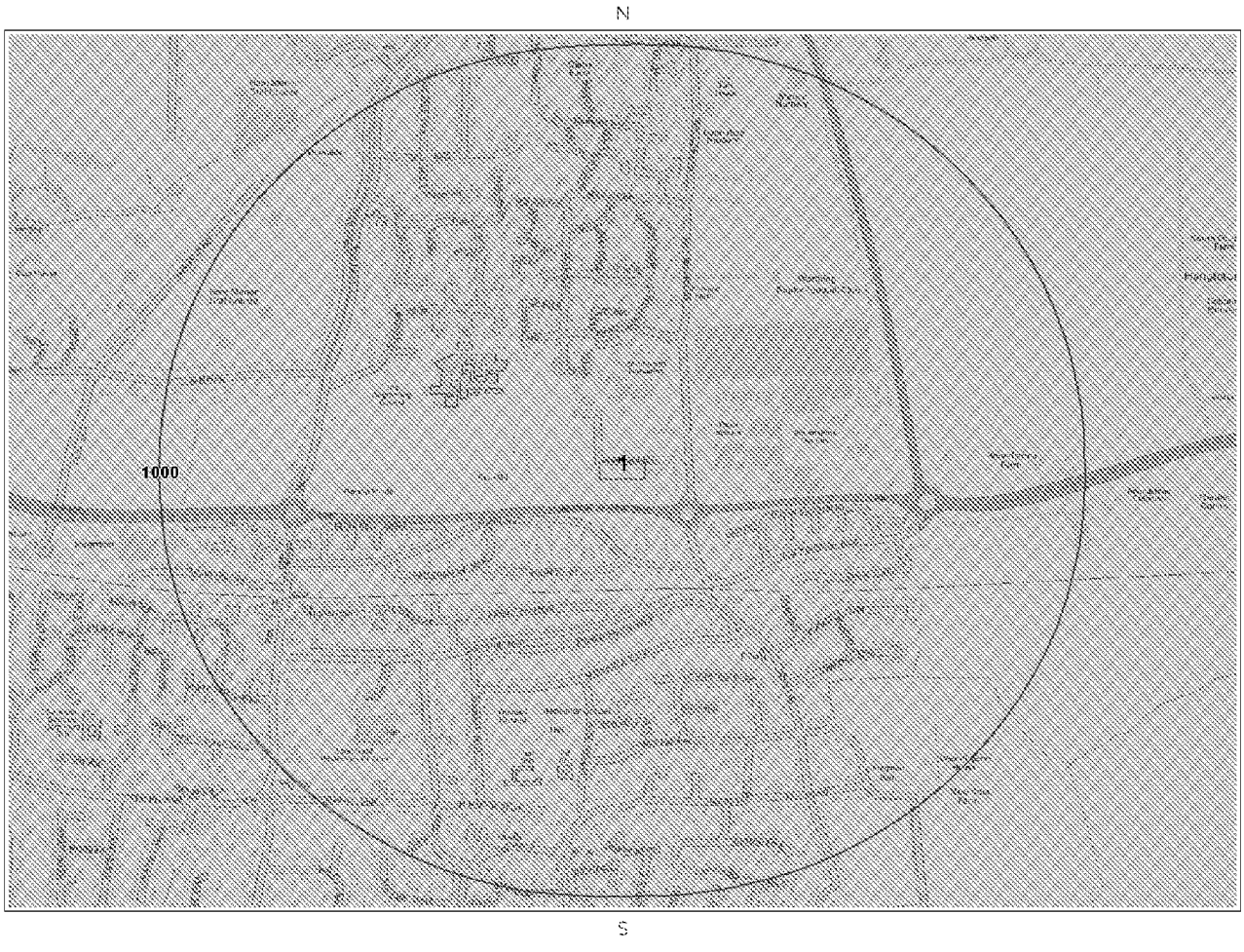
Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	0	0	1

Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	1	0	0

Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500
9.1 Tunnels	0	0	0	Not Searched
9.2 Historical Railway and Tunnel Features	0	0	0	Not Searched
9.3 Historical Railways	0	0	0	Not Searched
9.4 Active Railways	0	0	0	Not Searched
9.5 Railway Projects	0	0	0	0

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1:10,000 Scale Availability



1_10,000 Availability Legend

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Site Outline

Full Coverage

Partial Coverage

No Coverage

50
250
Search Buffers (m)

Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	No deposits are mapped	Full	Full	No coverage
N2	1703.0	Some deposits are mapped	Full	Full	Some deposits are mapped

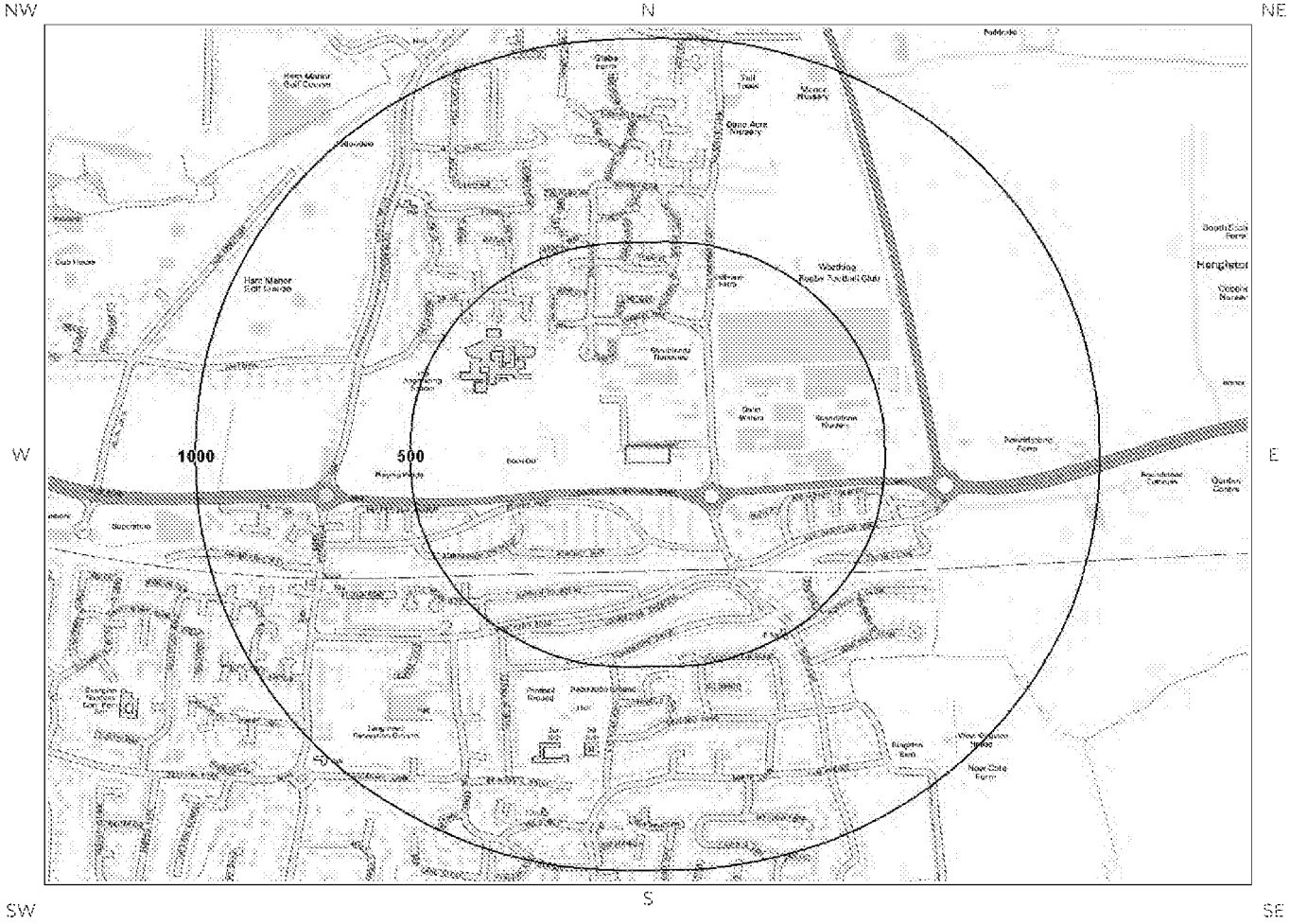
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

1 Geology (1:10,000 scale).

1.1 Artificial Ground Map (1:10,000 scale)



Artificial Ground Legend

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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

1. Geology 1:10,000 scale

1.1 Artificial Ground

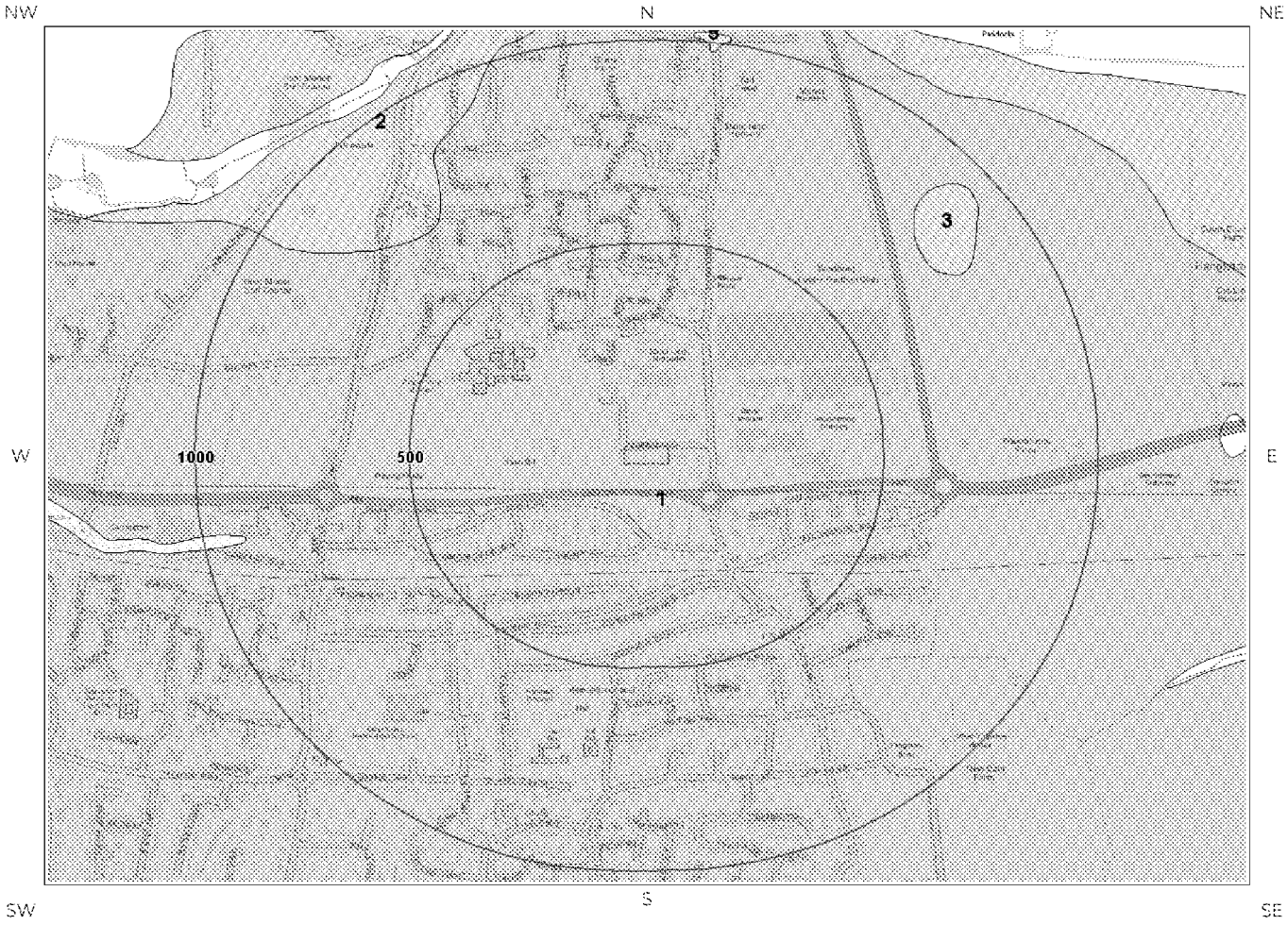
The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

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1.2 Superficial Deposits and Landslips Map (1:10,000 scale)



Artificial Ground Legend

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Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	BRK-Z	Brickearth - Silt	Silt

1.2.2 Landslip

Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale?

No

Database searched and no data found.

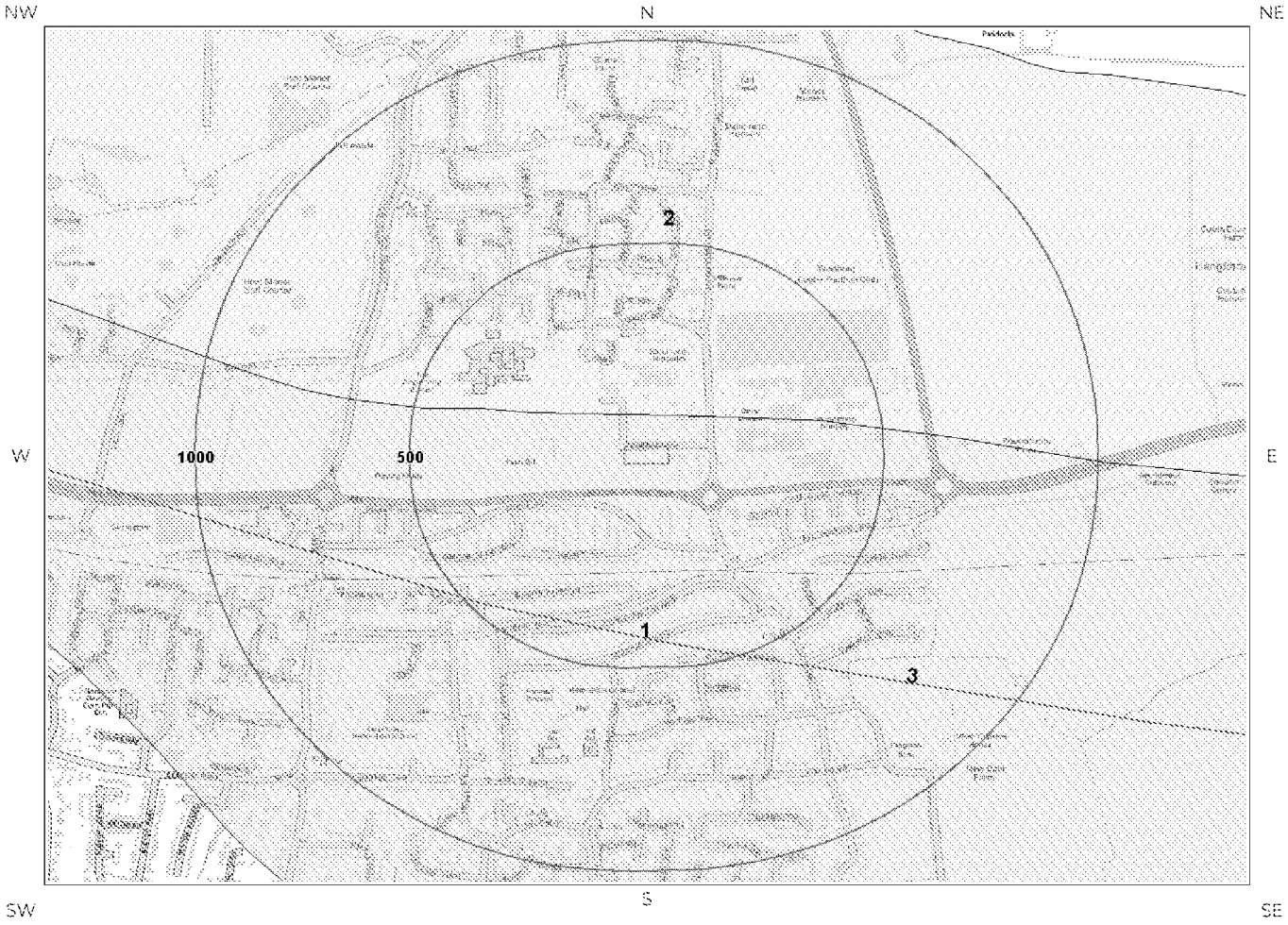
The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

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.

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1.3 Bedrock and Faults Map (1:10,000 scale)



Bedrock and Faults Legend

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Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and Faults

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	NPCH-CHLK	New Pit Chalk Formation - Chalk	Turonian Age
2	78.0	N	LPCK-CHLK	Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation And Portsdown Chalk Formation (undifferentiated) - Chalk	Campanian Age - Turonian Age

1.3.2 Faults

Are there any records of Faults within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	Category Description	Feature Description
3	406.0	S	FOLD_AXIS	Axial plane trace of major anticline

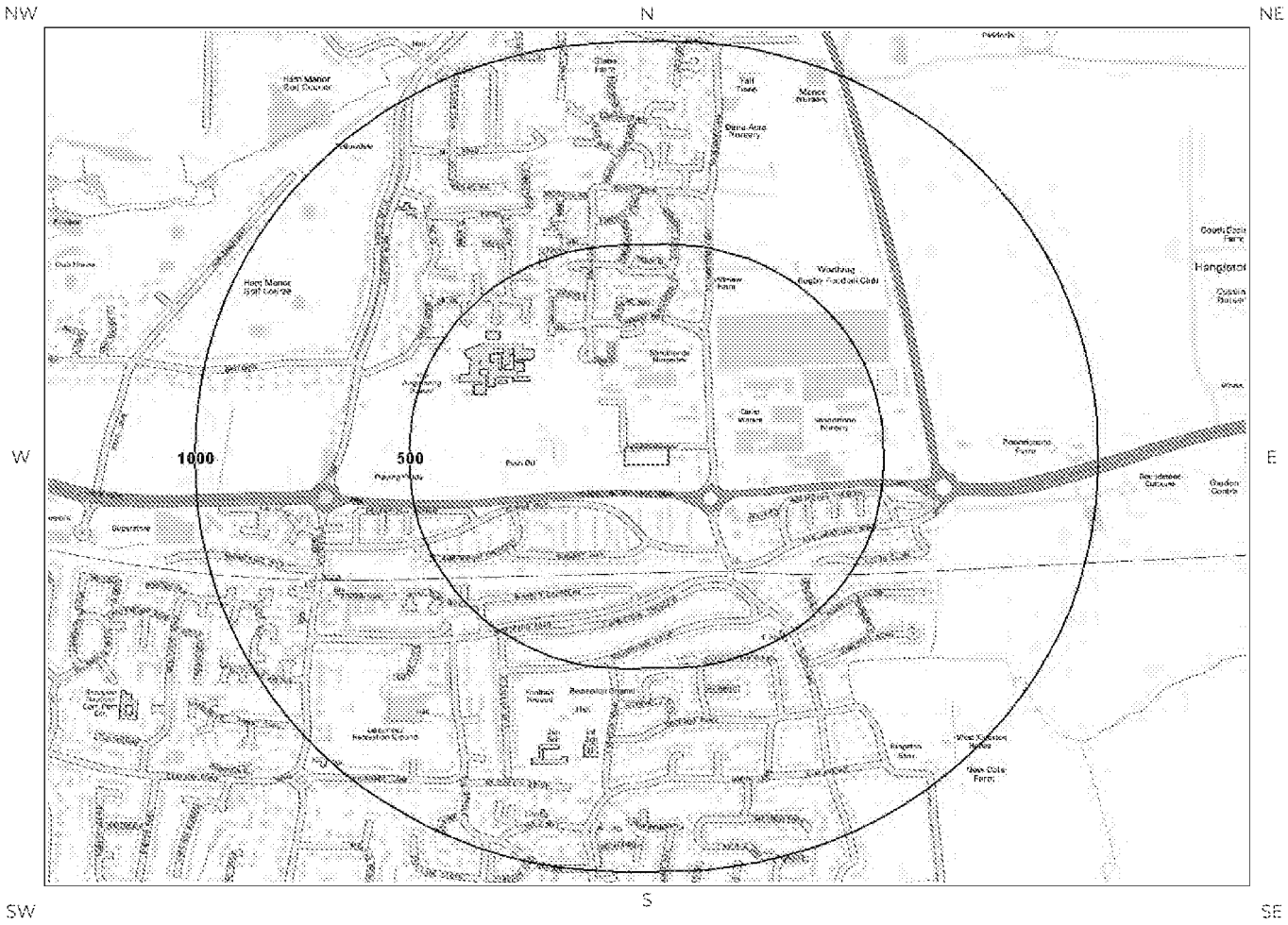
The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

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.

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2 Geology 1:50,000 Scale

2.1 Artificial Ground Map



Ground Workings Legend

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Site Outline

Search Buffers (m)

500

1000

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

Reclaimed Ground

2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 317

2.1.1 Artificial/ Made Ground

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

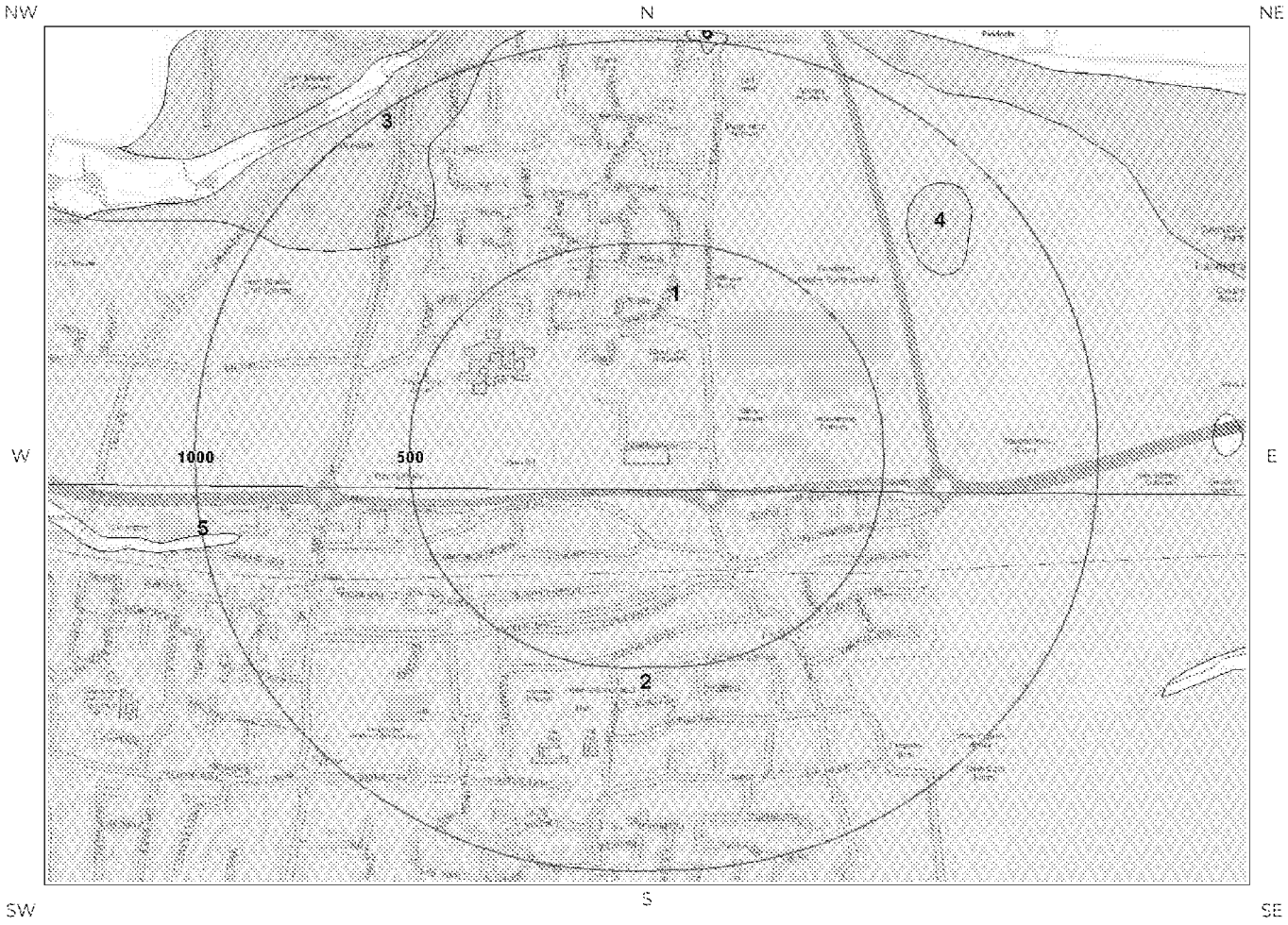
Database searched and no data found.

2.1.2 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.

2.2 Superficial Deposits and Landslips Map (1:50,000 scale)



Ground Workings Legend

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Site Outline

500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	RTDU-XSZC	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND, SILT AND CLAY
2	61.0	S	RTDU-XSZC	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND, SILT AND CLAY

2.2.2 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	High	Low

2.2.3 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, there 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.

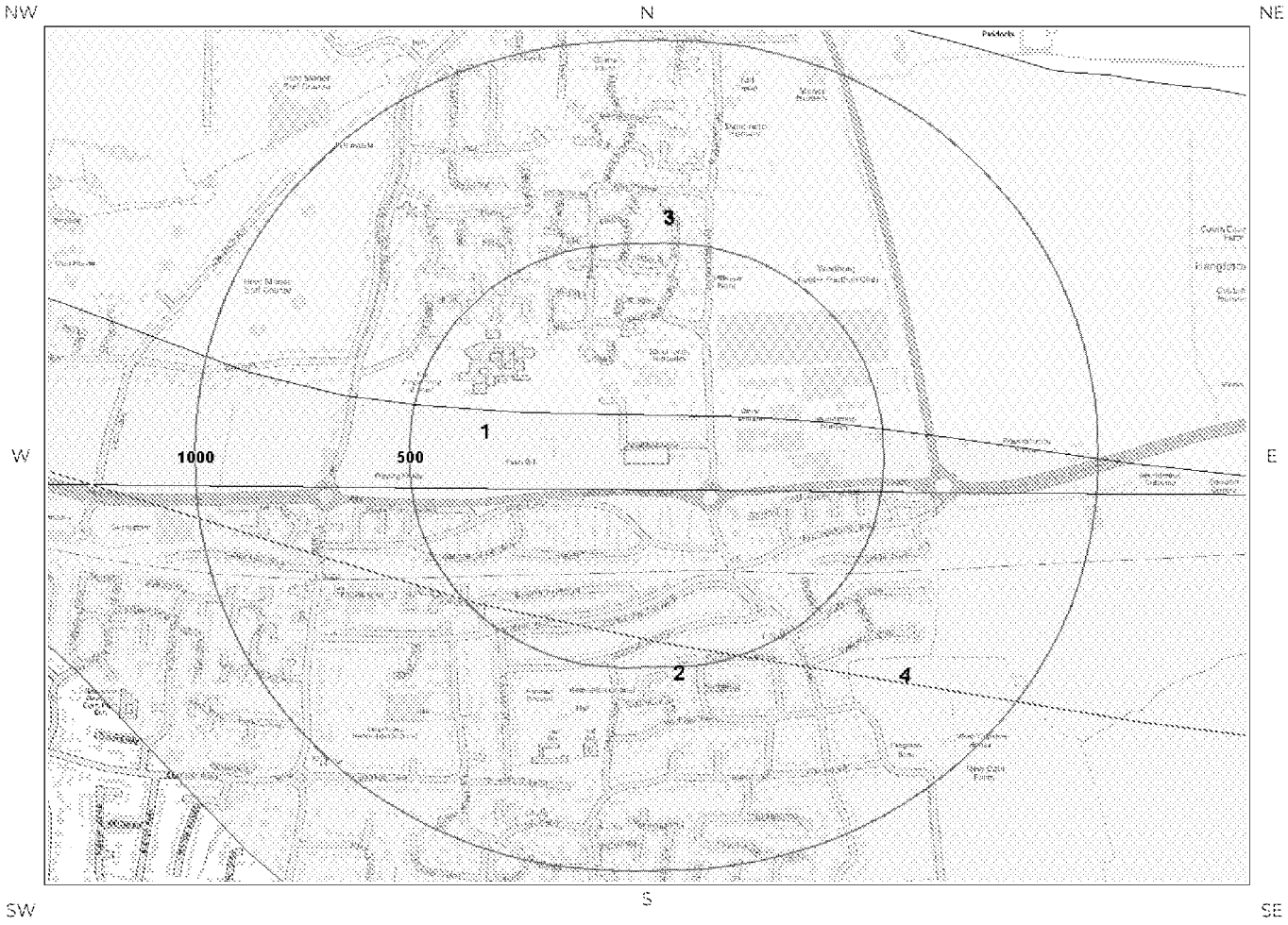
2.2.4 Landslip Permeability

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

Database searched and no data found.

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2.3 Bedrock and Faults Map (1:50,000 scale)



Ground Workings Legend

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Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 317

2.3.1 Bedrock/Solid Geology

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

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	NPCH-CHLK	NEW PIT CHALK FORMATION - CHALK	TURONIAN
2	61.0	S	NPCH-CHLK	NEW PIT CHALK FORMATION - CHALK	TURONIAN
3	78.0	N	LPCK-CHLK	LEWES NODULAR CHALK FORMATION, SEAFORD CHALK FORMATION, NEWHAVEN CHALK FORMATION, CULVER CHALK FORMATION AND PORTSDOWN CHALK FORMATION (UNDIFFERENTIATED) - CHALK	TURONIAN

2.3.2 Permeability of Bedrock Ground

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

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Very High	Very High

2.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? Yes

ID	Distance	Direction	Category Description	Feature Description
4	409.0	S	FOLD_AXIS	Axial plane trace of major anticline

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 nation wide coverage.

3 Radon Data

3.1 Radon Affected Areas

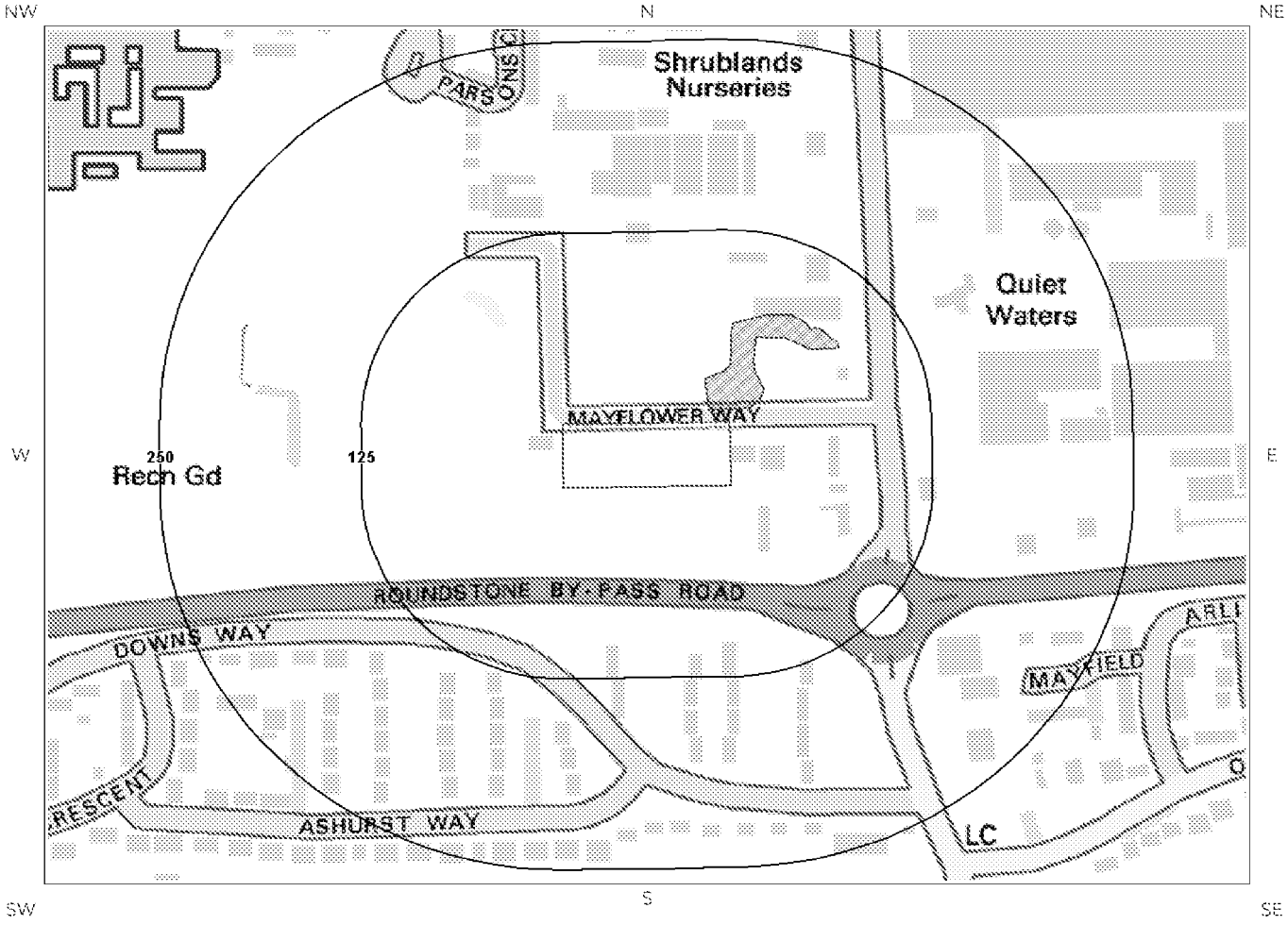
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

3.2 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.

---

4 Ground Workings Map



Ground Workings Legend

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Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

4 Ground Workings

4.1 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

ID	Distance (m)	Direction	NGR	Use	Date
1	7.0	N	507319 103335	Pond	1974

4.2 Historical Underground Working 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.

4.3 Current Ground Workings

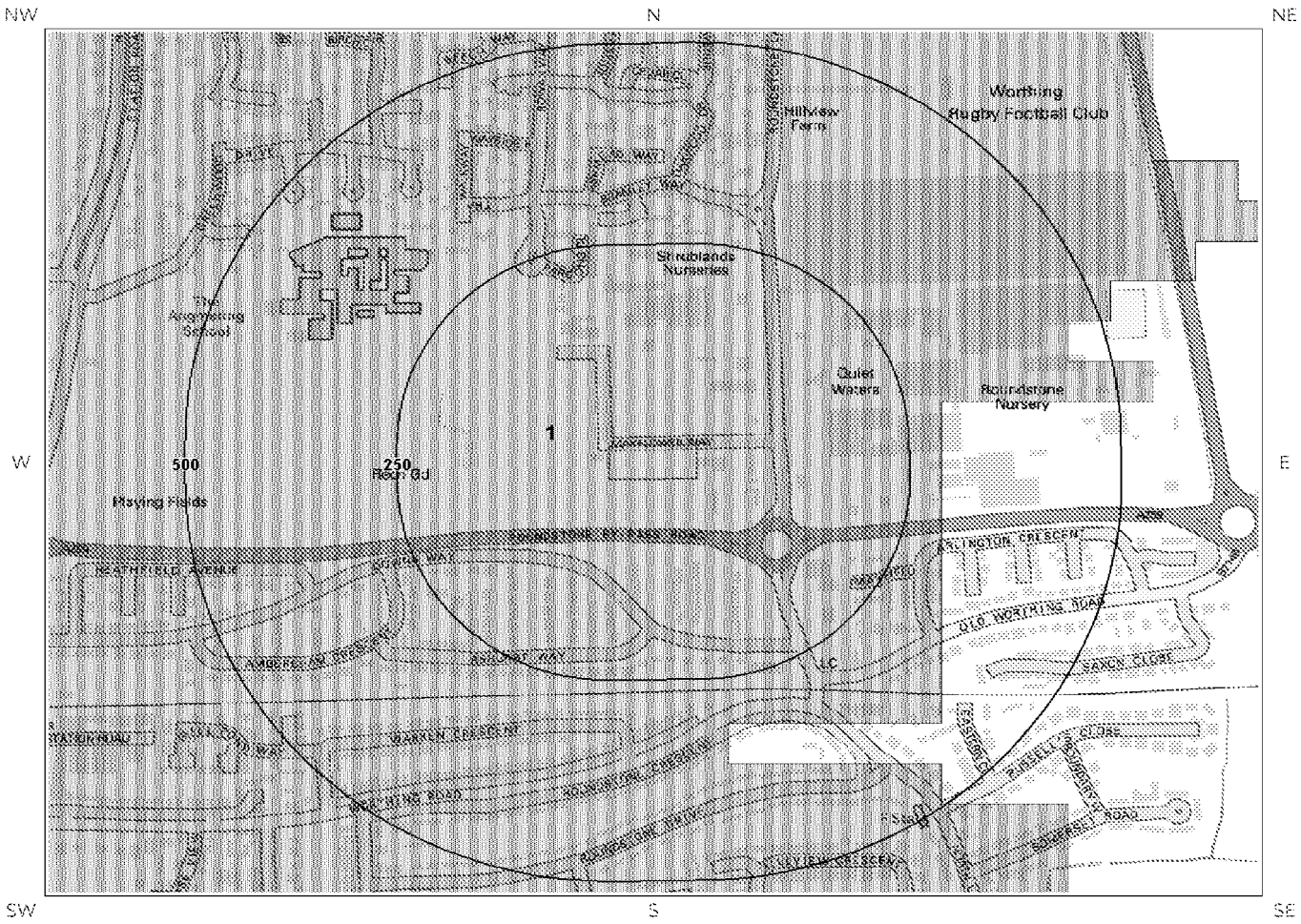
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British isles.

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

Database searched and no data found.

Groundsure
LOCATION INTELLIGENCE

5 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

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Site Outline

250
500
Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities

Non-Coal Mining

Highly likely

Likely

Unlikely

Highly unlikely

Rare

5 Mining, Extraction & Natural Cavities

5.1 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.

5.2 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.

5.3 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? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

5.4 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? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Not available	Chalk	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

---

5.5 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.

5.6 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.

5.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

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

Database searched and no data found.

5.8 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.

5.9 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..

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

Database searched and no data found.

5.10 Clay Mining

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

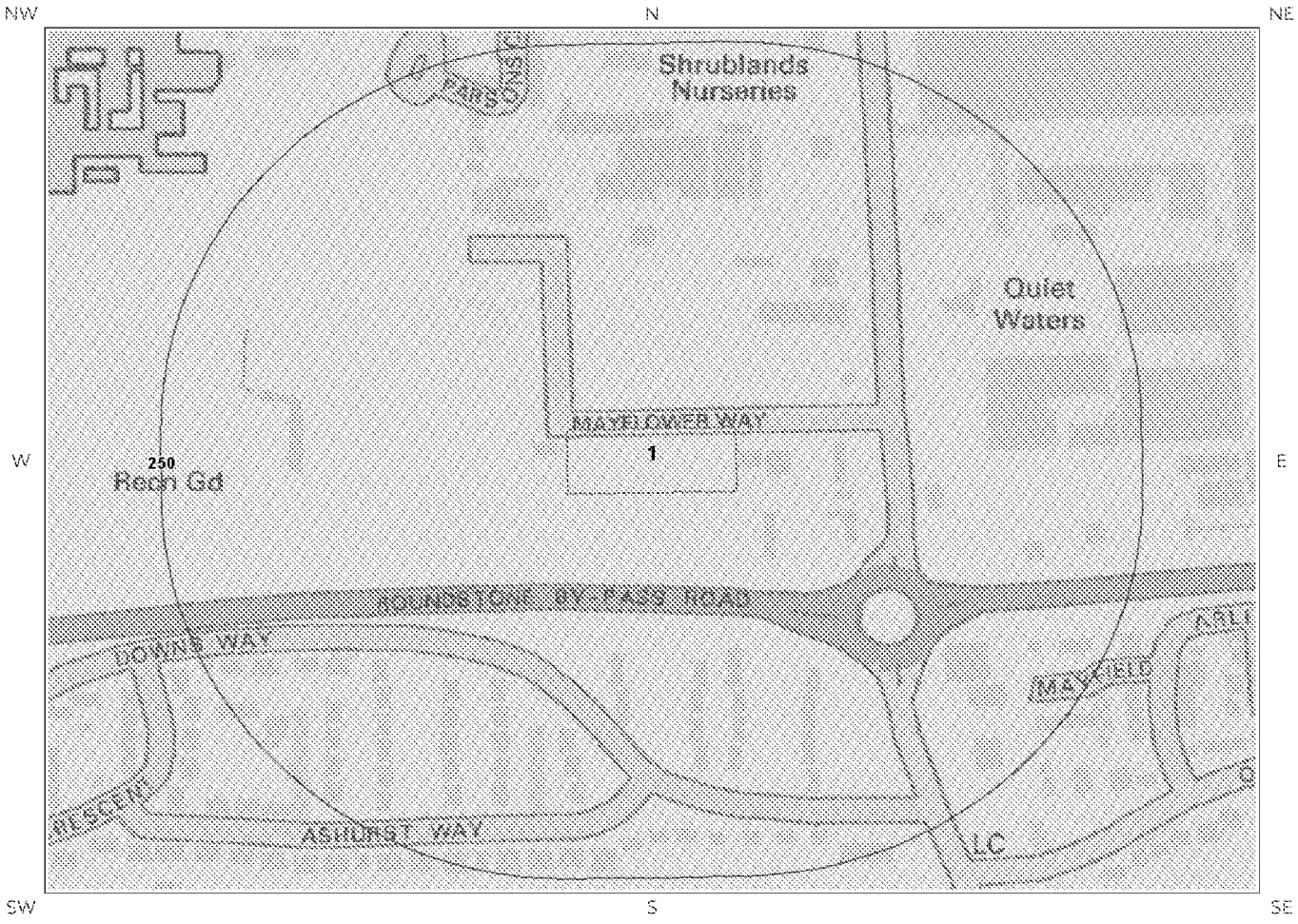
Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

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6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map



Shrink Swell Clay Legend

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Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

Very Low

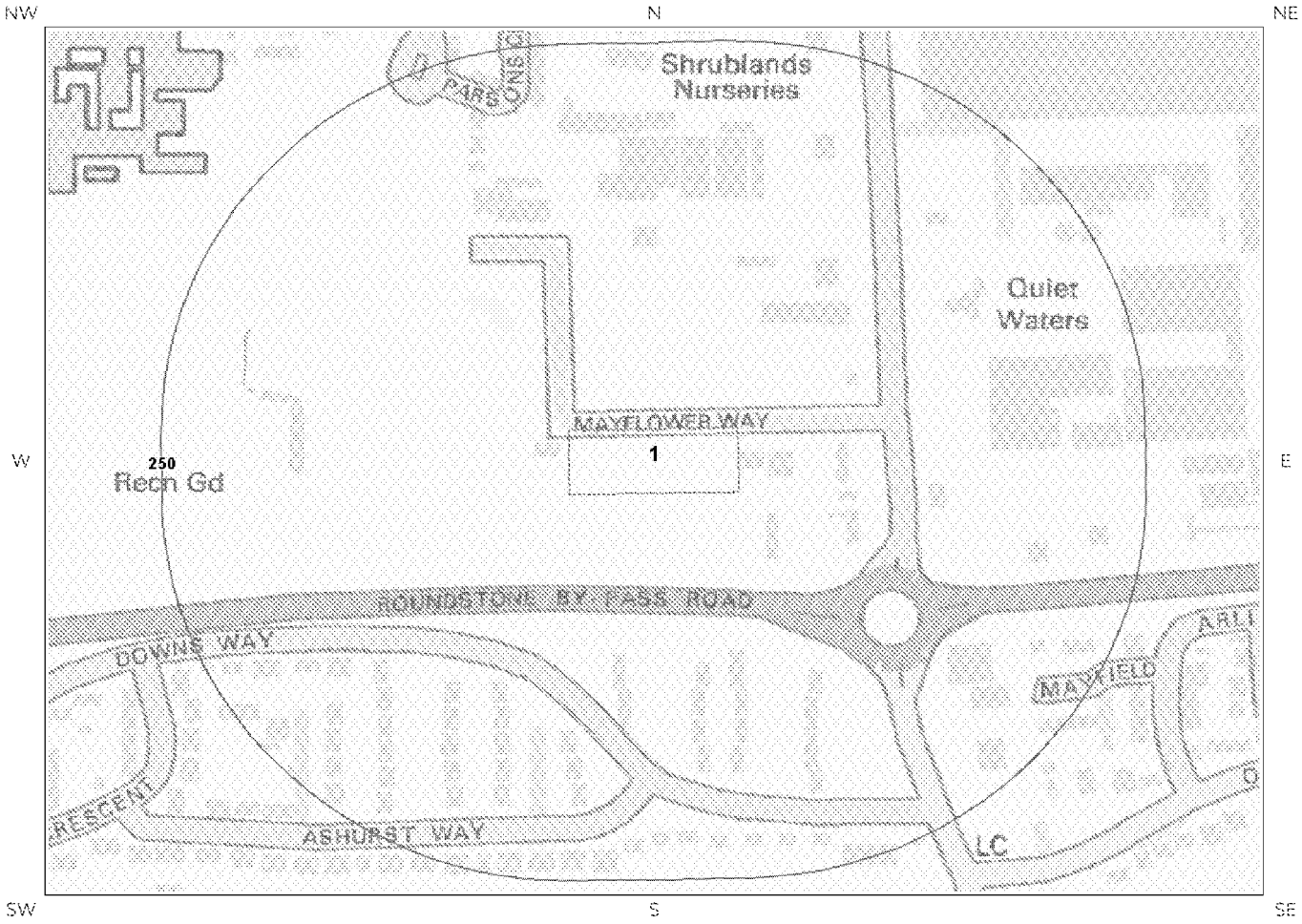
Low

Moderate

High

Groundsure
LOCATION INTELLIGENCE

6.2 Landslides Map



Landslides Legend

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Site Outline

Search Buffers (m)

No Data / Null

Negligible

Very Low

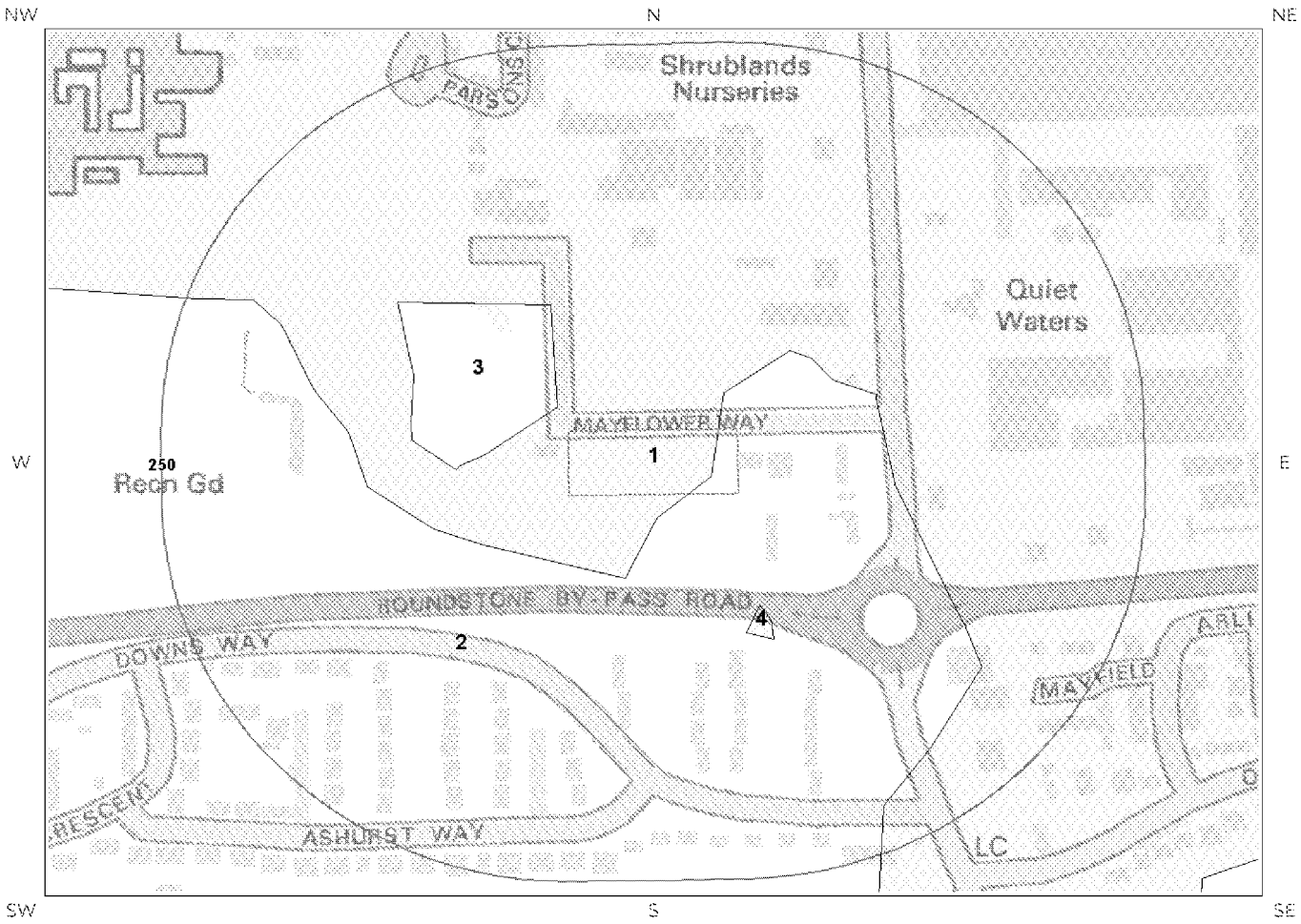
Low

Moderate

High

Groundsure
LOCATION INTELLIGENCE

6.3 Ground Dissolution of Soluble Rocks Map



Ground Dissolution
Soluble Rocks Legend

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Site Outline

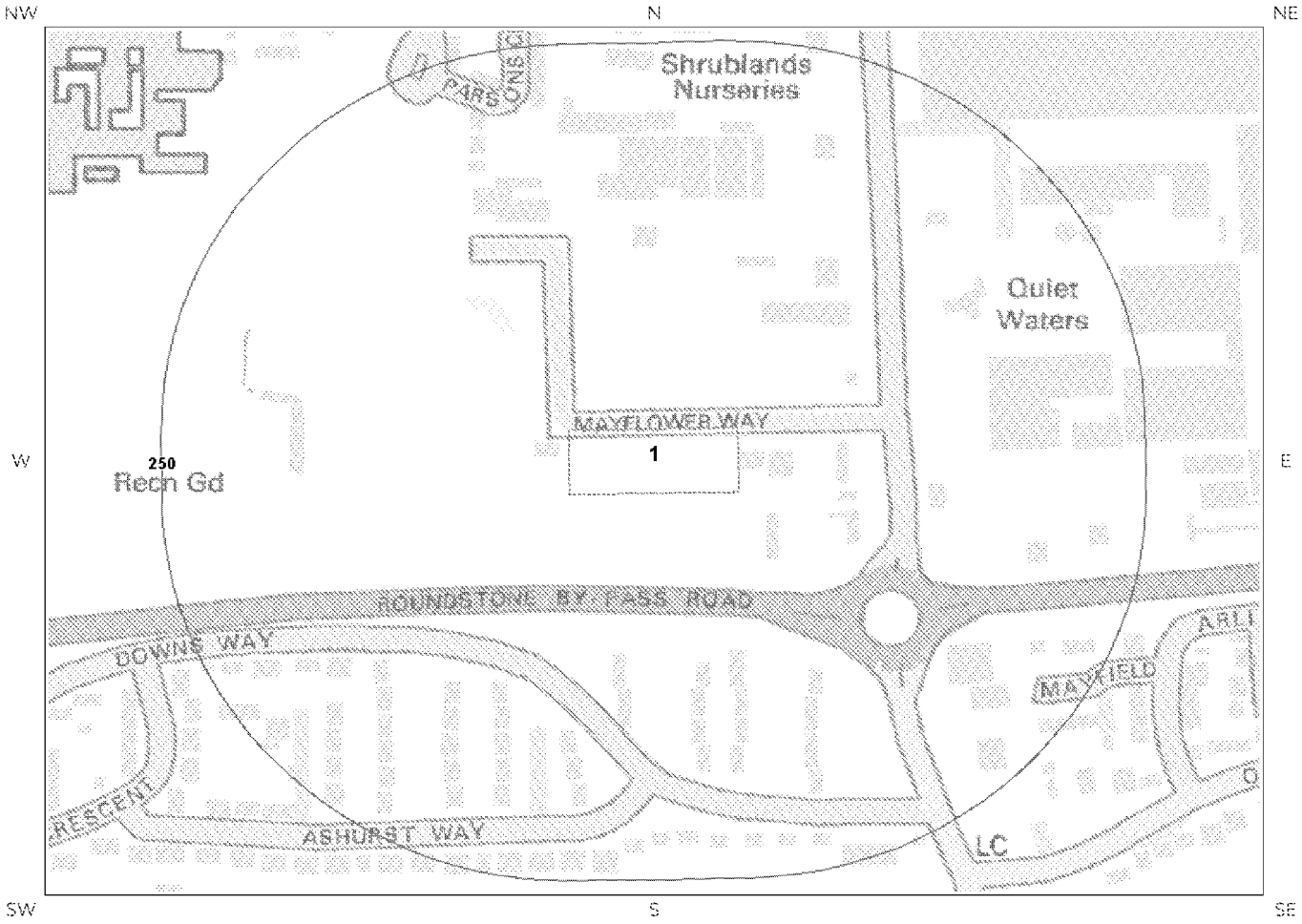
125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

Groundsure
LOCATION INTELLIGENCE

6.4 Compressible Deposits Map



Compressible Deposits Legend

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Site Outline

Search Buffers (m)

No Data / Null

Negligible

Very Low

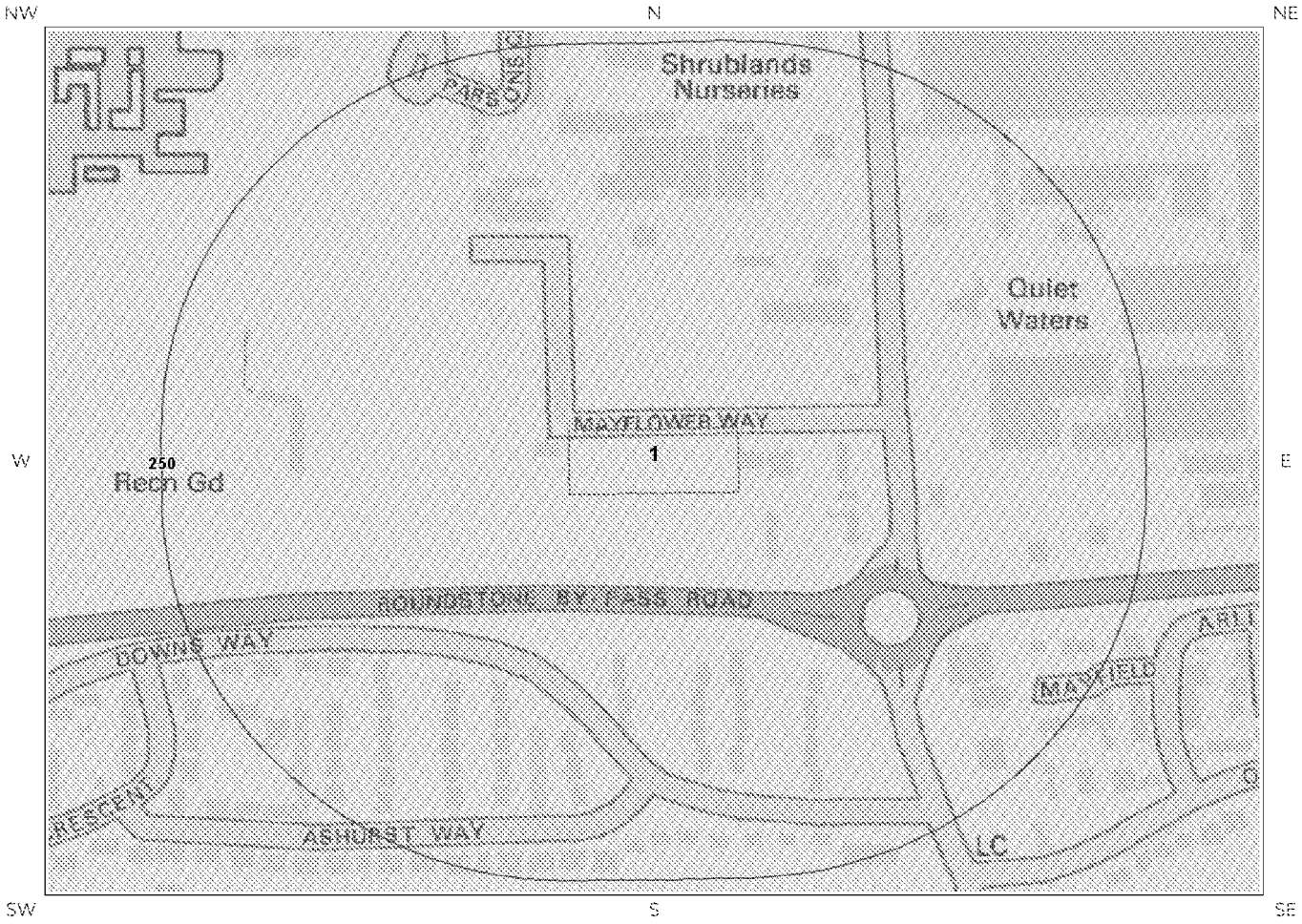
Low

Moderate

High

Groundsure
LOCATION INTELLIGENCE

6.5 Collapsible Deposits Map



Collapsible Deposits Legend

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Site Outline

Search Buffers (m)

No Data / Null

Negligible

Very Low

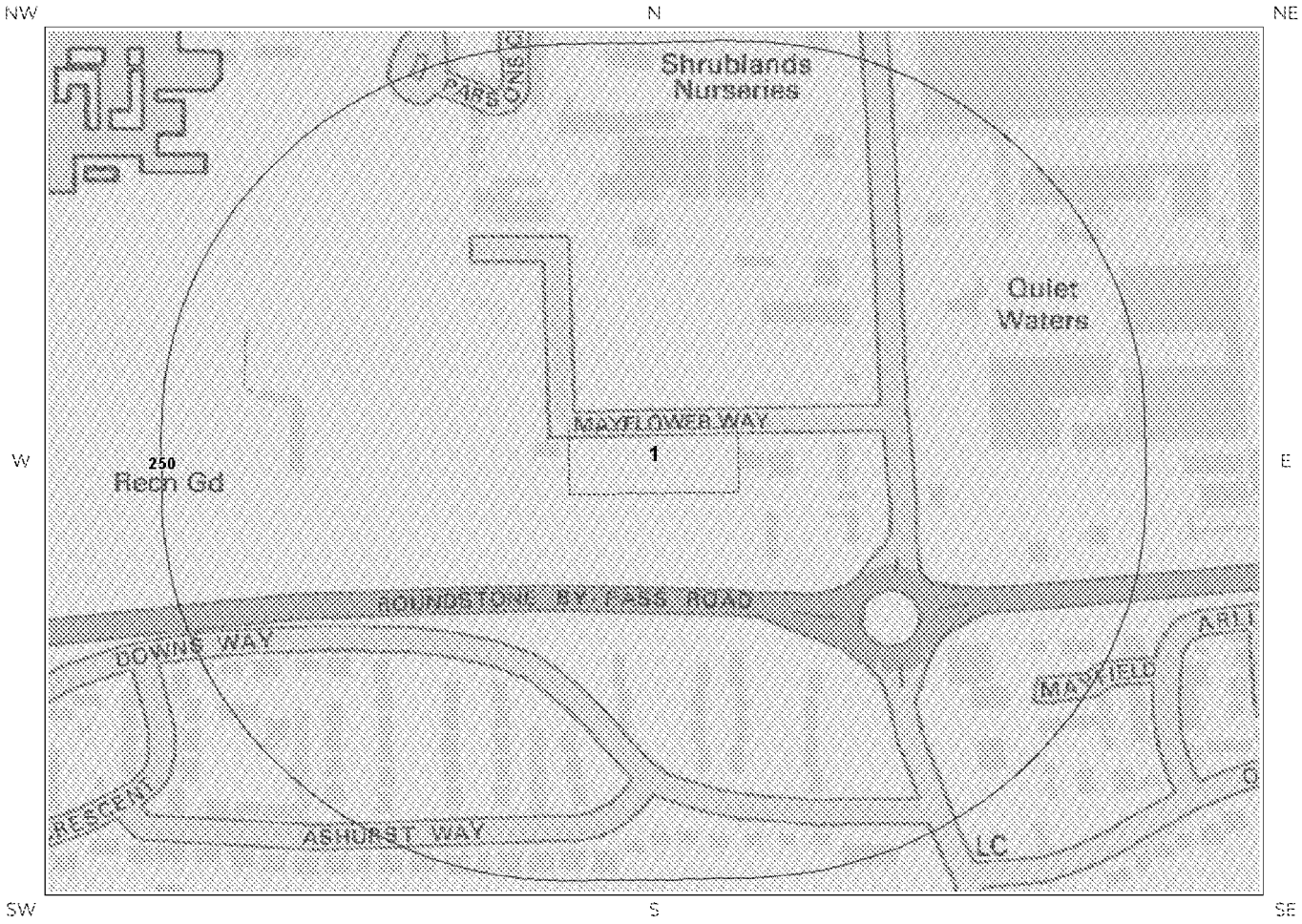
Low

Moderate

High

Groundsure
LOCATION INTELLIGENCE

6.6 Running Sand Map



Running Sand Legend

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Site Outline

Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

Moderate

High

6 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? Low

6.1 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	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

6.2 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.

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

6.3 Ground Dissolution of Soluble Rocks

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.
2	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. 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.
3	17.0	NW	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. 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.

6.4 Compressible Deposits

The following Compressible Deposits 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.

6.5 Collapsible Deposits

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Slight possibility for collapsible deposit problems after major changes in loading or groundwater conditions. Normal maintenance to avoid large amounts of water entering the ground through pipe leakage or soak-aways should reduce the likelihood of problems due to collapsible deposits. For new build, assess the possibility of collapsible (loessic) deposits in ground investigation. For existing property, no significant increase in insurance risk from collapsible deposits is likely.

ARUN DISTRICT COUNCIL A/219/17/PL

6.6 Running Sands

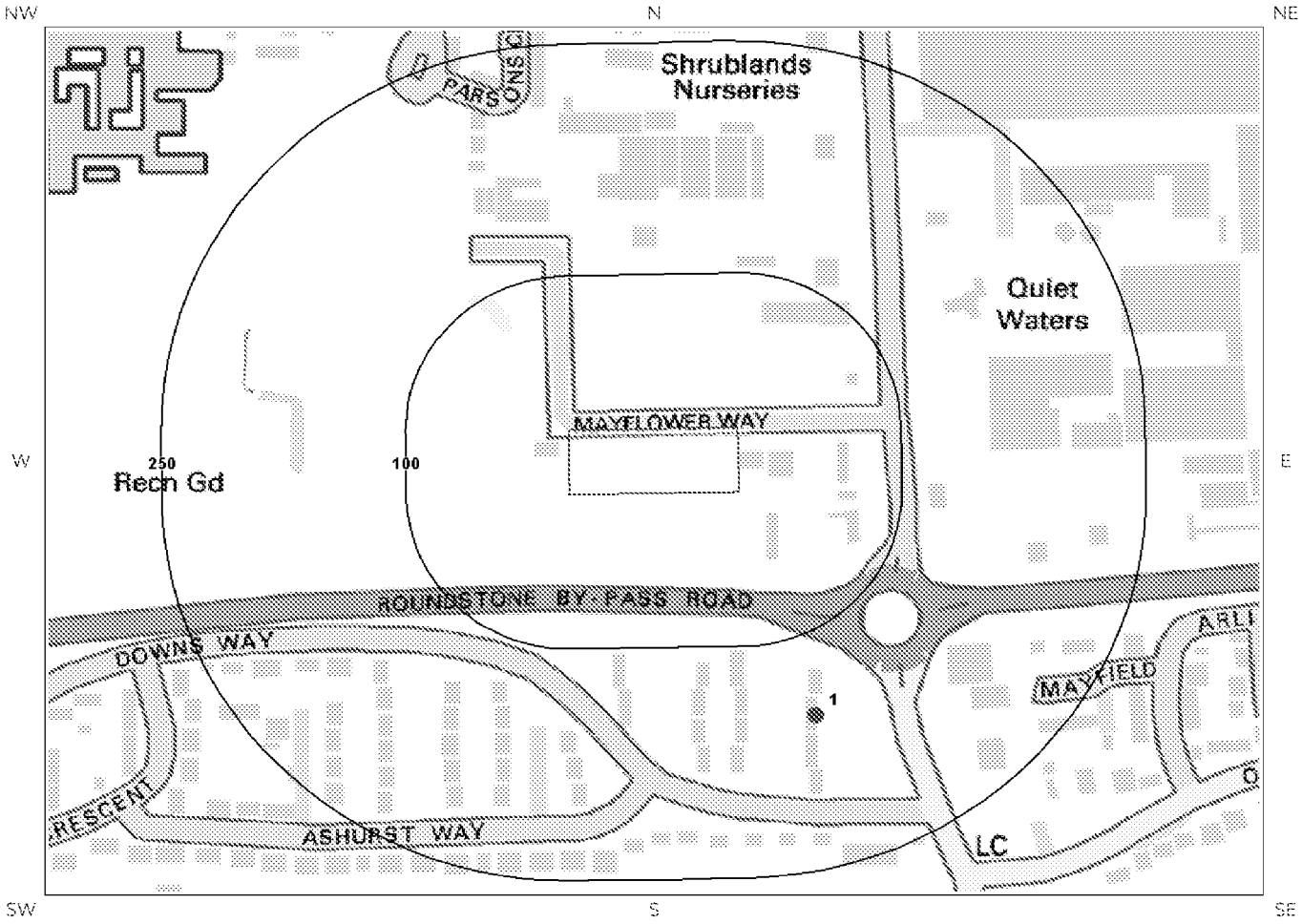
The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.

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Groundsure
LOCATION INTELLIGENCE

7 Borehole Records Map



Borehole Records Legend

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Site Outline

Borehole Locations

125
250
Search Buffers (m)

7 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: 1

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	152.0	S	507360 103110	TQ00SE37	45.72	HALFMOON NURSERIES

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

#1: scans.bgs.ac.uk/sobi_scans/boreholes/569989

8 Estimated Background Soil Chemistry

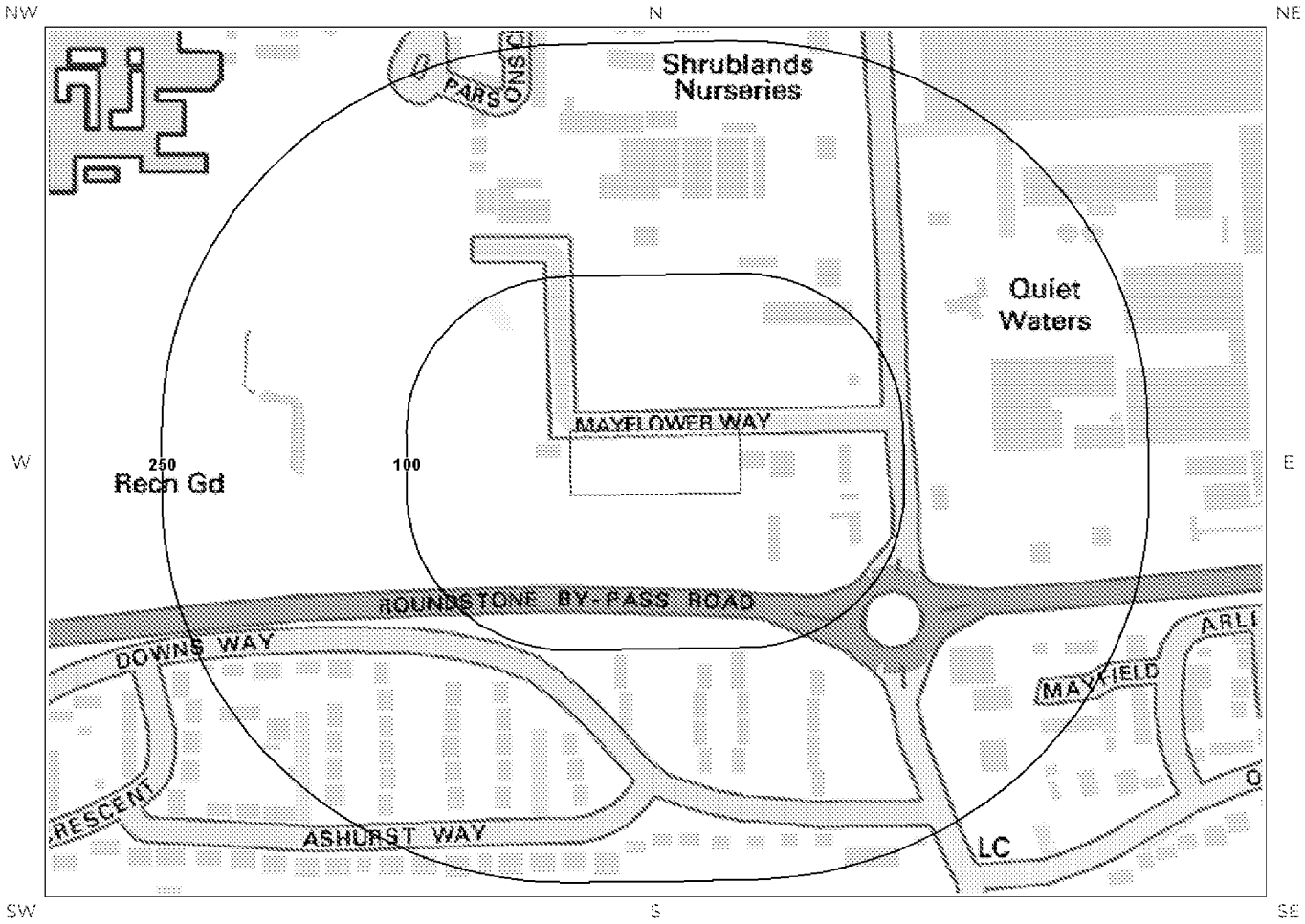
Records of background estimated soil chemistry within 250m of the study site boundary: 1

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

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg

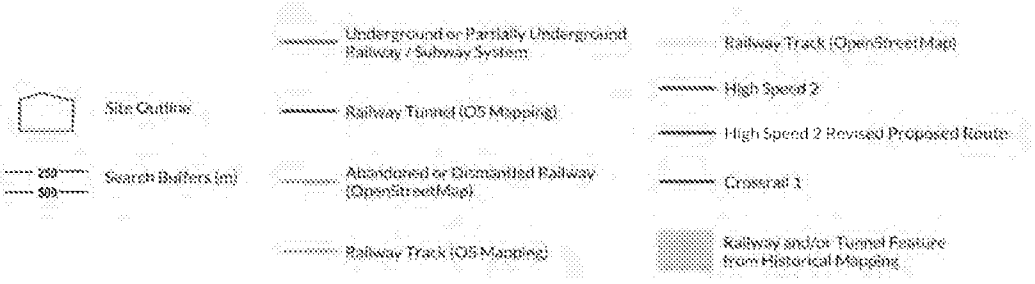
*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels Map



Railways and Tunnels Legend

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9 Railways and Tunnels

9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary?	No
Have any underground railway lines been identified within 250m of the study site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary?	No
Have any other railway tunnels been identified within 250m of the site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary?	No
Have any historical railway or tunnel features been identified within 250m of the study site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail 1 rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

Contact Details

[redacted]

Groundsure
LOCATION INTELLIGENCE

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

British Gypsum

The Coal Authority

Public Health England

JOHNSON POOLE & BLOOMER CONSULTANTS

OS Data

getmapping



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