LISTERS

Geotechnical Consultants

Frontier Estates Limited

Ground Investigation

Dappers Lane
Angmering
West Sussex
BN16 4DA

Report No: 14.11.004
January 2015

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ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

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For and on behalf of Listers Geotechnical Consultants

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EXECUTIVE SUMMARY

Project Reference	14.11.004
Site Location	Land adjoining Dappers Lane, Angmering, West Sussex BN16 4DA.
OS Grid Reference	507340, 104711.
Development Proposals	A new two storey main care home building along with several self contained, up to two storey apartment and bungalow buildings.
Existing Buildings	Two storey house with associated out buildings and a domestic garage (Broadlees).
Topography	Site slopes down some 7m from the northern boundary to Water Lane at the southern boundary.
Vegetation	An overgrown area with dense shrubs and mature trees was present in the southern part of the site. Much of the overgrown vegetation had been removed prior to our site visit. Matures trees and dense vegetation remained however along the sites boundaries and within landscaped areas, along with occasional trees in the paddock.
Published Geology	Superficial Head deposits underlain by Lambeth Group deposits across the site with the exception of the extreme south western corner, where the underlying Tarrent Chalk member is shown sub cropping beneath the Head deposits. The London Clay Formation, which overlies the Lambeth Group is shown immediately to the north west of the site.
Site History	Open ground until circa 1942 when a small gravel pit is shown on the site. Broadless recorded circa 1957 along with out-buildings and a glass house. Post 1970 gravel pit no longer recorded and house extended sometime after 1994 and the glass house is no longer shown on the 2010 map.
Hydrology	The nearest surface watercourse is an unnamed tertiary river 32m south of the site that flows towards the south west. A pond is also recorded 15m to the south east of the site.
Hydrogeology	Secondary (undifferentiated) Aquifer, associated with the superficial deposits. Secondary A Aquifer and Principal Aquifer associated with the Lambeth Group and Tarrant Chalk Member bedrock deposits respectively.
Geotechnical Hazards	A Gravel Pit is recorded on the site based on the historical maps. There is a moderate recorded risk of the occurrence of shrinking and swelling clay identified for this site.
Ground Conditions Encountered	Topsoil/Made Ground overlying suspected Head deposits, which in turn directly overlie the London Clay Formation in the northern part of the site and the Lambeth Group in the southern and eastern parts of the site.
Groundwater Encountered	Ground water seepages/inflows were encountered within the Head deposits and the granular Lambeth Group deposits at depths of between 0.9m to 5.5m. Entries were also recorded within the London Clay Formation at depths of 6.5m and 7.5m below the existing ground level.
Ground Contamination	Elevated lead, BaP, benzo(b)flouranthene and dibenzo(a,h)anthracene were encountered at concentrations above corresponding guideline screening values.
Groundwater Contamination	Low risk to groundwater receptors.
Site Remediation Required	Removal of contaminated soils or incorporation of a cover layer system in proposed gardens and landscaped areas.

Soil Gases	Characteristic Situation CS2 in accordance with BS8485:2007 and traffic light colour 'Amber 1' in accordance with NHBC Report No 10627 for residential properties. The BGS advises that basic radon gas protection measures are necessary.
Foundations	Natural soils may be capable of supporting the buildings on strip/trench fill foundations at not less than 1m below existing ground level or 0.20m into the top of the natural formation, whichever is the deeper. Should the allowable bearing pressure prove insufficient or problems with dewatering prove difficult, foundations could be supported on piles founded within the underlying Head, London Clay, Lambeth Group and possibly the underlying Tarrent Chalk Member.
Allowable Bearing Pressure	An allowable bearing capacity of 120kPa may be adopted for foundations not exceeding 1.0m in width.
Floor Slabs	Provided all the Topsoil and Made Ground is stripped off, ground bearing floor slabs could be constructed placed on a layer of well compacted granular fill. Where it is required to deepen the main foundations below 1.50m depth, due to the presence of trees and large shrubs (existing or in areas of recent vegetation) or where seasonal desiccation is occurring then ground floor slabs will require suspending in accord with NHBC guidelines.
Waste Soil Classification	Made Ground soil on this site is classified as non-hazardous due to elevated TOC. A higher TOC limit value may be permitted by the Environment Agency however at some inert waste landfill sites. Natural soils at the site are considered to be uncontaminated and may be disposed of as inert waste. Subject to approval from the receiving landfill.
Soakaways	Due to the variability of the soils encountered infiltration testing in machine dug trial pits is recommended to assess the feasibility of soakaways. Consideration will be required however to shallow ground water entries and to avoid promoting slope instability should such a solution be sought.
Roads & Hard Standing Design	A subgrade CBR value of 2% is adopted for design purposes founded in the Head deposits. Formation soils should be considered to be frost susceptible, requiring a minimum pavement construction thickness of 450mm.
Chemical Attack On Buried Concrete	Design Sulphate Class DS –1 ACEC Class AC-1 for buried concrete in the Made Ground, Head and Lambeth Group. DS –2 ACEC Class AC-1s for concrete extending into the London Clay Formation.

This executive summary should be read in conjunction with the main report.

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CONTENTS

GROUND INVESTIGATION REPORT **1**
INTRODUCTION 1
SCOPE OF THE INVESTIGATION 1
PROPOSALS 2
SITE INFORMATION AND WALKOVER SURVEY 2
GEOLOGY 3
Published Geology *3*
SOLUTION FEATURES *3*
HISTORIC BOREHOLES 4
DESK STUDY AND BACKGROUND INFORMATION **5**
GENERAL 5
HISTORY OF THE SITE 6
HYDROLOGY 7
HYDROGEOLOGY 7
LANDFILL, WASTE TREATMENT AND INDUSTRIAL USAGE SITES 8
WORKED OUT GROUND/MADE GROUND 9
RADON GAS 9
RISK OF GASEOUS CONTAMINATION 9
GROUND RELATED HAZARDS 10
BACKGROUND SOIL CHEMISTRY 10
POTENTIALLY SENSITIVE LAND USES 11
CONCEPTUAL MODEL 11
EXPLORATION AND TESTING **13**
GENERAL 13
SAMPLING STRATEGY 13
METHODOLOGY 14
GROUND CONDITIONS 15
California Bearing Ratio (CBR) Tests *17*
Sulphate and pH Tests *18*
GROUNDWATER 18
OBSERVED SOIL CONTAMINATION 18
SOAKAWAY TESTING 18
GROUND GAS 18
GROUND CONTAMINATION ASSESSMENT **19**
SOIL TESTING 19
RISK ASSESSMENT GUIDELINES – HUMAN HEALTH 19
Category 4 Screening Levels (C4SLs) *20*
Suitable 4 Use Levels (S4ULs) *20*
RISK ASSESSMENT GUIDELINES – GROUNDWATER 20
RESULTS OF TOTAL SOIL TESTS 21
Lead *21*
Benzo(b)flouranthene, Benzo(a)pyrene *21*
Dibenzo(a,h)anthracene *22*
RESULTS OF LEACHATE TESTS 22
HUMAN HEALTH RISK ASSESSMENT **22**
GENERAL 22
END USERS OF THE SITE 23
SURROUNDING RESIDENTS/STAFF/WORKERS 23
CONSTRUCTION WORKERS 23

ARUN DISTRICT COUNCIL A/114/18/PL

REMEDIAL MEASURES 24
Regulatory Approval *25*
FURTHER WORK 25
VALIDATION TESTING 25
Imported Topsoil and Subsoil Specification *25*
POST REMEDIATION VERIFICATION 26
GROUNDWATER RISK ASSESSMENT 26
GENERAL 26
GEOTECHNICAL ENGINEERING CONCLUSIONS 28
GENERAL 28
SITE EXCAVATION 29
FOUNDATION SOLUTIONS 30
Shallow Foundations *30*
Pile Foundations *31*
GROUND FLOOR SLABS 32
GAS PROTECTION 33
WORKING PLATFORMS FOR TRACKED PLANT 34
RETAINING WALL DESIGN 35
CLASSIFICATION OF WASTE MATERIAL 36
European Waste Catalogue Determination *36*
Waste Acceptance Criteria (WAC) Testing Results *37*
Waste Classification *38*
RE-USE OF MATERIAL ON SITE 39
SLOPE STABILITY 39
SUBSURFACE CONCRETE 40
ACCESS ROADS AND PARKING 40
SOAKAWAY TESTING 41
UNDERGROUND SERVICES 41
REFERENCES 42

ARUN DISTRICT COUNCIL A/114/18/PL

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APPENDICES

APPENDIX A - PLANS, PLOTS AND PHOTOGRAPHS

- Site Location Plan
- Exploratory Hole Location Plan - Existing Site Layout
- Exploratory Hole Location Plan – Showing Development Proposals
- Proposed Sections Showing Existing and Proposed Site Levels
- Plan Showing the Development Proposals & Indicative Areas Requiring Remediation
- Site Photographs
- SPT v Depth Plot
- Pile Design Data

APPENDIX B – FIELDWORK AND TESTING

- Trial Pit Logs
- Cable Percussive Borehole Logs
- Standard Penetration Test Table
- Hand Auger Borehole Logs
- Gas Monitoring

APPENDIX C- LABORATORY TESTING RESULTS AND TABLES

- Geotechnical Laboratory Testing Results
- Plasticity Chart
- Moisture Content v Depth
- Laboratory Shear Strength Results (Hand Vane and Pocket Penetrometer)
- Chemical Analysis Testing Results
- HazWasteOnline Summary
- WAC Testing Results

APPENDIX D - DESK STUDY INFORMATION

- GroundSure EnviroInsight
- GroundSure GeoInsight
- Ordnance Survey and National Grid Maps

ARUN DISTRICT COUNCIL A/114/18/PL

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GROUND INVESTIGATION REPORT

INTRODUCTION

A ground investigation has been undertaken for proposed new care home development on land adjoining Dappers Lane, Angmering, West Sussex BN16 4DA. A Site Location Plan is provided in Appendix A.

The Ordnance Survey National Grid reference for the centre of the site is 507340, 104711.

This report describes the work carried out by Listers Geotechnical Consultants, the ground conditions encountered and discusses their implications with regard to the proposed development.

This report describes the desk study and intrusive site investigation activities carried out by Listers Geotechnical Consultants in order to provide an evaluation of the ground conditions and the extent of any soil contamination present on the site. The report presents initial human health and groundwater risk assessments based on the findings of the desk study information and subsequent contamination laboratory testing. The contamination risk assessment has been carried out using the source-pathway-receptor risk assessment methodology.

The report also discusses the geotechnical implications with regard to the proposed development based on the findings of the fieldwork and subsequent laboratory testing.

Verbal instruction to undertake the investigation were received from Gelder & Kitchen LLP on 6th November 2014, acting on behalf of the client, Frontier Estates Limited.

This report has been prepared for the sole use of the client and their professional advisors. This report shall not be relied upon by third parties without the express written authority of Listers Geotechnical Consultants. If an unauthorised third party comes into possession of this report they must not rely on it and the authors owe them no duty of care and skill.

SCOPE OF THE INVESTIGATION

The scope of the investigation was to undertake a desk study and walkover survey, provide an assessment of the geotechnical engineering properties of the ground and the extent of any soil contamination on the site. A contaminated land risk assessment was undertaken based on the Contaminated Land Exposure Assessment (CLEA) and Environment Agency RTM guidelines.

The investigation also includes a preliminary assessment of the feasibility of adopting a soakaway drainage solution at the site, as well as providing parameters to aid pavement design.

ARUN DISTRICT COUNCIL A/114/18/PL

PROPOSALS

It is understood the development proposals have not been finalised however it is proposed to redevelop the site to accommodate a new two storey main care home building along with several self contained, up to two storey apartment and bungalow buildings with associated gardens, landscaped areas, access roads and car parking.

The contaminated land risk assessment has been prepared in support of the planning application for the development.

SITE INFORMATION AND WALKOVER SURVEY

A walkover survey of the site and its immediate surrounds was undertaken on the 14th November 2014. A selection of site photographs is presented in Appendix A along with the site plans.

The site lies in a predominantly residential area, and is currently occupied by a single two storey house with associated out buildings and a domestic garage (Broadlees). The remnants of a former structure is present adjacent to the out buildings, which is suspected to have been a former glass house. The house was accessed via a gravel drive off Dappers Lane which forms the western boundary to the site. A paddock with sheep was present within the eastern part of the site with further open fields beyond. Areas of concrete hardstanding were present in the north western corner of the paddock and an old oil drum, possibly used for burning garden waste, was present on one of the concrete slabs. An overgrown area with dense shrubs and mature trees was present in the southern part of the site, which was south of the gardens to the main house. A sceptic tank was present within the overgrown area along with a localised depression in the ground surface which led to Dappers Lane. The localised depression was estimated to be in the order of 1.5m to 2m lower than the surrounding site topography. Water Lane formed the southern boundary to the site and a small light industrial estate north of the site.

The site occupied an area of approximately 1.27 hectares and slopes down some 7m from the northern boundary to Water Lane at the southern boundary.

Much of the overgrown vegetation has been removed prior to our site visit to enable a topographical survey to be conducted and to aid access for our investigation plant however matures trees and dense vegetation remained in some areas. Further trees and vegetation was present along the sites boundaries and in landscaped areas along with occasional trees within the paddock.

A suspected drainage ditch was present in some places along the southern boundary and beyond Water Lane, a pond was noted a short distance south of the site.

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ARUN DISTRICT COUNCIL A/114/18/PL

GEOLOGY

Published Geology

Reference to the British Geological Survey 1:50,000 scale map and other published geological information on the area indicate that the site is underlain by superficial Head deposits of the Quaternary age. The Head deposits are underlain by Lambeth Group deposits across the site with the exception of the extreme south western corner, where the underlying Tarrent Chalk member is shown sub cropping beneath the Head deposits. The London Clay Formation, which overlies the Lambeth Group, is shown immediately to the north west of the site.

Head deposits are generally poorly sorted and poorly stratified deposits formed mostly by solifluction and/or hillwash and soil creep. Head typically comprises sand and gravel, locally with lenses of silt, clay or peat and organic material.

The London Clay Formation is generally represented by a blue grey or grey brown silty to very silty clay, clayey silt and sometimes silts, with some layers of sandy clay. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation. Generally the London Clay Formation occurs to in excess of 30m in thickness however it is likely to be much thinner in this area as the underlying Lambeth Group is shown sub cropping at the site.

The Lambeth Group is typically represented by mottled, variable sequences mainly of clay, sometimes silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerates. The Lambeth Group can occur to thicknesses in the order of 28m in the area however is likely to be significantly reduced in thickness at the site and is possibly absent towards the south western corner, where the underlying Tarrent Chalk Member is shown.

The underlying Tarrent Chalk Member typically comprises white chalk with flints and forms part of the Upper Chalk which extends to in excess of 100m thickness.

SOLUTION FEATURES

Chalk, as a calcium-carbonate rich rock, is highly susceptible to dissolution by water containing carbon dioxide. This dissolution can create three common types of features within the chalk, grouped together under the generic term 'dissolution features'. These features include:

- **Sinkholes:** Depressions at the ground surface caused by the collapse of overlying chalk or superficial deposits into underground voids created by dissolution. Shape and size dependent on underlying void feature.

ARUN DISTRICT COUNCIL A/114/18/PL

- **Solution pipes:** A feature in the surface of the Chalk caused by increased dissolution in an area of closely spaced discontinuities. These features may, or may not, have a ground surface expression. Up to 20 metres diameter through commonly much smaller.
- **Swallow Holes:** A void within the surface of the Chalk where a stream is 'swallowed' by the Chalk to flow underground. Often occur at the junction of impermeable strata and Chalk. Infilled ancient swallow holes do exist where streams used to flow and may not have any surface expression. Up to 14m in diameter, through commonly a few metres.

HISTORIC BOREHOLES

The records of two historic boreholes have been obtained from the British Geological Survey.

The nearest borehole to the site is located approximately 220m to the north west at Lansdowne Nursery. The borehole records 1.5m of Head deposits overlying 5.8m of gravel and flints, which possibly represents superficial River Terrace deposits. The combined London Clay (London Clay Formation) and Reading Beds (Lambeth Group) is recorded extending to 53m depth and Upper Chalk continues below and was proven to 62.5m depth.

The second borehole is located some 500m to the north west and records gravel and clay drift deposits to 7m underlain by London Clay to 18m depth and the Reading Beds to 45m. The Chalk deposits extend below this depth and continued to the base of the borehole at 69m depth.

ARUN DISTRICT COUNCIL A/114/18/PL

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DESK STUDY AND BACKGROUND INFORMATION

GENERAL

A desk study review of the site and its history has been undertaken to establish the former land usage and the potential for any historically derived sources of chemical contamination. A copy of the desk study information is presented in Appendix D of this report.

It should be noted that the information provided in the desk study is obtained from independent third party sources. It is provided in good faith, but no guarantee can be provided as to its accuracy. The Client should make independent enquiries on information provided in the desk study information that may impact on the proposed development. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.

The desk study comprises a review of the following consultations and information sources:

- Environment Agency (EA)
- Natural England
- National Geoscience Information Service
- Health Protection Agency
- Centre for Ecology & Hydrology
- British Geological Survey (BGS)
- Contemporary Trade Directories
- Historical Ordnance Survey maps

Information from the above referenced sources has been utilised to develop a conceptual model of the site for use in the geotechnical appraisal and source-pathway-receptor risk assessment.

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HISTORY OF THE SITE

The history of the site has been established by reviewing the historical Ordnance Survey maps of the area, collected as part of the desk study information. This has established the following:

Time Period	Historical usage of the site	Historical usage of the surrounding Area
1876-1877	The site is part of an open field and is bound by Dappers Lane to the west and Water Lane to the south.	Further open fields are shown to the north and east of the site. Two ponds are shown some 15m south east of the site beyond Water Lane. The ponds appear to be supplied by a watercourse which flows approximately from the north east to the south west with Avenals Farm beyond. Angmering is present some 100m to the south west.
1897-1899	No obvious changes have occurred on the site.	One of the ponds is now indicated as marsh land. A Gravel Pit is recorded 220m to the south west and an Old Chalk Pit 870m to the south east.
1909-1932	No obvious changes have occurred on the site.	The gravel pit to the south west is no longer shown. A small pond is indicated 30m west of the site.
1942-1943	A small Gravel Pit is shown midway along the western site boundary with an access track off Dappers Lane.	Further marsh land is shown south of the site adjacent to the remaining pond. Angmering has been significantly extended northwards and Lansdowne Nursery, comprising glass houses and a water tower are recorded 110m to the north west.
1957	Buildings are now shown in the north western part of the site, one of which is consistent with the existing out buildings. A glass house is also shown adjacent to the out buildings the remnants of which are still visible today. Several small buildings are also shown in the north western corner of the existing paddock. A building is located at the approximate location of the existing house but is smaller in size and is recorded as Broadlees.	St Deny's Nursery is recorded immediately north of the site and comprises various glass houses and buildings along with a tank which is located approximately 30m north of the site boundary. Sloping ground is now shown beyond the pond and watercourse south of the site and the marsh land is no longer recorded. A Builder's Yard is shown 10m south west of the site and houses are shown to the west of Dappers Lane.
1970-2014	The Gravel Pit is no longer recorded. Limited detail is shown on the large scale maps post 1994 however the glass house is no longer shown on the 2010 map. It is considered that Broadlees main house has been extended to its current layout at some point during this period.	Lansdowne Nursery is no longer recorded and is replaced by two small semi detached houses. Angmering continues to expand west of the site, replacing the small pond shown on earlier maps.

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We understand from the site owner that the site was formerly occupied by a nursery with a green house. We understand the glass from the former greenhouse was buried in an excavation within the southern part of the existing paddock area. We understand the excavation is estimated to have been approximately 15 feet by 15 feet (4.6m by 4.6m) and approximately 12-15 feet deep (3.7 to 4.6m). Topsoil was subsequently introduced to the existing landscaped gardens and paddock area.

HYDROLOGY

The nearest surface watercourse and unnamed tertiary river 32m south of the site that flows towards the south west. In this area the watercourse has not been designated with a River Quality by the Environment Agency. A surface water feature is also recorded 15m to the south east of the site which corresponds to the pond, south of Water Lane.

It should be appreciated that the site is recorded to be within a Zone 2 Fluvial floodplain, which possibly resulted in the designation 'Water Lane', which forms the southern boundary to the site. It should be noted that this information does not constitute a site specific Flood Risk Assessment, which may be required for the development to support a planning application or satisfy planning conditions.

There are no recorded current surface water abstraction licenses located within 1000m of the site.

HYDROGEOLOGY

Information obtained from the Environment Agency indicates that the site is located on a Secondary (undifferentiated) Aquifer, associated with the superficial deposits. This probably corresponds to the Head deposits recorded at the site. The site is also recorded to be located on both a Secondary A Aquifer and Principal Aquifer associated with the Lambeth Group and Tarrant Chalk Member bedrock deposits respectively.

ARUN DISTRICT COUNCIL A/114/18/PL

The aquifer designation data is based on geological mapping provided by the British Geological Survey. The maps are divided into two different types of aquifer designation:

- **Superficial (Drift)** - permeable unconsolidated (loose) deposits. For example, sands and gravels.
- **Bedrock** - solid permeable formations e.g. sandstone, chalk and limestone.

For each type there are Principal, Secondary A, Secondary B and Unproductive Strata, each with a decreasing rank of importance.

There is one current groundwater abstraction licenses located within 1000m of the site. This is located 818m to the south for horticultural watering.

The site is not within 1500m of a potable water supply and according to information provided by the Environment Agency the site is outside of any Source Protection Zones (SPZ). An SPZ is a protection zone placed around a well or borehole that supplies groundwater of potable quality.

There have been four substantiated pollution incident to controlled waters within 250m of the site. The nearest was recorded 37m south east of the site and is described as a significant impact to freshwater water course in 1999. The remaining three incidents were all located 165m to the north of the site and is recorded as diesel: petrol having a minor Category 3 impact to water and land. In view of the anticipated hydraulic gradient at the site and nature of the pollution, it is considered unlikely that these incidents would have significantly affected the site itself.

LANDFILL, WASTE TREATMENT AND INDUSTRIAL USAGE SITES

Reference to records from the BGS, the Environment Agency and the Local Authority indicates that there are three Environment Agency ELV (End of Life Vehicle) facilities located some 900m to the north west of the site, there are no further waste transfer sites, waste treatment sites or waste management facilities within 1000m of the site area. It is considered unlikely that any of these facilities would affect the site area.

Reference to records also indicates that there are no recorded current/historical landfill disposal sites within 1000m of the site.

There have been no applications for Integrated Pollution Control Licenses or Integrated Pollution Prevention and Control (IPPC) licenses within 500m of the site.

There are nine trade directory/potentially contaminative industrial site entries that have been found within 250m of the site, these are all listed in Appendix D. The nearest includes industrial work wear production 26m to the west and a cleaning equipment and supplies business 60m to the north.

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There are no recorded active fuel filling stations within 500m of the site.

WORKED OUT GROUND/MADE GROUND

A Gravel Pit is recorded on the site based on the historical maps and ponds between 12m and 16m to the south east. Unspecified workings are recorded 39m south east of the site based on the 1974 maps, which probably corresponds to slopes recorded in the area. A Gravel Pit is recorded 218m to the south west based on the 1896 maps and this is also recorded as a ceased Angmering Gravel Pit by the British Geological Survey along with a chalk pit 867m to the south east.

RADON GAS

Groundsure utilise information from the Health Protection Agency (HPA) to determine if the site is within a radon affected area and the British Geological Survey (BGS) database to determine if radon protection is considered necessary. The BGS data complies with the BR 211, 'Radon: guidance on protective measures for new dwellings' and indicates that basic radon gas protection is required for new dwellings or extensions.

RISK OF GASEOUS CONTAMINATION

We have provisionally assessed the risk of ground gas impacting the site, by reference to guidance given in the paper "A pragmatic approach to ground gas risk assessment for the 21st Century" Card and Wilson, 2011. This is a follow up paper to the CIRIA Report 665 and is compatible with that document.

- No credible sources or pathways for landfill gas migration from an off site landfill have been identified.
- The site has not been a registered landfill.
- The Made Ground is not expected to be 5m deep or an average of 3m in thickness.
- The site is located on a carbonate rich rock that can produce carbon dioxide.
- Radon protection measures are required for this site.
- Table 2 in the Card and Wilson 2011 paper has been referenced and the site does not lie on a potential naturally organic soil or a humic or degradable Made Ground soil, as defined in this table.

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The site is recorded to be located on carbonate chalk deposits in the extreme south western corner of the site. Such deposits do not typically produce methane and although such deposits can produce carbon dioxide, the generation is not considered likely to be sufficiently high to present a significant risk to end users. Although the site is not recorded to be within close proximity of a landfill site a former gravel pit occupied the site. The topography suggests that this has not subsequently been infilled. We have however installed groundwater monitoring standpipes at the site and as a precaution these have been monitored for ground gasses twice over a period of one month. The results are reported later in this report.

GROUND RELATED HAZARDS

The desk study information identified that the site lies within an area where small scale chalk mining may occur but is likely to be restricted in extent.

There is a moderate recorded risk of the occurrence of shrinking and swelling clay identified for this site.

The risk of subsidence from landslides, dissolution of soluble rocks, compressible deposits, collapsible deposits and running sand is also recorded to be low, very low or negligible.

BACKGROUND SOIL CHEMISTRY

Information from the BGS regarding background levels of some heavy metals in the natural soils estimates that in the site area, rural soil has the following levels of arsenic, cadmium, chromium, lead and nickel:

Contaminant	Level in rural soil (mg/kg)
Arsenic	15
Cadmium	<1.8
Chromium	60-90
Lead	<150
Nickel	15-30

These concentrations are all well below the generic environmental screening standards for a residential site.

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POTENTIALLY SENSITIVE LAND USES

The site is not located in close proximity to any environmentally sensitive land uses, however the area is located within a nitrate vulnerable zone. The nearest environmentally sensitive site is located 358m to the east at the South Downs Site of Special Scientific Interest (SSSI) site.

CONCEPTUAL MODEL

A preliminary qualitative risk assessment has been carried out using the source-pathway-receptor principle to create a conceptual model for the site.

As such, potential sources of contamination and potential receptors have been assessed using the Contaminated Land Exposure Assessment (CLEA) Guidelines. The fact that a pathway must exist between a potential source of contamination and a potential receptor for there to be a risk, has been taken into account.

The results of the desk study and walkover indicate that the following potential sources of ground contamination are present at or in close proximity to the site:

- Made Ground is likely to be present at the site associated with demolition of historical structures.
- A gravel pit is recorded on site. The topography suggests that has not been infilled however investigations are considered necessary to confirm this assumption.

The following most sensitive receptors have been identified at the site:

Human Health

- End users of the site (residents/staff)
- Surrounding residents
- Construction workers

Environmental

- Controlled Waters - the pond 15m to the south east of the site.
- Controlled Waters - the watercourse 32m to the south east of the site
- Controlled Waters - the Secondary Aquifer and Principal Aquifer beneath the site.

It is considered that a number of potential pathways exist between these potential sources and the above identified receptors.

For the human receptors these include:

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- Direct soil ingestion in areas of exposed soil.
- Ingestion of soil attached to home-grown fruit and vegetables.
- Ingestion of fruit and vegetables with contamination uptake.
- Inhalation of indoor and outdoor vapours and dust.
- Dermal contact with contaminated soil.
- Inhalation of soil gases or vapours migrating through permeable strata into the building.

For the environmental receptors the pathways include:

- Migration of contaminants through the unsaturated zone.
- Migration of contaminants through the groundwater.
- Movement of contaminants through drains or services runs.
- Run-off to the nearby watercourse.
- Migration of soil gases through permeable strata.

ARUN DISTRICT COUNCIL A/114/18/PL

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EXPLORATION AND TESTING

GENERAL

A total of fourteen exploratory holes were formed at the site, inclusive of nine machine excavated trial pits, two hand augered boreholes and three cable percussion boreholes between the 14th and 26th November 2013. The logs are provided in Appendix B.

SAMPLING STRATEGY

The positions of the exploratory holes were selected by Listers Geotechnical Consultants to provide a wide coverage of information on the site area. Access was not available with the cable percussive rig to the overgrown area within the southern parts of the site or to the rear garden of the existing house. Machine excavated trial pits were also avoided in the rear garden area and was not accessible to the localised depression located in the southern part of the site.

As the desk study and walkover survey had identified a number of potential pollution sources at the site several of the exploratory holes were targeted on these sources. These included:

Target	Exploratory Hole
Gravel Pit	HA1, TP1
Former structures and old fires	TP8
Suspected area of glass infilled pit from former glass house	TP5, BH3
Raised landscaped mound/imported Topsoil	HA2
Imported Topsoil	TP5, TP6, TP7, TP8, BH1, BH3

The other exploratory holes were positioned in order to provide a spread of information.

The position of all exploratory holes undertaken at the site as part of this investigation can be seen on the Exploratory Hole Location Plans in Appendix A. The results of the laboratory testing are provided in Appendix C.

ARUN DISTRICT COUNCIL A/114/18/PL

METHODOLOGY

The trial pits, TP1 to TP9 were excavated with a JCB type backhoe excavator to a maximum depth of 3.2m below ground level. Small-disturbed samples were taken at regular intervals down to the base of the holes for subsequent laboratory testing and inspection. In-situ measurements of shear strength were taken using a hand shear vane, where applicable. On completion, all trial pits were carefully backfilled with arisings in thin layers, ensuring that excavated material was replaced in the same order as it had been removed.

Boreholes BH1 to BH3 were drilled utilising a standard cable percussion rig, at a diameter of 150mm, down to a maximum depth of 12m below ground level. Metal casing was extended to a maximum depth of 7m, to avoid the collapse of the loose deposits within the upper part of the boreholes and seal out groundwater inflows. Disturbed samples were collected at regular intervals throughout the borehole for future laboratory inspection and testing. Standard penetration tests (SPTs) or undisturbed tube samples (U100s) were taken at 1.0m intervals down to the base of each borehole.

On completion of the boring, boreholes BH2 and BH3 were utilised for the installation of a 50mm diameter slotted uPVC standpipe from the base of the borehole up to within 6m below existing ground level. From 1m depth up to ground level a plain pipe was added. The slotted section of the standpipe was surrounded with pea gravel, while expansive bentonite clay was added around the plain pipe and below the slotted section to seal the borehole. The standpipe was finished with a stopcock cover, which was then concreted flush with ground level.

Boreholes HA1 to HA2 were put down using a Dutch portable hand auger to a maximum depth of 1m below existing ground level. The 55mm diameter auger head was rotated and pushed down into the soil by means of a T-handle to obtain selected disturbed soil samples at regular intervals.

Engineering and geoenvironmental conclusions given in this report are based on data obtained from these sources but it should be noted that variations, which affect these conclusions, may occur between and beyond the test locations. Also water levels may vary with time.

GROUND CONDITIONS

The site and laboratory test work revealed that the general succession of strata can be represented by Head overlying London Clay Formation and Lambeth Group deposits. It may be summarised as follows:

Topsoil/Made Ground - Topsoil was generally encountered at each location from surface down to depths of approximately 0.2m in the southern parts of the site and between 0.5m and 1m in the paddock area where imported Topsoil is understood to have been introduced. At TP9 and BH2 locations Made Ground was recorded which comprised Topsoil up to 0.2m depth with pockets of ash and isolated brick fragments. This in turn was underlain with a band of brick and flint gravel at BH2 location which extended to 1m depth. Made Ground was also present at the location of TP3 and TP8. TP3 included various metal car parts and a rubber tyre while TP8 encountered occasional ceramic, brick and metal fragments, The landscaped mound within the rear garden comprised a thin veneer of Topsoil on top of firm clay with occasional chalk, brick and flint gravel.

Classification tests on selected samples revealed moisture contents ranging from 23% to 38%. Localised clay Made Ground at HA1 location recorded the fines fraction to be classified as a soil of medium volume change potential in accordance with NHBC Building Standards, Chapter 4.2.

Loss on ignition tests revealed an organic content of between 4% and 9%.

Head deposits - encountered at each test location where the base of the Made Ground was proven from between 0.2m and 1m depth down to depths of between 6.8m and 1.6m where the full depth was proven. The Head deposits reduced in thickness from the north to the south east of the site, where site levels were at their lowest. The Head deposits were represented in general by a variable mix of orange brown and brown sandy gravel, with variable proportions of clay, and firm through to stiff slightly gravelly clay. Infrequent soft clay lenses were noted within the predominantly granular soils, which are considered to be as a result of perched groundwater seepages.

Classification tests on selected samples revealed moisture contents ranging from 6% to 40% with the fines fraction classified as a soil of medium

ARUN DISTRICT COUNCIL A/114/18/PL

volume change potential in accordance with NHBC Building Standards, Chapter 4.2.

Full laboratory sieve analyses on the more granular soil horizons revealed these to be clayey sandy gravel.

Undrained triaxial compression tests undertaken on undisturbed samples revealed shear strengths ranging from 10kPa to 55kPa however it is considered that some tests failed prematurely along gravel lenses. Corresponding laboratory hand vane tests on the same samples revealed undrained shear strengths ranging from 20kPa to 84kPa.

Shear vane tests undertaken in the field in samples from the trial pits revealed undrained shear strengths ranging from 73kPa to 130kPa.

'N' values derived from standard penetration tests in the boreholes ranged from 20 to in excess of 50 reflecting the variability of the deposit.

The number of blows taken to retrieve an undisturbed U100 tube sample from the boreholes ranged between 60 and 80.

Loss on ignition tests revealed an organic content of 4%.

London Clay Formation - encountered within the northern part of the site in the boreholes from between 5.0m and 6.8m depth continuing down to beyond the base of the boreholes at 12.0m. Represented in general by a firm becoming stiff blue grey fissured silty slightly sandy clay.

Classification tests on selected samples revealed moisture contents ranging from 17% to 43% with the fines fraction classified as a soil of medium volume change potential in accordance with NHBC Building Standards, Chapter 4.2.

ARUN DISTRICT COUNCIL A/114/18/PL

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An undrained triaxial compression test undertaken on an undisturbed sample revealed a shear strength of 21kPa however it is considered that this tests failed prematurely along a pre-existing fissures. A corresponding laboratory hand vane test on the same sample recorded average undrained shear strength of 124kPa. Further hand vane tests and pocket penetrometer tests converted to approximate shear strength ranged from 26kPa to 175kPa with the lower bound results considered to be due to localised softening during the drilling process as a result of an isolated groundwater seepage.

'N' values derived from standard penetration tests in the boreholes ranged from 19 to 27 with a slight increase with depth.

The number of blows taken to retrieve an undisturbed U100 tube sample from the boreholes ranged between 100 and 110.

Lambeth Group - encountered within the trial pits in the southern and south eastern parts of the site at depths between 1.6m and 2.6m and continued down to beyond the base of the pits at a maximum depth of 3.2m below ground level. Represented in general by stiff light brown and light orange brown, slightly sandy, clay and very silty, fine sand with clay laminations and gravelly beds.

Classification tests on selected samples revealed moisture contents ranging from 20% to 33% with the fines fraction classified as a soil of medium volume change potential in accordance with NHBC Building Standards, Chapter 4.2.

Full laboratory sieve analyses on the more granular soil horizons revealed these to be silty very gravelly sand.

Shear vane tests undertaken in the field in samples from the trial pits revealed undrained shear strengths ranging from 90kPa to 159kPa.

California Bearing Ratio (CBR) Tests

CBR tests were undertaken in the Head deposits encountered at the site. Results of the testing ranged between <1% and 4%.

ARUN DISTRICT COUNCIL A/114/18/PL

Sulphate and pH Tests

Soluble sulphate tests carried out on soil samples recovered from the exploratory holes recorded values ranging from 0.13g/l to 0.52g/l, in conjunction with pH values ranging from 6.7 to 8.4.

GROUNDWATER

Ground water seepages/inflows were encountered within the Head deposits and the granular Lambeth Group deposits at depths of between 0.9m to 5.5m. Entries were also recorded within the London Clay Formation at depths of 6.5m and 7.5m below the existing ground level.

Monitoring carried out as part of the project has recorded standing water at 2.02 and 2.95m at BH2 location and 0.67m and 2.02m at BH3 location.

OBSERVED SOIL CONTAMINATION

No obvious evidence of prevalent contamination was noted during the fieldwork however Topsoil/Made Ground was encountered in isolated areas which contained brick and ash fragments.

SOAKAWAY TESTING

Soakaway testing was carried out in the Head strata encountered at the site. The tests were undertaken within a standpipe installation in borehole BH2 to provide indicative infiltration results broadly following the principals of BRE Digest 365 'Soakaway Design'. Testing was not undertaken in BH3 as this standpipe was flooded at the time of our visit.

The infiltration results ranged between 4.0 x 10^{-3}m/s and 6.6 x 10^{-3}m/s.

GROUND GAS

Ground gas monitoring carried out as a part of this investigation has revealed oxygen levels of between 14.7% and 17.7% by volume, carbon dioxide levels of between 2.7% and 5.1% by volume, and methane levels of 0.2% and 0.3% by volume.

Flow rates of 0.0l/hr and 0.1l/hr were recorded. These low flow rates are indicative of the soils encountered which did not include any significant thicknesses of Made Ground, or have any significant quantities of organic matter or materials which can decay.

The results are provided in Appendix B.

ARUN DISTRICT COUNCIL A/114/18/PL

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GROUND CONTAMINATION ASSESSMENT

SOIL TESTING

Six samples of the Made Ground/Topsoil and one sample of the natural soils collected on site during this investigation were tested for a range of contaminants. Several of the samples to be tested were recovered from the test locations targeting the potential sources of contamination identified in the desk study and during the site walk over.

The suite of testing carried out on the samples was decided upon following consultation of R&D CLR Publications, published as part of the Contaminated Land Exposure Assessment (CLEA), a joint venture between the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency.

The test suite included a range of:

- Metals and inorganic substances
- Speciated Polyaromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH), with eight band split
- Asbestos screening

The soil samples were tested to obtain 'Total' values within the soil.

In addition, two soil samples were also tested from a solution obtained using the NRA R&D301 leachate procedure, simulating contaminant leachability to underlying groundwater.

The results of the tests from this investigation are included in Appendix C.

RISK ASSESSMENT GUIDELINES – HUMAN HEALTH

The human health risk assessment has been undertaken using the guidance provided in the Environment Agency's publication CLR11, Model Procedures for the Management of Contaminated Land, published in September 2004. Human health assessment criteria used are based upon the proposed final land use of the site, in this case the guidelines for 'Residential with home-grown produce' have been used as an initial screening tool.

Currently in the UK, no statutory limits for the presence of contaminants in soils or groundwater exist. Therefore, the results of the soil samples tested are compared to the following environmental quality standards:

ARUN DISTRICT COUNCIL A/114/18/PL

Category 4 Screening Levels (C4SLs)

Published in March 2014 by DEFRA, C4SLs were primarily produced to support the revised Statutory Guidance to support Part 2A of the Environmental Protection Act 1990, which was published in April 2012. This Guidance introduced a new four-category system for classifying land under Part 2A for cases of a Significant Possibility of Significant Harm to human health, where Category 1 includes land where the level of risk is clearly unacceptable and Category 4 includes land where the level of risk posed is acceptably low.

With regards to using the C4SLs for planning purposes the DEFRA letter of 3rd September 2014 from Lord de Mauley established that they are also meant for use in planning situations, as does the DCLGs 'Planning Portal' document 2014.

Suitable 4 Use Levels (S4ULs)

As well as limited number of C4SLs (and where C4SLs are not available), the set of S4ULs produced by Land Quality Management (LQM) and the Chartered Institute of Environmental Health (CIEH) in 2015 using the CLEA software, are used as a screening tool.

The CLEA software 1.06 version was released in October 2009 and is a deterministic exposure model with altered exposure data to the original model. The model allows the creation of a generic assessment criteria database with which to screen laboratory testing results. These generic assessment criteria are conservative and based upon common assumptions.

RISK ASSESSMENT GUIDELINES – GROUNDWATER

The procedures set out in Environment Agency's Remedial Targets Methodology *Hydrogeological risk assessment for contaminated land* (2006), have been followed.

The test results are compared to the UK Drinking Water Standards (UKDWS) set out in The Water Supply (Water Quality) Regulations 2000. Where the environmental setting is sensitive, results are also compared to the Environmental Quality Standards (EQS) as set out in the EC Dangerous Substances Directive (76/464/EEC).

Several of the EQS contaminants are dependent on the hardness of the receiving watercourse. In this area chalk deposits are present and Southern Water indicates water pumped from underground sources in the chalk at Burpham, Angmering and Patching has hardness in the order of 275$CaCO_3$ mg/l and hard water conditions are present based on the local geology. This information has therefore been used to aid our assessment.

ARUN DISTRICT COUNCIL A/114/18/PL

RESULTS OF TOTAL SOIL TESTS

Asbestos screening did not detect asbestos and hence the risk from this contaminant is considered to be low.

Of all the contaminants tested a number recorded values higher than their relevant environmental standard value for human health for a residential setting.

The results of the analyses are described below and presented in Appendix C of this report.

Lead

Of the seven samples tested, the values obtained ranged from 13mg/kg to 1200mg/kg with two samples exceeding the C4SL of 200mg/kg.

The elevated concentrations were recorded within localised areas of Made Ground at HA1 and HA2 locations where clay with isolated brick fragments was encountered. This corresponds to the clay core within the landscaped bund within the existing rear garden and a thin clay band at the base of the former gravel pit some 1.5m to 2m lower than the surrounding site topography.

Benzo(b)flouranthene, Benzo(a)pyrene

These two contaminants are part of the family of polyaromatic hydrocarbon compounds (PAHs) and of the seven samples tested only one sample exceeded the S4UL of 3.0mg/kg for benzo(a)pyrene (BaP) and 3.7mg/kg for benzo(b)flouranthene with recorded values of 5.6mg/kg and 7.3mg/kg respectively.

The elevated results correspond to the near surface Made Ground at HA1 location where brick fragments were recorded within a thin layer of soft clay.

We understand the new care home is proposed in this area, in addition it is considered likely that existing levels will need to be raised in the order of 2m to 2.5m to accommodate the new building. It is therefore considered that the incorporation of the new building and raising site levels with clean material will effectively sever the pathway to end users from these contaminants.

ARUN DISTRICT COUNCIL A/114/18/PL

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Dibenzo(a,h)anthracene

Dibenzo(a,h)anthracene is also a PAH and of the seven samples tested, the values obtained ranged from <0.1mg/kg to 0.92mg/kg with four results exceeding the S4UL of 0.3mg/kg. The elevated concentrations correspond to the Made Ground soils at TP3, TP9, HA1 and HA2 locations, where various anthropogenic materials were noted such as brick, ash, and metal car parts. Such deposits are not considered to be widespread at the site however one of the elevated results corresponds to the clay core within the landscaped bund in the rear garden. Should this material be proposed for reuse in garden/landscaped areas then further testing is recommended to determine its suitability or alternatively remedial measures undertaken as detailed later in this report. The contamination at TP9 location is considered to be attributed to ash within the Topsoil at this location. The extent of the ash within the Topsoil has not been established. Where such deposits remain in garden/landscaped areas then suitable precautionary remedial measures are recommended across this area.

RESULTS OF LEACHATE TESTS

Of the two samples tested neither recorded values in excess of the respective guideline values adopted.

HUMAN HEALTH RISK ASSESSMENT

The following qualitative risk assessment has been carried out using the source-pathway-receptor principle. As such, potential sources of contamination have been assessed using the CLEA Guidelines. The fact that a pathway must exist between a potential source and potential receptor for there to be a risk, has been taken into account. The potential human receptors evaluated for their individual risk are:

- End users of the site (residents, staff).
- Surrounding residents.
- Construction workers.

GENERAL

Elevated lead, BaP, benzo(b)flouranthene and dibenzo(a,h)anthracene were encountered at concentrations above corresponding guideline screening values.

It is considered that the elevated BaP and benzo(b)flouranthene corresponds to localised Made Ground within the base of the former pit within the southern part of the site. It is considered likely that existing levels will need to be raised in the order of 2m to 2.5m to accommodate the new care building in this area. It is therefore considered that the incorporation of the new building and raising site levels with clean material will effectively sever the pathway to end users from these contaminants. Hence these contaminants are considered unlikely to pose a significant risk to human end users.

ARUN DISTRICT COUNCIL A/114/18/PL

[redacted]

Elsewhere elevated lead and dibenzo(a,h)anthracene was encountered which are considered to be as a result of anthropogenic fragments within the Made Ground at isolated locations at the site. Remedial measures or further investigation are therefore considered necessary in these areas to minimise the risk to human health or further quantify the risks.

END USERS OF THE SITE

The elevated concentrations of lead and dibenzo(a,h)anthracene encountered within the Made Ground soils in the have the potential to cause significant harm to the end users of the site if direct contact to them is available to the end users from such routes as soil ingestion or inhalation of dust.

The contamination has been shown not to be widespread across the site, but appears to exist in localised areas. Based on the development proposals it is considered that much of the contaminated soils are likely to be covered by new buildings and the care home however should such deposits remain in proposed gardens or areas of landscaping then suitable precautions will be necessary.

It is therefore considered that it may be necessary to implement remedial measures at the site to break the source-pathway-receptor linkage between the contaminated soils and the end users.

SURROUNDING RESIDENTS/STAFF/WORKERS

The guideline values listed above have been calculated with the most sensitive receptor in mind, the end users of the site. As such, remedial measures produced to safeguard the health and eliminate the risk to this receptor will also reduce the risk for surrounding residents.

Therefore, the conclusions made for the end users are also relevant to the slightly less sensitive surrounding population.

CONSTRUCTION WORKERS

The exposure route of primary concern for the contamination is 'direct soil ingestion'. For the construction workers there is a direct link to the soil when they undertake the site work and therefore different measures should be taken to manage the short-term exposure risk of coming into contact with contaminated soil.

To reduce the risk to as low as reasonably practicable for the construction workers it is recommended that appropriate health and safety measures be implemented along with the use of Personal Protective Equipment (PPE). All personnel coming into contact with the soil, ground workers in particular, should be instructed to use gloves when on site to avoid dermal contact and restrict inadvertent hand-to-mouth ingestion. Washing facilities should be provided for the site staff to use, and should be used prior to eating or smoking. Reference should be made to the HSE Document, "Protection of Workers and the General Public during Development of Contaminated Land".

ARUN DISTRICT COUNCIL A/114/18/PL

REMEDIAL MEASURES

Elevated concentrations of lead and dibenzo(a,h)anthracene have been recorded within soil samples collected from the site.

It has been established that these potentially pose a significant risk to both end users of the site in gardens and areas of landscaping, the surrounding residents and the construction workers involved in the development of the site. The contamination is not generally considered to be widespread and is likely to be attributed to anthropogenic materials such as Topsoil with ash and car parts at TP9 and TP3 location respectively and within the clay core of the landscaped bund on site. An indicative plan showing the estimated extent of the contaminated soils is presented in Appendix A. In these areas the following remedial solutions are suggested:

i. **Cover system**: removal of the pathway between the contaminated soil and end users, by adding a carefully designed cover layer in areas of domestic gardens and soft landscaped areas on the site. This would work by reducing the risk to acceptable levels /removing the pathway and so breaking the pollutant linkage.

   We recommend a **clean** topsoil cover thickness of 600mm should be adopted in gardens capable of cultivating home-grown produce, assuming the imported material is ***certified clean prior to use***.

   This may be undertaken by either raising site levels or removing some of the soil to create the depth required. In our opinion a reduced thickness of 300mm may be acceptable in less sensitive landscaped areas and front gardens however we recommend approval is sought from the Local Authority regarding the minimum cover thicknesses required at this site.

ii. **Remove source**: removal of the contaminated Made Ground soil, followed by validation testing to confirm the residual soils pose a low risk to human health. Following this exercise a nominal thickness of clean material may be introduced. This applies to the gardens and soft landscaped areas at the site.

For disposal details of these soils reference should be made to the DISPOSAL OF WASTE MATERIAL section at the end of this report. Alternatively, the soil may be suitable for re-use on site, see the section titled RE-USE OF MATERIAL ON SITE.

To reduce the risk to as low as reasonably practicable for the construction worker it is recommended that, high standards of personal hygiene should always be maintained amongst site personnel at all times. All personnel coming into contact with the soil, ground workers in particular, should be instructed to use gloves when on site. Washing facilities should also be provided and used prior to eating or smoking to prevent any hand to mouth transfer. Should any visual or olfactory evidence of

ARUN DISTRICT COUNCIL A/114/18/PL

contamination be encountered during the construction phase, work should be suspended and further advice should be sought.

Regulatory Approval

Any finalised remedial measures concerning human health will need to be approved by the relevant Local Authority Environmental Health Department or the NHBC prior to development. These should be accompanied with a copy of this report and any subsequent investigation reports.

Once remediation methods have been finalised it is recommended that a remediation strategy is written so that all parties involved in the development are clear about the chosen methods, implementation programmes and verification testing regimes that are required.

FURTHER WORK

The contaminated Made Ground is considered to be localised at the location of TP3 and is likely to be associated with isolated car parts at this location. The extent of the contamination at TP9 location in the Topsoil with ash pockets is not known at this stage. Further testing may be undertaken in order to delineate the area of contaminated Made Ground at this location.

Should the existing clay core within the landscaped bund be proposed for reuse the supplementary testing may be undertaken to determine its suitability as bulk fill in garden/landscaped areas or suitable precautionary remedial measures, as detailed above, undertaken.

VALIDATION TESTING

In garden and landscaped areas where remedial works are required then validation of the imported topsoil/sub soil thicknesses will be necessary along with testing certificates demonstrating the imported soils are suitable for use as discussed below. Alternatively where the Made Ground soils are completely removed then validation testing of the residual soils is recommended to demonstrate the remaining soils pose a low risk to human health.

Imported Topsoil and Subsoil Specification

Any new soil imported to the site should have been tested for a range of chemicals or determinants by the supplier. The TPH analysis should ideally have a breakdown of the carbon banding ranges.

The concentrations of determinants required in the topsoil must take into account the thickness of the cover system that is being implemented in the gardens at the site and the concentrations of any elevated levels of contaminants in the soil beneath.

To ensure that the requirements of the 600mm cover system are fulfilled, any imported subsoil or topsoil should contain levels of contaminants at or below the current guideline values.

ARUN DISTRICT COUNCIL A/114/18/PL

It should be noted that newly placed topsoil will settle over time and may not then fulfil the full thickness requirement of the cover system. Consideration to a combination of subsoil and topsoil should be given to reduce this effect.

POST REMEDIATION VERIFICATION

Any remedial measures undertaken at the site will require independent verification once completed to ensure the pollutant linkage to the end users of the site has been removed. This is undertaken to satisfy the relevant regulatory authorities and other interested parties, including future owners of the site, banks, insurers and mortgage companies. This usually involves a small validation investigation to confirm that the remediation has been successful.

Any soil imported to the site should be accompanied by a certificate of chemical analysis. Otherwise, further testing for contaminants must be undertaken to demonstrate that the imported soils are clean. The engineer performing the verification will need to see the soil testing results to validate the imported soil prior to the cover system being constructed to ensure that it is suitable for use.

More commonly, regulators wish to see independent testing on the imported soil to confirm its suitability in addition to the original certificate of analysis.

If the imported soil was found to be unsuitable, it would need removal and replacing with new clean soil.

GROUNDWATER RISK ASSESSMENT

The following risk assessment has, again, been carried out using the source-pathway-receptor principle. The procedures set out in the Environment Agency's Remedial Targets Methodology *Hydrogeological risk assessment for contaminated land* (2006), have been followed. Results have been compared to the UK Drinking Water Standards and to the available Environmental Quality Standards (EQS). The potential environmental receptors considered during this risk assessment were:

- Controlled Waters - the pond 15m to the south east of the site.
- Controlled Waters - the watercourse 32m to the south east of the site
- Controlled Waters - the Secondary Aquifer and Principal Aquifer beneath the site.

GENERAL

Of the contaminants tested for within the leachate samples, none recorded values in excess of their respective EQS or UKDWS. It is therefore considered that the above recognised environmental receptors are unlikely to be at significant risk from potential groundwater pollution at the site.

ARUN DISTRICT COUNCIL A/114/18/PL

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The Environment Agency is the regulatory body charged with protection of controlled waters and may be a consultee in the planning process. We recommend that the conclusions of this report are agreed with the relevant Local Authority at the earliest stage, to reduce potential delays to the development.

ARUN DISTRICT COUNCIL A/114/18/PL

GEOTECHNICAL ENGINEERING CONCLUSIONS

GENERAL

The development proposals has not been finalised however involves the construction of a new care home building and several two storey houses. We understand ground levels will be raised in some parts in the order of 1.3m and new retaining walls constructed to maintain level areas. Cuttings into the existing ground surface are generally not anticipated at the site however towards the north western site boundary and in the central part of the site sections of ground may be reduced by up to 1m. Plans showing the development proposals including the proposed sections are presented in Appendix A.

The exploratory work from this investigation differed from the geological maps with London Clay Formation sub cropping beneath Head deposits in the northern part of the site. The Tarrent Chalk Member, recorded sub cropping beneath Head deposits in the extreme south eastern corner of the site by the geological maps, was also not encountered during the course of our investigations.

The investigations encountered Topsoil/Made Ground overlying suspected Head deposits, which in turn directly overlie the London Clay Formation in the northern part of the site and the Lambeth Group in the southern and eastern parts of the site. The thickness of the Lambeth Group and depth to the underlying chalk was not established however it is considered likely to extend beyond 3m depth below existing site levels. Similarly the London Clay deposits will thin towards the south where the underlying Lambeth Group is present.

The Topsoil/Made Ground extended to depths of between 0.15m and 1.0m below the existing ground surface. The Head deposits extended to depths of between 0.9m towards the lowest site level in the southern parts of the site (TP3) to 6.8m in the north eastern part of the site (BH1). The Head deposits were variable and generally comprised medium dense through to very dense flint gravel with varying proportions of clay and sand intermixed with firm through to stiff clay deposits. Localised soft clay lenses were recorded at BH2 location. The London Clay Formation, encountered in the northern parts of the site, comprised firm becoming stiff blue grey clay, which was fissured and included sandy horizons at some locations. The Lambeth Group encountered in the southern and eastern parts of the site at depths of between 0.9m and 2.6m below existing ground levels and generally comprised stiff light brown and light orange brown clay and light brown very silty fine sand.

ARUN DISTRICT COUNCIL A/114/18/PL

Ground water seepages/inflows were encountered within the Head deposits and the granular Lambeth Group deposits at depths of between 0.9m to 5.5m. Entries were also recorded within the London Clay Formation at depths of 6.5m and 7.5m below the existing ground level. The groundwater seepages are considered likely to represent perched entries contained within the variable granular Head deposits, with more significant inflows towards the base of the existing slope contained within the granular Lambeth Group. Monitoring as part of this investigation has recorded standing water at 2.02 and 2.95m at BH2 location and 0.67m and 2.02m at BH3 location.

The laboratory testing shows the cohesive Head, Lambeth Group and London Clay Formation to have a medium volume change potential as defined by NHBC Building Standards, Chapter 4.2.

SITE EXCAVATION

Conventional hydraulic plant should be satisfactory for excavating foundation and service trenches within the soils however specialist breaking plant will be required to assist in the removal of concrete slabs at the site.

In line with HSE guidelines, all excavations requiring personnel access should be adequately supported to avoid the risk of collapse. Shallow excavations (say <1m below existing site levels) within the soils are likely to remain stable in the short term. Excavations below 1m however are likely to be at increased risk of encountering seepages/inflows, which will affect the stability of trenches and may hamper trench excavations, particularly in the southern and eastern parts of the site.

Perched groundwater seepages are likely to be encountered within excavations through the Head deposits, particularly following wet periods. It is considered that such entries may be controlled using conventional pumping from sumps for trench excavations however more significant control measures may be necessary if the proposals include cutting into the existing slope or where excavations extend into the granular Lambeth Group deposits, encountered towards the southern and eastern parts of the site. In this respect we recommend the advice of a specialist dewatering contractor should be obtained. The effects of dewatering on adjacent infrastructure will also need to be taken into account as dewatering could result in settlement and induce localised instability.

It would be prudent to carry out all ground works in the late summer or autumn when groundwater levels and flows are usually at their lowest.

Slope stability aspects are outside our brief however consideration will be necessary to ensure the existing slope stability is not compromised as groundwater entries will promote excavation collapse.

ARUN DISTRICT COUNCIL A/114/18/PL

An area of deepened Made Ground is suspected in the southern part of the existing paddock area as a result of burying glass from the former glass house on the site. The location and extent of this feature was not proven during this phase of works however we understand the excavation measured some 15 feet by 15 feet (4.6m by 4.6m) and is approximately 12-15 feet deep (3.7 to 4.6m). We recommend suitable contingencies should be allocated, should such deposits be encountered, which may include full trench support to maintain an open excavation.

Should cuttings into the site be proposed then consideration will also be necessary to possible heave movements within the cohesive soils. Based on cutting excavations of less than 1m in depth then the magnitude of potential heave is likely to be negligible. Further consideration will be needed however should the current proposals be altered and cutting excavations extend below this depth. Heave recovery may also occur as a result of the removal of trees and large shrubs in the southern part of the site.

Consideration should be given to the effects of trees and shrubs on service runs that cross the site. Soil movements brought on by the influence of vegetation can severely disrupt drain runs and mains services, and measures should be incorporated into the excavations to allow for future ground movements.

FOUNDATION SOLUTIONS

Shallow Foundations

In our opinion, the natural soils may be capable of supporting the buildings on strip/trench fill foundations at not less than 1m below existing ground level or 0.20m into the top of the natural formation, whichever is the deeper. However the site falls some 7m from the north to the south and hence it is considered that retaining walls are likely to be required and hence the viability of trench fill will be dependent on final site level proposals.

An allowable bearing capacity of 120kPa may be adopted for foundations not exceeding 1.0m in width founded on the Head, London Clay and Lambeth Group soils. This allows for a factor of safety of three against shear failure and for settlements generally not to exceed 25mm taking place over a number of years. Should any softened deposits be encountered during the course of foundation excavations then excavations should continue to locate stiffer soils or suitable reinforcement introduced to span the soft area. In order to minimise differential settlement of spread foundations spanning variable soils it is recommended that suitable reinforcing be incorporated into the foundations to avoid the occurrence of localised movement and the creation of hard spots.

ARUN DISTRICT COUNCIL A/114/18/PL

A former gravel pit is recorded on the site towards the western boundary. A depression was noted at the location of the former gravel pit suggesting this feature has not been subsequently infilled. A shallow hand auger undertaken at the base of depression however recorded Made Ground at this location comprising naturally derived clay deposits. In view of the limited extent of the pit and the proximity of Dappers Lane which was present at the time of the pit, it is considered unlikely that the Made Ground extends to significant depth. Further investigation is recommended however in order to determine the full thickness of the Made Ground soils in order to determine the viability of trench fill foundations at this location.

Consideration should also be given to deepened Made Ground associated with a localised infilled area containing glass from the former glass house. Deepened trench fill will be required in this area to extend below the base of the Made Ground, or alternatively given the likely depth anticipated, appropriate reinforcement introduced to span the area. Further investigation works may be undertaken in an attempt to determine the location and extent of the infilled area in order to enable appropriate foundation design.

Where foundations within are to be constructed within the vicinity of trees or shrubs then they will require deepening in accord with guidelines given in NHBC Building Standards Chapter 4.2. We recommend the cohesive soils should be considered as being of medium volume change potential.

Should the above bearing pressures prove insufficient or final site levels and dewatering considerations preclude the effective use of trench fill foundations, then foundations could be supported on piles extending into the underlying London Clay Formation and Lambeth Group strata.

Pile Foundations

Should the above quoted allowable bearing pressure prove insufficient or problems with dewatering prove difficult, foundations could be supported on piles founded within the underlying Head, London Clay, Lambeth Group and possibly the underlying Tarrent Chalk Member.

The full thickness of the Lambeth Group deposits has not been established in the southern parts of the site or the London Clay Formation in the northern and central parts of the site. In view of the recorded geology in the area it should be appreciated that piles may extend through the London Clay and into the underlying Lambeth Group at some locations. Similarly towards the southern and western parts of the site piles may extend through the Lambeth Group and into the underlying Tarrent Chalk Member. Due to access restrictions our borehole excavations were limited to the northern and eastern parts of the site where London Clay Formation soils were proven to the full extent of the boreholes. Hence should a piled foundation solution be sought we recommend supplementary boreholes are undertaken in western and southern areas of the site, extending below the influence of proposed piles lengths, to provide

ARUN DISTRICT COUNCIL A/114/18/PL

information within the Lambeth Group deposits and determine the competency of the underlying chalk, if present, to enable suitable pile design.

Consideration will therefore be necessary to the presence of variable deposits as discussed above which include a combination of cohesive soils, granular soils and variable bedrock geology, as well as groundwater entries within the natural deposits at variable depths.

A preliminary pile design data sheet of ultimate values for bored piles through the Head and London Clay Formation in the northern part of the site is included in Appendix A, based on information to date. The design sheet will require updating following any supplementary boreholes at the site.

The ultimate shaft friction and the end bearing has been calculated using the result of the standard penetration tests in conjunction with recognised conversion factors and laboratory test data. We recommend any support from the Made Ground is ignored. In addition, consideration will be required to final site levels when designing piles.

In view of the complex ground conditions present at this site, the advice of a specialist piling contractor should be obtained to determine the most appropriate pile type and its design. Given the presence of groundwater, particularly in the southern parts of the site, care will need to be taken to avoid the occurrence of necking of bored cast in place piles.

Where piles are located within influence of trees/hedgerows at the site and cohesive soils are present, including the recently removed vegetation, then piles should be sleeved within the zone of desiccation and void formers used beneath ground beams to reduce the effects of any localised heave recovery of the soil should the trees be removed or die. This sleeving will also act to minimise the effects of seasonal uplift forces within the root zone.

If pile load tests are carried out an appropriate factor of safety would be 2.5. If it is not expected to carry out such tests then the factor of safety should be increased to 3.0.

GROUND FLOOR SLABS

Provided all the Topsoil and Made Ground is stripped off, ground bearing floor slabs could be constructed placed on a layer of well compacted granular fill. However where it is required to deepen the main foundations below 1.50m depth, due to the presence of trees and large shrubs (existing or in areas of recent vegetation) or where seasonal desiccation is occurring then ground floor slabs will require suspending in accord with NHBC guidelines. A void should be left below the floor slab to accommodate future soil movements. This may be achieved by use of a proprietary compressible material such as Clay board or Cellcore.

ARUN DISTRICT COUNCIL A/114/18/PL

It should be noted that in accord with NHBC guidelines, a suspended floor slab will be required in soils with a volume change potential, even in the absence of trees and shrubs, where the soil is seasonally desiccated. Under those circumstances the adoption of a suspended slab is only likely to be avoided if construction of the floor slab takes place during the wetter times of the year. A void should be left below the floor slab to accommodate future soil movements. This may be achieved by use of a proprietary compressible material such as Clay board or Cellcore.

The NHBC Standards Chapter 4.2 provides useful guidance for determining the theoretical influence of trees on clay soils based on the volume change potential, the tree heights (including mature heights), tree species and distances from the building. We recommend the advice is sought from a qualified Arboriculturalist with regard to the tree species/mature heights on site, to aid determining the potential zones of influence.

GAS PROTECTION

The risk of ground gases impacting the site was assessed by reference to the paper "A pragmatic approach to ground gas risk assessment for the 21st Century" Card and Wilson, 2011. This is a follow up paper to the CIRIA Report 665 and is compatible with that document.

A former gravel pit is recorded on the site towards the western boundary. The historical maps indicate this was fairly limited in lateral extent and during our site walk over a depression was noted at the location of the former gravel pit suggesting this feature has not been subsequently infilled. A hand auger undertaken at the base of depression recorded Made Ground at this location however this comprised naturally derived clay deposits. Based on this information it is considered unlikely that the gravel pit presents a significant risk from ground gases at the site.

The results of the gas monitoring have revealed that carbon dioxide gas up to 5.1% are being produced in the ground while low levels of methane gas up to 0.3% was recorded. Flows rates of 0.0l/hr and 0.1l/hr were recorded.

The low flow rates indicate that no significant volumes of gas being produced in the ground. There was no organic rich soil and no significant thickness of Made Ground at the site.

The results have been evaluated with reference to Code of practice for the characterization and remediation from ground gas in affected developments, BS8485:2007.

Using the maximum carbon dioxide reading of 5.1% with the highest recorded flow rate of 0.1l/hr, the maximum gas screening value is 0.005l/hr. One result recorded a carbon dioxide levels above 5% however there were no methane levels above 1%. Based on the recorded carbon dioxide concentrations this classifies the site as Characteristic Situation CS2 in accordance with BS8485:2007 and traffic light colour 'Amber 1' in accordance with NHBC Report No 10627 for residential properties. For private

ARUN DISTRICT COUNCIL A/114/18/PL

housing, BS8485:2007 would require a solution score level 3 to be incorporated into the design. Various gas protection design systems are detailed in Table 3 of the document in order to achieve this required level of protection. Where NHBC design measures are required then high level gas protection measures will also be necessary. This includes; installing a high level gas protection membrane to create a permeability contrast to prevent ingress of gas into buildings and installed as prescribed in BRE414; incorporating ventilation of the sub floor void designed to provide a minimum of one complete volume change per 24 hours; ensuring membranes used are fitted by a specialist contractor and are fully certified.

The BGS advises that basic radon gas protection measures are necessary.

The above conclusions should be agreed with the relevant local Regulatory Authority as soon as possible prior to development, to reduce any potential delays to the development should they require further clarification of this report or further ground gas monitoring.

WORKING PLATFORMS FOR TRACKED PLANT

If construction on the site requires the use of heavy tracked plant then reference will need to be made to the most recent guide for the design of 'Working Platforms for Tracked Plant', 2004, produced by the BRE.

Use of such plant will require construction of either a working platform or an adequate running surface if the subgrade is determined as being already adequate to support the anticipated plant loadings.

Following removal of the near surface Topsoil and Made ground soils, the subgrade down to 2.0m depth includes cohesive and granular soils. Accordingly, the following soil characteristics should be used for preliminary Working Platform design in accord with the most recent guidance given by the Building Research Establishment. We recommend the platform is designed to the weakest soil, as the granular and cohesive distribution cannot be accurately estimated.

Anticipated Subgrade Characteristics down to 2.00m Depth		
	Cohesive and Granular Head	**Cohesive and granular Lambeth Group**
Undrained Shear Strength Cu of cohesive soil	40kN/m^2	75kN/m^2
Angle of shearing resistance of granular subgrade Ø´s	30°	30°
Effective unit weight of subgrade material	19kN/m^3	19kN/m^3

It should be noted that soft spots and zones of weaker soil may exist on any site at shallow depth that will have a significant influence on the instability of tracked plant such as the infilled pit containing glass the exact location of which has not been established but is suspected to be in the locality of BH3

ARUN DISTRICT COUNCIL A/114/18/PL

and TP5. The location of such features will not readily be determined by a general ground investigation for foundation design and more specific investigation at shallow depth may be required before the design of a working platform can be completed.

The advice of a specialist contractor should be sought to determine the most suitable size and thickness of platform required for their specific plant. This will take into account the size of the plant and anticipated loadings imposed on the working platform.

RETAINING WALL DESIGN

It is proposed to construct retaining walls at the site to facilitate level areas for the development. At the time of writing this report the exact dimensions or method of constructing the retaining walls were not decided however from the preliminary plans provided the retained soils are likely to be in the order of up to 1.3m and will retain infilled soils in the southern part of the site and as a result of a shallow cutting near the northern western boundary.

Hence the design parameters will be dictated by the soils used to raise site levels in this area. Where retaining walls extend below the existing ground surface as part of cut and fill operations then the following parameters may be adopted for the Head deposits:

Parameter	Cohesive Head	Granular Head
c'	0kN/m^2 (worst credible) - 5kN/m^2	0kN/m^2
ϕ'	21°	32°
c_u	40kN/m^2	0kN/m^2
γ_b	19kN/m^3	19kN/m^3

ARUN DISTRICT COUNCIL A/114/18/PL

CLASSIFICATION OF WASTE MATERIAL

The excavations on site from foundation and services trenches will produce a considerable amount of surplus soil. Under current waste management legislation if this soil is surplus to requirements it will be classified as waste and needs disposing of at a licensed facility. However, some of the soil may be able to be re-used on-site as described in the RE-USE OF MATERIAL ON SITE section below.

If it is decided that the soil should be taken off-site as waste and disposed of, the implementation of the Landfill Directive means that the waste soil requires classification prior to leaving site.

In the event that there is some surplus soil, or soil that is not suitable for use as back fill, under current waste management legislation this soil will be classified as waste and requires classification prior to leaving site.

If it is decided that the soil should be disposed of at a landfill facility, the implementation of the Landfill Directive means that the waste soil require classification under the Waste Acceptance Criteria (WAC).

European Waste Catalogue Determination

A summary of the results of the assessment is provided in Appendix C. The full details of the assessment are available upon request.

ARUN DISTRICT COUNCIL A/114/18/PL

[redacted]

Using the 'Total' soil contamination test results from this investigation in conjunction with the HazWasteOnline spreadsheets, some of the soil has been initially classified as **non hazardous, potentially hazardous and hazardous**. Reference has been made to the document WM2 A41 published by the Environment Agency with regard to hazardous wastes. The table below shows the results and the reasons why, after consideration, all the samples are considered to be **non-hazardous**:

Sample No.	Depth	Initial Classification	Reason for initial Classification	Reason to discount initial classification	Final Classification
TP1	0.10	Non-hazardous	-	-	**NON-HAZARDOUS**
TP3	0.05	Hazardous	Zinc Chromate	No trend in elevated chromium for zinc chromate – Zinc Oxide more likely to be present associated with trace lubricants, linked to the car parts in area, therefore, that used as determinant.	**NON-HAZARDOUS**
TP5	0.50	Non-hazardous	-	-	**NON-HAZARDOUS**
TP8	0.10	Non-hazardous	-	-	**NON-HAZARDOUS**
TP9	0.05	Non-hazardous	-	-	**NON-HAZARDOUS**
HA1	0.30	Potentially Hazardous	TPH >1mg/kg – Potentially Flammable	Hydrocarbon concentration not high enough for flammability to be relevant.	**NON-HAZARDOUS**
HA2	0.30	Hazardous	Lead Chromate and TPH >1mg/kg – Potentially Flammable	Hydrocarbon concentration not high enough for flammability to be relevant. No trend in elevated chromium for lead chromate – other lead compounds more likely to be present associated with trace lubricants, linked to the car parts in area, therefore, that used as determinant.	**NON-HAZARDOUS**

Waste Acceptance Criteria (WAC) Testing Results

To further classify the waste soil for landfill disposal, Waste Acceptance Criteria (WAC) testing has been carried out on a representative sample of the Made Ground at TP9 location. The results show that this soil initially **fails** the **inert** waste criteria due to the levels of Total Organic Carbon (TOC).

The laboratory testing results are presented in Appendix C.

ARUN DISTRICT COUNCIL A/114/18/PL

Waste Classification

From the results of the HazWasteOnline spreadsheets and the WAC testing, currently, the waste Made Ground soil on this site is classified as **non-hazardous**. A higher TOC limit value may be permitted by the Environment Agency however at some inert waste landfill sites. **This may allow the Made Ground to be reclassified as inert** as the Dissolved Organic Carbon fraction is well below the acceptance criteria for inert waste. We recommend the analytical results are provided to the landfill operators or waste management contractors to confirm whether it meets their license agreements and to confirm tipping costs.

Uncontaminated soil and stones, including naturally occurring sands and clays, may be accepted in an inert landfill without testing, provided that it is not topsoil or peat and excludes soil from contaminated sites. Inert waste should not undergo change, will not burn, react, biodegrade or adversely affect human health or the environment. It should not contain metals or plastics. In our opinion the natural soils at the site are uncontaminated and may be disposed of as inert waste. We recommend confirmation is sort by the receiving landfill should supplementary testing be required to confirm this.

The Landfill Regulations dictate that all waste must be treated before going to landfill. This treatment should fulfil all of the following three criteria:

- Physical, thermal, chemical or biological process including sorting.
- Change the characteristics of the waste.
- Reduce the volume, reduce the hazardous nature, facilitate its handling or enhance its recovery.

The most basic method of pre-treatment is sorting of the waste and re-cycling any possible materials, many waste disposals companies will have on-site recycling facilities that will be able to undertake this process at the landfill site. However, if treatment would not reduce its quantity or the hazards it poses to human health or the environment, then all three steps may not be necessary. The exception is inert waste for which treatment is not technically feasible.

The Environment Agency expect all landfill operators to obtain written evidence that the waste they accept has been pre-treated. We recommend that a signed certificate should be obtained describing the treatment to give to the receiving landfill. Further testing may be required after the treatment before the soil is accepted by the relevant landfill.

ARUN DISTRICT COUNCIL A/114/18/PL

RE-USE OF MATERIAL ON SITE

Currently, if surplus soil is 'fit for re-use' on the site and has not been treated, its re-use is allowed within the planning law. If it needs treating prior to re-use, exemptions can be sought from the Environment Agency to allow this activity.

A recent voluntary code of practice published by CL:AIRE, in conjunction with the EA, (the Definition of Waste: Development Industry Code of Practice, Version 2) endorses the re-use of surplus soil on and off the site of origin without the need for exemptions from the EA, dependent on whether it is "fit for purpose". It also supports the use of "Hub and Cluster" sites (to enable surplus soil to be used on agreed sites in the local vicinity, dependent on the soil being 'fit for purpose').

Based upon the human health and groundwater risk assessments, the Topsoil within the paddock area and the natural soils at this site are considered to be suitable to be re-used on site for bulk fill and garden/landscaping purposes, dependent on the agreement of the Local Authority. The clay core material within the existing landscaped bund may be used as bulk fill beneath buildings however further testing and possibly remedial measures may be necessary should this material be proposed in landscaped/garden areas.

SLOPE STABILITY

The site slopes down from the north to the south with an estimated fall in current ground levels in the order of 7m at an estimated average angle of 4° (1:14) to the horizontal and approximately 9° (1:6) to the horizontal towards the south western corner.

Slope stability aspects are outside the scope of this report however, it should be appreciated that vegetation can reinforce slopes and their recent removal and the subsequent gradual loss of root reinforcement may reduce stability.

Generally the overall slope at the site is not considered to be particularly steep however, the angle increases towards the south western part of the site. In the absence of detailed ground analysis, as a guide consideration should be given to the following to avoid possible instability:

- Increasing/redirecting water flow through the slope (e.g. sheet piling, retaining walls >1m, soakaways).
- Long continuous open foundation/service excavations; say in excess of 10m, parallel to ground contours.
- Unduly loading the slope, such as infilling following ground contours, say 1.5m above existing ground levels.
- Permanent cuttings following ground contours more than say 1m.

ARUN DISTRICT COUNCIL A/114/18/PL

SUBSURFACE CONCRETE

With respect to BRE Special Digest 1 'Concrete in Aggressive Ground' (2005), chemical tests on selected soil samples have recorded soluble sulphate concentrations ranging from 0.13g/l to 0.52g/l. The pH values ranged from 6.7 to 8.4.

This would correspond to a Design Sulphate Class of **DS-1** for the Made Ground, Head and Lambeth Group and **DS-2** for the London Clay Formation.

In terms of BRE Special Digest 1, the current land use on the site means that it should be considered to be natural ground.

The groundwater beneath the site should be considered as mobile for the Made Ground, Head and Lambeth Group and static for the London Clay Formation.

Reference to this document indicates that these results correspond to **AC-1** class (ACEC) 'Aggressive Chemical Environment for Concrete' in the Made Ground, Head and Lambeth Group and **AC-1s** for concrete extending into the London Clay Formation.

ACCESS ROADS AND PARKING

The structural design of a road or hard standing is based on the strength of the subgrade, which is assessed on the California Bearing Ratio (CBR) scale. CBR tests were undertaken in the Head deposits encountered at the site with results of the testing ranging between <1% and 4%.

It is recommended that for formation prepared in Head deposits, a subgrade CBR value of 2% is adopted for design purposes. The Head deposits should be considered to be frost susceptible, requiring a minimum pavement construction thickness of 450mm.

The site conditions should be reassessed at the time of construction and the CBR/pavement design updated accordingly if considered necessary.

Any areas of soft or deleterious material should be excavated and replaced with a properly compacted granular fill or alternatively geogrids or similar soil reinforcement techniques should be employed to span the deposits and provide a subgrade with a known CBR value. Discussions should be held with a soil reinforcement company (such as Tensar) who would design a subgrade to a specified CBR value.

ARUN DISTRICT COUNCIL A/114/18/PL

SOAKAWAY TESTING

Soakaway tests provided indicative infiltration results between 4.0 x 10^{-3}m/s and 6.6 x 10^{-3}m/s. The ground conditions at the site however include a chaotic mix of granular soils with varying amounts of clay and clay soils, which are considered likely to be effectively impermeable. It is therefore recommended that supplementary tests are undertaken in machine excavated trial pits in order to more accurately determine the capability of the soils to dispose of storm water using ground infiltration systems.

The Environment Agency does not approve soakaways in contaminated ground. The elevated results for PAHs and lead at this site are within the Made Ground soils at shallow depths and should not be allowed to directly infiltrate into soakaways in contact with the aquifer beneath.

Consideration will however be necessary to shallow groundwater entries, particularly in the southern parts of the site, and to avoid promoting slope instability if such a drainage solution is sought. In this respect, we recommend shallow soakaways up slope or near buildings should be avoided.

Groundwater entries and more cohesive soils may prevent the effective use of soakaways at depth.

UNDERGROUND SERVICES

Elevated levels of lead and various PAHs were recorded in the Made Ground at the site. It should be noted that the utility companies often have their own local guidelines and standards on levels of shallow soil contamination in the ground that may or may not be acceptable for the installation of below ground services. These standards may be different to those specified for assessing risks to human health and groundwater.

The local requirements should be obtained from the particular service supply company as soon as possible to avoid unexpected delays or additional development costs.

Guidance can be sought from the UK Water Industry Research (UKWIR), 'Guidance for the selection of water supply pipes to be used in brownfield sites', reference 10/WM/03/21 and 'Pipe materials selection and specification for use in contaminated land', referenced 04/WM/03/0. These documents propose that the assessment of the hazard to potable water supply pipes should be based on the following pathways: contact with migrating groundwater, permeation of vapour, and direct contact with soil.

Approval should be sought for the type of pipes proposed before they are installed.

ARUN DISTRICT COUNCIL A/114/18/PL

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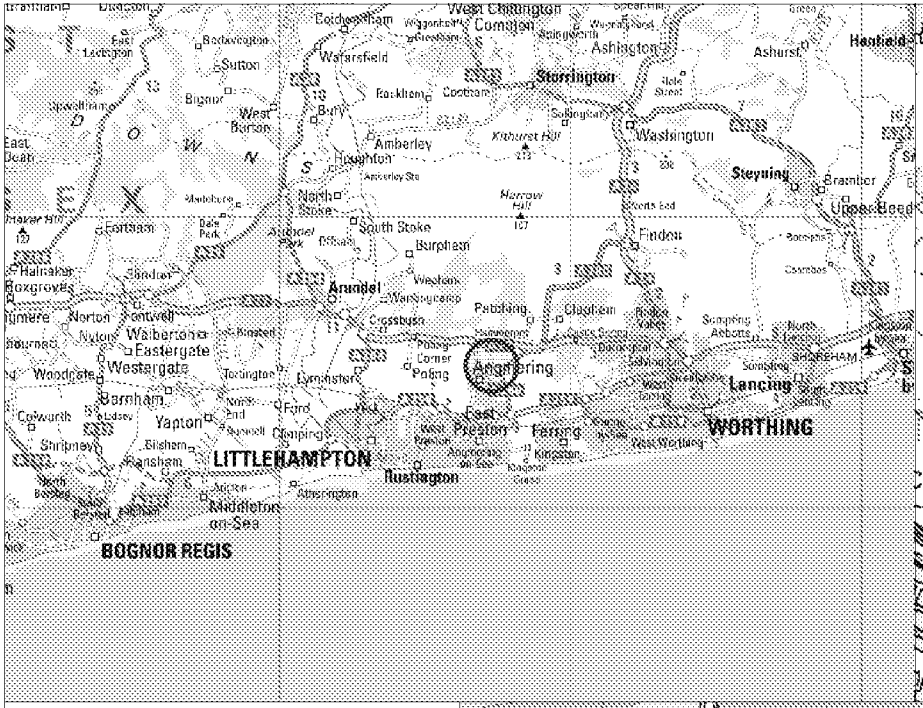
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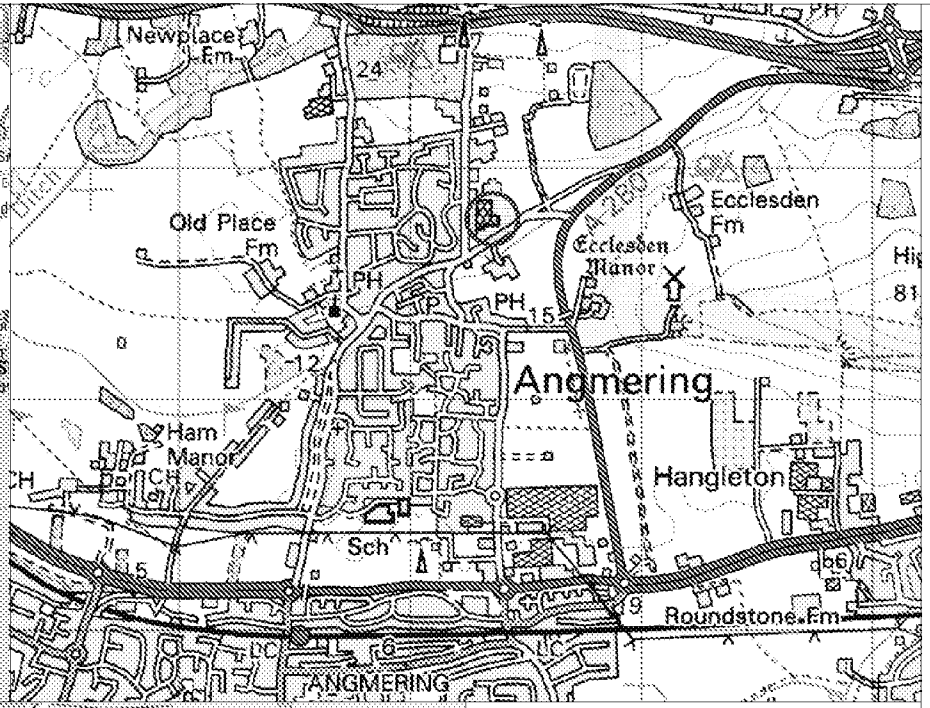
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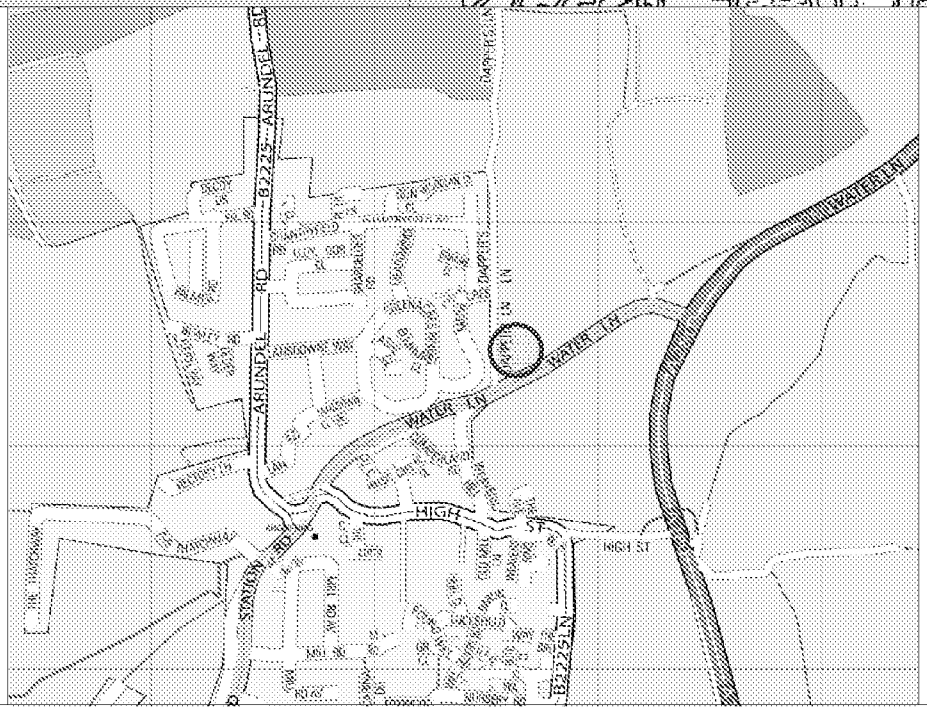
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APPENDIX A
PLANS, PLOTS AND PHOTOGRAPHS

ARUN DISTRICT COUNCIL A/114/18/PL







Key:

Approximate Site Location

Listers Geotechnical Consultants

Slapton Hill Barn,
Blakesley Road,
Slapton,
Towcester,
Northants
NN12 8QD.

Telephone: (01327) 860060
Fax: (01327) 860430
E-mail: info@listersgeotechnics.co.uk

Site Location Plan

Site: Dappers Lane, Angmering, BN16 4DA

Scale: NTS | Job No.: 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

BH1
TP8
TP9
BH2
TP6
TP7
TP5
Landscaped mound
HA2
BH3
TP4
Base of pit
HA1
TP1
TP3
TP2

Key:

Cable Percussive Borehole

Machine Excavated Trial Pit

Hand Auger Borehole

Listers Geotechnical Consultants

Slapton Hill Barn,
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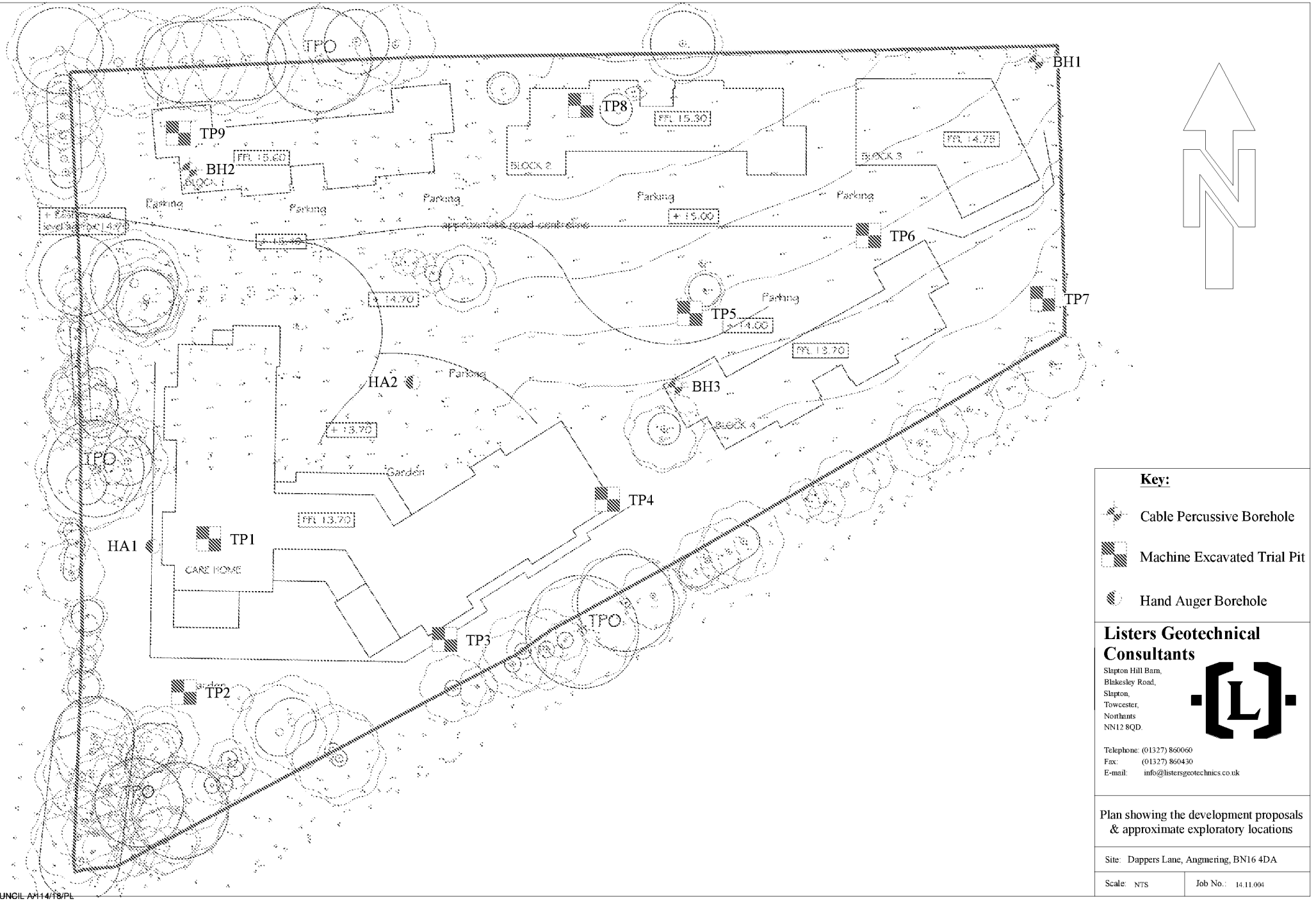
Plan showing existing site layout & approximate exploratory locations

Site: Dappers Lane, Angmering, BN16 4DA

Scale: NTS

Job No.: 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL



Key:

- Cable Percussive Borehole
- Machine Excavated Trial Pit
- Hand Auger Borehole

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E-mail: info@listersgeotechnics.co.uk

Plan showing the development proposals & approximate exploratory locations

Site: Dappers Lane, Angmering, BN16 4DA

Scale: NTS | Job No.: 14.11.004

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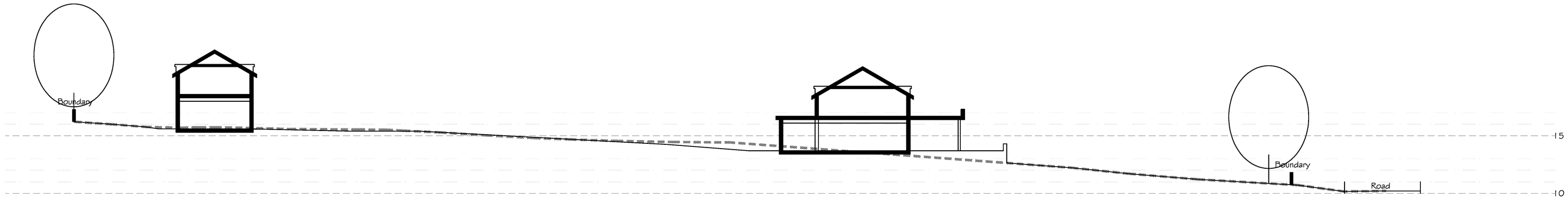
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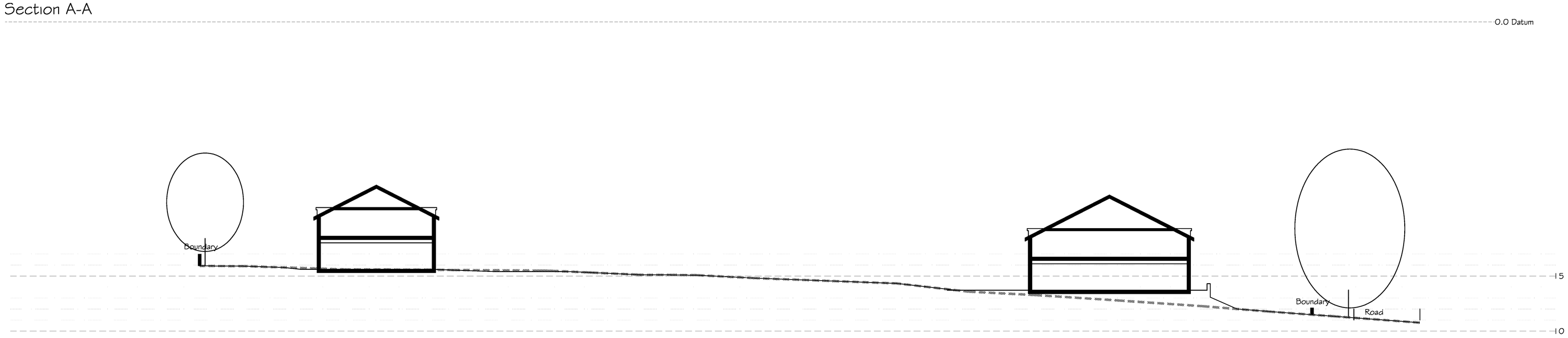
Section A-A



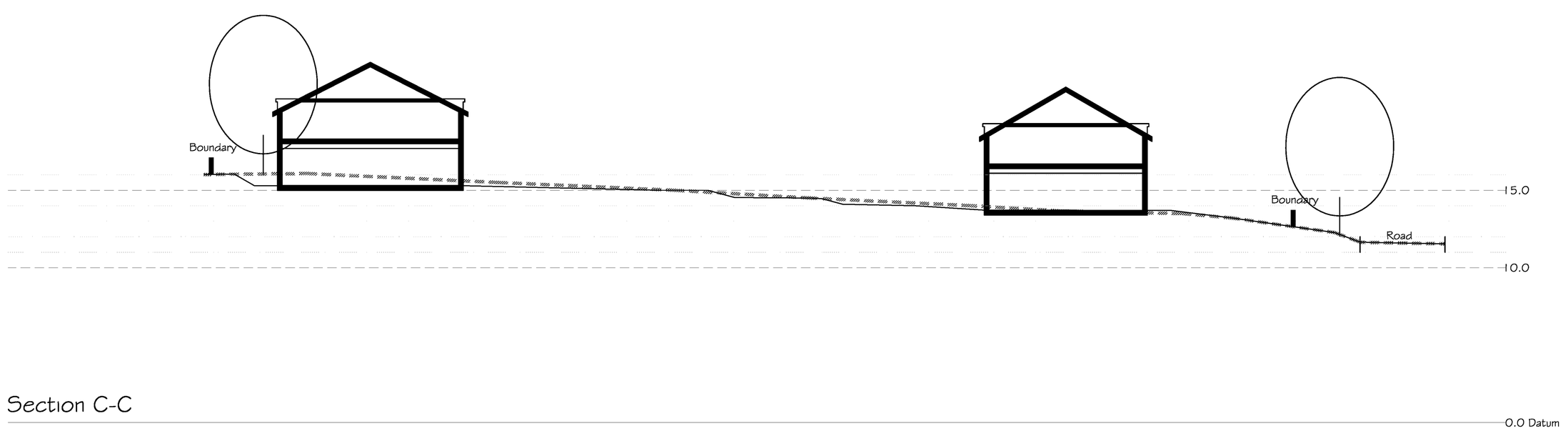
Existing Ground Level

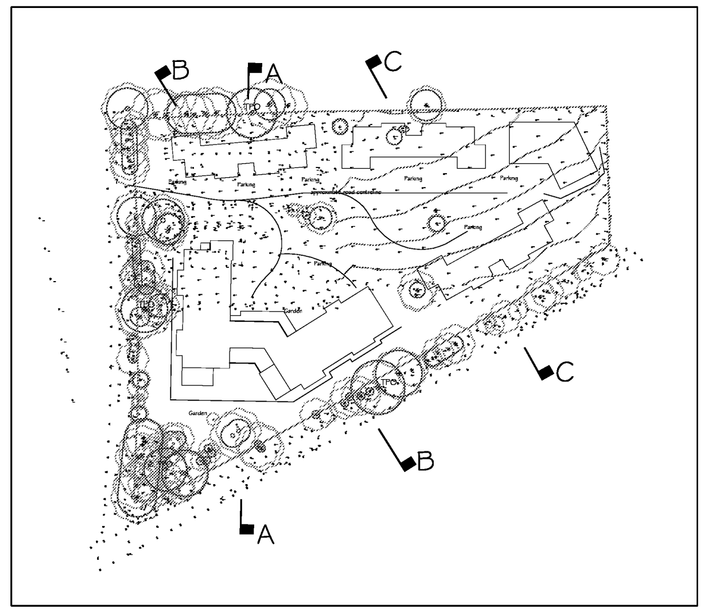
Proposed Ground Level

Section B-B



Section C-C





Scale 1:200

0 1 2 3 4 5 10 (metres) 20

Rev	Date	Description	By

harrisirwin
architects & designers

ASKE STABLES, ASKE, RICHMOND
NORTH YORKSHIRE DL10 5HG

t : 01748 825675
e : enquiries@harrisirwin.com
w : www.harrisirwin.com

Project:
Proposed Development
Dappers Lane
Angmering

Client: FRONTIER

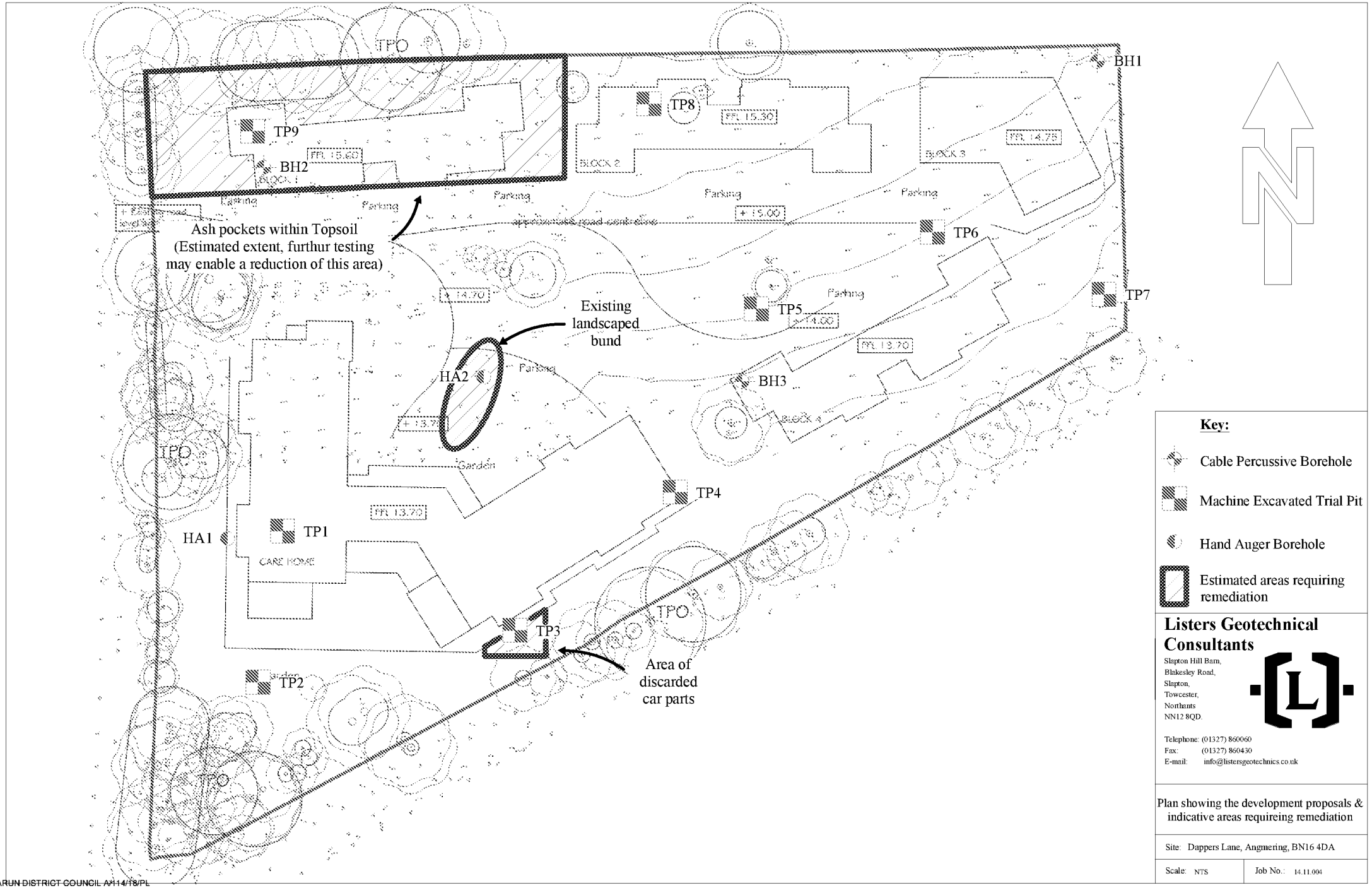
Drawing:
Indicative Site Sections

FEASIBILITY

Scale @ A1	Date:	Drawn:	Checked:
200	Jan 15	RSW	

Proj. No.:	Status:	Dwg. No.:	Rev:
1877	-	F005	-

ARUN DISTRICT COUNCIL A1114 RPL



ARUN DISTRICT COUNCIL A/114/18/PL



Broadlees House



Access track fronting the main house

Site Photographs	Job No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL



View towards the west showing out buildings



Septic tank in the southern part of the site

Site Photographs	Job No. 14.11.004



View towards the east across the paddock



Remnant concrete slabs in north western corner of the paddock area

Site Photographs	Job No. 14.11.004



View towards the west showing the landscaped bund in rear garden



View towards the west across the paddock

Site Photographs	Job No. 14.11.004



View towards the south east across the paddock and showing the overgrown area in the southern part of the site



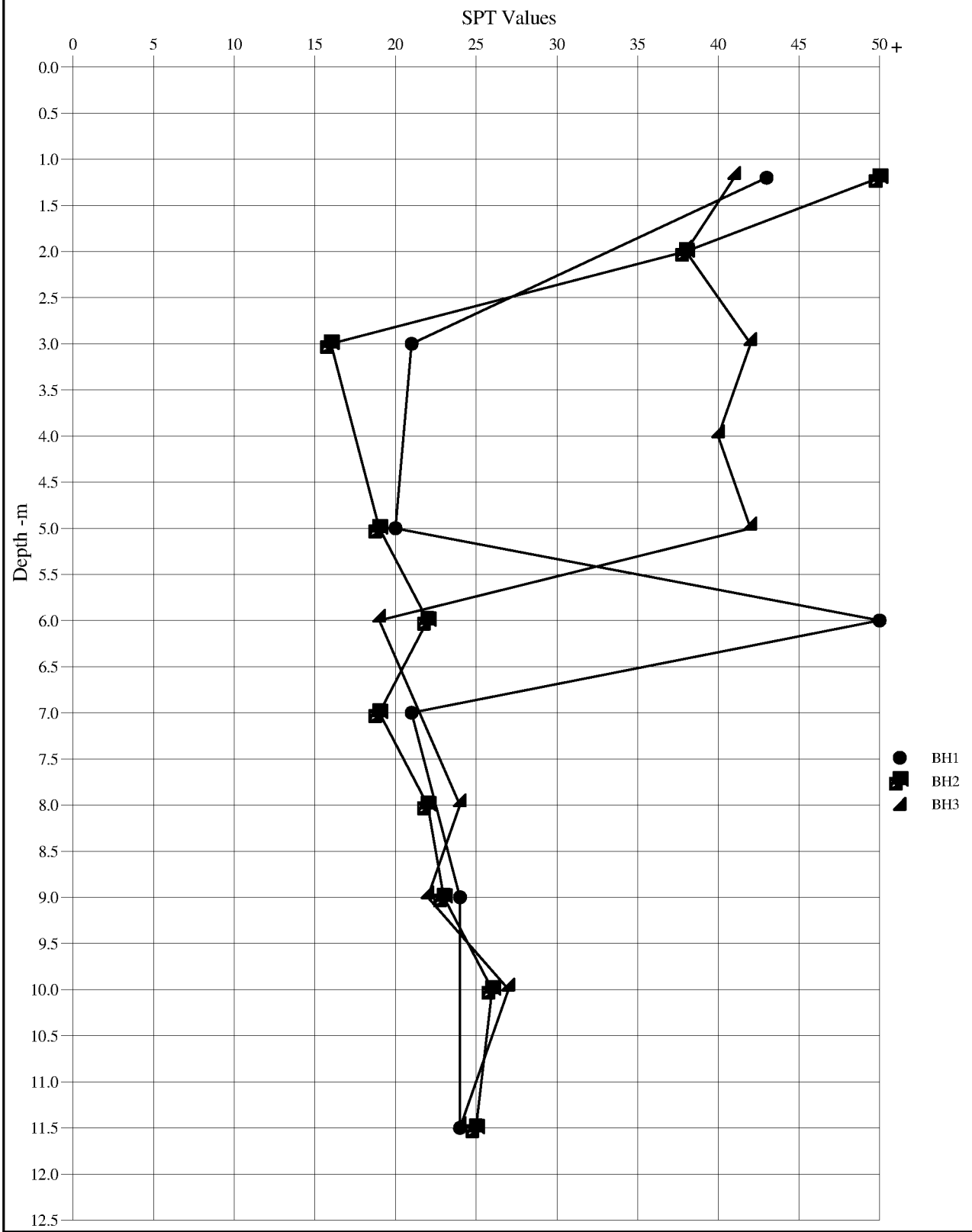
Southern boundary along Water Lane

Site Photographs	Job No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

Site: Dappers Lane, Angmering, West Sussex



Date	**SPT VALUES v DEPTH**	Lab Ref. 14.11.004 Client Ref.

ARUN DISTRICT COUNCIL A/114/18/PL

The working load of a single pile is the sum of the ultimate shaft resistance and the ultimate end bearing resistance, each divided by an appropriate factor of safety. The following unit ultimate values of shaft resistance and end bearing resistance are proposed for preliminary pile design at this site:

ULTIMATE SKIN FRICTION	**kN/m^2**
Made Ground	
GL - 1m	Ignore
Head – Cohesive and Granular	
average from 1m to 6m and water at say 3m based on granular soils	27 x As
London Clay	
at say 6m	48 x As
increases linearly to 12m to	60 x As
ULTIMATE END BEARING	
London Clay Formation	
at 8m	780 x Ab
increases linearly to 12m to	900 x Ab

As – Area of the pile shaft (m^2)
Ab – Area of the pile base (m^2)
Depths based on measurements below existing ground level

The adhesion factor, α of 0.6 in the London Clays has been utilised from guidance provided in '*Guidance notes for the design of straight shafted bored piles in London Clay*' produced by the London District Surveyors Association. Reference should be made to the document for specific design assumptions and conditions when installing piles in London Clay.

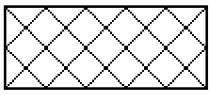
Date January 2015	**PILE DESIGN DATA**	**Report No.** 14.11.004

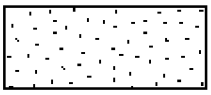
ARUN DISTRICT COUNCIL A/114/18/PL

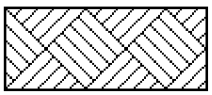
APPENDIX B
FIELDWORK AND TESTING

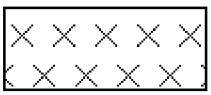
1.0 SOIL/ROCK SYMBOLS

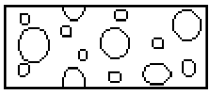
1.1 Soils

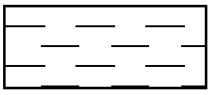

Made Ground

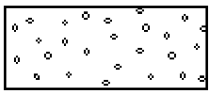

Sand

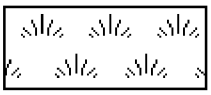

Topsoil


Silt

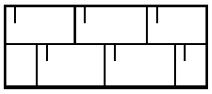

Boulders and Cobbles

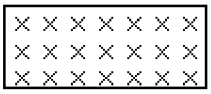

Clay

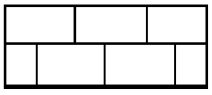

Gravel

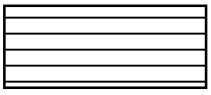

Peat

1.2 Rocks, Sedimentary

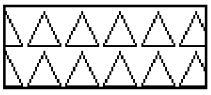

Chalk


Siltstone

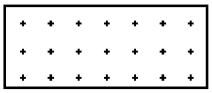

Limestone


Mudstone


Conglomerate


Breccia


Coal


Sandstone

SOIL/ROCK SYMBOLS

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP1

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Dark brown very sandy SILT with many roots and rootlets and a glass bottle.		0.00	(0.20) 0.20	0.10	D		
HEAD Orange brown clayey slightly sandy fine to coarse GRAVEL with some cobbles and occasional roots and rootlets to 0.70m. Gravel and cobbles are sub-angular to sub-rounded flint.				0.30 0.50	D D		
		1.00		1.00	D		
			(2.40)	1.50	D		
		2.00					
				2.50	D		
LAMBETH GROUP Stiff becoming very stiff light brown and light orange brown silty slightly sandy CLAY.			2.60	2.70 2.70	D V	159	
			(0.60)				
		3.00		3.00	D		
Trial Pit terminated at 3.20 m			3.20				

Ground Level: 13.520m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.70m
3. Groundwater: Seepage at 2.60m
4. Stability: Upright and stable

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP2

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Dark brown very sandy SILT with many roots and rootlets.		0.00	(0.15) 0.15	0.10	D		
HEAD Firm light brown silty sandy CLAY with many roots and rootlets.			(0.55) 0.70	0.50	D		
HEAD Stiff orange brown sandy gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded flint.		1.00	(0.60) 1.30	1.00	D/V	130	
LAMBETH GROUP Stiff light brown and light orange brown silty CLAY. Grading into very clayey fine and medium SAND below approximately 2.30m with occasional thin firm clay laminations.		2.00	(1.20)	1.50 2.00	D/V D	135	
LAMBETH GROUP Light brown very silty fine SAND with firm clay laminations.			2.50 (0.50)	2.50	D		
Trial Pit terminated at 3.00 m		3.00	3.00				

Ground Level: 11.650m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.70m
3. Groundwater: Slight seepage at 1.30m
4. Stability: Upright and stable

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP3

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
MADE GROUND Car chassis, axles, rubber tyre and a leaf spring on to dark brown very sandy SILT with many roots and rootlets.		0.00	(0.15) 0.15	0.05	D		
HEAD Stiff orange brown sandy very gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded flint.			(0.75) 0.90	0.50	D		
LAMBETH GROUP Stiff light brown and light orange brown silty CLAY with occasional sand laminations.		1.00		1.00	D/V	120	
			(1.40)	1.50	D/V	97	
...becoming firm and stiff below 2.0m with very silty sand beds.		2.00		2.00	D/V	73	
LAMBETH GROUP Light orange brown silty very gravelly fine and medium SAND with occasional cobble. Gravel and cobbles are sub-rounded flint.			2.30 (0.50)	2.50	D		
Trial Pit terminated at 2.80 m			2.80				
		3.00					

Ground Level: 11.310m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.15m
3. Groundwater: Inflow from land drain at 1.00m and from below 2.30m
4. Stability: Collapse below 2.30m, widening pit by 0.3m on each side
5. 63mm diameter land drain struck at 1.00m

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP4

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Dark brown very sandy SILT with many roots and rootlets.		0.00	(0.20) 0.20	0.10	D		
HEAD Firm brown silty sandy gravelly CLAY rapidly grading into clayey very sandy fine to coarse GRAVEL. Gravel is sub-angular to sub-rounded flint.		1.00	(1.40)	0.50	CBR		
LAMBETH GROUP Stiff light brown and light orange brown silty slightly sandy CLAY.		2.00	1.60 (0.20) 1.80	1.70	D/V	127	
Trial Pit terminated at 1.80 m		3.00					

Ground Level: 12.500m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.20m
3. Groundwater: Seepage from 0.90m to 1.60m
4. Stability: Collapse below 0.90m widening pit by 0.1m on each side

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP5

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Grass onto dark brown clayey very gravelly SAND with some roots and rootlets. Gravel is fine to coarse sub-angular to sub-rounded flint and occasional ceramic.		0.00	(0.45)	0.10	D		
HEAD Brown and orange clayey slightly sandy fine to coarse GRAVEL with some cobbles. Gravel and cobbles are sub-angular to sub-rounded flint.			0.45	0.50	D		
		1.00	(1.75)	1.00	D		
				1.50	D		Dry
		2.00		2.00	D		
Trial Pit terminated at 2.20 m			2.20				
		3.00					

Ground Level: 14.430m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.45m
3. Groundwater: Dry
4. Stability: Upright and stable

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/F

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP6

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Grass onto dark brown clayey silty slightly gravelly fine and medium SAND with some roots and rootlets. Gravel is fine to coarse sub-angular to sub-rounded flint, chalk, ceramic, glass and brick.		0.00		0.10	D		
			(0.50)				
			0.50	0.50	CBR		
HEAD Orange brown clayey silty slightly sandy fine to coarse GRAVEL with some cobbles. Gravel and cobbles are sub-angular to sub-rounded flint.			(0.60)				
		1.00		1.00	D		
Trial Pit terminated at 1.10 m			1.10				Dry
		2.00					
		3.00					

Ground Level: 14.460m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.50m
3. Groundwater: Dry
4. Stability: Upright and stable

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP7

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Grass onto dark brown very clayey silty gravelly fine to medium SAND with some roots and rootlets to 0.1m. Gravel consists of fine to coarse sub-angular to sub-rounded chalk, occasional flint, glass, ceramic and brick.		0.00	(1.00)	0.10	D		
HEAD Orange brown very clayey sandy fine to coarse GRAVEL with occasional cobbles. Gravel and cobbles are sub-angular to sub-rounded flint.		1.00	1.00 (0.75)	1.00 1.50	D D		
LAMBETH GROUP Stiff light brown and light orange brown silty CLAY with occasional calcareous sand laminations.		2.00	1.75 (1.25)	1.80 2.00 2.20 2.50 2.80	V D V D D/V	90 114 117	
Trial Pit terminated at 3.00 m		3.00	3.00				

Ground Level: 13.500m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.10m
3. Groundwater: Seepage at 1.75m
4. Stability: Minor collapse from 1.0m to 1.50m widening pit by 0.2m on each side

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP8

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Grass onto dark brown clayey silty gravelly fine and medium SAND with some roots and rootlets. Gravel is fine to coarse sub-angular to sub-rounded flint, chalk, occasional ceramic, brick and metal.		0.00	(0.50)	0.10	D		
			0.50	0.50	D		
HEAD Brown and orange brown clayey silty slightly sandy fine to coarse GRAVEL with some cobbles. Gravel and cobbles are sub-angular to sub-rounded flint.		1.00		1.00	D		
				1.50	D		
			(2.60)				
		2.00		2.00	D		
				2.50	D		
		3.00		3.00	D		
Trial Pit terminated at 3.10 m			3.10				

Ground Level: 15.790m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.50m
3. Groundwater: Seepages below 1.20m
4. Stability: Collapse below 1.20m, widening pit by 0.40m on each side

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

[redacted]

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** TP9

Date of Excavation: 14/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
MADE GROUND Grass onto dark brown silty fine and medium SAND with occasional rootlets and pockets of ash.		0.00	(0.10) 0.10 (0.30) 0.40	0.05 0.20	D D		
HEAD Brown very silty slightly gravelly fine and medium SAND. Gravel is fine to coarse sub-angular to sub-rounded flint.			(0.20) 0.60	0.50	CBR		
HEAD Brown clayey silty slightly sandy fine to coarse GRAVEL. Gravel is sub-angular to sub-rounded flint.		1.00					Dry
Trial Pit terminated at 0.60 m		2.00					
		3.00					

Ground Level: 15.620m AOD

-

Remarks

1. Method of Excavation: JCB 3CX
2. Max Depth of Visible Roots: 0.10m
3. Groundwater: Dry
4. Stability: Upright and stabel

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex

BOREHOLE NO. BH1

Date of Boring: 24/11/2014

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N - Value	Water Level -m
TOPSOIL Grass onto dark brown very clayey silty gravely fine to medium SAND. Gravel is fine to coarse sub-angular to sub-rounded flint and occasional brick.		0.0	0.50	0.50	D		
				0.50-1.00	B		
		1.0	(1.70)	1.20	D	43	
				1.50	D		
HEAD Dense light brown sometimes very clayey silty sandy fine to coarse GRAVEL. Gravel is sub-angular flint. ...with a gravel lense at 2.00m.		2.0	2.20	2.00	D		
				2.00	U	(80)	
				2.20-2.70	B		
				2.50	D		
HEAD Firm and stiff brown silty slightly gravelly CLAY. Gravel is fine to coarse sub-angular flint.		3.0		3.00	D	21	
				3.50	D		
		4.0	(3.30)	4.00	D		
				4.00	U	(60)	
				4.50	D		
		5.0		5.00	D	20	▼
			5.50	5.50	D		
HEAD Firm brown silty gravelly CLAY with lenses of very dense clayey sandy fine to coarse GRAVEL. Gravel is fine to coarse sub-angular flint.				5.50-6.00	B		
		6.0	(1.30)	6.00	D	50+	
				6.50	D		
LONDON CLAY FORMATION Stiff blue grey fissured silty slightly sandy CLAY.			6.80				
		7.0		7.00	D	21	
				7.00-7.50	B		
				7.50	D		
		8.0		8.00	D		
				8.00	U	(100)	
				8.50	D		
		9.0		9.00	D	24	
			(5.20)	9.50	D		
		10.0		10.00	D		
				10.00	U	(110)	
		11.0		11.00	D		
				11.50	D	24	
Base of borehole at 12.00 m		12.0					

Borehole Diameter: 150mm

Casing to: 7.00m

Ground Level: 14.910m AOD

-

Chiselling: 5.70m - 6.00m for 1 hours

▼ Water Strike

▼ Water (Standing Level)

W Water Sample

B Bulk Sample

D Small Disturbed Sample

U Undisturbed Sample

(No. of blows shown in brackets)

SPT Standard Penetration Test

CPT Cone Penetration Test

* Extrapolated Value

Remarks:

1. Method of Boring: Shell and Auger
2. Slow seepage at 5.50m, rising to 5.40m and sealed off with 5.50m of casing.

BOREHOLE LOG

Report No: 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex

BOREHOLE NO. BH2

Date of Boring: 25/11/2014

Description of Strata	Strata Change			Samples		SPT CPT N - Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Grass onto topsoil (drillers description).		0.0	0.20				
			(0.80)	0.50	D		
				0.50-1.00	B		
MADE GROUND Dark brown very clayey silty GRAVEL. Gravel is fine to coarse sub-angular flint and brick.		1.0	1.00				
				1.20	D	50+	
			(1.50)	1.50	D		
HEAD Very dense becoming dense brown clayey sandy fine to coarse GRAVEL. Gravel is sub-angular flint.		2.0		2.00	D	38	
				2.00-2.50	B		
			2.50	2.50	D		
				2.50-3.00	B		
HEAD Medium dense brown clayey fine to coarse GRAVEL with lenses of soft brown gravelly CLAY. Gravel is sub-angular flint.		3.0		3.00	D	16	
				3.50	D		
			(2.50)				
		4.0		4.00	D		
				4.00	U	(80)	
				4.50	D		
LONDON CLAY FORMATION Firm becoming stiff blue grey silty slightly sandy CLAY.		5.0	5.00	5.00	D	19	
				5.00-5.50	B		
				5.50	D		
		6.0		6.00	D	22	
				6.50	D		
		7.0		7.00	D	19	
				7.50	D		
		8.0		8.00	D	22	
			(7.00)	8.50	D		
		9.0		9.00	D	23	
				9.50	D		
		10.0		10.00	D	26	
		11.0		11.00	D		
				11.50	D	25	
Base of borehole at 12.00 m		12.0					

Borehole Diameter: 150mm

Casing to: 6.00m

-

Ground Level: 15.610m AOD

-

Chiselling: 5.30m - 5.60m for 1 hours

Remarks:
1. Method of Boring: Shell and Auger
2. Seepage at 2.0m, rising to 1.50m.
3. Second seepage at 6.50m, rising to 6.0m.

▼ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value

BOREHOLE LOG

Report No: 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex

BOREHOLE NO. BH3

Date of Boring: 24/11/2014

Description of Strata	Legend	Strata Change Depth -m Scale	Strata Change Depth -m Strata	Samples Depth -m	Samples Type	SPT CPT N - Value	Water Level -m
TOPSOIL Grass onto TOPSOIL (drillers description).		0.0	0.20				
			(0.80)	0.50	D		
				0.50-1.00	B		
HEAD Brown clayey sandy GRAVEL. Gravel is fine to coarse sub-angular flint.		1.0	1.00	1.20	D	41	
				1.50	D		
HEAD Dense brown clayey sandy fine to coarse GRAVEL with some cobbles. Gravel and cobbles are sub-angular flint.		2.0		2.00	D	38	
				2.50	D		
		3.0		3.00	D	42	
			(4.30)	3.50	D		▼▼
		4.0		4.00	D	40	
				4.50	D		
		5.0		5.00	D	42	
			5.30	5.30-5.80	B		
HEAD Firm brown slightly gravelly CLAY. Gravel is fine to coarse sub-angular flint.			(0.70)	5.50	D		
		6.0	6.00	6.00-6.50	B	19	
LONDON CLAY FORMATION Firm becoming stiff blue grey silty slightly sandy becoming sandy CLAY.				6.00	D		
				6.50	D		
		7.0		7.00	U	(100)	
				7.00	D		▼▼
				7.50	D		
		8.0		8.00	U	24	
				8.00	D		
				8.50	D		
		9.0	(6.00)	9.00	D	22	
				9.50	D		
		10.0		10.00	U	27	
				10.00	D		
		11.0		11.00	D		
				11.50	D	24	
Base of borehole at 12.00 m		12.0					

Borehole Diameter: 150mm

Casing to: 6.00m

Ground Level: 13.880m AOD

-

Chiselling: 4.80m - 5.30m for 1 hours

▼ Water Strike

▼ Water (Standing Level)

W Water Sample

B Bulk Sample

D Small Disturbed Sample

U Undisturbed Sample

(No. of blows shown in brackets)

SPT Standard Penetration Test

CPT Cone Penetration Test

* Extrapolated Value

Remarks:

1. Method of Boring: Shell and Auger
2. Inflow at 4.0m, rising to 3.5m.
3. Second inflow at 7.50m, rising to 7.0m.

BOREHOLE LOG

Report No: 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

Test Location	Depth at Start of Test -m	Spoon or Cone	Blows per 75mm Penetration				'N' Value	Strata Type
BH1	1.2	S	10	10	11	12	43	H
	3.0	S	6	5	5	5	21	H
	5.0	S	3	3	6	8	20	H
	6.0	C	35/140	16	20	14/200	50+	H
	7.0	S	5	5	5	6	21	LC
	9.0	S	6	6	6	6	24	LC
	11.5	S	6	5	6	7	24	LC
BH2	1.2	S	12	12	16	10/200	50+	H
	2.0	C	10	9	9	10	38	H
	3.0	S	4	4	4	4	16	H
	5.0	S	4	5	5	5	19	LC
	6.0	S	5	5	6	6	22	LC
	7.0	S	4	5	5	5	19	LC
	8.0	S	5	6	6	5	22	LC
	9.0	S	5	6	6	6	23	LC
	10.0	S	6	7	6	7	26	LC
	11.5	S	6	6	6	7	25	LC
BH3	1.2	C	10	9	10	12	41	H
	2.0	C	9	9	10	10	38	H
	3.0	C	9	11	11	11	42	H
	4.0	C	10	8	11	11	40	H
	5.0	C	12	12	9	9	42	H
	6.0	S	5	5	4	5	19	LC
	8.0	S	6	5	6	7	24	LC
	9.0	S	5	5	6	6	22	LC
	10.0	S	7	7	6	7	27	LC
	11.5	S	6	6	6	6	24	LC

Key

H – Head deposits
LC – London Clay Formation

STANDARD PENETRATION TESTS

Report No: 14.11.004

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** HA1

Date of Excavation: 24/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Dark brown sandy SILT with many roots and rootlets.		0.00	(0.30)				
MADE GROUND Soft dark brown silty slightly gravelly CLAY with many roots and rootlets. Gravel is sub-angular to sub-rounded brick and flint.			0.30 (0.20)	0.30	D		
MADE GROUND Firm light brown silty slightly sandy, slightly gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded chalk. (POSSIBLE HEAD).			0.50 (0.50)	0.60	D		Dry
Trial Pit terminated at 1.00 m		1.00	1.00				

Remarks

1. Method of Excavation: Hand Auger
2. Max Depth of Visible Roots: 0.50m
3. Groundwater: Dry
4. Stability: Upright and stable

▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

[redacted]

Geotechnical Consultants

LOCATION: Dappers Lane, Angmering, West Sussex **TRIAL PIT:** HA2

Date of Excavation: 24/11/2014

Description of Strata	Strata Change			Samples		Hand Vane (kPa) (Cu)	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
TOPSOIL Gram onto dark brown sandy SILT with roots and rootlets.		0.00	(0.10) 0.10				
MADE GROUND Firm light brown silty sandy slightly gravelly CLAY with occasional rootlets. Gravel is fine to coarse sub-angular to sub-rounded chalk, brick and flint.			(0.40)	0.30	D		
Trial Pit terminated at 0.50 m			0.50				Dry
		1.00					

Remarks

1. Method of Excavation: Hand Auger
2. Max Depth of Visible Roots: 0.50m
3. Groundwater: Dry
5. Stability: Upright and stable

-	
-	
▼	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
K	Chemical Sample
J	Jar Sample
CBR	CBR Sample
C	Core

TRIAL PIT LOG

Report No. 14.11.004

ARUN DISTRICT COUNCIL A/114/18/PL

[redacted]

Geotechnical Consultants

Date	Weather	Test Location	Methane CH4(%)	Carbon Dioxide CO_2(%)	Oxygen O2(%)	Atmospheric Pressure (mBar)	Flow (l/h)	Water Level (m bgl)
12/12/2014	Overcast	BH2	0.3	5.1	15.3	992	0.0	2.95
12/12/2004		BH3	0.3	4.7	14.7	992	0.0	2.02
16/01/2015	Rain	BH2	0.2	2.7	17.7	1001	0.1	2.02
16/01/2015		BH3	0.2	3.6	15.9	1001	0.1	0.67

Gas measurements taken using a portable Gas Data LMS xi gas monitor

GAS MONITORING RESULTS

Report No. 14.11.004

[redacted]

APPENDIX C
LABORATORY TESTING RESULTS AND TABLES

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
[redacted]

PROJECT INFORMATION		SAMPLE INFORMATION	
Site Location:-	Dappers Lane, Angmering, West Sussex	**Laboratory Tests Undertaken:-**	
		TEST TYPE	**TEST METHOD** / **TESTED**
		Natural Moisture Contents (MC%)	(BS 1377:Part 2:1990 Clause 3.2) ✓
		Liquid Limits (%)	(BS 1377:Part 2:1990 Clause 4.3) ✓
		Plastic Limits (%)	(BS 1377:Part 2:1990 Clause 5.3) ✓
		Plasticity Index (%)	(BS 1377:Part 2:1990 Clause 5.4) ✓
		Linear Shrinkage (%)	(BS 1377:Part 2:1990 Clause 6.5)
		PSD - Wet Sieving	(BS 1377:Part 2:1990 Clause 9.2) ✓
Client Reference:-	-	Engineering Sample Descriptions	(BS 5930 : Section 6)
		Passing 425/63 (μm)	- ✓
		Hydrometer	(BS 1377:Part 2:1990 Clause 9.5)
Date Samples Received:-	15th November 2014	Loss on Ignition (%)	- ✓
Date Testing Completed:-	16th December 2014	Soil Suctions (kPa)	BRE Digest IP 4/93, 1993
		Bulk Density (Mg/m^3)	(BS 1377:Part 2:1990 Clause 7.2) ✓
		Strength Tests	(BS 1377:Part 7:1990 Clause 8 & 9) ✓
		Soluble Sulphate Content (SO^4g/l)	(BS 1377:Part 3:1990 Clause 5.3) ✓
		pH value	(BS 1377:Part 3:1990 Clause 9.4) ✓
		California Bearing Ratios (CBR)	(BS 1377:Part 4:1990 Clause 7) ✓
		Compaction Tests	(BS 1377:Part 4:1990 Clauses 3.0-3.6)
The results relate only to the samples tested			

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Laboratory testing in accord with BS EN ISO/IEC 17025-2000 and Quality Management in accord with ISO 9001

Signed on behalf of GroundTech Laboratories:- [redacted] **ical Signatory**

Quality Assured to ISO 9001

GEOTECHNICAL LABORATORY TEST RESULTS

Project Ref: 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m^3	Test Type	Cell Pressure kN/m^2	Deviator Stress kN/m^2	Apparent Cohesion kN/m^2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 1	B	0.50	PI/63	16	33	20	14	53	7	CL	45	0.48	22	-0.27	4									
	D	0.50		13																				
	D	1.20		6																				
	D	1.50		12																				
	D	2.00		12																				
	U	2.00		18													1.82	TL	39	20	10			
	B	2.20	PI/63	25	58	23	35	97	34	CH	92	0.43	25	0.06									8.4	0.31
	D	2.50		16																				
	D	3.00		22																				
	D	3.50		26																				
	D	4.00		25																				
	U	4.00		34													1.92	TL	80	110	55			
	D	4.50		27																				
	D	5.00		62																				
	B	5.50	PSD	86																				
	D	5.50		30																				
	D	6.00		40																				
	D	6.50	PI/63	33	63	22	41	77	32	CH	68	0.52	24	0.27										
	B	7.00		32																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Ref
14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

[redacted]

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m^3	Test Type	Cell Pressure kN/m^2	Deviator Stress kN/m^2	Apparent Cohesion kN/m^2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
	D	7.00		23																				
	D	7.50		34																				
	D	8.00		27																				
	U	8.00		29													1.97	TL	162	42	21			
	D	8.50	PI/63	40	63	24	38	94	36	CH	88	0.64	26	0.41									7.4	0.52
	D	9.00		22																				
	D	9.50		42																				
	D	10.00		21																				
	D	11.00	PI/63	37	62	25	36	94	34	CH	89	0.60	27	0.32										
	D	11.50		23																				
	D	12.00		36																				
BH 2	B	0.50	PI/63	24	39	22	17	43	7	CI	34	0.62	24	0.11	4								7.5	0.21
	D	0.50		25																				
	D	1.20		11																				
	D	1.50		20																				
	B	2.00	PSD	24																				
	D	2.00		24																				
	B	2.50		36																				
	D	2.50		33																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Ref
14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants, NN12 8QD

[redacted]

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m^3	Test Type	Cell Pressure kN/m^2	Deviator Stress kN/m^2	Apparent Cohesion kN/m^2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 2	D	3.00		33																				
	D	3.50		32																				
	D	4.00	PI/63	29	54	22	33	97	32	CH	89	0.53	24	0.22										
	D	4.50		29																				
	D	5.00		36																				
	D	5.00		24																				
	D	5.50		39																				
	D	6.00		26																				
	D	7.00	PI/63	30	66	27	39	92	36	CH	84	0.45	29	0.08										
	D	7.50		40																			7.3	0.48
	D	8.00		28																				
	D	8.50		43																				
	D	9.00		25																				
	D	9.50		40																				
	D	10.00	PI/63	24	62	25	38	86	33	CH	79	0.38	27	-0.01										
	D	11.00		38																				
	D	11.50		25																				
	D	12.00	PI/63	43	63	26	37	79	29	CH	73	0.68	28	0.45									7.2	0.50
BH 3	B	0.50	PSD	16																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Ref
14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
T[redacted]

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m^3	Test Type	Cell Pressure kN/m^2	Deviator Stress kN/m^2	Apparent Cohesion kN/m^2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 3	D	0.50		20																				
	D	1.20		14																				
	D	1.50		15																				
	D	2.00		16																				
	D	2.50	PSD	17																				
	D	3.00		16																				
	D	3.50		19																				
	D	4.00	PSD	7																				
	D	4.50		11																				
	D	5.00		17																				
	B	5.30	PI/63	24	50	20	30	89	27	CI	80	0.48	22	0.14									7.6	0.13
	D	5.50		23																				
	B	6.00		41																				
	D	6.00		31																				
	D	6.50		44																				
	D	7.00		23																				
	D	7.50	PI/63	27	38	18	20	98	19	CI	46	0.72	20	0.47										
	D	8.00		18																				
	D	8.50		26																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Ref
14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m^3	Test Type	Cell Pressure kN/m^2	Deviator Stress kN/m^2	Apparent Cohesion kN/m^2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 3	D	9.00		21																				
	D	9.50	PI/63	26	36	17	20	99	19	CI	56	0.71	19	0.47										
	D	10.00		17																				
	D	11.00		23																				
	D	11.50		22																				
	D	12.00	PI/63	24	37	17	21	97	20	CI	61	0.64	19	0.35									7.3	0.52
HA 1	D	0.30		34																				
	D	0.60	PI/63	32	50	23	26	92	24	CI	83	0.65	25	0.33										
HA 2	D	0.30		23																				
TP 1	D	0.10		38											9									
	D	0.30		14																				
	D	0.50	PSD	10																				
	D	1.00		15																				
	D	1.50		13																				
	D	2.00		16																				
	D	2.50	PSD	23																				
	D	2.70		25																				
	D	3.00	PI/63	32	42	18	24	100	24	CI	93	0.75	20	0.56									7.3	0.36
TP 2	D	0.10		26																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Ref
14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

[redacted]

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m^3	Test Type	Cell Pressure kN/m^2	Deviator Stress kN/m^2	Apparent Cohesion kN/m^2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
TP 2	D	0.50		29																				
	D	1.00	PI/63	24	47	20	27	79	21	CI	68	0.51	22	0.14										
	D	1.50		26																				
	D	2.00		32																				
	D	2.50	PI/63	26	33	16	16	97	16	CL	70	0.79	18	0.58										
	D	3.00		20																				
TP 3	D	0.05		48											8									
	D	0.50		17																				
	D	1.00	PI/63	28	52	21	31	99	31	CH	93	0.54	23	0.23									7.2	0.29
	D	1.50		30																				
	D	2.00		25																				
	D	2.50	PSD	26																				
TP 4	D	0.10		25											6								6.7	0.35
	D	0.50		25																				
	D	1.70	PI/63	25	52	18	34	100	34	CH	91	0.48	20	0.19										
TP 5	D	0.10		18																				
	D	0.50	PSD	13																				
	D	1.00		17																				
	D	1.50	PSD	14																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Ref
14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m^3	Test Type	Cell Pressure kN/m^2	Deviator Stress kN/m^2	Apparent Cohesion kN/m^2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
	D	2.00		14																				
TP 6	D	0.20		22																				
	D	0.50		11																				
	D	1.00	PSD	13																				
TP 7	D	0.10		19											5									
	D	1.00	PI/63	24	33	19	14	53	7	CL	47	0.72	21	0.33										
	D	1.50		19																				
	D	2.00		33																			6.8	0.40
	D	2.50	PI/63	33	45	19	27	96	26	CI	86	0.73	21	0.53										
	D	3.00		26																				
TP 8	D	0.10		27																				
	D	0.50		11																				
	D	1.00	PSD	18																				
	D	1.50		15																				
	D	2.00		17																				
	D	2.50	PSD	20																				
	D	3.00		12																				
TP 9	D	0.05		46																				
	D	0.20		24											5								6.7	0.29

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Ref
14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m^3	Test Type	Cell Pressure kN/m^2	Deviator Stress kN/m^2	Apparent Cohesion kN/m^2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
TP 9	D	0.50	PSD	11																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Ref
14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
[redacted]

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: BH 1

Sample Depth: 5.50m -6.00m

Sample Description:

Hydrometer No.:

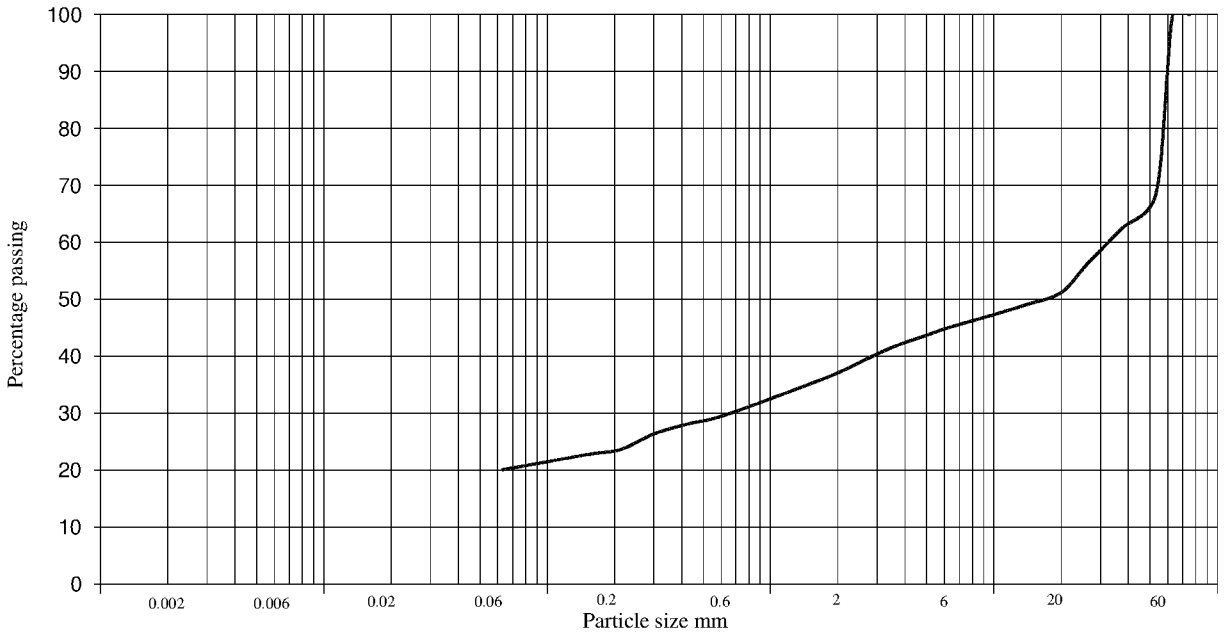
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm	68.50		
37.5mm			
26.5mm	56.49		
20mm	51.21		
14mm	49.07		
10mm	47.31		
6.3mm	45.05		
5mm	43.70		
3.5mm	41.26		
2mm	37.10		
1.18mm	33.60		
600µm	29.44		
425µm	28.09		
300µm	26.36		
212µm	23.59		
150µm	22.70		
63µm	20.07		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: BH 2

Sample Depth: 2.00m -2.50m

Sample Description:

Hydrometer No.:

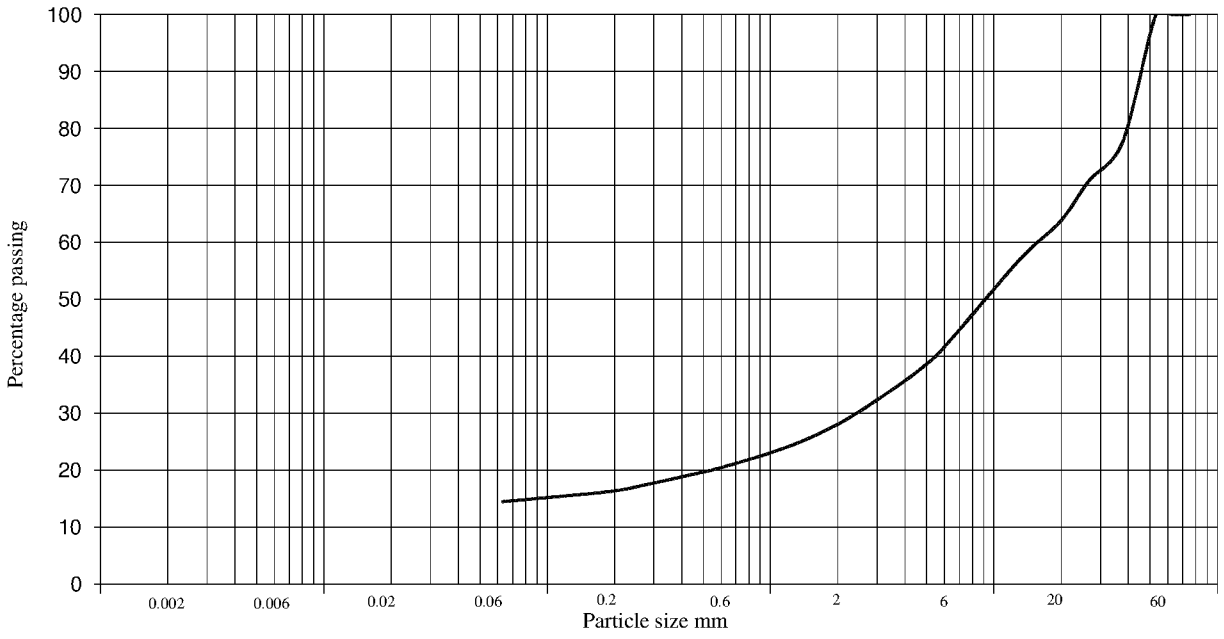
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm			
37.5mm	77.55		
26.5mm	70.78		
20mm	63.88		
14mm	58.27		
10mm	51.84		
6.3mm	42.62		
5mm	38.67		
3.5mm	33.64		
2mm	28.10		
1.18mm	24.06		
600µm	20.46		
425µm	19.09		
300µm	17.76		
212µm	16.52		
150µm	15.83		
63µm	14.47		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: BH 3

Sample Depth: 0.50m -1.00m

Sample Description:

Hydrometer No.:

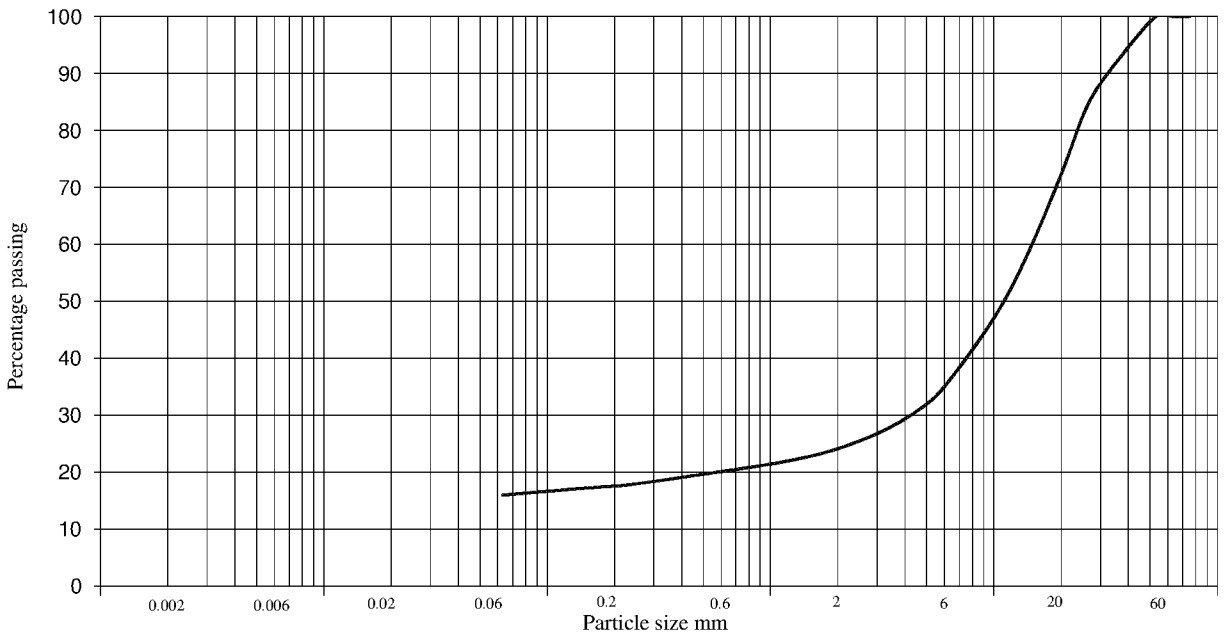
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm			
37.5mm	93.30		
26.5mm	84.82		
20mm	72.36		
14mm	57.97		
10mm	47.12		
6.3mm	36.10		
5mm	31.98		
3.5mm	27.67		
2mm	24.12		
1.18mm	21.92		
600µm	20.09		
425µm	19.23		
300µm	18.36		
212µm	17.62		
150µm	17.21		
63µm	15.97		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

[redacted]

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: BH 3

Sample Depth: 2.50m

Sample Description:

Hydrometer No.:

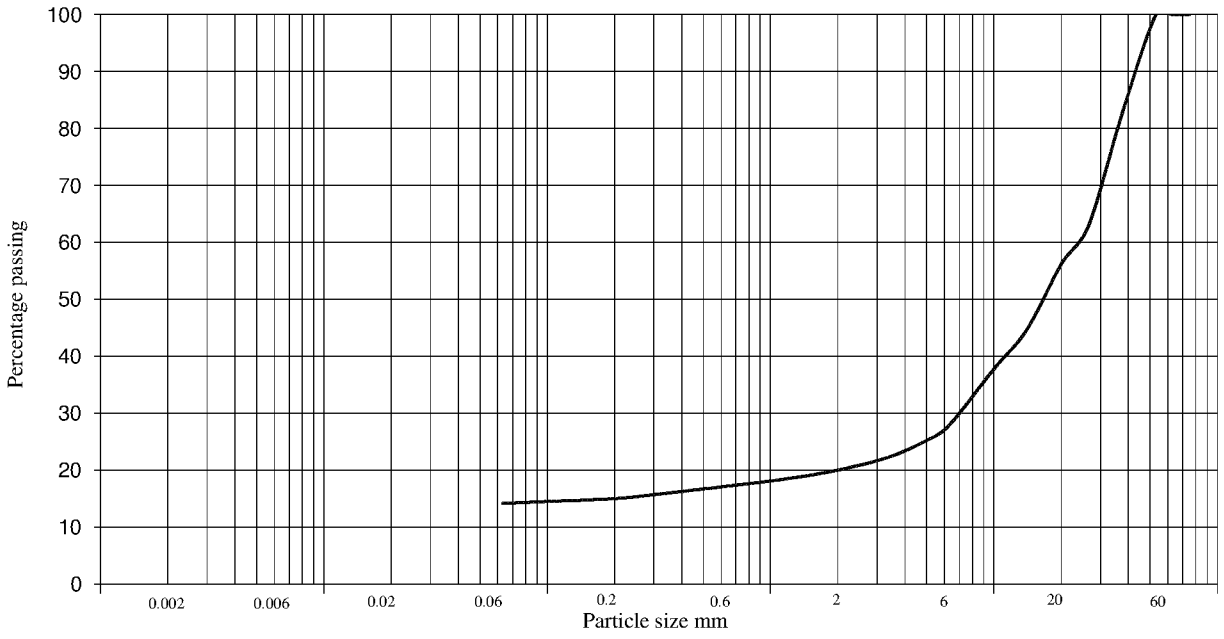
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm			
37.5mm	82.78		
26.5mm	63.01		
20mm	56.22		
14mm	44.65		
10mm	37.82		
6.3mm	27.92		
5mm	25.22		
3.5mm	22.25		
2mm	20.01		
1.18mm	18.47		
600µm	17.05		
425µm	16.37		
300µm	15.66		
212µm	15.07		
150µm	14.75		
63µm	14.17		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: BH 3

Sample Depth: 4.00m

Sample Description:

Hydrometer No.:

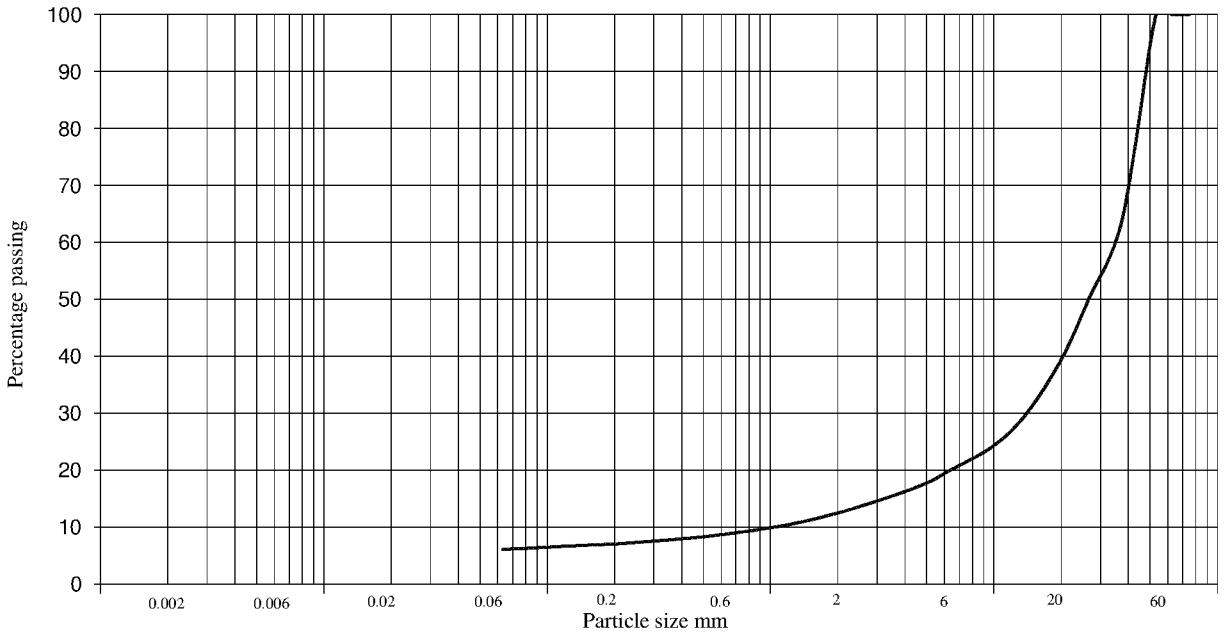
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm			
37.5mm	64.23		
26.5mm	50.05		
20mm	39.49		
14mm	30.02		
10mm	24.34		
6.3mm	19.91		
5mm	17.75		
3.5mm	15.22		
2mm	12.49		
1.18mm	10.37		
600µm	8.66		
425µm	8.04		
300µm	7.53		
212µm	7.10		
150µm	6.82		
63µm	6.08		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants, NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 1

Sample Depth: 0.50m

Sample Description:

Hydrometer No.:

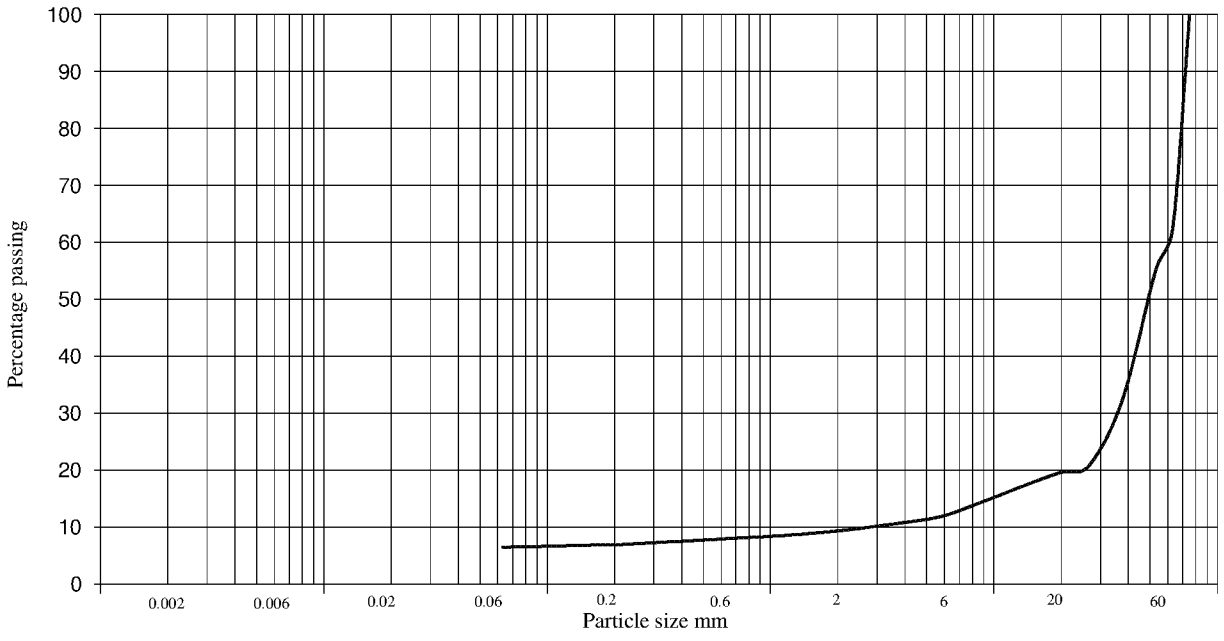
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm	69.56		
63mm			
50mm	55.26		
37.5mm	32.35		
26.5mm	20.75		
20mm	19.64		
14mm	17.47		
10mm	15.23		
6.3mm	12.30		
5mm	11.40		
3.5mm	10.44		
2mm	9.35		
1.18mm	8.58		
600µm	7.92		
425µm	7.58		
300µm	7.26		
212µm	6.97		
150µm	6.83		
63µm	6.49		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 1

Sample Depth: 2.50m

Sample Description:

Hydrometer No.:

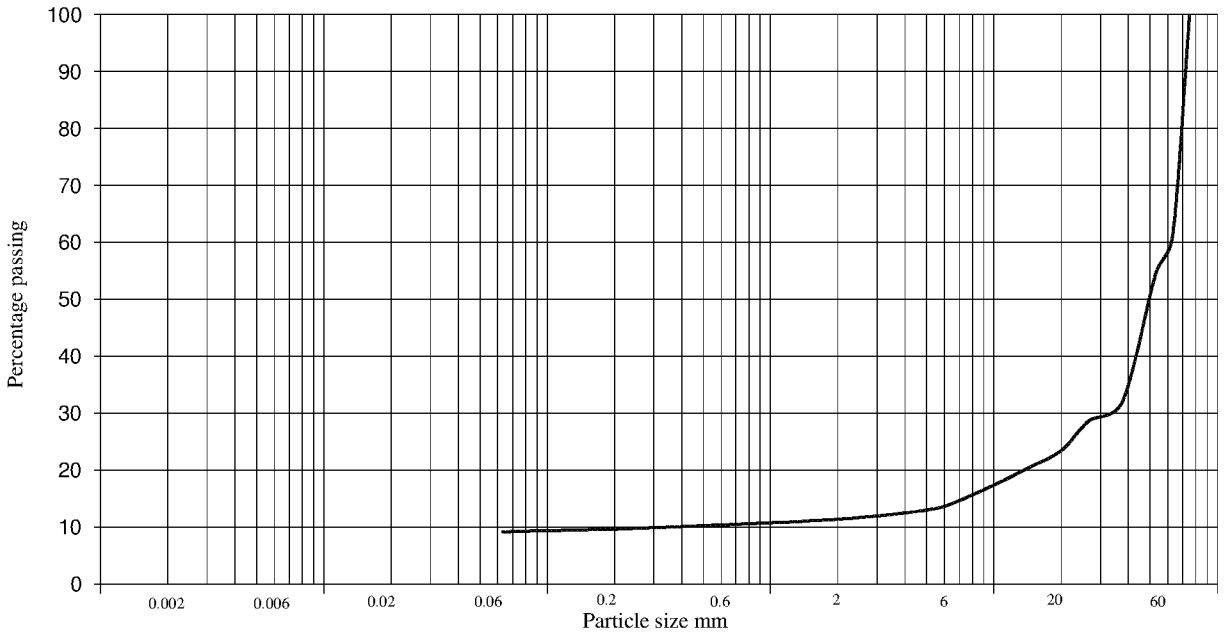
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm	67.79		
63mm			
50mm	54.63		
37.5mm	31.99		
26.5mm	28.63		
20mm	23.44		
14mm	20.23		
10mm	17.38		
6.3mm	13.92		
5mm	12.99		
3.5mm	12.13		
2mm	11.36		
1.18mm	10.86		
600µm	10.36		
425µm	10.13		
300µm	9.88		
212µm	9.63		
150µm	9.51		
63µm	9.15		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 3

Sample Depth: 2.50m

Sample Description:

Hydrometer No.:

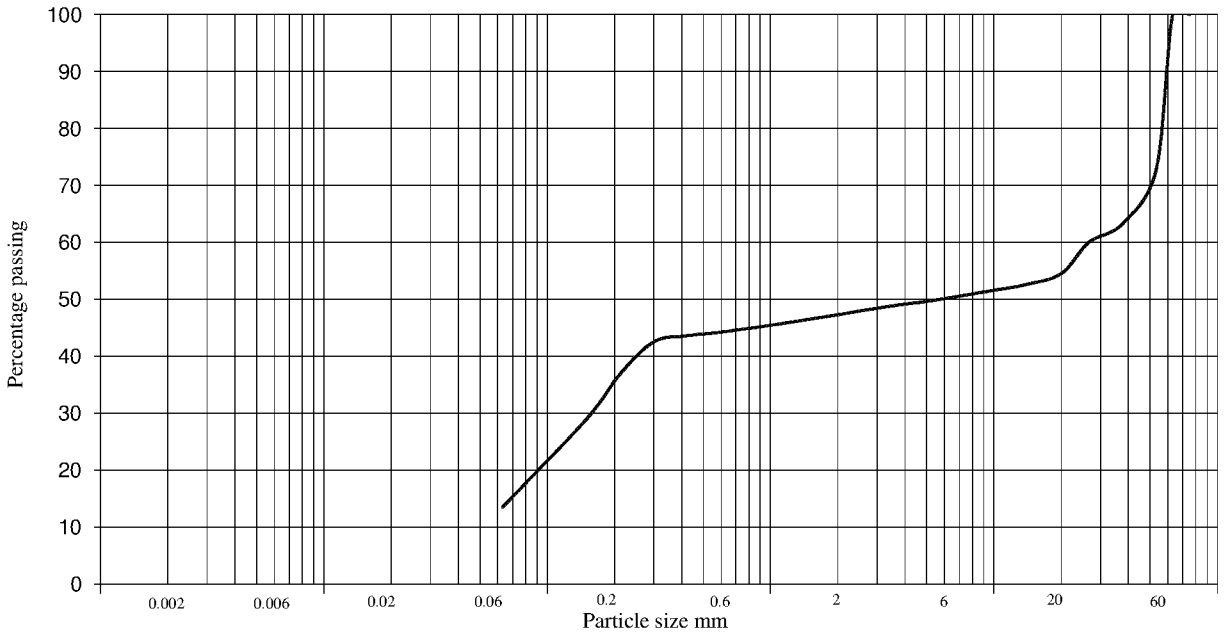
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm	72.60		
37.5mm	63.22		
26.5mm	59.97		
20mm	54.50		
14mm	52.59		
10mm	51.57		
6.3mm	50.24		
5mm	49.61		
3.5mm	48.72		
2mm	47.28		
1.18mm	45.85		
600µm	44.21		
425µm	43.59		
300µm	42.53		
212µm	36.92		
150µm	28.99		
63µm	13.48		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 5

Sample Depth: 0.50m

Sample Description:

Hydrometer No.:

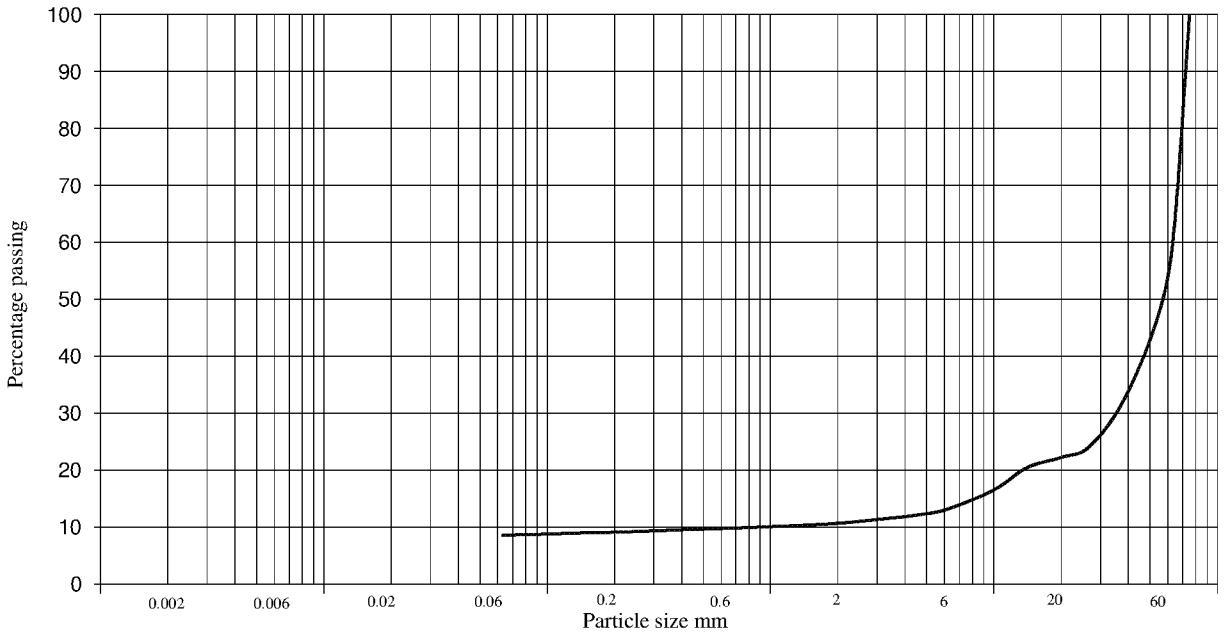
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm	59.95		
63mm			
50mm			
37.5mm	31.86		
26.5mm	24.05		
20mm			
14mm	20.44		
10mm	16.55		
6.3mm	13.29		
5mm	12.36		
3.5mm	11.53		
2mm	10.69		
1.18mm	10.22		
600µm	9.77		
425µm	9.55		
300µm	9.35		
212µm	9.14		
150µm	9.01		
63µm	8.57		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 5

Sample Depth: 1.50m

Sample Description:

Hydrometer No.:

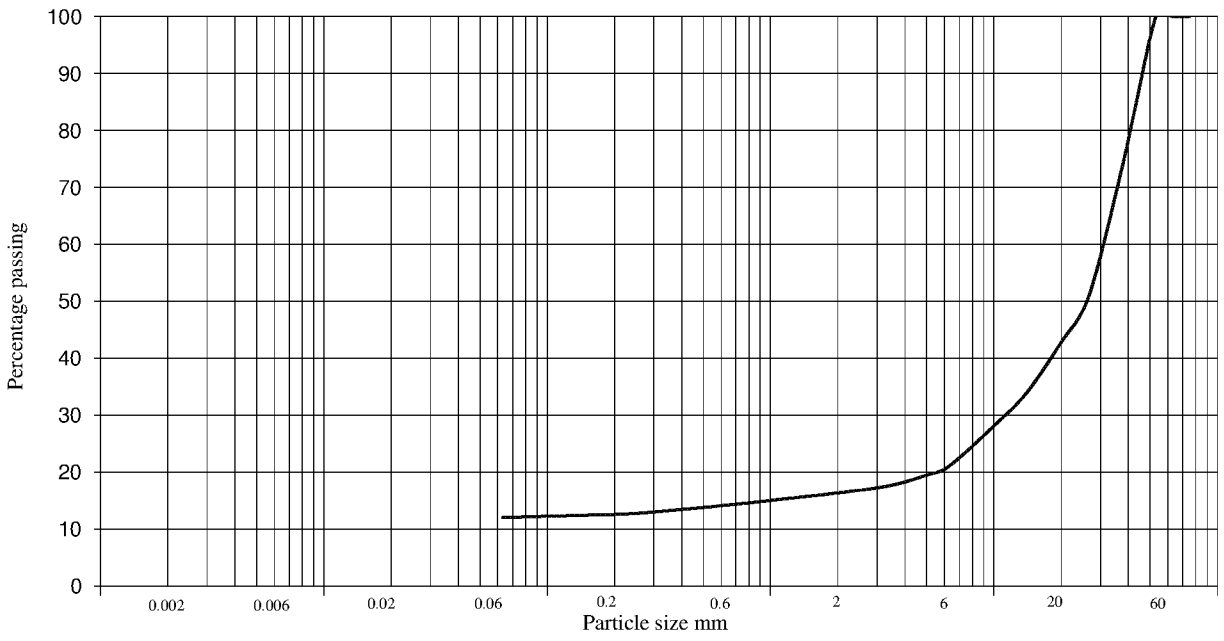
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm			
37.5mm	73.72		
26.5mm	50.88		
20mm	42.87		
14mm	33.99		
10mm	28.19		
6.3mm	21.12		
5mm	19.51		
3.5mm	17.57		
2mm	16.40		
1.18mm	15.37		
600µm	14.12		
425µm	13.57		
300µm	13.02		
212µm	12.64		
150µm	12.48		
63µm	12.07		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 6

Sample Depth: 1.00m

Sample Description:

Hydrometer No.:

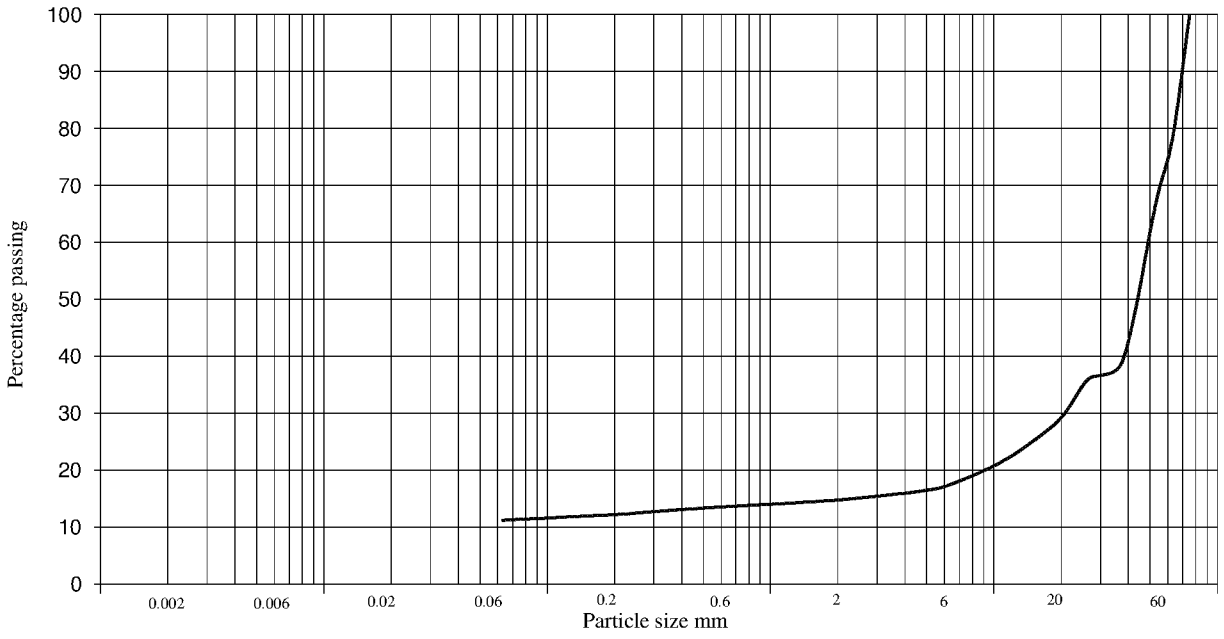
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm	78.46		
50mm	66.92		
37.5mm	39.08		
26.5mm	36.03		
20mm	29.25		
14mm	24.29		
10mm	20.75		
6.3mm	17.39		
5mm	16.45		
3.5mm	15.62		
2mm	14.75		
1.18mm	14.17		
600µm	13.52		
425µm	13.12		
300µm	12.70		
212µm	12.22		
150µm	11.95		
63µm	11.18		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 8

Sample Depth: 1.00m

Sample Description:

Hydrometer No.:

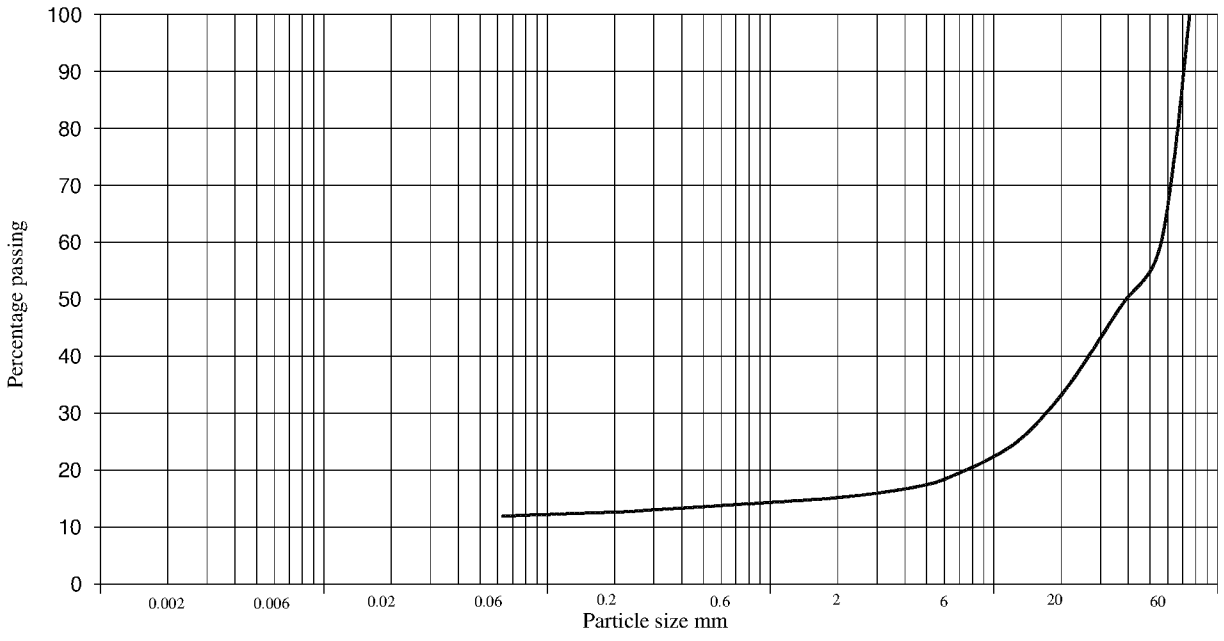
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm	72.69		
50mm	57.02		
37.5mm	49.14		
26.5mm	40.02		
20mm	33.22		
14mm	26.44		
10mm	22.41		
6.3mm	18.78		
5mm	17.47		
3.5mm	16.25		
2mm	15.18		
1.18mm	14.53		
600µm	13.80		
425µm	13.42		
300µm	13.04		
212µm	12.67		
150µm	12.50		
63µm	11.94		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
[redacted]

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 8

Sample Depth: 2.50m

Sample Description:

Hydrometer No.:

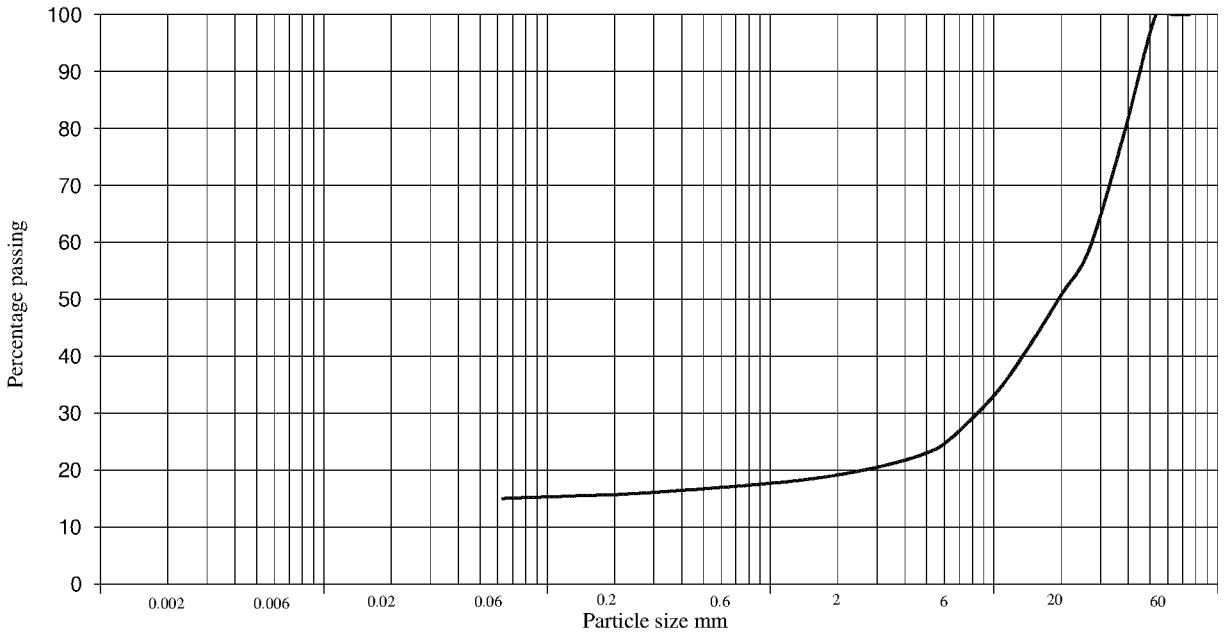
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm			
37.5mm	78.04		
26.5mm	58.58		
20mm	50.84		
14mm	41.13		
10mm	33.16		
6.3mm	25.37		
5mm	23.07		
3.5mm	20.99		
2mm	19.19		
1.18mm	17.99		
600µm	16.99		
425µm	16.55		
300µm	16.13		
212µm	15.77		
150µm	15.58		
63µm	15.04		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Quality Assured ISO 9001

Gelder and Kitchen LLP

Site: Dappers Lane Angmering

Test Location: TP 9

Sample Depth: 0.50m

Sample Description:

Hydrometer No.:

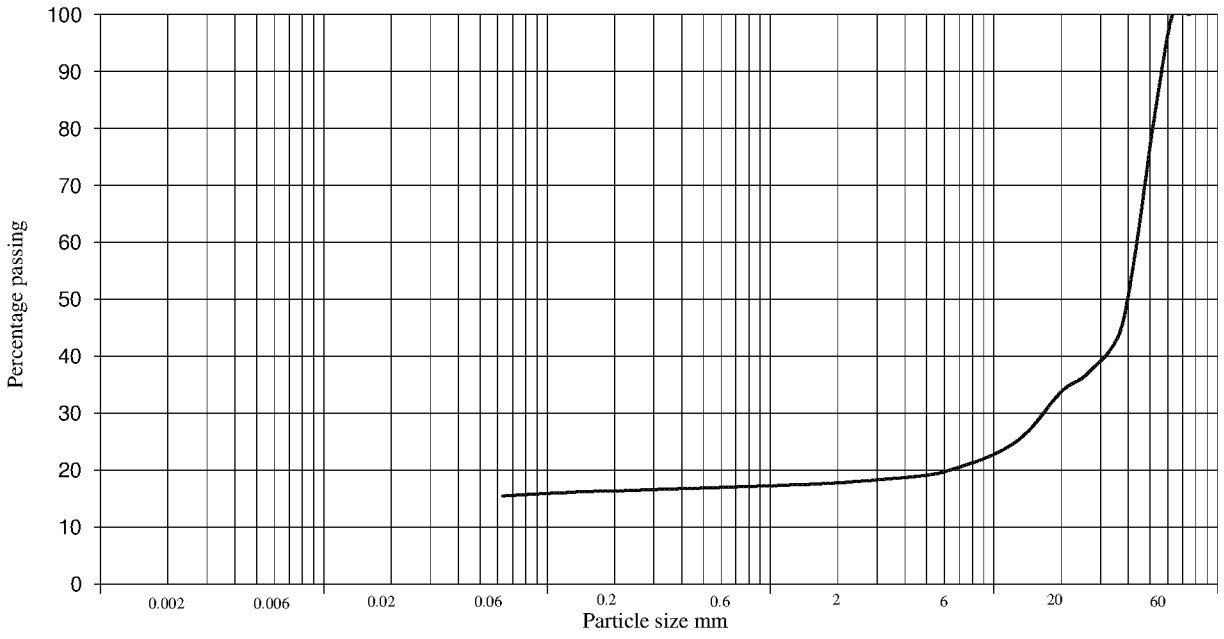
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm			
63mm			
50mm	83.79		
37.5mm	45.63		
26.5mm	37.20		
20mm	33.82		
14mm	26.60		
10mm	22.81		
6.3mm	20.00		
5mm	19.14		
3.5mm	18.47		
2mm	17.79		
1.18mm	17.38		
600µm	16.99		
425µm	16.79		
300µm	16.61		
212µm	16.40		
150µm	16.26		
63µm	15.49		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Ref 14.11.004

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

[redacted]

Test Location	Depth (mm)	C.B.R. Value %	Natural Moisture Content %	Bulk Density Mg/m^3	Dry Density Mg/m^3	Remarks
TP3	0.50	Top: 3.5 Base: 2.3	24	1.72	1.39	HEAD Stiff orange brown sandy very gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint
TP4	0.50	Top: 0.20 Base: 0.17	26	1.69	1.34	HEAD Firm brown silty sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint
TP9	0.50	Top: 3.6 Base: 9.4	14	1.78	1.56	HEAD Brown clayey slightly sandy GRAVEL. Gravel is fine to coarse subangular to subrounded flint (71% retained on 20mm).

Samples recompacted using standard compaction
Surcharge 9kg

Date	CALIFORNIA BEARING RATIO	Report No.
December 2014		14.11.004

GroundTech Laboratories

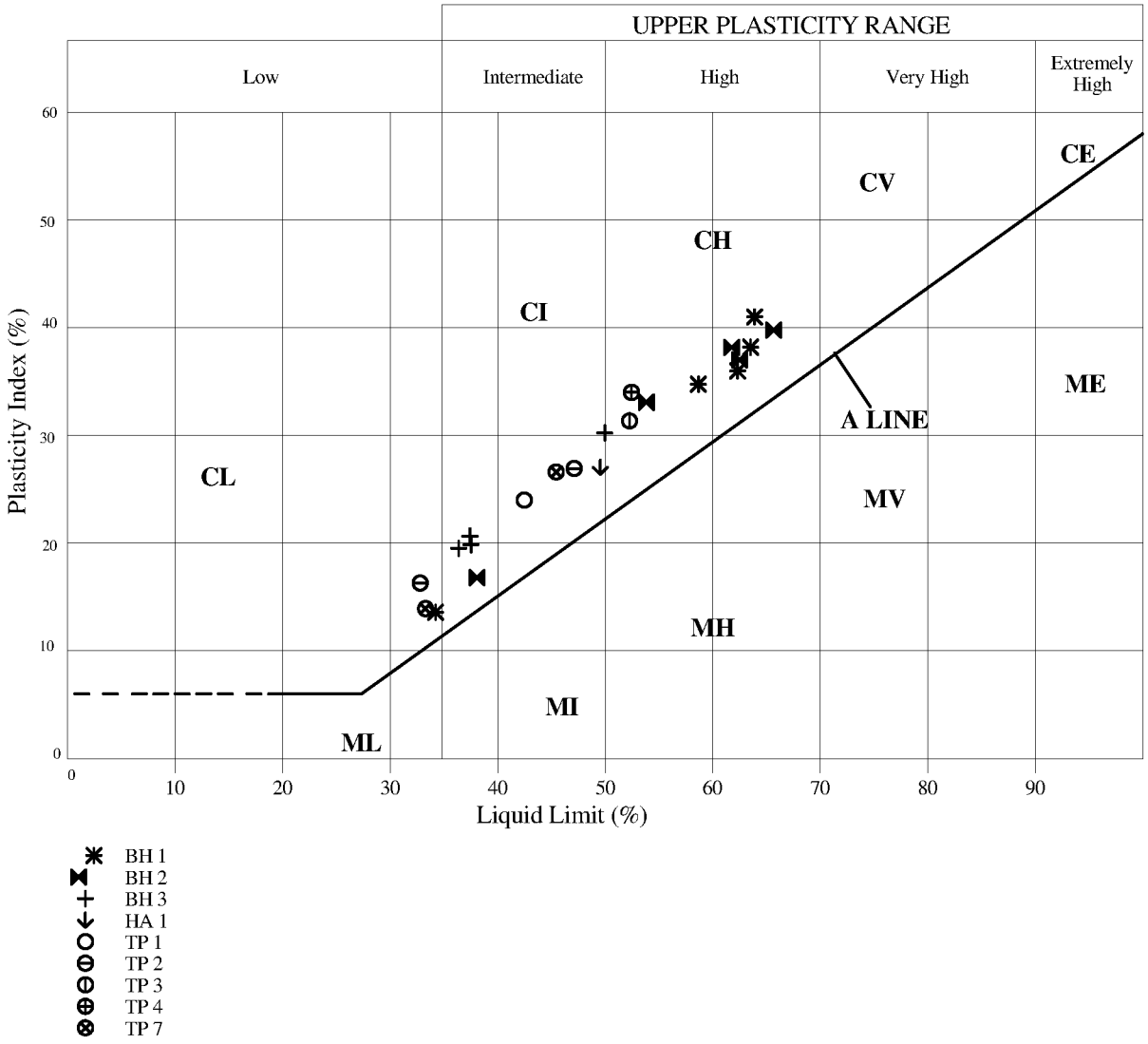
Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

[redacted]

Quality Assured to ISO9001

Site: Dappers Lane, Angmering, West Sussex



PLASTICITY CHART

Lab. Ref. 14.11.004

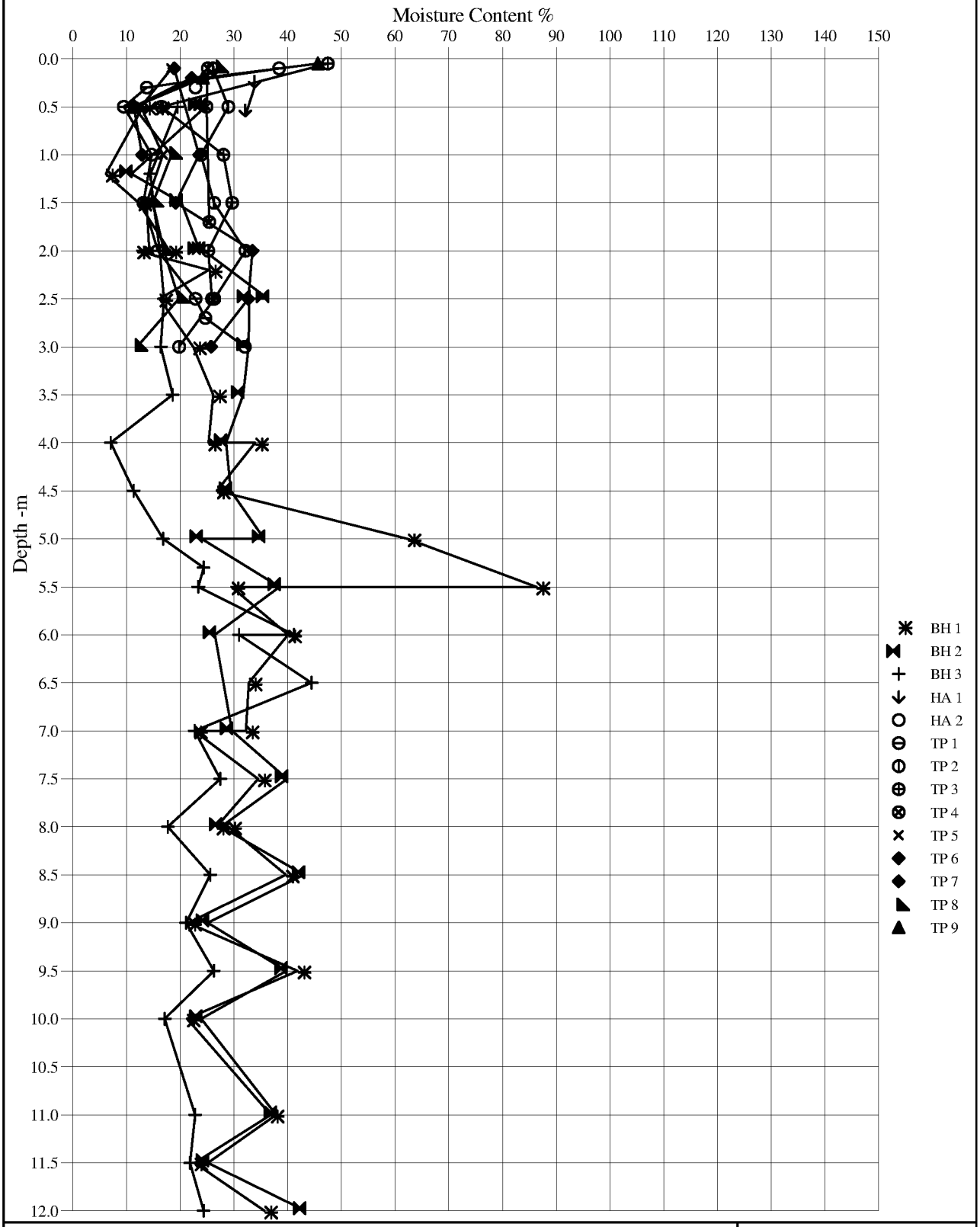
GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants, NN12 8QD

Quality Assured to ISO9001

Site: Dappers Lane, Angmering, West Sussex



MOISTURE CONTENT v DEPTH

Lab Ref. 14.11.004

GroundTech Laboratories

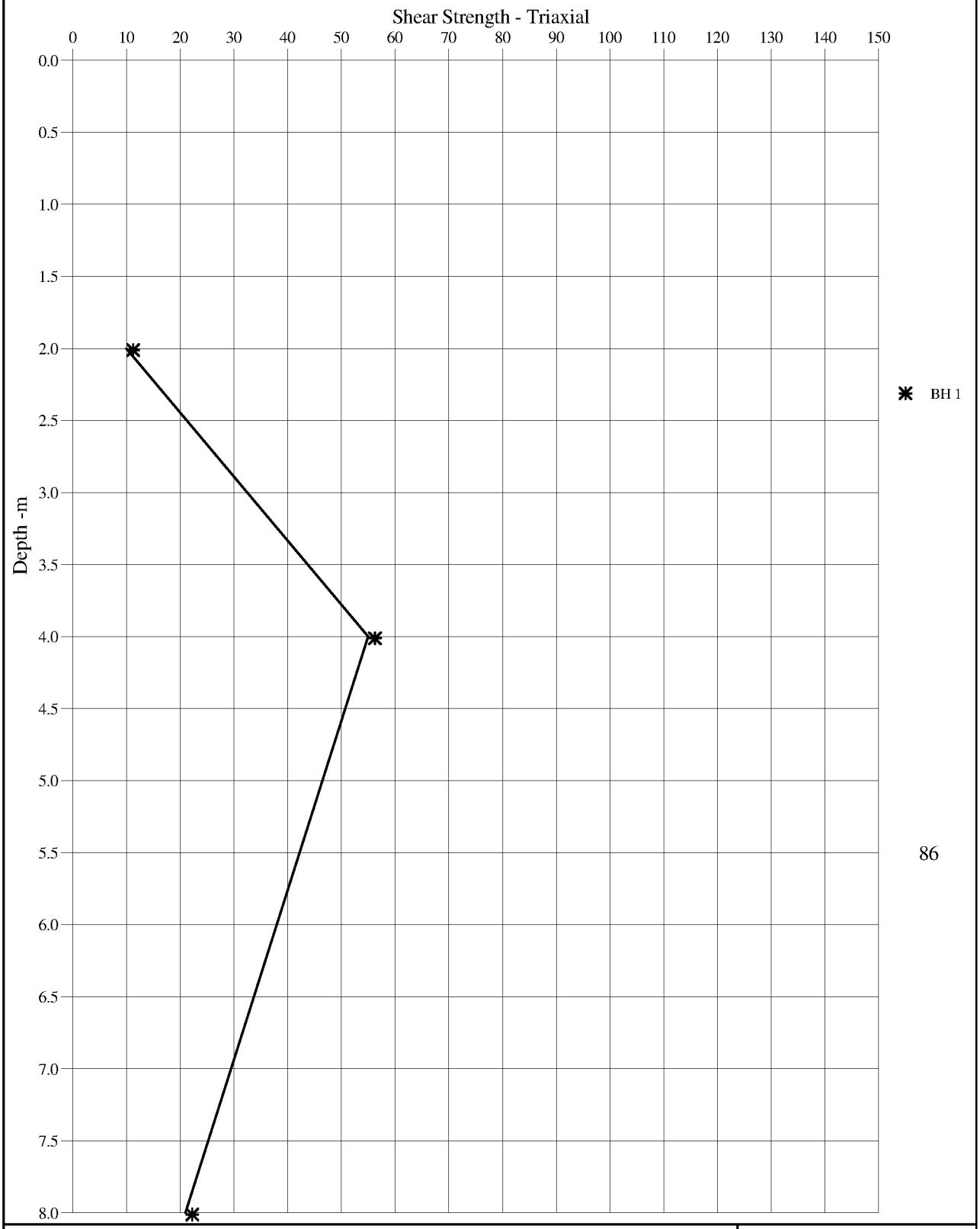
Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

[redacted]

Quality Assured to ISO9001

Site: Dappers Lane, Angmering, West Sussex



STRENGTH v DEPTH

Lab Ref. 14.11.004

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL

Amended Report

[redacted]

Report Number:	14-14530 Issue-2		
Initial Date of Issue:	20-Nov-14	**Date of Re-Issue:**	05-Dec-14
Client:	Listers Geotechnical Consultants		
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD		
Contact(s):	Ian Evetts		
Project:	14.11.004 - Dappers Lane, Angmering, West Sussex		
Quotation No.:		**Date Received:**	18-Nov-14
Order No.:	14.11.004/654	**Date Instructed:**	18-Nov-14
No. of Samples:	5	**Results Due:**	20-Nov-14
Turnaround: (Weekdays)	3		
Date Approved:	05-Dec-14		
Approved By:			

[redacted]

Details: Keith Jones, Technical Manager

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest
The right chemistry to deliver results

Results Summary - Soil

Project: 14.11.004 - Dappers Lane, Angmering, West Sussex

Client: Listers Geotechnical Consultants					Chemtest Job No.:	14-14530	14-14530	14-14530	14-14530	14-14530
Quotation No.:					Chemtest Sample ID.:	70863	70864	70865	70866	70867
Order No.: 14.11.004/654					Client Sample Ref.:					
					Client Sample ID.:	TP1	TP3	TP5	TP8	TP9
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.10	0.05	0.50	0.10	0.05
					Bottom Depth(m):					
					Date Sampled:	14-Nov-14	14-Nov-14	14-Nov-14	14-Nov-14	14-Nov-14
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
ACM Type	U	2192				-				
Asbestos Identification	U	2192	%	0.001		No Asbestos Detected				
Moisture	N	2030	%	0.02	29	29	5.3	21	36	
Stones	N	2030	%	0.02	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.4	0.94	1.3	0.59	1.4	1.7	
Arsenic	U	2450	mg/kg	1	11	30	7.9	15	18	
Cadmium	U	2450	mg/kg	0.1	0.55	1.1	0.31	0.88	0.68	
Chromium	U	2450	mg/kg	1	26	46	26	32	45	
Copper	U	2450	mg/kg	0.5	48	100	25	40	59	
Mercury	U	2450	mg/kg	0.1	0.15	0.14	< 0.10	0.17	0.13	
Nickel	U	2450	mg/kg	0.5	17	69	19	20	28	
Lead	U	2450	mg/kg	0.5	53	72	13	130	120	
Selenium	U	2450	mg/kg	0.2	0.23	0.40	0.30	0.28	0.36	
Zinc	U	2450	mg/kg	0.5	110	410	60	190	210	
TPH >C5-C6	N	2670	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
TPH >C6-C7	N	2670	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
TPH >C7-C8	N	2670	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
TPH >C8-C10	N	2670	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
TPH >C10-C12	N	2670	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
TPH >C12-C16	N	2670	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
TPH >C16-C21	N	2670	mg/kg	1	< 1.0	2.3	< 1.0	1.7	< 1.0	
TPH >C21-C35	N	2670	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Total TPH >C5-C35	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10	
Naphthalene	U	2700	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Acenaphthylene	U	2700	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Acenaphthene	U	2700	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Fluorene	U	2700	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Phenanthrene	U	2700	mg/kg	0.1	0.34	0.69	< 0.10	< 0.10	< 0.10	
Anthracene	U	2700	mg/kg	0.1	0.15	0.21	< 0.10	< 0.10	< 0.10	
Fluoranthene	U	2700	mg/kg	0.1	0.66	1.6	0.12	0.85	0.27	
Pyrene	U	2700	mg/kg	0.1	0.67	1.6	0.19	0.81	0.29	
Benzo[a]anthracene	U	2700	mg/kg	0.1	0.34	0.55	< 0.10	0.33	0.22	

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest
The right chemistry to deliver results

Results Summary - Soil

Project: 14.11.004 - Dappers Lane, Angmering, West Sussex

Client: Listers Geotechnical Consultants									
Quotation No.:					**Chemtest Job No.:**	14-14530	14-14530	14-14530	14-14530	14-14530
Order No.: 14.11.004/654					**Chemtest Sample ID.:**	70863	70864	70865	70866	70867
					Client Sample Ref.:					
					Client Sample ID.:	TP1	TP3	TP5	TP8	TP9
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.10	0.05	0.50	0.10	0.05
					Bottom Depth(m):					
					Date Sampled:	14-Nov-14	14-Nov-14	14-Nov-14	14-Nov-14	14-Nov-14
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Chrysene	U	2700	mg/kg	0.1		1.3	1.3	< 0.10	0.94	0.70
Benzo[b]fluoranthene	U	2700	mg/kg	0.1		1.0	0.98	< 0.10	0.89	0.44
Benzo[k]fluoranthene	U	2700	mg/kg	0.1		0.54	0.23	< 0.10	0.62	0.16
Benzo[a]pyrene	U	2700	mg/kg	0.1		0.28	0.85	< 0.10	0.39	0.45
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.1		< 0.10	0.88	< 0.10	0.24	0.18
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.1		< 0.10	0.92	< 0.10	0.17	0.36
Benzo[g,h,i]perylene	U	2700	mg/kg	0.1		< 0.10	1.1	< 0.10	0.35	0.22
Total Of 16 PAH's	U	2700	mg/kg	2		5.3	11	< 2.0	5.6	3.3

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest
The right chemistry to deliver results

Results Summary - Leachate

Project: 14.11.004 - Dappers Lane, Angmering, West Sussex

Client: Listers Geotechnical Consultants					Chemtest Job No.:	14-14530	14-14530
Quotation No.:					Chemtest Sample ID.:	70864	70866
Order No.: 14.11.004/654					Client Sample Ref.:		
					Client Sample ID.:	TP3	TP8
					Sample Type:	SOIL	SOIL
					Top Depth (m):	0.05	0.10
					Bottom Depth(m):		
					Date Sampled:	14-Nov-14	14-Nov-14
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Arsenic (Dissolved)	U	1450	µg/l	1		1.7	5.0
Boron (Dissolved)	U	1450	µg/l	20		< 20	< 20
Cadmium (Dissolved)	U	1450	µg/l	0.08		0.11	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1		< 1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1		9.3	5.2
Mercury (Dissolved)	U	1450	µg/l	0.5		< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1		4.2	2.4
Lead (Dissolved)	U	1450	µg/l	1		7.5	4.1
Selenium (Dissolved)	U	1450	µg/l	1		1.3	1.8
Zinc (Dissolved)	U	1450	µg/l	1		50	12

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest
The right chemistry to deliver results

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL

Final Report

[redacted]

Report Number:	14-15647 Issue-1
Initial Date of Issue:	04-Dec-14
Client:	Listers Geotechnical Consultants
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD
Contact(s):	Ian Evetts
Project:	14.11.004 Dappers Lane, Angmering, West Sussex

Quotation No.:		**Date Received:**	02-Dec-14
Order No.:	14.11.004/654	**Date Instructed:**	02-Dec-14
No. of Samples:	2	**Results Due:**	04-Dec-14
Turnaround: (Weekdays)	3		
Date Approved:	04-Dec-14		

Approved By:

[redacted]

Details: Keith Jones, Technical Manager

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest
The right chemistry to deliver results

Results Summary - Soil

Project: 14.11.004 Dappers Lane, Angmering, West Sussex

Client: Listers Geotechnical Consultants					Chemtest Job No.:	14-15647	14-15647
Quotation No.:					Chemtest Sample ID.:	76249	76250
Order No.: 14.11.004/654					Client Sample Ref.:		
					Client Sample ID.:	HA1	HA2
					Sample Type:	SOIL	SOIL
					Top Depth (m):	0.30	0.30
					Bottom Depth(m):		
					Date Sampled:	24-Nov-14	24-Nov-14
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Moisture	N	2030	%	0.02		24	18
Stones	N	2030	%	0.02		< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.4		2.1	1.4
Arsenic	U	2450	mg/kg	1		28	20
Cadmium	U	2450	mg/kg	0.1		0.55	0.57
Chromium	U	2450	mg/kg	1		31	28
Copper	U	2450	mg/kg	0.5		68	47
Mercury	U	2450	mg/kg	0.1		0.70	0.65
Nickel	U	2450	mg/kg	0.5		25	22
Lead	U	2450	mg/kg	0.5		490	1200
Selenium	U	2450	mg/kg	0.2		0.36	< 0.20
Zinc	U	2450	mg/kg	0.5		250	210
TPH >C5-C6	N	2670	mg/kg	1		< 1.0	< 1.0
TPH >C6-C7	N	2670	mg/kg	1		< 1.0	< 1.0
TPH >C7-C8	N	2670	mg/kg	1		< 1.0	< 1.0
TPH >C8-C10	N	2670	mg/kg	1		< 1.0	< 1.0
TPH >C10-C12	N	2670	mg/kg	1		< 1.0	< 1.0
TPH >C12-C16	N	2670	mg/kg	1		6.2	< 1.0
TPH >C16-C21	N	2670	mg/kg	1		36	11
TPH >C21-C35	N	2670	mg/kg	1		53	33
Total TPH >C5-C35	N	2670	mg/kg	10		95	44
Naphthalene	U	2700	mg/kg	0.1		0.97	0.55
Acenaphthylene	U	2700	mg/kg	0.1		0.67	0.22
Acenaphthene	U	2700	mg/kg	0.1		1.1	0.22
Fluorene	U	2700	mg/kg	0.1		0.79	0.26
Phenanthrene	U	2700	mg/kg	0.1		7.7	1.9
Anthracene	U	2700	mg/kg	0.1		1.9	0.40
Fluoranthene	U	2700	mg/kg	0.1		14	4.2
Pyrene	U	2700	mg/kg	0.1		14	4.3
Benzo[a]anthracene	U	2700	mg/kg	0.1		5.2	1.8
Chrysene	U	2700	mg/kg	0.1		6.9	2.2
Benzo[b]fluoranthene	U	2700	mg/kg	0.1		7.3	2.6
Benzo[k]fluoranthene	U	2700	mg/kg	0.1		2.9	1.1

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest
The right chemistry to deliver results

Results Summary - Soil

Project: 14.11.004 Dappers Lane, Angmering, West Sussex

Client: Listers Geotechnical Consultants					Chemtest Job No.:	14-15647	14-15647
Quotation No.:					Chemtest Sample ID.:	76249	76250
Order No.: 14.11.004/654					Client Sample Ref.:		
					Client Sample ID.:	HA1	HA2
					Sample Type:	SOIL	SOIL
					Top Depth (m):	0.30	0.30
					Bottom Depth(m):		
					Date Sampled:	24-Nov-14	24-Nov-14
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Benzo[a]pyrene	U	2700	mg/kg	0.1		5.6	2.1
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.1		4.0	1.4
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.1		0.84	0.32
Benzo[g,h,i]perylene	U	2700	mg/kg	0.1		4.0	1.5
Total Of 16 PAH's	U	2700	mg/kg	2		78	25

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest
The right chemistry to deliver results

Report Information

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None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Waste Classification Report

BSAC3-ZBEQV-BB27E

Job name

Dappers Lane Angmering

Waste Stream

Listers Suite 6 PAH in CAS order and no pH

Comments

Project

Site

Classified by

Name:
Muxlow, Colin
Date:
22/01/2015 16:25
Telephone:
01327 860060

Company:
Listers Geotechnical Consultants
Slapton Hill Barn, Blakesley Road
Slapton,
Towcester
NN12 8QD

Report

Created by: Muxlow, Colin
Created date: 22/01/2015 16:25

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazardous properties	Page
1	TP1	0.1	Non Hazardous		2
2	TP3	0.05	Hazardous	H7	5
3	TP5	0.5	Non Hazardous		8
4	TP8	0.1	Non Hazardous		10
5	TP9	0.05	Non Hazardous		12
6	HA1	0.3	Potentially Hazardous	H3-B	15
7	HA2	0.3	Hazardous	H3-B, H7	18

Appendices	Page
Appendix A: User Defined and non CLP Substances	21
Appendix B: Notes	22
Appendix C: Version	23

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest Ltd.
Depot Road
Newmarket

Amended Report

[redacted]

Report Number:	14-14531 Issue-2		
Initial Date of Issue:	25-Nov-14	**Date of Re-Issue:**	05-Dec-14
Client:	Listers Geotechnical Consultants		
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD		
Contact(s):	Ian Evetts		
Project:	14.11.004 - Dappers Lane, Angmering, West Sussex		
Quotation No.:		**Date Received:**	18-Nov-14
Order No.:	14.11.004/654	**Date Instructed:**	18-Nov-14
No. of Samples:	1	**Results Due:**	25-Nov-14
Turnaround: (Weekdays)	6		
Date Approved:	05-Dec-14		
Approved By:	[redacted]		
Details:	Keith Jones, Technical Manager		

ARUN DISTRICT COUNCIL A/114/18/PL

Chemtest
The right chemistry to deliver results

Results Summary - Soil

Project: 14.11.004 - Dappers Lane, Angmering, West Sussex

Client: Listers Geotechnical Consultants			**Chemtest Job No.:**		14-14531
Quotation No.:			**Chemtest Sample ID.:**		70868
Order No.: 14.11.004/654			Client Sample Ref.:		
			Client Sample ID.:		TP9
			Sample Type:		SOIL
			Top Depth (m):		0.05
			Bottom Depth(m):		
			Date Sampled:		14-Nov-14
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.02	28

ARUN DISTRICT COUNCIL A/114/18/PL

Results Summary - 2 Stage WAC

Project: 14.11.004 - Dappers Lane, Angmering, West Sussex

Chemtest Job No: 14-14531 Chemtest Sample ID: 70868 Sample Ref: Sample ID: TP9 Top Depth(m): 0.05 Bottom Depth(m): Sampling Date: 14-Nov-2014							Landfill Waste Acceptance Criteria Limits		
							Inert Waste Landfill	Stable Non-reactive Hazardous waste in non-hazardous	Hazardous Waste Landfill
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			7.2	3	5	6
Loss on Ignition	2610	U	%			13	--	--	10
Total BTEX	2760	U	mg/kg			0.03	6	--	--
Total PCBs (7 congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (of 17) PAHs	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				7.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.19	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
Arsenic	1450	U	0.015	0.004	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.06	0.012	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.0001	< 0.0001	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.001	< 0.001	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.013	0.002	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.0005	< 0.0005	< 0.001	< 0.005	0.01	0.2	2
Molybdenum	1450	U	0.028	0.009	0.053	0.095	0.5	10	30
Nickel	1450	U	0.002	< 0.001	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.001	< 0.001	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.003	0.001	< 0.010	0.012	0.06	0.7	5
Selenium	1450	U	< 0.001	< 0.001	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.009	0.002	< 0.50	< 0.50	4	50	200
Chloride	1220	U	54	8.6	100	110	800	15000	25000
Fluoride	1220	U	0.17	0.092	< 1.0	< 1.0	10	150	500
Sulphate	1220	U	21	< 1.0	40	12	1000	20000	50000
Total Dissolved Solids	1020	N	400	120	760	1300	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	N	34	9.8	64	110	500	800	1000

Soild Information	
Dry mass of test portion/kg	0.175
Moisture (%)	28

Leachate Test Information	
Leachant volume 1st extract/l	0.282
Leachant volume 2nd extract/l	1.4
Eluant recovered from 1st extract/l	0.099

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
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If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

APPENDIX D
DESK STUDY INFORMATION

[redacted]

Listers Geotechnical Consultants Ltd

Slapton Hill Barn, Blakesley Road,
Towcester, NN12 8QD

GroundSure Reference:	GS-1765011
Your Reference:	14.11.004/654
Report Date	12 Nov 2014
Report Delivery Method:	Email - pdf

GroundSure EnviroInsight

Address: Dappers Lane & Water Lane, ,ANGMERING,LITTLEHAMPTON, BN16 4DA

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure EnviroInsight** 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 EnviroInsight

Address:	Dappers Lane & Water Lane, ,ANGMERING,LITTLEHAMPTON, BN16 4DA
Date:	12 Nov 2014
Reference:	GS-1765011
Client:	Listers Geotechnical Consultants Ltd

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	13-Sep-2012
Grid Reference:	507340,104711
Site Size:	1.24ha

Contents Page

Contents Page 3
Overview of Findings 5
Using this report 9
1. Environmental Permits, Incidents and Registers Map 10
1. Environmental Permits, Incidents and Registers 11
1.1 Industrial Sites Holding Licences and/or Authorisations 11
1.1.1 Records of historic IPC Authorisations within 500m of the study site: 11
1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site: 11
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: 11
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site: 11
1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: 11
1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: 12
1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 12
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations: 12
1.1.9 Records of Licensed Discharge Consents within 500m of the study site: 12
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 13
1.2 Dangerous or Hazardous Sites 13
1.3 Environment Agency Recorded Pollution Incidents 14
1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site: 14
1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site: 15
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990 15
2. Landfill and Other Waste Sites Map 16
2. Landfill and Other Waste Sites 17
2.1 Landfill Sites 17
2.1.1 Records from Environment Agency landfill data within 1000m of the study site: 17
2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site: 17
2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site: 17
2.1.4 Records of Local Authority landfill sites within 1500m of the study site: 17
2.2 Other Waste Sites 18
2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site: 18
2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site: 18
3. Current Land Use Map 19
3. Current Land Uses 20
3.1 Current Industrial Data 20
3.2 Petrol and Fuel Sites 20
3.3 Underground High Pressure Oil and Gas Pipelines 21
4. Geology 22
4.1 Artificial Ground and Made Ground 22
4.2 Superficial Ground and Drift Geology 22
4.3 Bedrock and Solid Geology 22
5. Hydrogeology and Hydrology 23
5a. Aquifer Within Superficial Geology 23
5b. Aquifer Within Bedrock Geology and Abstraction Licenses 24
5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses 25
5d. Hydrology Source Protection Zones within confined aquifer 26
5 e. Hydrology – Detailed River Network and River Quality 27
5. Hydrogeology and Hydrology 28
5.1 Aquifer within Superficial Deposits 28
5.2 Aquifer within Bedrock Deposits 29

5.3 Groundwater Abstraction Licences....29
5.4 Surface Water Abstraction Licences....31
5.5 Potable Water Abstraction Licences....31
5.6 Source Protection Zones....32
5.7 Source Protection Zones within Confined Aquifer....32
5.8 Groundwater Vulnerability and Soil Leaching Potential....33
5.9 River Quality....33
5.9.1 Biological Quality:....33
5.9.2 Chemical Quality:....33
5.10 Detailed River Network....34
5.11 Surface Water Features....34
6. Environment Agency Flood Map for planning (from rivers and the sea)....35
6. Flooding....36
6.1 Zone 2 Flooding....36
6.2 Zone 3 Flooding....36
6.3 Flood Defences....36
6.4 Areas benefiting from Flood Defences....37
6.5 Areas benefiting from Flood Storage....37
6.6 Groundwater Flooding Susceptibility Areas....37
6.6.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?....37
6.6.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?....37
6.7 Groundwater Flooding Confidence Areas....37
7. Designated Environmentally Sensitive Sites Map....38
7. Designated Environmentally Sensitive Sites....39
7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:....39
7.2 Records of National Nature Reserves (NNR) within 2000m of the study site:....39
7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:....39
7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:....39
7.5 Records of Ramsar sites within 2000m of the study site:....39
7.6 Records of Ancient Woodland within 2000m of the study site:....40
7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:....40
7.8 Records of World Heritage Sites within 2000m of the study site:....40
7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:....41
7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:....41
7.11 Records of National Parks (NP) within 2000m of the study site:....41
7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:....41
7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:....41
8. Natural Hazards Findings....43
8.1 Detailed BGS GeoSure Data....43
8.1.1 Shrink Swell....43
8.1.2 Landslides....43
8.1.3 Soluble Rocks....44
8.1.4 Compressible Ground....44
8.1.5 Collapsible Rocks....44
8.1.6 Running Sand....45
9. Mining....46
9.1 Coal Mining....46
9.2 Shallow Mining....46
9.3 Brine Affected Areas....46
Contact Details....47
Standard Terms and Conditions....48

Overview of Findings

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

Section 1: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
1.1.1 Records of historic IPC Authorisations	0	0	0	0
1.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0
1.1.5 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
1.1.6 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
1.1.7 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	2
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
1.1.9 Records of Licensed Discharge Consents	0	0	2	6
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0
1.2 Records of COMAH and NIHHS sites	0	0	0	0
1.3 Environment Agency Recorded Pollution Incidents				
1.3.1 National Incidents Recording System, List 2	0	0	3	4
1.3.2 National Incidents Recording System, List 1	0	1	0	1
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites						
2.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
2.1.2 Environment Agency Historic Landfill Sites	0	0	0	0	0	1
2.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
2.1.4 GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
2.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
2.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	3	0

Section 3: Current Land Use

	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	0	1	8	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	0	0
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0

Section 4: Geology

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

Section 5: Hydrogeology and Hydrology

	0-500m
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
5.2 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
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	1	10
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	3
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	1
5.6 Source Protection Zones (within 500m of the study site)	0	0	0	1	Not searched	Not searched
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	2	2	Not searched	Not searched

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.10 Detailed River Network entries within 500m of the site	0	2	4	2	Not searched	Not searched
5.11 Surface water features within 250m of the study site	No	Yes	Yes	Not searched	Not searched	Not searched

Section 6: Flooding

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

Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
7.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.5 Records of Ramsar sites	0	0	0	0	0	0
7.6 Records of Ancient Woodlands	0	0	0	0	1	16
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	1	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.11 Records of National Parks	0	0	0	1	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	1	0	0	1	0	1

Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Moderate
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Moderate
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Low
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low

Section 9: Mining

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

Using this report

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

1. Environmental Permits, Incidents and Registers

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

2. Landfills and Other Waste Sites

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

3. Current Land Uses

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

4. Geology

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

5. Hydrogeology and Hydrology

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

6. Flooding

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

7. Designated Environmentally Sensitive Sites

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

8. Natural Hazards

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

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

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

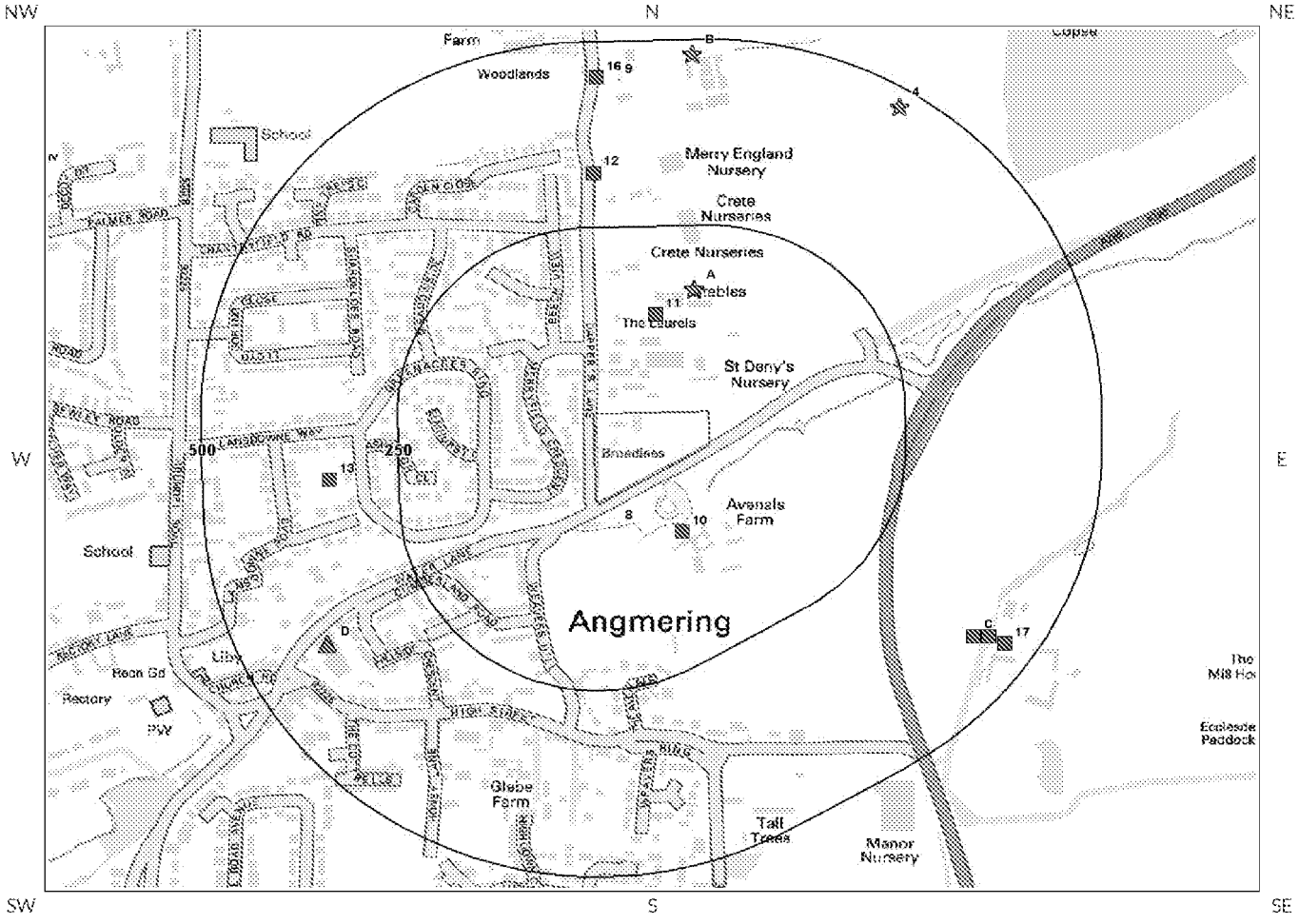
Note: Maps

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

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

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

1. Environmental Permits, Incidents and Registers Map



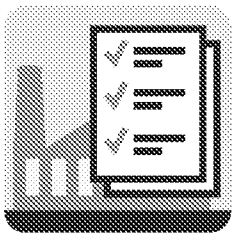
Environmental Permits, Incidents and Registers Legend

© Crown copyright and database rights 2014. Ordnance Survey license 100035207.

- 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

Report Reference: GS-1765011
Client Reference: 14.11.004/654

ARUN DISTRICT COUNCIL A/114/18/PL



1. Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

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

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

0

Database searched and no data found.

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

0

Database searched and no data found.

1.1.3 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.

1.1.4 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.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

1.1.7 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	Direction	NGR	Details	
18D	394.0	SW	506928 104437	Address: Chandlers Garage Worthing Ltd, Water Lane, BN16 4EH Process: Waste Oil Burning Process, Process:vehicle Re-spray Process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
19D	394.0	SW	506928 104437	Address: Chandlers Garage (Worthing) Ltd, BMW House, Water Lane, Angmering, Littlehampton, BN16 4HE Process: Service Station Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

---

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

8

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

ID	Distance	Direction	NGR	Details	
10	84.0	SE	507380 104590	Address: Lower Avenals Farm, Lower Avenals Farm, Water Lane, Angmering, West Sussex Effluent Type: Sewage Discharges - Unspecified - Not Water Company Permit Number: P02921 Permit Version: 1	Receiving Water: Freshwater River Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: 25/4/1990 Effective Date: 25/4/1990 Revocation Date: -
11	131.0	N	507346 104882	Address: New Build, Acre Nursery, Angmering, New Build, The Acre Nursery, Dapper Lane, Angmering, West Sussex, BN16 4EN Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: P12474 Permit Version: 1	Receiving Water: Groundwater Via Soakaway Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 5/10/2005 Effective Date: 5/10/2005 Revocation Date: -

ID	Distance	Direction	NGR	Details	
12	323.0	N	507266 105072	Address: Greenways, Dappers Lane, Angmering, West Sussex, BN16 4EN Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: NPSWQD008029 Permit Version: 1	Receiving Water: Tributary Of Black Ditch Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 3/6/2009 Effective Date: 3/6/2009 Revocation Date: -
13	339.0	W	506930 104660	Address: Southdowns & Perryhill, Southdowns & Perryhill, Greenacres Ring, Angmering, West Sussex Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: P03266 Permit Version: 1	Receiving Water: Into Land Status: Lapsed Under Schedule 23 Environment Act 1995 Issue date: - Effective Date: - Revocation Date: 31/3/1997
14 C	422.0	SE	507750 104450	Address: Ecclesden Manor, Ecclesden Manor, Angmering, Littlehampton, West Sussex, BN16 4AW Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: P05439 Permit Version: 1	Receiving Water: Freshwater River Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: 14/7/1994 Effective Date: 14/7/1994 Revocation Date: 28/2/1997
15 C	438.0	SE	507770 104450	Address: Manor Farmhouse, Manor Barn &, Manor Farmhouse, Manor Barn &, Manor Cottage, High Street Angmering, Littlehampton West Sussex Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: P07625 Permit Version: 1	Receiving Water: Freshwater River Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 16/6/1999 Effective Date: 16/6/1999 Revocation Date: -
16	451.0	N	507270 105200	Address: Woodlands, Dappers Lane, Angmering, Woodlands, Dappers Lane, Angmering, West Sussex, BN16 4EN Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: P12063 Permit Version: 1	Receiving Water: - Unnamed Trib. Black Ditch Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 29/4/2004 Effective Date: 29/4/2004 Revocation Date: -
17	460.0	SE	507790 104440	Address: The Barn, The Barn, Ecclesden Manor, High Street Angmering, Littlehampton West Sussex Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: P02819 Permit Version: 1	Receiving Water: Into Land Status: Lapsed Under Schedule 23 Environment Act 1995 Issue date: 8/3/1990 Effective Date: 8/3/1990 Revocation Date: 31/3/1997

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

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

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

7

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

ID	Distance	Direction	NGR	Details	
1A	165.0	N	507394 104917	Incident Date: 04/11/2002 Incident Identification: 118506 Pollutant: Oils and Fuel:Oils and Fuel Pollutant Description: Diesel:Petrol	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
2A	165.0	N	507394 104917	Incident Date: 04/11/2002 Incident Identification: 118506 Pollutant: Oils and Fuel Pollutant Description: Petrol	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
3A	165.0	N	507394 104917	Incident Date: 04/11/2002 Incident Identification: 118506 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
4	475.0	NE	507656 105161	Incident Date: 29/10/2003 Incident Identification: 198906 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
5B	480.0	N	507392 105232	Incident Date: 17/06/2002 Incident Identification: 85444 Pollutant: Specific Waste Materials:Specific Waste Materials Pollutant Description: Tyres:Vehicles and Vehicle Parts	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
6B	480.0	N	507392 105232	Incident Date: 17/06/2002 Incident Identification: 85444 Pollutant: Specific Waste Materials Pollutant Description: Tyres	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
7B	480.0	N	507392 105232	Incident Date: 17/06/2002 Incident Identification: 85444 Pollutant: Specific Waste Materials Pollutant Description: Vehicles and Vehicle Parts	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

1.3.2 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:

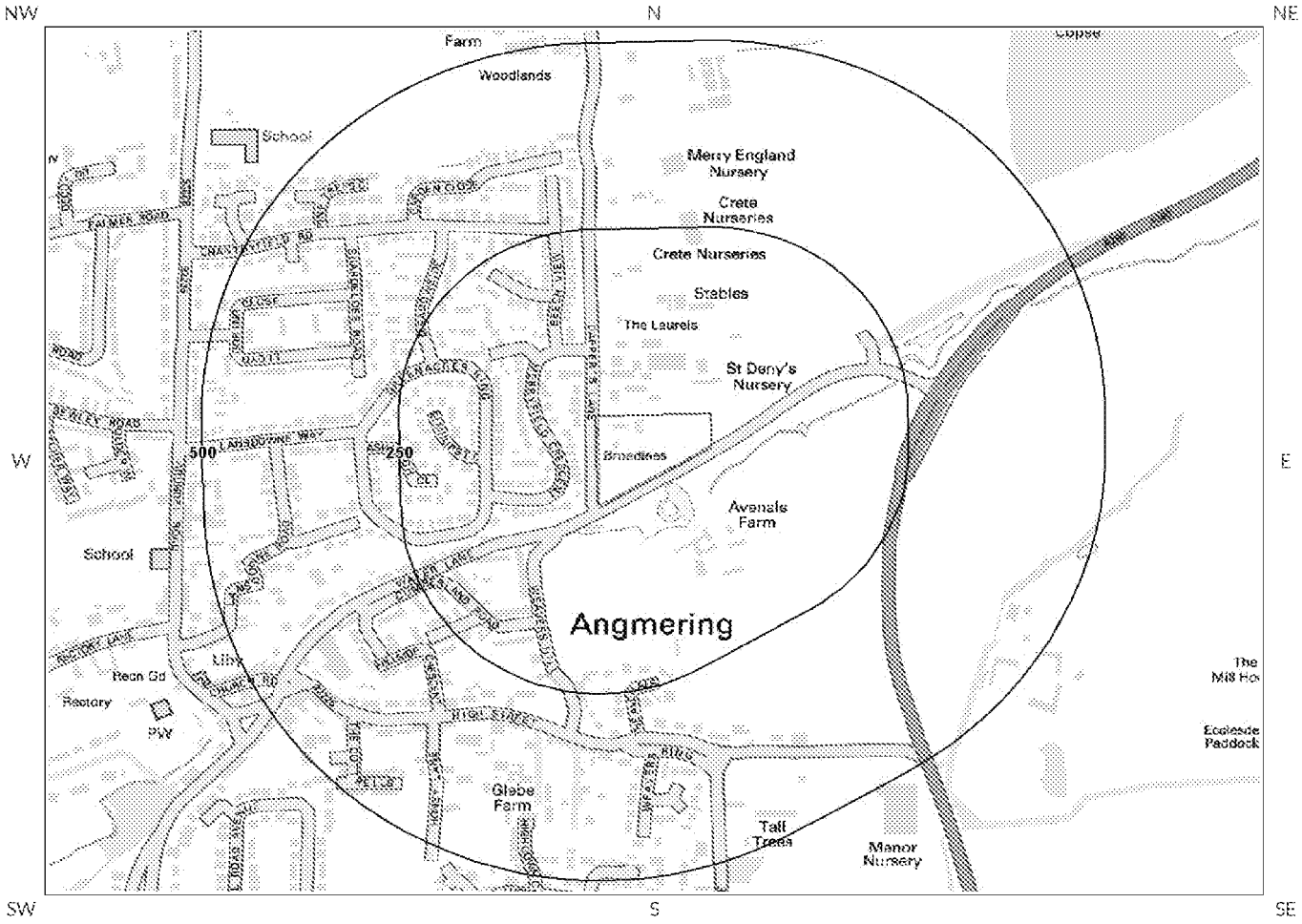
ID	Distance	Direction	NGR	Details	
8	37.0	SE	507300 104600	Incident Date: 08-Aug-1999 Incident Identification: 2646.0 Catchments Name: ARUN Water Description: RIVER STRETCH (FRESHWATER) Water Course: A2 Incident Substantiated: Yes	Priority Description: Immediate (2 Hours) Waste Description: Not Available Water Impact: Significant Impact Land Impact: No Impact Air Impact: No Impact Pollutant:
9	450.0	N	507300 105200	Incident Date: 15-Apr-2000 Incident Identification: 5782.0 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: Significant Impact Land Impact: Minor Impact Air Impact: No Impact Pollutant:

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

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

Database searched and no data found.

2. Landfill and Other Waste Sites Map

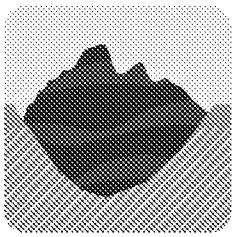


Landfill and Other Waste Sites Legend

Mapping sourced from Ordnance Survey®

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- Site Outline
- Search Buffers (m) — 250 / 500
- E.A. Active Landfill
- E.A. Historic Landfill
- Local Authority Landfill
- Historic and Planned Waste Sites
- E.A. Licensed Waste Site
- BGS / DoE Survey Landfill



2. Landfill and Other Waste Sites

2.1 Landfill Sites

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

0

Database searched and no data found.

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

1

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1226.0	NE	508700 105200	Site Address: Northdown Farm, Patching, Worthing, Sussex Waste Licence: - Site Reference: WD27/327 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

---

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.2 Other Waste Sites

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

0

Database searched and no data found.

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

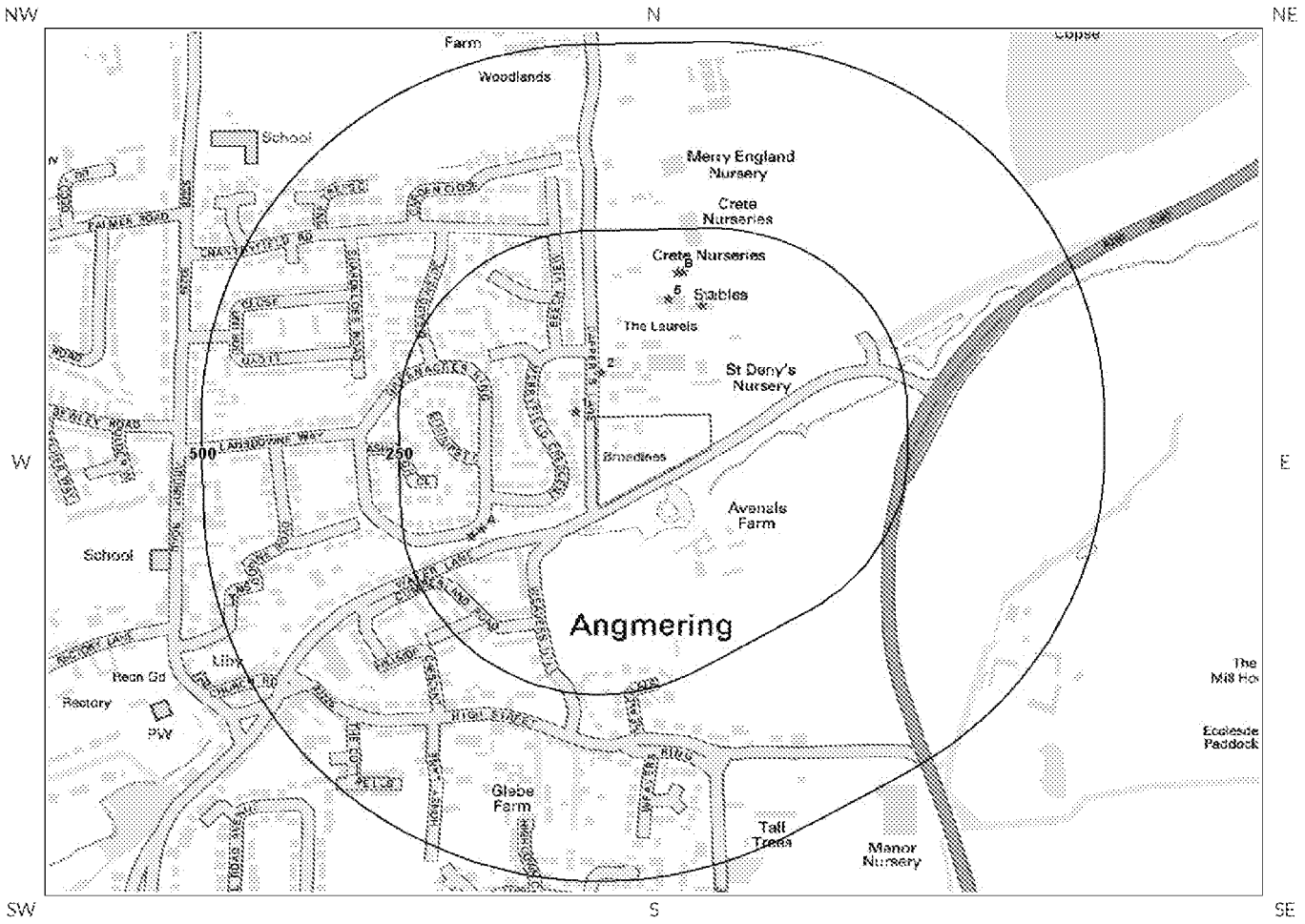
3

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	
Not shown	886.0	NW	506590 105320	Site Address: New Place Nursery, Arundel Road, Angmering, West Sussex, West Sussex, BN16 4ET Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MAC003 EPR reference: EA/EPR/VP3995HJ/S002 Operator: Macaree Stephen Waste Management licence No: 10135 Annual Tonnage: 0.0	Issue Date: 05/07/2004 Effective Date: - Modified: - Surrendered Date: 02/06/2014 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Vw & Audi New & Used Parts Centre Correspondence Address: -, -
Not shown	900.0	NW	506580 105330	Site Address: New Place Nursery, Unit 9, Arundel Road, Angmering, West Sussex, BN16 4ET Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HIL004 EPR reference: - Operator: Hills Colin Waste Management licence No: 10134 Annual Tonnage: 20.0	Issue Date: 02/06/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Swift Salvage - New Place Nursery Correspondence Address: -, New Place Nursery, Unit 9, Arundel Road, Angmering, West Sussex, BN16 4ET
Not shown	900.0	NW	506580 105330	Site Address: New Place Nursery, Unit 9, Arundel Road, Angmering, West Sussex, BN16 4ET Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HIL004 EPR reference: EA/EPR/BP3896LX/A001 Operator: Hills Colin Waste Management licence No: 10134 Annual Tonnage: 20.0	Issue Date: 02/06/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Swift Salvage - New Place Nursery Correspondence Address: -, -

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3. Current Land Use Map



Current Land Use Legend

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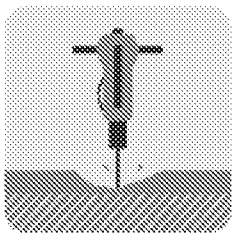
Site Outline

250
500
Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Underground High Pressure Oil & Fuel Pipelines



3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 9

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	26.0	W	Mitchells	507242 104756	The Gables, Dappers Lane, Angmering, Littlehampton, BN16 4EN	Workwear	Industrial Products
2	60.0	N	Rag Bags	507274 104809	Unit 1 St. Denys Nursery, Dappers Lane, Angmering, Littlehampton, BN16 4EN	Cleaning Equipment and Supplies	Industrial Products
3	147.0	N	Ace Cutter Ltd	507402 104899	Unit 3 The Acre, Dappers Lane, Angmering, Littlehampton, BN16 4EN	Construction Completion Services	Construction Services
4A	152.0	W	Electricity Sub Station	507122 104599	BN16	Electrical Features	Infrastructure and Facilities
5	156.0	N	Delta Signs	507359 104907	Unit 7 The Acre, Dappers Lane, Angmering, Littlehampton, BN16 4EN	Signs	Industrial Products
6A	165.0	W	Gas Governor Station	507110 104590	BN16	Gas Features	Infrastructure and Facilities
7A	166.0	W	Gas Governor Station	507110 104589	BN16	Gas Features	Infrastructure and Facilities
8B	192.0	N	Paul Nash Fibrous Plaster Mouldings	507372 104943	Unit 15 The Acre Dappers Lane, Angmering, Littlehampton, BN16 4EN	General Construction Supplies	Industrial Products
9B	193.0	N	Thatcher Motors Ltd	507378 104944	Unit 14 The Acre, Dappers Lane, Angmering, Littlehampton, BN16 4EN	Vehicle Repair, Testing and Servicing	Repair and Servicing

3.2 Petrol and Fuel Sites

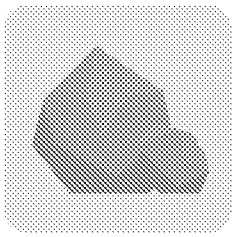
Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

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

Database searched and no data found.



4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

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

4.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL

4.3 Bedrock and Solid Geology

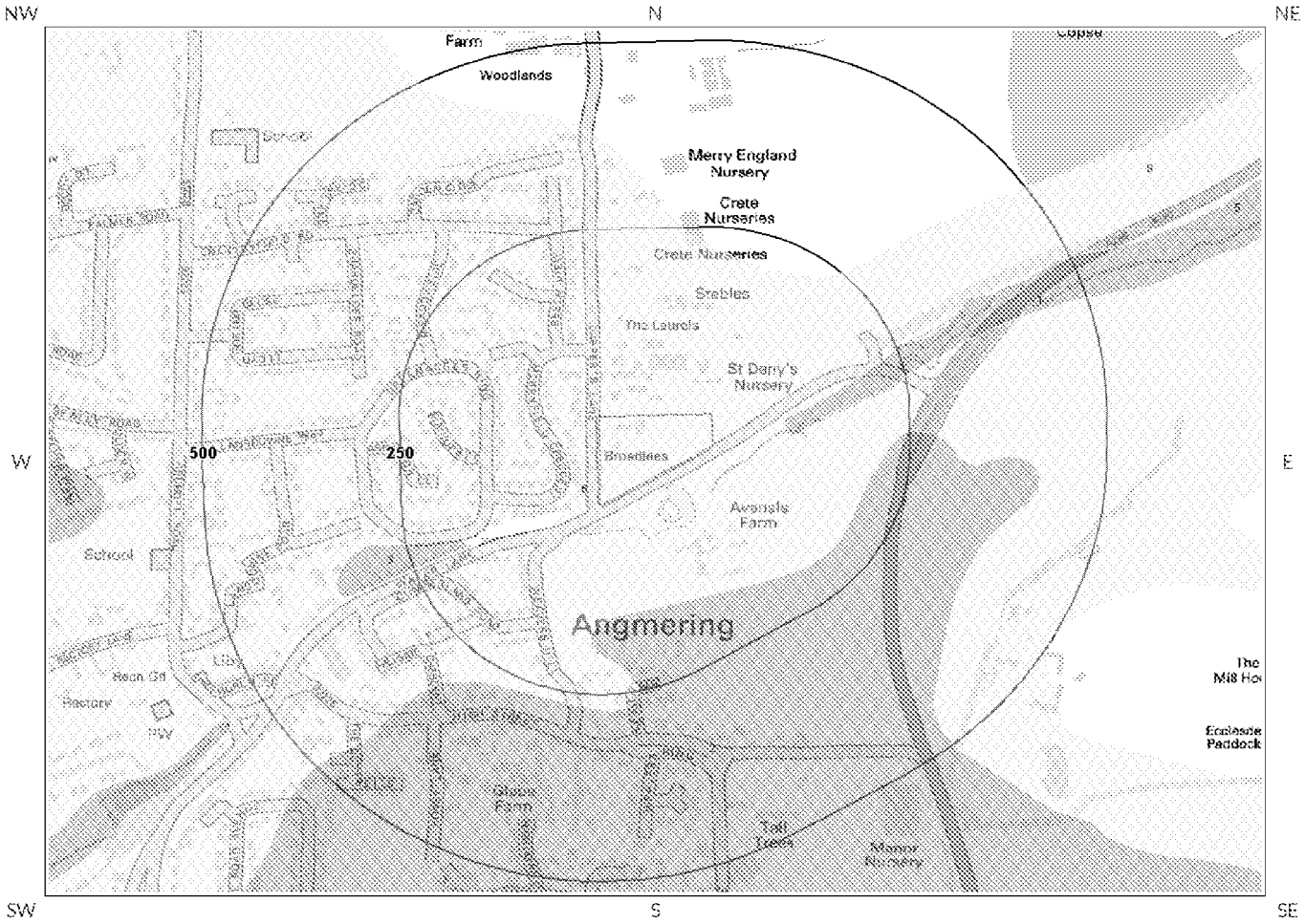
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LMBE-CLSS	LAMBETH GROUP	CLAY, SILT AND SAND
TACH-CHLK	TARRANT CHALK MEMBER	CHALK
LC-CLSS	LONDON CLAY FORMATION	CLAY, SILT AND SAND

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

5. Hydrogeology and Hydrology

5a. Aquifer Within Superficial Geology



Aquifer Within Superficial Geology

Mapping sourced from Ordnance Survey®

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Site Outline

250 / 500 Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

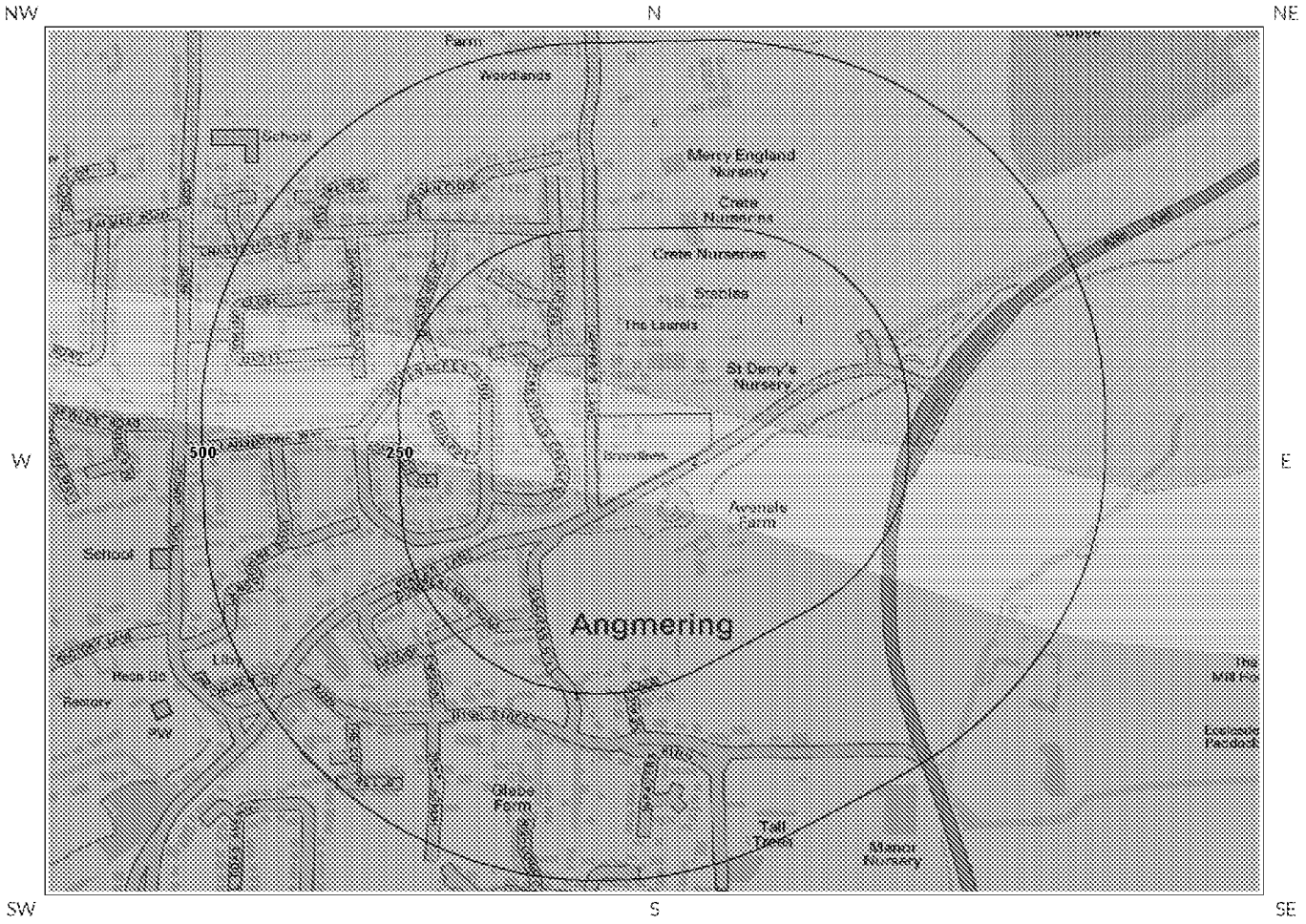
Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

5b. Aquifer Within Bedrock Geology and Abstraction Licenses



Aquifer Within Bedrock Geology and Abstraction Licenses

Mapping sourced from Ordnance Survey®

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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

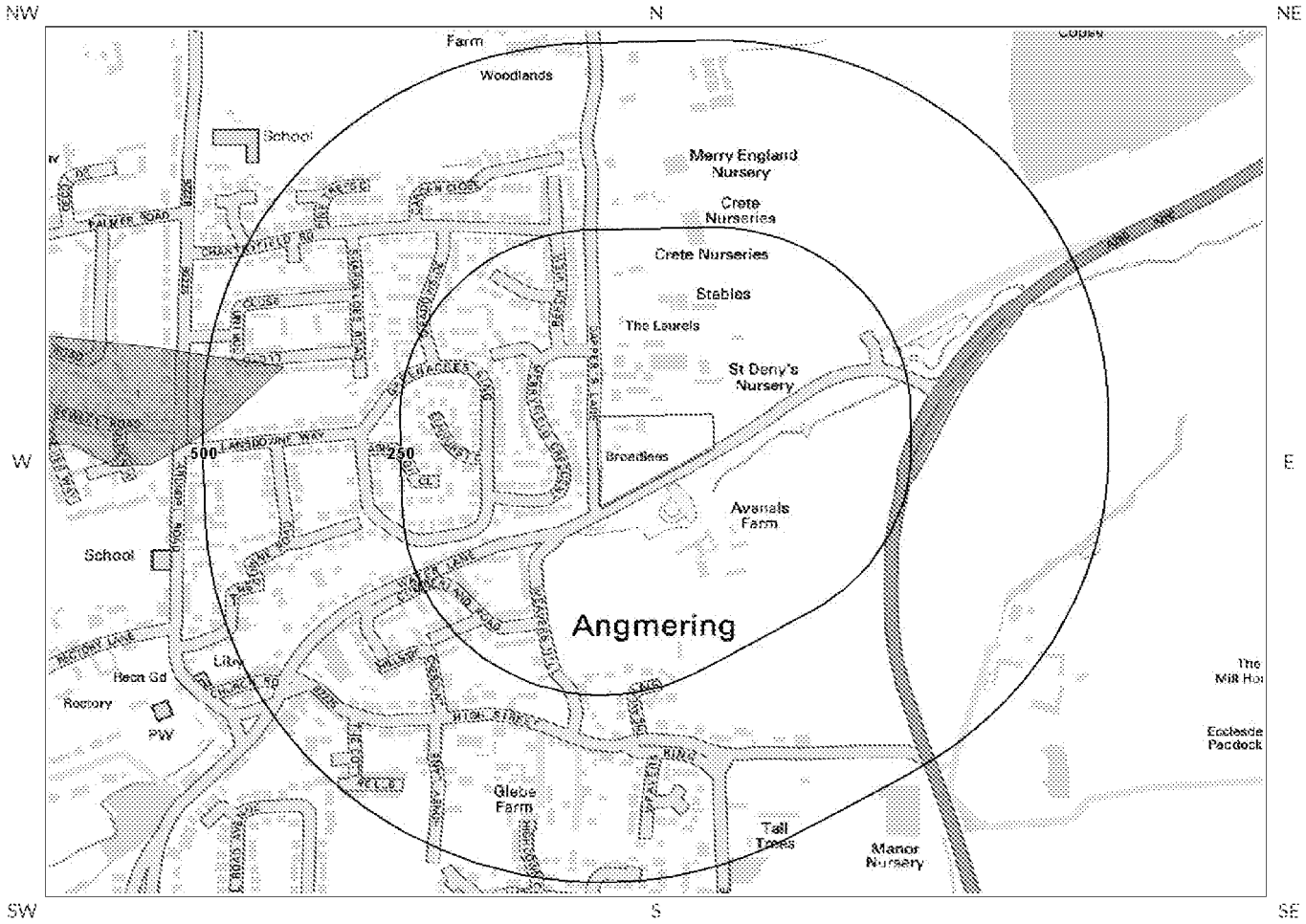
Unproductive

Unknown (lakes and landslip)

Groundwater Abstraction Licence

Surface Water Abstraction Licence

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



Map Legend 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

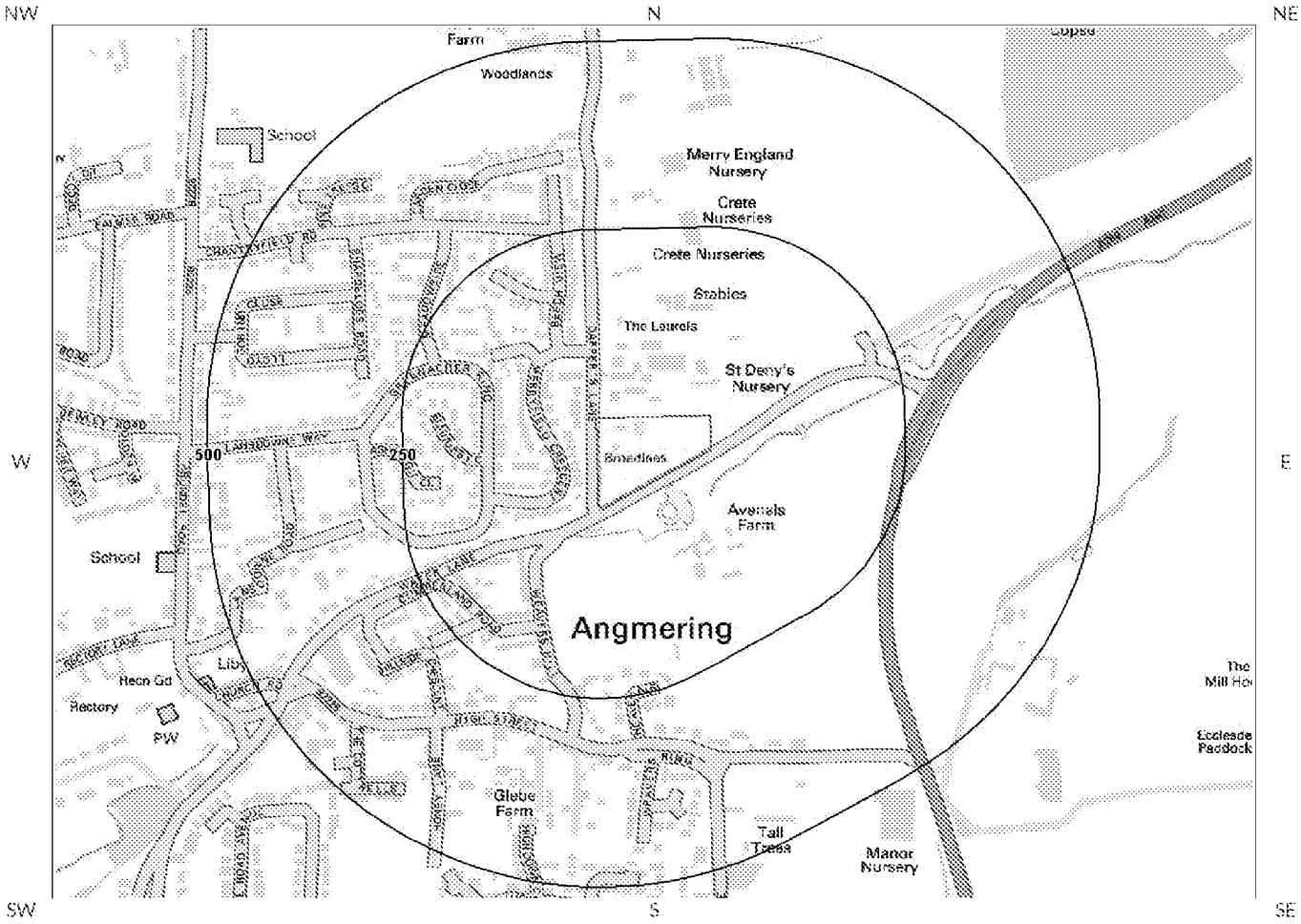
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

5d. Hydrology Source Protection Zones within confined aquifer



Hydrology Source Protection Zones

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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1C - Inner Catchment within Confined Aquifer

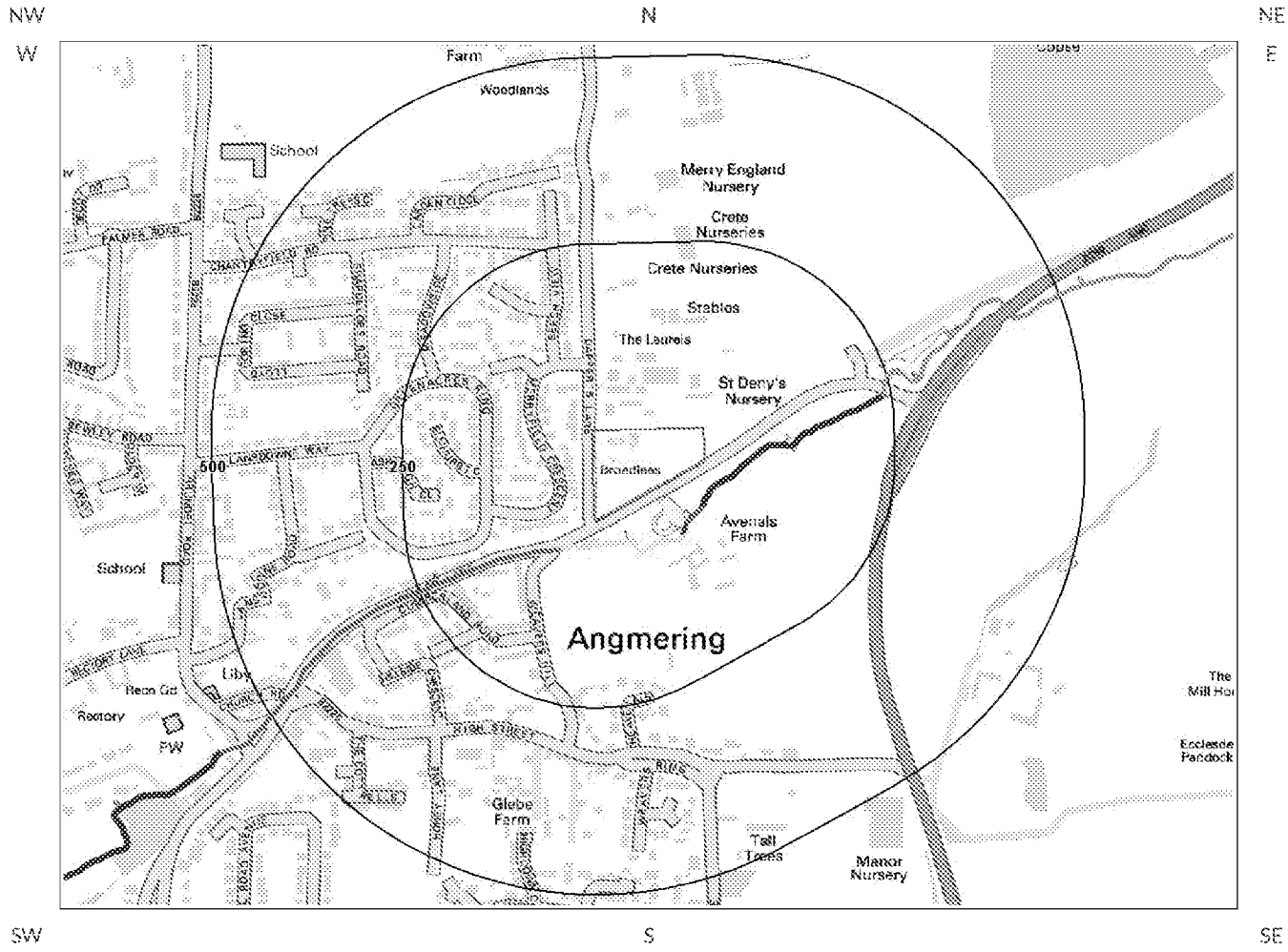
Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

ARUN DISTRICT COUNCIL A/114/18/PL

5 e. Hydrology – Detailed River Network and River Quality



Hydrology - Detailed River Network and River Quality

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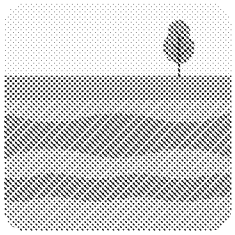
Site Outline

250 / 500 Search Buffers (m)

Primary River
Secondary River
Tertiary River
Lake/Reservoir
Underground River (inferred)
General Quality Assessment: Biology
General Quality Assessment: Chemistry

Canal
Canal Tunnel
Culvert
Multiple Channel Culvert
Underground River (Potential Sewer)
Underground River (local knowledge)

ARUN DISTRICT COUNCIL A/114/18/PL



5. Hydrogeology and Hydrology

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

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

ID	Distance (m)	Direction	Designation	Description
6	0.0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
1	87.0	E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	146.0	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
3	177.0	W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
7	249.0	N	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
8	368.0	NE	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

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

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

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	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
2	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	4.0	N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
5	248.0	N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

5.3 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 (5b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	818.0	S	507140 103820	Licence No: 10/41/414018 Details: Horticultural Watering Direct Source: Southern Region Groundwater Point: Fresh Acres Nurseries Data Type: Point	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	1129.0	S	507540 103530	Licence No: 10/41/414002 Details: Horticultural Watering Direct Source: Southern Region Groundwater Point: West End Nurseries Data Type: Point	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:
Not shown	1305.0	SE	508580 104120	Licence No: 10/41/310112 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: Roundstone Farm Ferring Data Type: Point	Annual Volume (m^3): 77270 Max Daily Volume (m^3): 1820 Original Application No: 169/0753 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 8/6/2009 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1435.0	S	507640 103240	Licence No: 10/41/310106 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: Roundstone Nursery Data Type: Point	Annual Volume (m^3): 18200 Max Daily Volume (m^3): 191 Original Application No: WR.0596 Original Start Date: - Expiry Date: - Issue No: 101 Version Start Date: 8/6/2009 Version End Date:
Not shown	1563.0	NW	505870 105450	Licence No: 10/41/414103 Details: General Farming & Domestic Direct Source: Southern Region Groundwater Point: Decoy Cottage Poling Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 169/0400 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/10/1980 Version End Date:
Not shown	1584.0	SW	505870 103890	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	Annual Volume (m^3): 11783 Max Daily Volume (m^3): 109.1 Original Application No: WR.0187 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 8/6/2009 Version End Date:
Not shown	1870.0	SE	508900 103570	Licence No: 10/41/310103 Details: General Farming & Domestic Direct Source: Southern Region Groundwater Point: Reynards Nursery Data Type: Point	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:
Not shown	1901.0	W	505370 104580	Licence No: 24/066 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: Old Place Farm Data Type: Point	Annual Volume (m^3): 18184 Max Daily Volume (m^3): 1400 Original Application No: 169/0157 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 16/6/2009 Version End Date:
Not shown	1901.0	W	505370 104580	Licence No: 24/066 Details: General Farming & Domestic Direct Source: Southern Region Groundwater Point: Old Place Farm Data Type: Point	Annual Volume (m^3): 18184 Max Daily Volume (m^3): 1400 Original Application No: 169/0157 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 16/6/2009 Version End Date:
Not shown	1954.0	NW	506400 106500	Licence No: 10/41/310210 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: Angmering Ps Point 2 Data Type: Point	Annual Volume (m^3): 26000000 Max Daily Volume (m^3): 114000 Original Application No: WR.0611 Original Start Date: - Expiry Date: - Issue No: 101 Version Start Date: 11/12/2009 Version End Date:
Not shown	1954.0	NW	506400 106500	Licence No: 10/41/310210 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Southern Region Groundwater Point: Angmering Ps Point 2 Data Type: Point	Annual Volume (m^3): 26000000 Max Daily Volume (m^3): 114000 Original Application No: WR.0611 Original Start Date: - Expiry Date: - Issue No: 101 Version Start Date: 8/6/2009 Version End Date:

5.4 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 (5b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1681.0	W	503250 104460	Licence No: 10/41/414014 Details: Spray Irrigation - Direct Direct Source: Southern Region Surface Waters Point: Black Ditch At Manor Farm Data Type: Line	Annual Volume (m^3): 20548 Max Daily Volume (m^3): 916.5 Application No: WR.0114 Original Start Date: - Expiry Date: 31/10/2006 Issue No: 101 Version Start Date: 1/4/2006 Version End Date:
Not shown	1708.0	W	505620 104190	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	Annual Volume (m^3): 31822 Max Daily Volume (m^3): 3000 Application No: WR.0761 Original Start Date: - Expiry Date: - Issue No: 101 Version Start Date: 8/6/2009 Version End Date:
Not shown	1708.0	W	505620 104190	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	Annual Volume (m^3): 31822 Max Daily Volume (m^3): 3000 Application No: WR.0761 Original Start Date: - Expiry Date: - Issue No: 101 Version Start Date: 8/6/2009 Version End Date:

5.5 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 (5c):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1954.0	NW	506400 106500	Licence No: 10/41/310210 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: Angmering Ps Point 2 Data Type: Point	Annual Volume (m^3): 26000000 Max Daily Volume (m^3): 114000 Original Application No: WR.0611 Original Start Date: - Expiry Date: - Issue No: 101 Version Start Date: Version End Date:

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? Yes

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (5c):

ID	Distance (m)	Direction	Type	Description
1	404.0	W	3	Total Catchment

5.7 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.

5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency 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	Minor Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
55	S	Major Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
181	E	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
375	NW	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
388	N	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

5.9 River Quality

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

5.9.1 Biological Quality:

Database searched and no data found.

5.9.2 Chemical Quality:

Database searched and no data found.

5.10 Detailed River Network

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

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

ID	Distance (m)	Direction	Details	
1	32.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
2	34.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
3	51.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
4	60.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Resivoir Main River Status: Currently Undefined
5	60.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
6	239.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
7	343.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
8	348.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

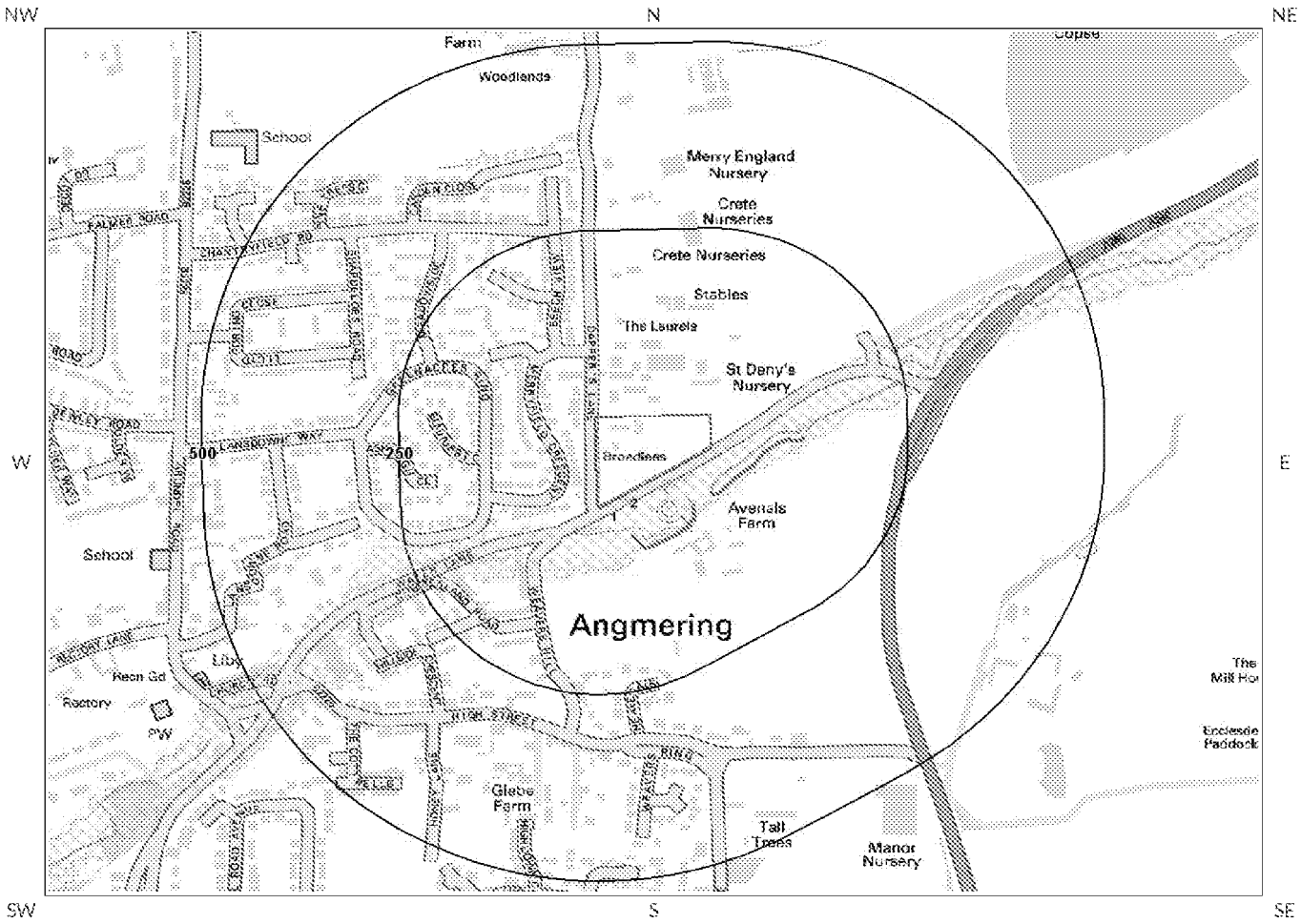
5.11 Surface Water Features

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
15.0	SE
31.0	S
33.0	SE
246.0	E

6. Environment Agency Flood Map for planning (from rivers and the sea)



Environment Agency Flood Map for planning (from rivers and the sea)

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Zone 2 Floodplain

Zone 3 Floodplain

Flood Storage Area

Area Benefiting from Flood Defences

Flood Defences

6. Flooding

6.1 Zone 2 Flooding

Environment Agency 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 1 – Environment Agency Flood Map for Planning:

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

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

ID	Distance (m)	Direction	Update	Type
1	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models)

6.2 Zone 3 Flooding

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 1 – Environment Agency Flood Map for Planning.

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

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

ID	Distance (m)	Direction	Update	Type
2	0.0	On Site	03-Nov-2014	Zone 3 - (Fluvial Models)

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site? Yes

The following flood defence records are represented as lines on the Flood Map:

ID	Distance (m)	Direction	Update
3	50.0	SE	31-Oct-2014
4	51.0	SE	31-Oct-2014

6.4 Areas benefiting from Flood Defences

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

6.5 Areas benefiting from Flood Storage

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

6.6 Groundwater Flooding Susceptibility Areas

6.6.1 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).

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

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

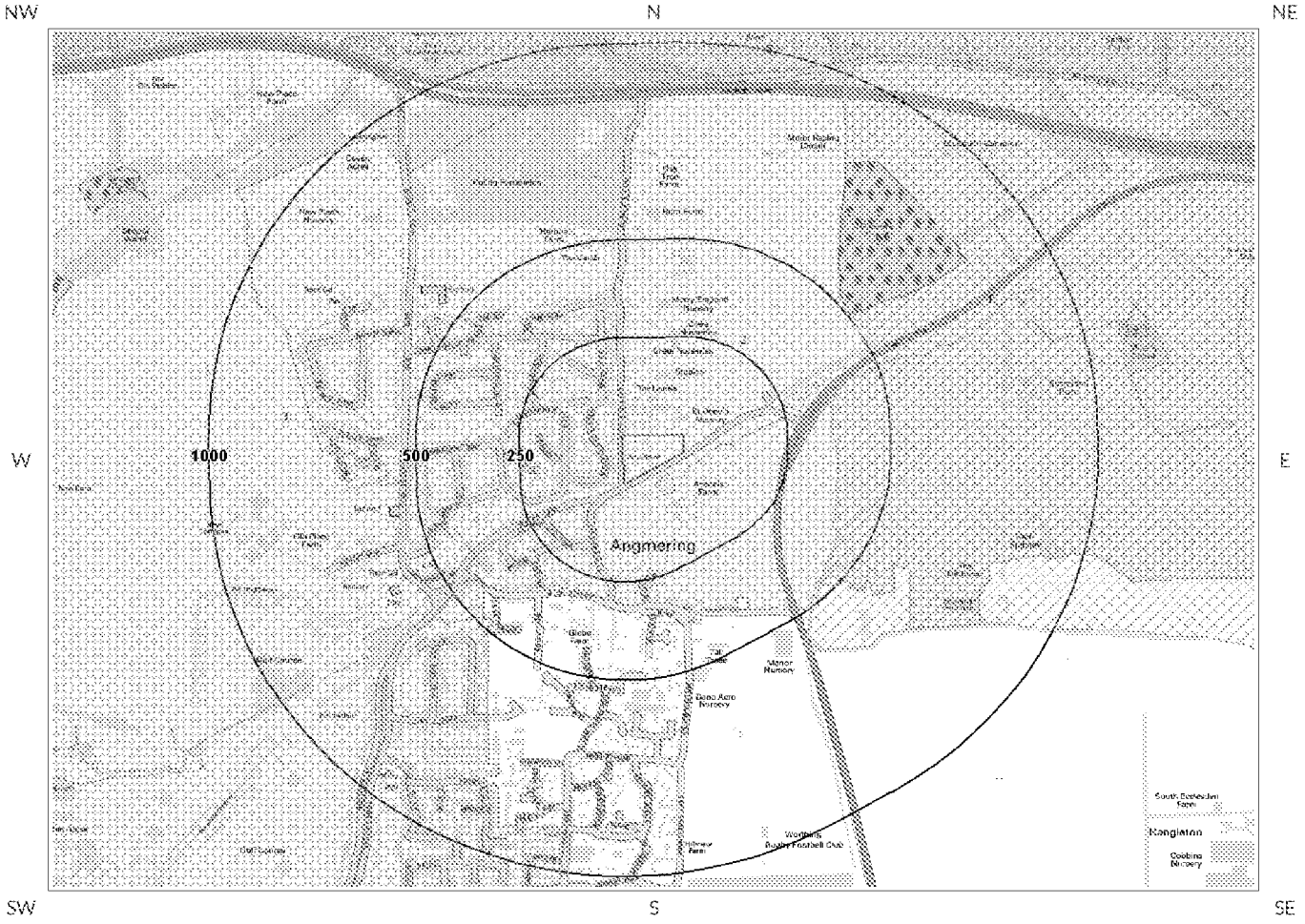
6.7 Groundwater Flooding Confidence Areas

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.

7. Designated Environmentally Sensitive Sites Map

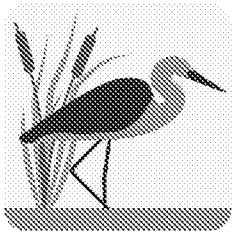


Designated Environmentally Sensitive Sites Map

Mapping sourced from Ordnance Survey®

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



7. Designated Environmentally Sensitive Sites

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

---

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

17

The following Ancient Woodland records are supplied by English Nature/Scottish Natural Heritage/Natural Resources Wales and are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
6	505.0	NE	GROOMS COPSE	Ancient and Semi-Natural Woodland
7	1303.0	NW	BEECH COPSE	Ancient and Semi-Natural Woodland
8	1383.0	W	DECOY POND WOOD/PLAT/THE LAG/POLING BROOK	Ancient and Semi-Natural Woodland
Not shown	1465.0	NW	KITPEASE/BUTLERSCOPSES	Ancient Replanted Woodland
Not shown	1486.0	NE	JEWS HEAD COPPICE, SELDON COPPICE, JEWSHEAD WOOD	Ancient and Semi-Natural Woodland
Not shown	1530.0	NE	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1619.0	N	PATCHING COPSE	Ancient Replanted Woodland
Not shown	1630.0	N	KITPEASE/BUTLERSCOPSES	Ancient and Semi-Natural Woodland
Not shown	1681.0	N	OLIVERS COPSE	Ancient Replanted Woodland
Not shown	1681.0	NW	BEECH COPSE	Ancient and Semi-Natural Woodland
Not shown	1713.0	NW	BEECH COPSE	Ancient and Semi-Natural Woodland
Not shown	1808.0	NW	BEECH COPSE	Ancient and Semi-Natural Woodland
Not shown	1883.0	E	HIGHDOWN COPSE/GORING WOOD	Ancient and Semi-Natural Woodland
Not shown	1902.0	E	TITNORE WOOD	Ancient and Semi-Natural Woodland
Not shown	1942.0	E	CLAPHAM COMMON WOOD	Ancient and Semi-Natural Woodland
Not shown	1992.0	NW	BEECH COPSE	Ancient Replanted Woodland
Not shown	1998.0	N	PATCHING COPSE	Ancient Replanted Woodland

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	ESA Name	Data Source
5	899.0	N	South Downs	Natural England

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	SSSI Name	Data Source
1	358.0	E	South Downs	Natural England

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

0

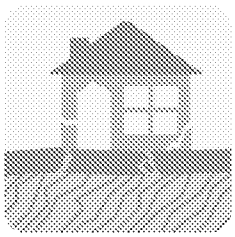
Database searched and no data found.

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

3

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	0.0	On Site	NVZ Deferred Slurry Storage Area	DEFRA
3	403.0	SW	NVZ Area	DEFRA
Not shown	1903.0	E	NVZ Deferred Slurry Storage Area	DEFRA



8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

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

8.1.1 Shrink Swell

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

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

Hazard
Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. 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 probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk during droughts or where vegetation with high moisture demands is present.

8.1.2 Landslides

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

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

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

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

8.1.3 Soluble Rocks

What is the maximum Soluble 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
Significant soluble rocks are present. Low possibility of subsidence occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow. Consider implications for stability when changes to drainage or new construction are planned. For new build site investigation should consider potential for dissolution problems on the site and its surroundings. Care should be taken with local drainage into the bedrock. Some possibility groundwater pollution. For existing property possible increase in insurance risk due to soluble rocks.

8.1.4 Compressible Ground

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

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

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

8.1.5 Collapsible Rocks

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

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

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

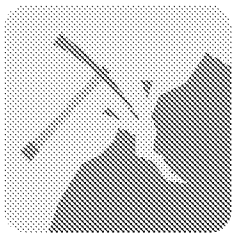
8.1.6 Running Sand

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

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

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

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



9. Mining

9.1 Coal Mining

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

Database searched and no data found.

9.2 Shallow Mining

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

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

9.3 Brine Affected Areas

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

Guidance: No Guidance Required.

Contact Details

GroundSure Helpline
Telephone: 08444 159 000
info@groundsure.com

GroundSure

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
[redacted]
BGS Geological Hazards Reports and general geological enquiries

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

National Customer Contact Centre, PO Box 544
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Email:**enquiries@environment-agency.gov.uk**

Environment Agency

Public Health England

Public information access office
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133-155 Waterloo Road, London, SE1 8UG
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Public Health England

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
[redacted]

The Coal Authority

Ordnance Survey

Adanac Drive, Southampton
[redacted]

Mapping sourced from Ordnance Survey®

Local Authority
Authority: Arun District Council
[redacted]
Address: The Arun Civic Centre, Maltravers Road, Littlehampton, West Sussex, BN17 5LF

Gemapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
[redacted]

getmapping®

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

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3 The Client's obligations

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

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

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

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

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

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

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

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

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

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

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

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

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in

GroundSure's possession or control; and

(iii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. **© GroundSure Limited June 2013**

GroundSure
Environmental Intelligence Solutions

Listers Geotechnical Consultants Ltd

Slapton Hill Barn, Blakesley Road,
Towcester, NN12 8QD

GroundSure Reference:	GS-1765012
Your Reference:	14.11.004/654
Report Date	12 Nov 2014
Report Delivery Method:	Email - pdf

GroundSure GeoInsight

Address: Dappers Lane & Water Lane, ,ANGMERING,LITTLEHAMPTON, BN16 4DA

Dear Sir/ Madam,

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

GroundSure GeoInsight

Address:	Dappers Lane & Water Lane, ,ANGMERING,LITTLEHAMPTON, BN16 4DA
Date:	12 Nov 2014
Reference:	GS-1765012
Client:	Listers Geotechnical Consultants Ltd

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	13-Sep-2012
Grid Reference:	507340,104711
Site Size:	1.24ha

Contents Page

Overview of Findings....5
1 Geology....8
1.1 Artificial Ground Map....8
1 Geology....9
1.1 Artificial Ground....9
1.1.1Artificial/ Made Ground....9
1.1.2 Permeability of Artificial Ground....9
1.2 Superficial Deposits and Landslips Map....10
1.2 Superficial Deposits and Landslips....11
1.2.1 Superficial Deposits/ Drift Geology....11
1.2.2 Permeability of Superficial Ground....11
1.2.3 Landslip....11
1.2.4 Landslip Permeability....11
1.3 Bedrock and Faults Map....12
1.3 Bedrock, Solid Geology & Faults....13
1.3.1 Bedrock/ Solid Geology....13
1.3.2 Permeability of Bedrock Ground....13
1.3.3 Faults....13
1.4 Radon Data....14
1.4.1 Radon Affected Areas....14
1.4.2 Radon Protection....14
2 Ground Workings Map....15
2 Ground Workings....16
2.1 Historical Surface Ground Working Features derived from Historical Mapping....16
2.2 Historical Underground Working Features derived from Historical Mapping....16
2.3 Current Ground Workings....17
3 Mining, Extraction & Natural Cavities Map....18
3 Mining, Extraction & Natural Cavities....19
3.1 Historical Mining....19
3.2 Coal Mining....19
3.3 Johnson Poole and Bloomer....19
3.4 Non-Coal Mining....19
3.5 Non-Coal Mining Cavities....20
3.6 Natural Cavities....20
3.7 Brine Extraction....20
3.8 Gypsum Extraction....21
3.9 Tin Mining....21
3.10 Clay Mining....21
4 Natural Ground Subsidence....22
4.1 Shrink-Swell Clay Map....22
4.2 Landslides Map....23
4.3 Ground Dissolution Soluble Rocks Map....24
4.4 Compressible Deposits Map....25
4.5 Collapsible Deposits Map....26
4.6 Running Sand Map....27
4 Natural Ground Subsidence....28
4.1 Shrink-Swell Clays....28
4.2 Landslides....28
4.3 Ground Dissolution of Soluble Rocks....29
4.4 Compressible Deposits....29
4.5 Collapsible Deposits....29
4.6 Running Sands....29
5 Borehole Records Map....31
5 Borehole Records....32

ARUN DISTRICT COUNCIL A/114/18/PL

6 Estimated Background Soil Chemistry....33
7 Railways and Tunnels Map....34
7 Railways and Tunnels....35
7.1 Tunnels....35
7.2 Historical Railway and Tunnel Features....35
7.3 Historical Railways....35
7.4 Active Railways....36
7.5 Railway Projects....36

ARUN DISTRICT COUNCIL A/114/18/PL

Overview of Findings

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

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

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

Section 1: Geology		
1.1 Artificial Ground	1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?	Yes
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?	Yes
	1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	1.2.4 Are there any records relating to permeability of landslips within the study site boundary?	No
1.3 Bedrock, Solid Geology & Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?	Yes
	1.3.3 Are there any records of faults within 500m of the study site boundary?	No
1.4 Radon data	1.4.1 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 5 and 10% of properties are above the Action Level
	1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	Basic radon protective measures are necessary

Section 2: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	2	10	2	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	1	0	1

Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0

Section 3 Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.2 Coal Mining	0	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	2	1	2	4	6
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

Section 4 Natural Ground Subsidence	On-site
4.1 Shrink Swell Clay	Moderate
4.2 Landslides	Very Low
4.3 Ground Dissolution of Soluble Rocks	Low
4.4 Compressible Deposits	Negligible
4.5 Collapsible Deposits	Very Low
4.6 Running Sand	Very Low

Section 5 Borehole Records	On-site	0-50m	51-250
5 BGS Recorded Boreholes	0	0	0

Section 6 Estimated Background Soil Chemistry	On-site	0-50m	51-250
6 Records of Background Soil Chemistry	2	2	13

Section 7 Railways and Tunnels	On-site	0-50m	51-250	251-500
7.1 Tunnels	0	0	0	Not Searched
7.2 Historical Railway and Tunnel Features	0	0	0	Not Searched
7.3 Historical Railways	0	0	0	Not Searched
7.4 Active Railways	0	0	0	Not Searched

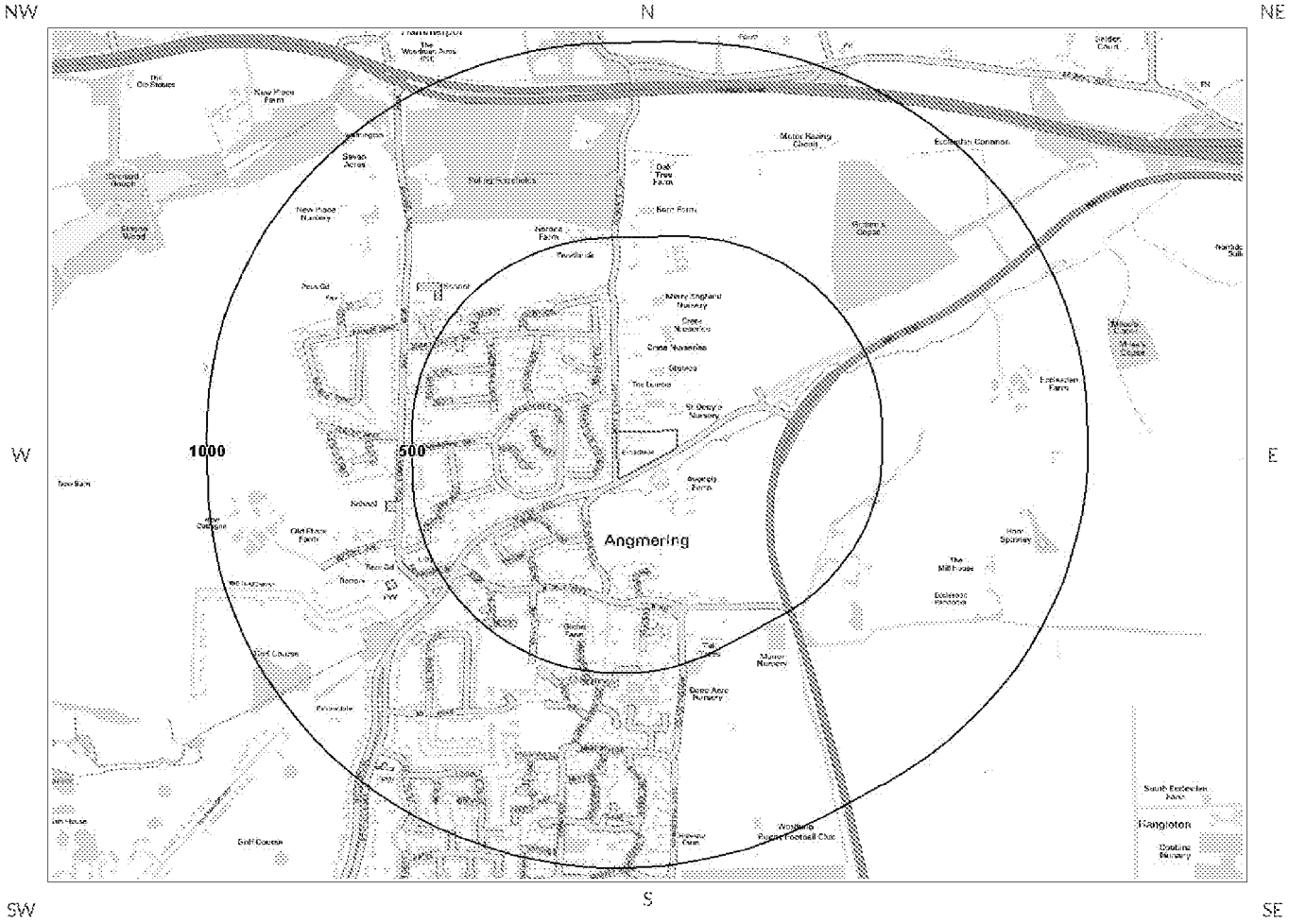
ARUN DISTRICT COUNCIL A/114/18/PL

Section 7 Railways and Tunnels	On site	0-50m	51-250	251-500
7.5 Railway Projects	0	0	0	0

ARUN DISTRICT COUNCIL A/114/18/PL

1 Geology

1.1 Artificial Ground Map



Artificial Ground Legend

Mapping sourced from Ordnance Survey®

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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

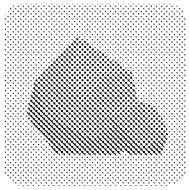
Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground



1 Geology

1.1 Artificial Ground

1.1.1Artificial/ Made Ground

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

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

Database searched and no data found.

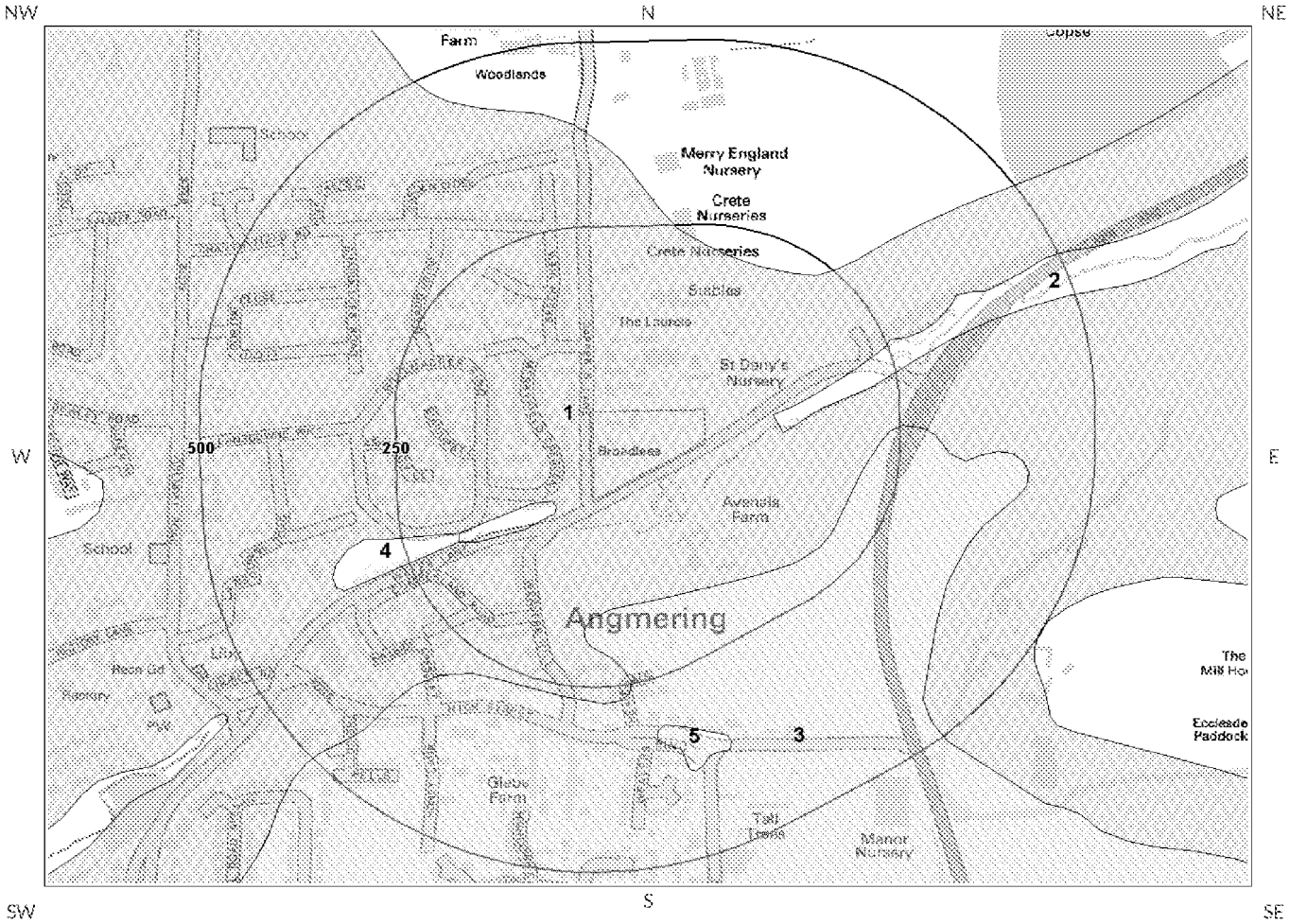
1.1.2 Permeability of Artificial Ground

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

Database searched and no data found.

ARUN DISTRICT COUNCIL A/114/18/PL

1.2 Superficial Deposits and Landslips Map



Superficial Deposits and Landslips Legend

Mapping sourced from Ordnance Survey

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Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL
2	87.0	E	ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
3	146.0	S	RTDU-SSCL	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND, SILT AND CLAY
4	177.0	W	RBD1-SAGR	RAISED BEACH DEPOSITS, 1	SAND AND GRAVEL
5	314.0	S	RBD1-SAGR	RAISED BEACH DEPOSITS, 1	SAND AND GRAVEL

1.2.2 Permeability of Superficial Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Very Low

1.2.3 Landslip

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

Database searched and no data found.

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

1.2.4 Landslip Permeability

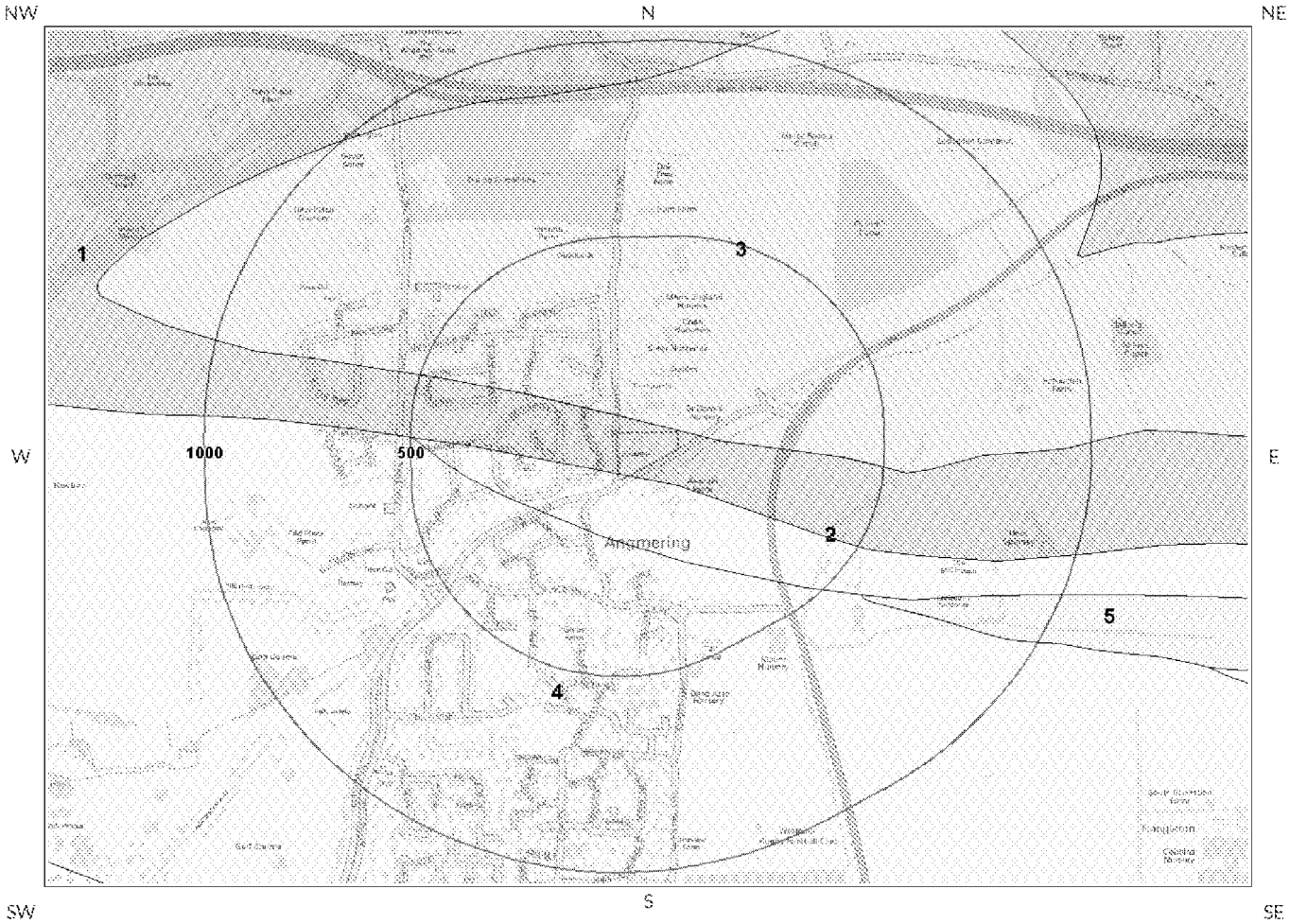
Are there any records relating to permeability of landslips within the study site* boundary? No

Database searched and no data found.

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

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1.3 Bedrock and Faults Map



Bedrock and Faults Legend

Mapping sourced from Ordnance Survey®

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Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock, Solid Geology & Faults

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

1.3.1 Bedrock/ Solid Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	LMBE-CLSS	Lambeth Group - Clay, Silt And Sand	Paleocene
2	0.0	On Site	TACH-CHLK	Tarrant Chalk Member - Chalk	Campanian
3	4.0	N	LC-CLSS	London Clay Formation - Clay, Silt And Sand	Eocene
4	148.0	SW	LPCK-CHLK	Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation And Portsdown C	Campanian / Turonian

1.3.2 Permeability of Bedrock Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Very High	Very High
0.0	On Site	Mixed	Moderate	Very Low
4.0	N	Mixed	Moderate	Very Low

1.3.3 Faults

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

Database searched and no data found.

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

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

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

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1.4 Radon Data

1.4.1 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 5 and 10% of properties are above the Action Level

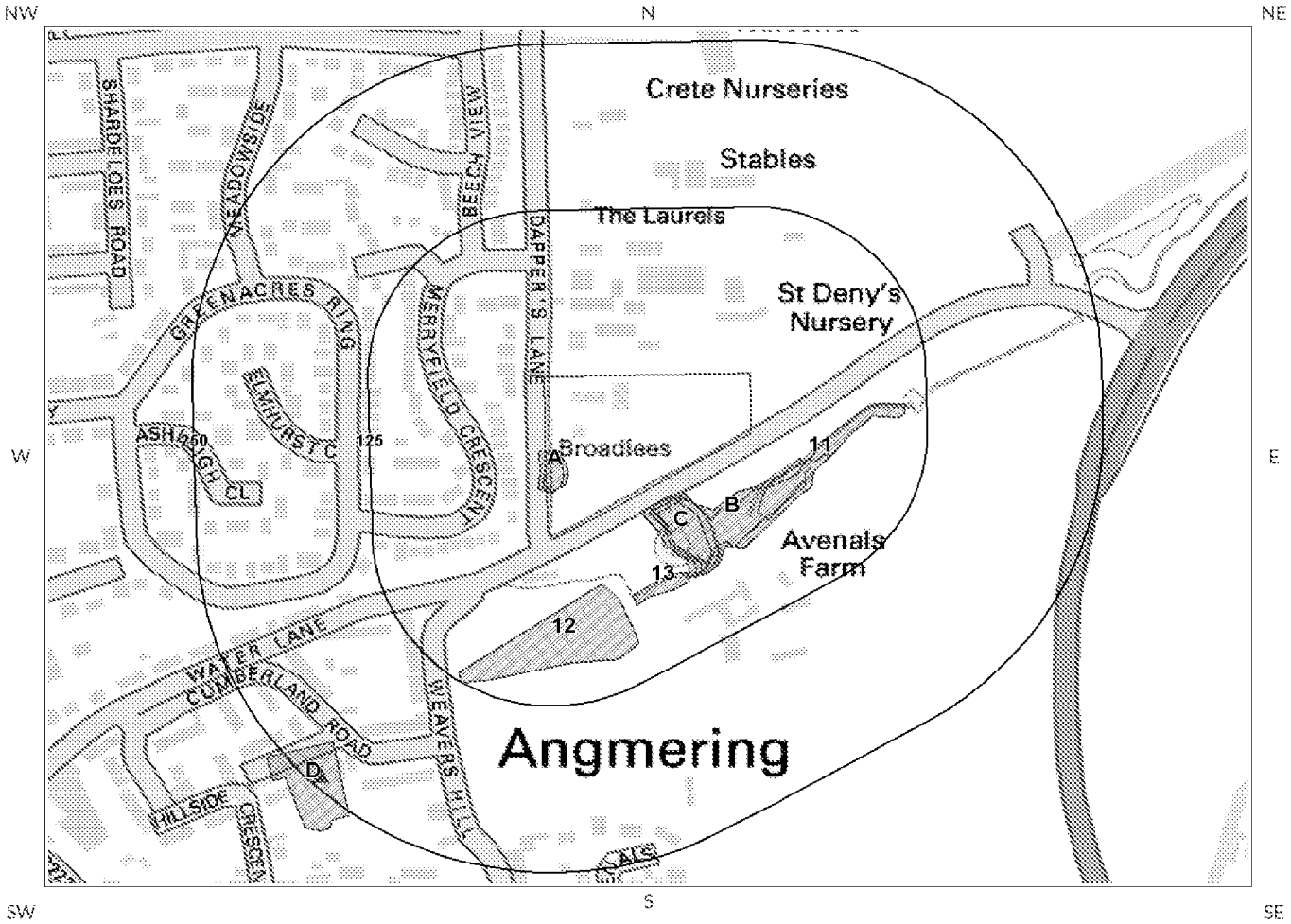
---

1.4.2 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? Basic radon protective measures are necessary

---

2 Ground Workings Map



Ground Workings Legend

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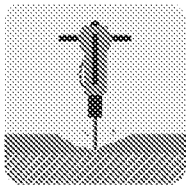
Site Outline

Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings



2 Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

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

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

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

ID	Distance (m)	Direction	NGR	Use	Date
1A	0.0	On Site	507276 104679	Gravel Pit	1943
2A	0.0	On Site	507272 104677	Gravel Pit	1957
3C	12.0	SE	507361 104629	Pond	1957
4B	16.0	SE	507407 104646	Ponds	1876
5B	16.0	SE	507407 104646	Ponds	1876
6B	16.0	SE	507399 104643	Ponds	1943
7B	16.0	SE	507399 104643	Ponds	1896
8B	16.0	SE	507399 104643	Ponds	1932
9B	16.0	SE	507399 104643	Ponds	1910
10C	19.0	SE	507369 104633	Pond	1974
11	39.0	SE	507459 104685	Unspecified Ground Workings	1974
12	46.0	SE	507271 104557	Unspecified Pit	1974
13	64.0	SE	507351 104590	Unspecified Ground Workings	1974
14D	218.0	SW	507099 104442	Gravel Pit	1896

2.2 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.

2.3 Current Ground Workings

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

Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
15D	242.0	SW	507108 104450	Sand & Gravel	Angmering Gravel Pit	A surface mineral working. it may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	867.0	SE	508195 104329	Chalk	Ham Spinney Chalk Pit	A surface mineral working. it may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

Mapping sourced from Ordnance Survey®

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Site Outline

Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities

Non-Coal Mining

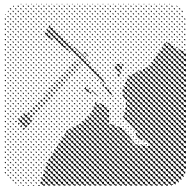
Highly likely

Likely

Unlikely

Highly unlikely

Rare



3 Mining, Extraction & Natural Cavities

3.1 Historical Mining

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

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

Database searched and no data found.

3.2 Coal Mining

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

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

Database searched and no data found.

3.3 Johnson Poole and Bloomer

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

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

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

3.4 Non-Coal Mining

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

Are there any Non-Coal Mining areas within 1000m of the study site boundary? 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	Rare and localised small scale mining may have occurred.
2	0.0	On Site	Not available	Chalk	Small scale mining may have occurred but restricted in extent.
3	47.0	W	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
4	146.0	S	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
5	198.0	SE	Not available	Chalk	Rare and localised small scale mining may have occurred.
6	362.0	SE	Not available	Chalk	Small scale mining may have occurred but restricted in extent.

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
7	367.0	SE	Not available	Chalk	Rare and localised small scale mining may have occurred.
8	498.0	SE	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
9	499.0	SE	Not available	Chalk	Rare and localised small scale mining may have occurred.
10	626.0	W	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.
Not shown	881.0	N	Not available	Chalk	Small scale mining may have occurred but restricted in extent.
Not shown	882.0	N	Not available	Chalk	Rare and localised small scale mining may have occurred.
Not shown	916.0	SE	Not available	Chalk	Rare and localised small scale mining may have occurred.
Not shown	922.0	E	Not available	Chalk	Small scale mining may have occurred but restricted in extent.
Not shown	992.0	NW	Not available	Chalk	Small scale mining may have occurred but restricted in extent.

3.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

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

Database searched and no data found.

3.6 Natural Cavities

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

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

Database searched and no data found.

3.7 Brine Extraction

This 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.

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3.8 Gypsum Extraction

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

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

Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level.

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

Database searched and no data found.

3.10 Clay Mining

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

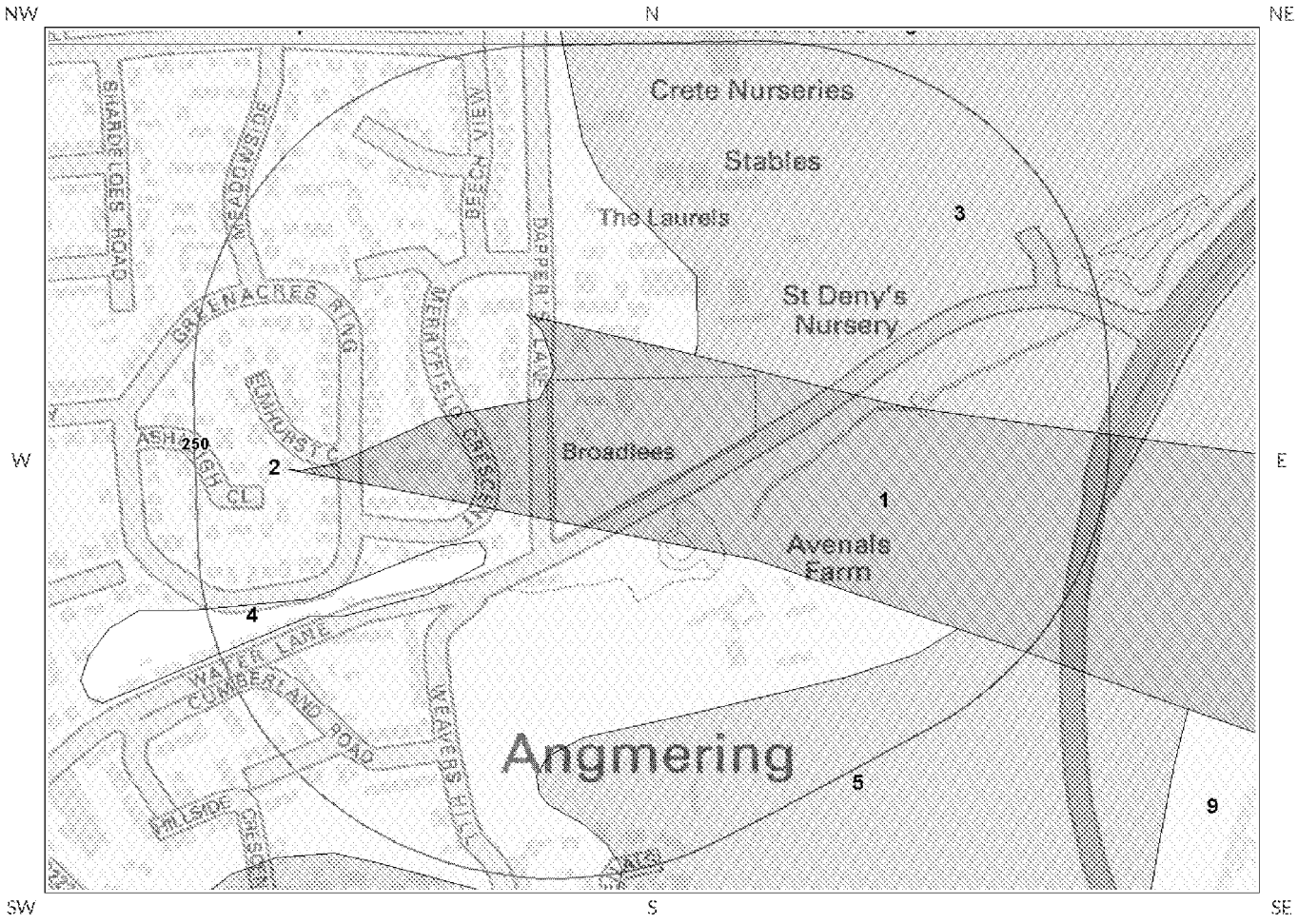
Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

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4 Natural Ground Subsidence

4.1 Shrink-Swell Clay Map



Shrink Swell Clay Legend

Mapping sourced from Ordnance Survey®

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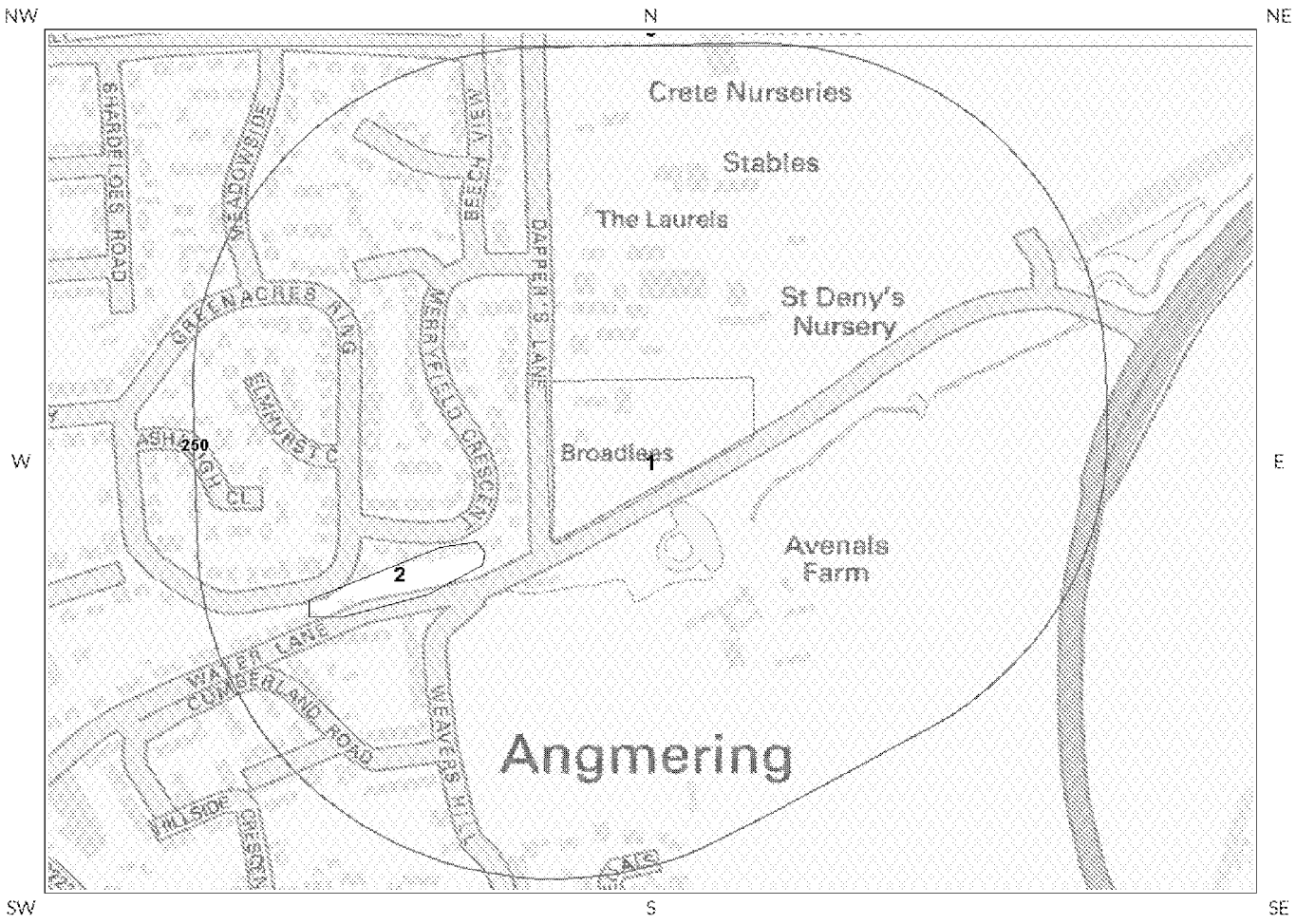
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.2 Landslides Map



Landslides Legend

Mapping sourced from Ordnance Survey®

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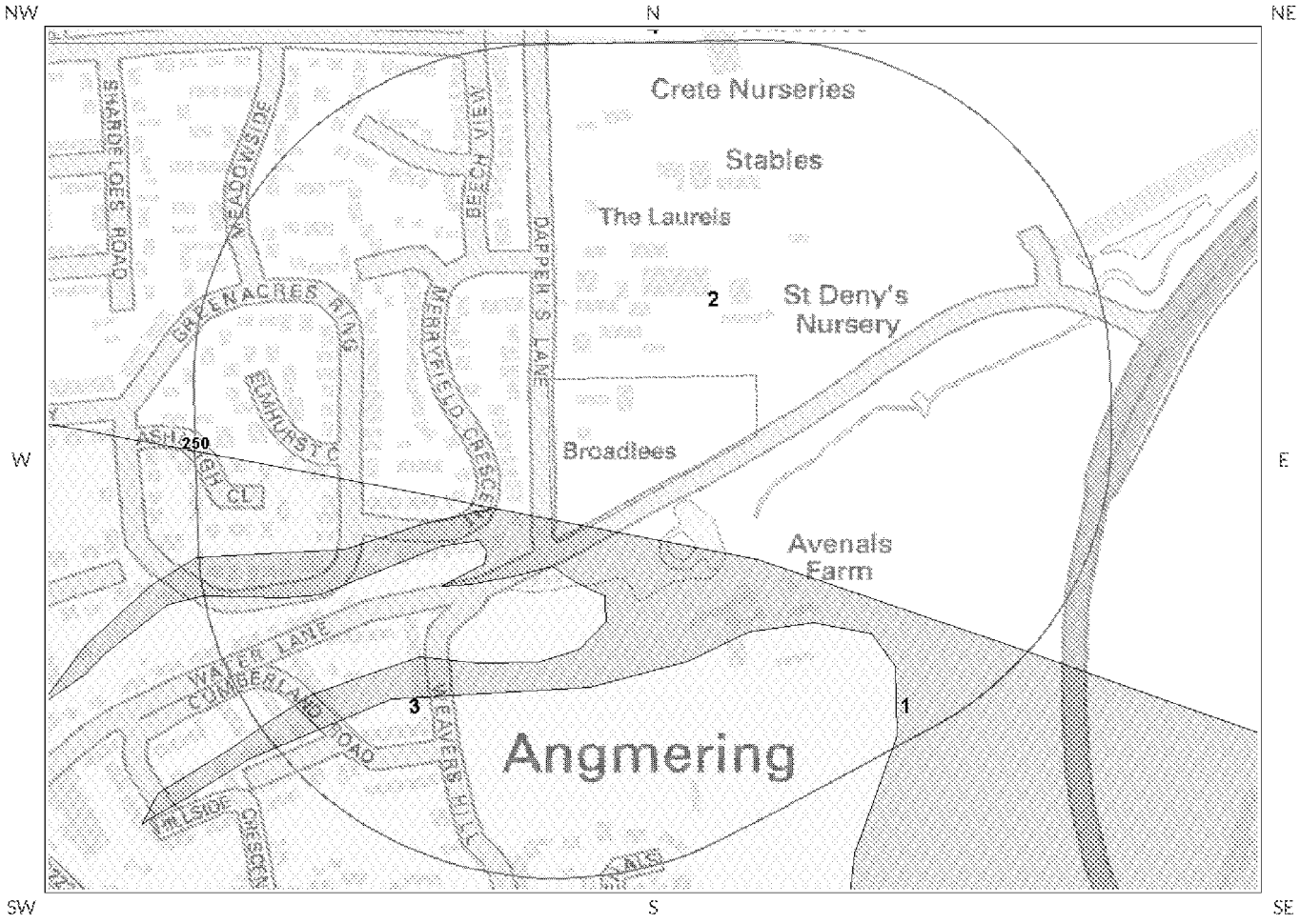
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.3 Ground Dissolution Soluble Rocks Map



Ground Dissolution Soluble Rocks Legend

Mapping sourced from Ordnance Survey®

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Site Outline

125 250 Search Buffers (m)

No Data / Null

Negligible

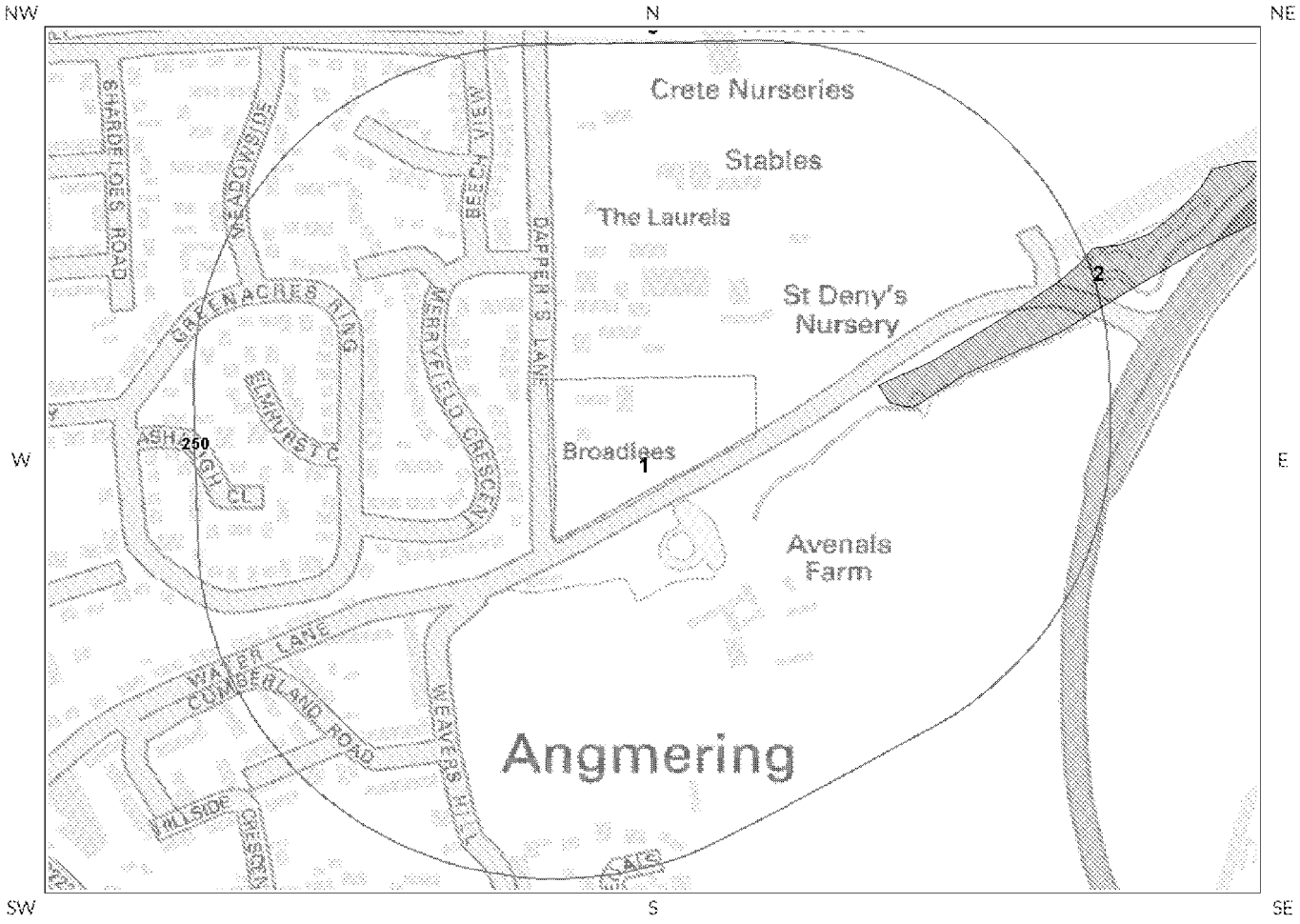
Very Low

Low

Moderate

High

4.4 Compressible Deposits Map



Compressible Deposits Legend

Mapping sourced from Ordnance Survey®

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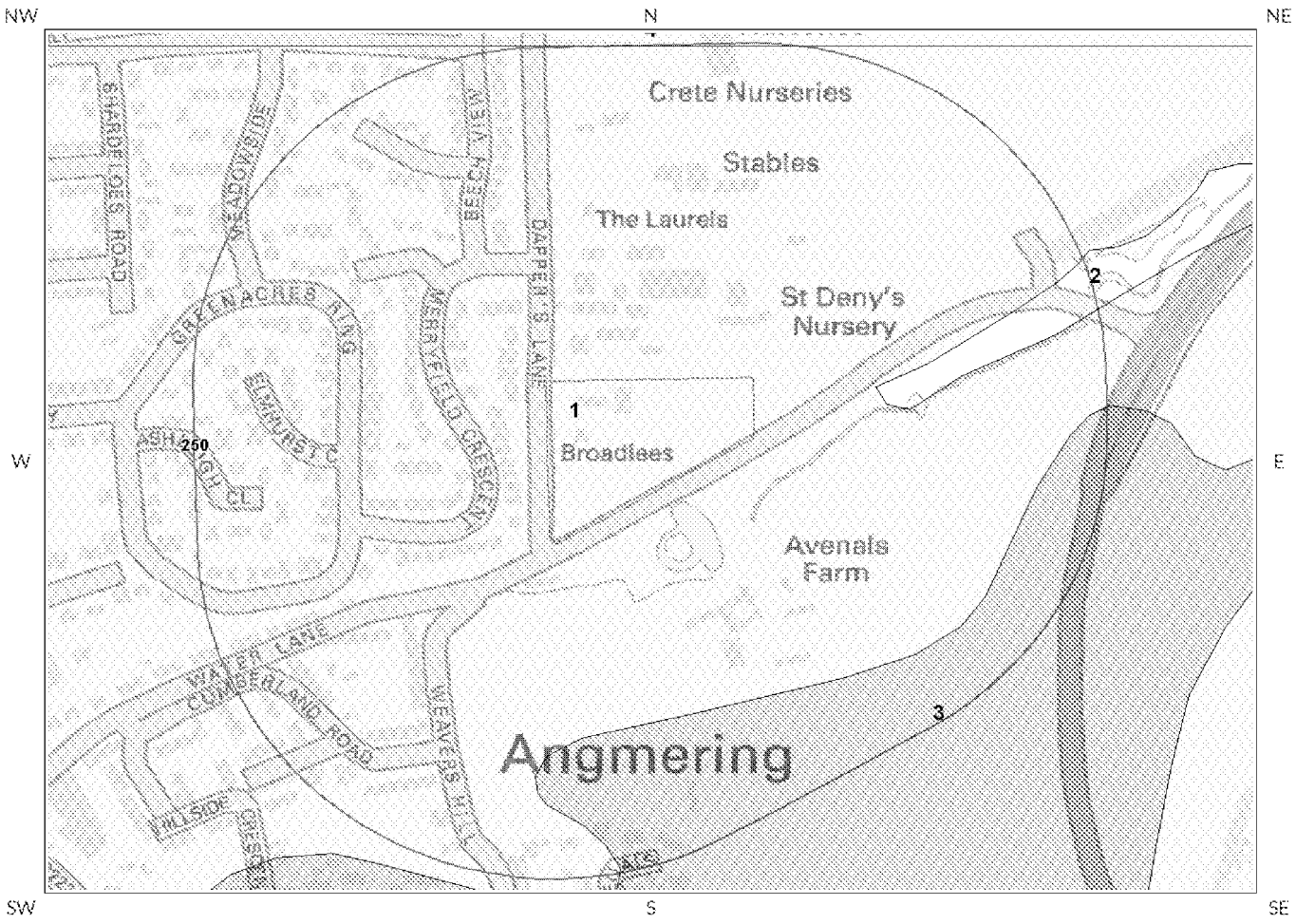
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.5 Collapsible Deposits Map



Collapsible Deposits Legend

Mapping sourced from Ordnance Survey®

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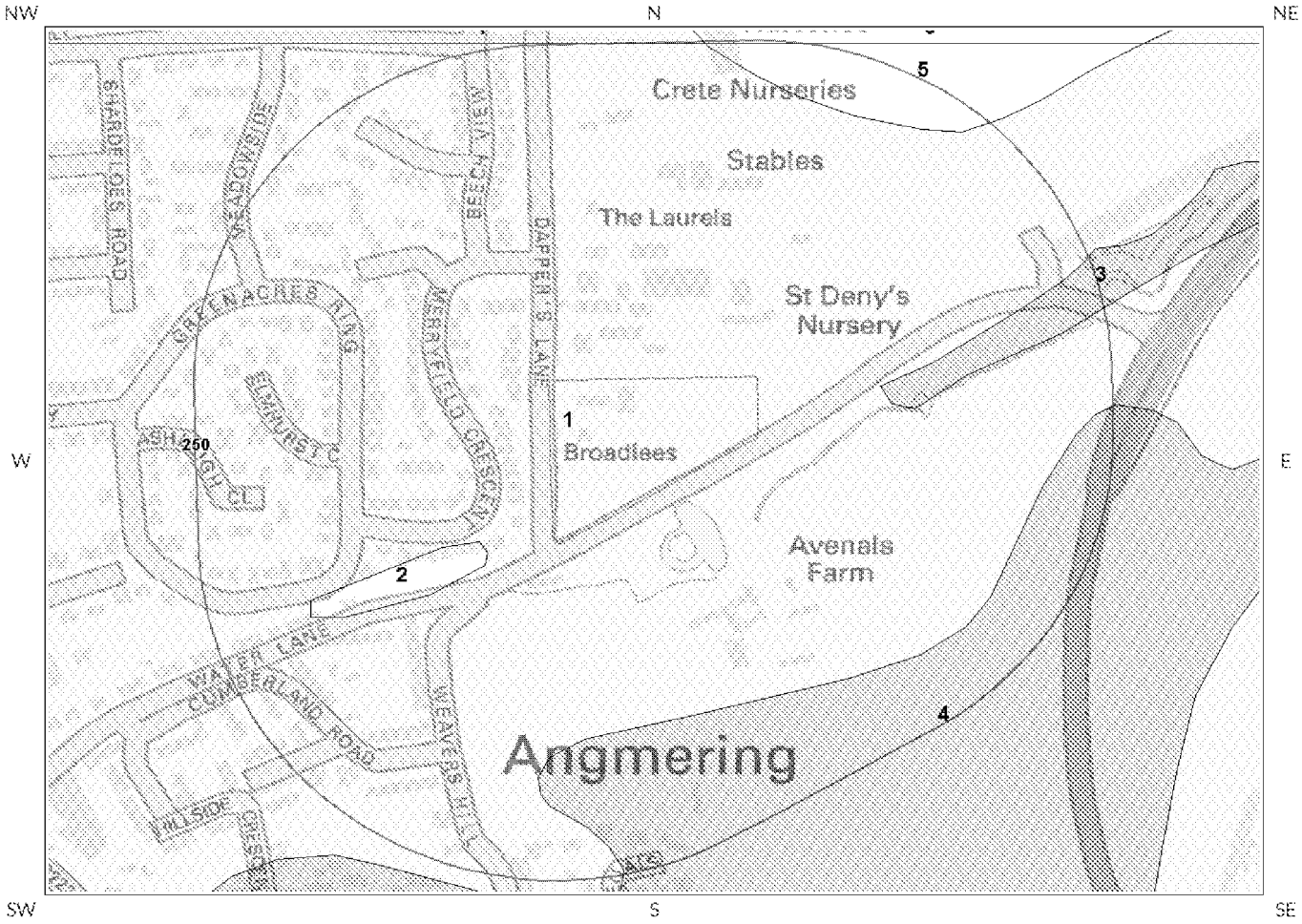
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.6 Running Sand Map



Running Sand Legend

Mapping sourced from Ordnance Survey®

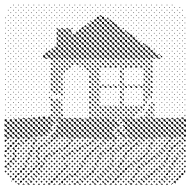
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Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High



4 Natural Ground Subsidence

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

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

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

4.1 Shrink-Swell Clays

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Moderate	Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. 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 probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk during droughts or where vegetation with high moisture demands is present.
2	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
3	4.0	N	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.
4	47.0	W	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
2	47.0	W	Negligible	No indicators for slope instability identified. 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

4.3 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	Low	Significant soluble rocks are present. Low possibility of subsidence occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow. Consider implications for stability when changes to drainage or new construction are planned. For new build - site investigation should consider potential for dissolution problems on the site and its surroundings. Care should be taken with local drainage into the bedrock. Some possibility groundwater pollution. For existing property - possible increase in insurance risk due to soluble rocks.
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	18.0	S	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.

4.4 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.

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

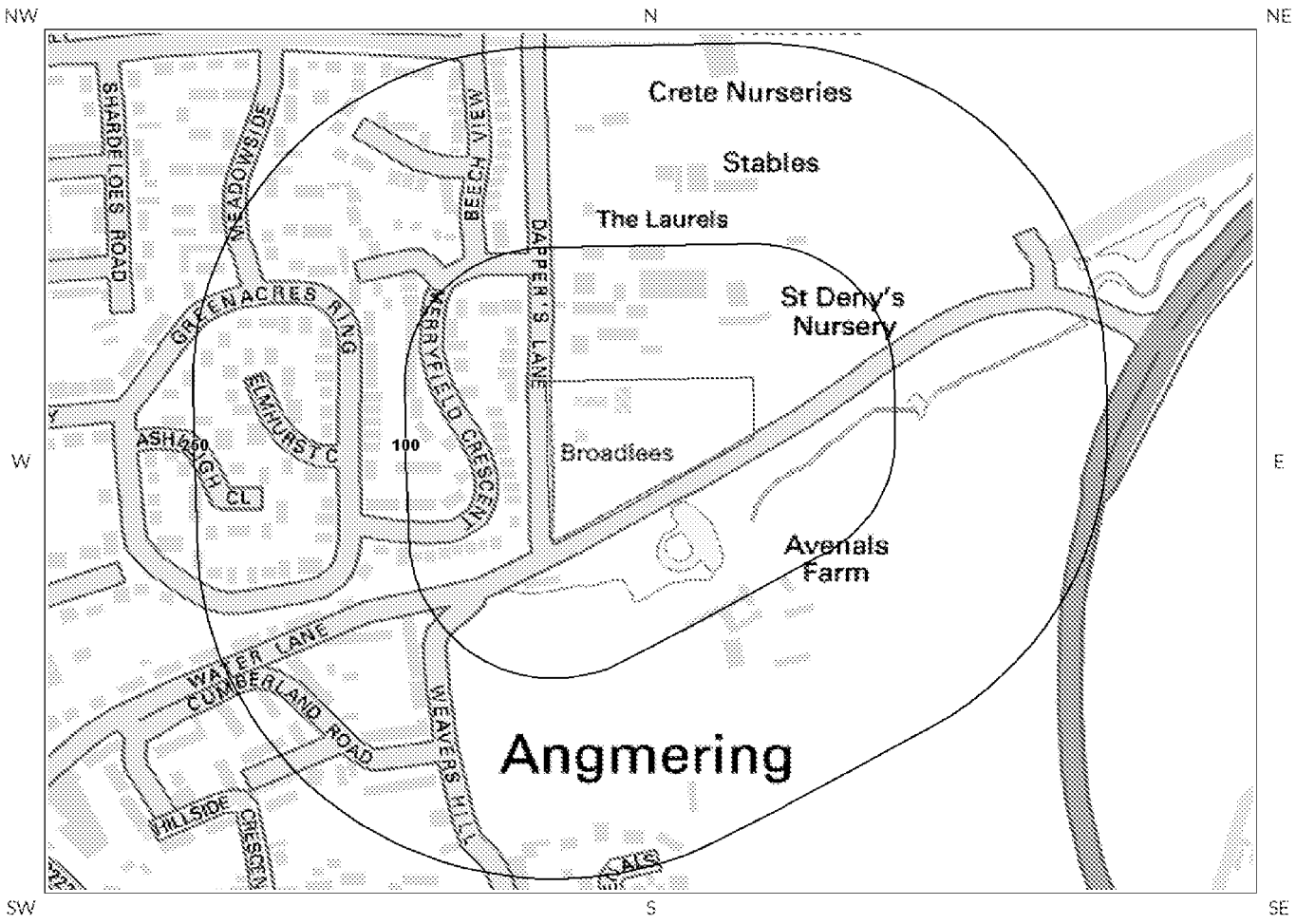
4.6 Running Sands

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

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

ID	Distance (m)	Direction	Hazard Rating	Details
2	47.0	W	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

5 Borehole Records Map



Borehole Records Legend

Mapping sourced from Ordnance Survey®

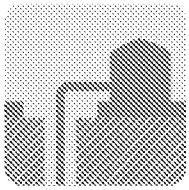
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Site Outline

Borehole Locations

125
250
Search Buffers (m)

Report Reference: GS-1765012
Client Reference: 14.11.004/654

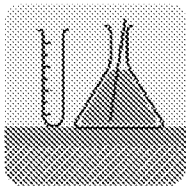


5 Borehole Records

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

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

Database searched and no data found.



6 Estimated Background Soil Chemistry

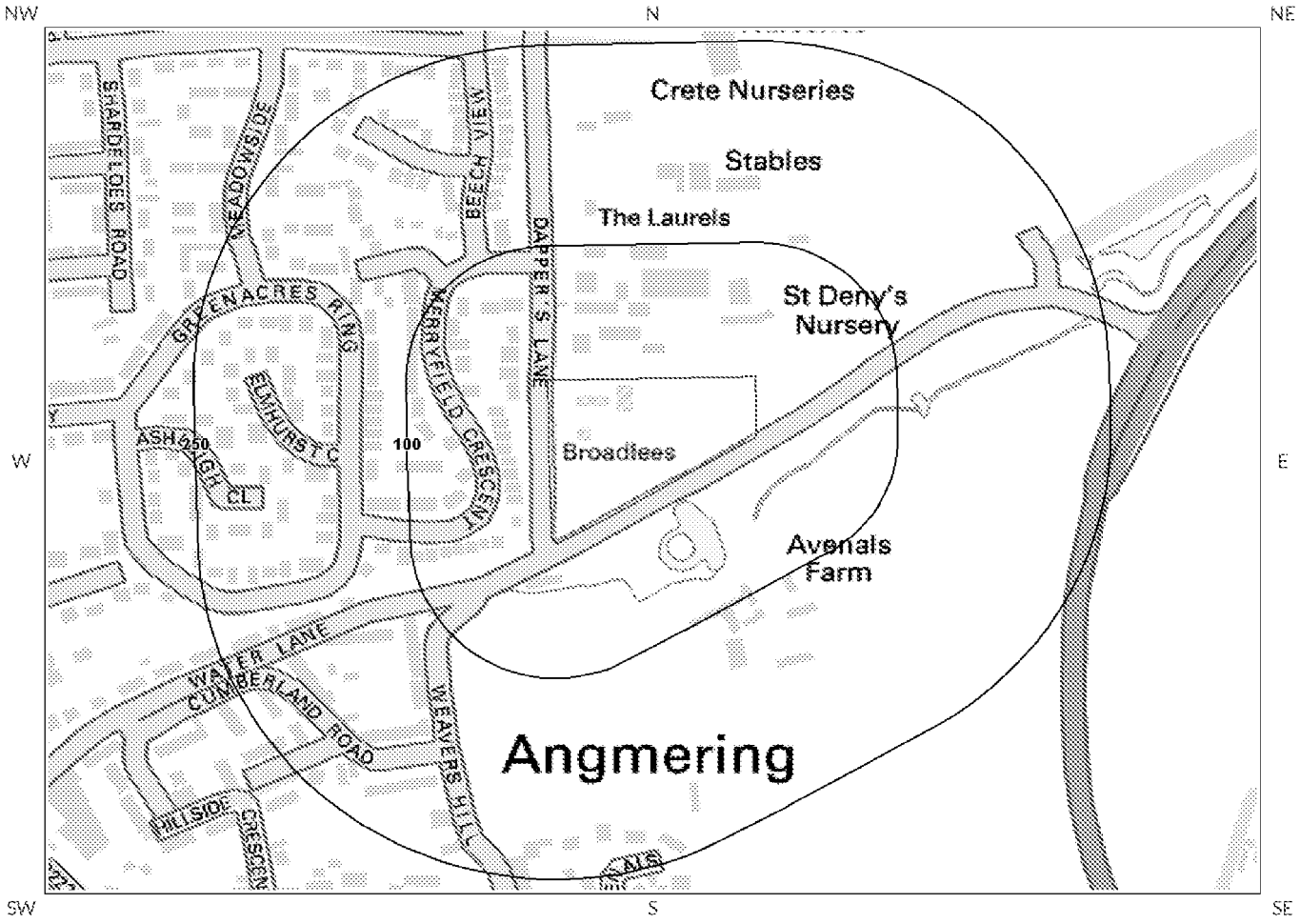
Records of background estimated soil chemistry within 250m of the study site boundary: 17

For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight 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 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
4.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
47.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
87.0	E	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
94.0	E	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
111.0	E	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
146.0	S	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
148.0	SW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
156.0	S	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
177.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
198.0	SE	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
206.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
219.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
227.0	E	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
248.0	N	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
249.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg

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

7 Railways and Tunnels Map

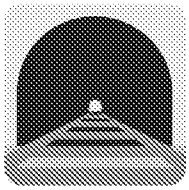


Railways and Tunnels Legend

Mapping sources from Ordnance Survey

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© OpenStreetMapContributors

- Site Outline
- Search Buffers (m): 250, 500
- Underground or Partially Underground Railway / Subway System
- Railway Tunnel (OS Mapping)
- Abandoned or Dismantled Railway (OpenStreetMap)
- Railway Track (OS Mapping)
- Railway Track (OpenStreetMap)
- High Speed 2
- Crossrail
- Railway and/or Tunnel Feature from Historical Mapping



7 Railways and Tunnels

7.1 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.

7.2 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.

7.3 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.

Note: 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.

7.4 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.

Note: 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.

7.5 Railway Projects

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

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 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 Report****.*

Contact Details

GroundSure

GroundSure Helpline
Telephone: 08444 159 000
info@groundsure.com

GroundSure
Environmental Intelligence Solutions

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
[redacted]
BGS Geological Hazards Reports and general geological enquiries

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

British Gypsum
British Gypsum Ltd
East Leake
Loughborough
Leicestershire
LE12 6HX

British Gypsum

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
[redacted]

The Coal Authority

Public Health England
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
[redacted]

Public Health England

Johnson Poole & Bloomer Limited
Harris and Pearson Building, Brettel Lane
Brierley Hill, West Midlands
DY5 3LH
[redacted]

JOHNSON POOLE & BLOOMER CONSULTANTS

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
[redacted]
Website: **http://www.ordnancesurvey.co.uk/**

Mapping sourced from Ordnance Survey®

Getmapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
[redacted]

getmapping®

Peter Brett Associates
Caversham Bridge House
Waterman Place
Reading
Berkshire RG1 8DN
[redacted]

pba peterbrett

Acknowledgements: Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028].
This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Report Reference: GS-1765012
Client Reference: 14.11.004/654

ARUN DISTRICT COUNCIL A/114/18/PL

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:
"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.
"Client" means the party or parties entering into a Contract with GroundSure.
"Commercial" means any building or property which is not Residential.
"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

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

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

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

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

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

3 The Client's obligations

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

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

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

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

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.
4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.
4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

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

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.
6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey.

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

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

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

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

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are
(a) supplied to the Client's specification(s) and in any event
(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly

given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

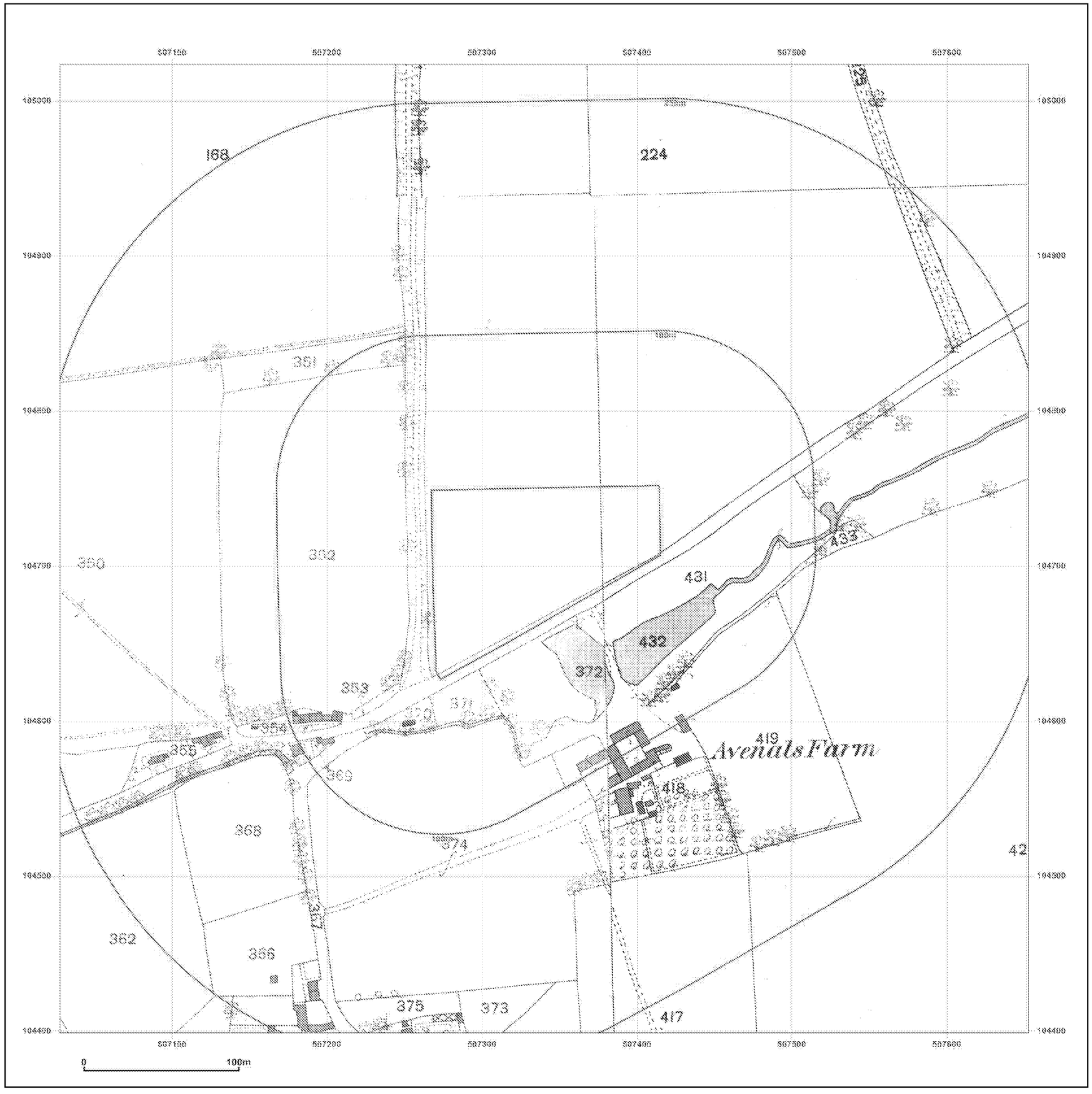
12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law

© GroundSure Limited June 2013

ARUN DISTRICT COUNCIL A/114/18/PL



GroundSure
ENVIRONMENTAL INSIGHT

Site Details:

Dappers Lane & Water Lane,
,ANGMERING,LITTLEHAMPTO
N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

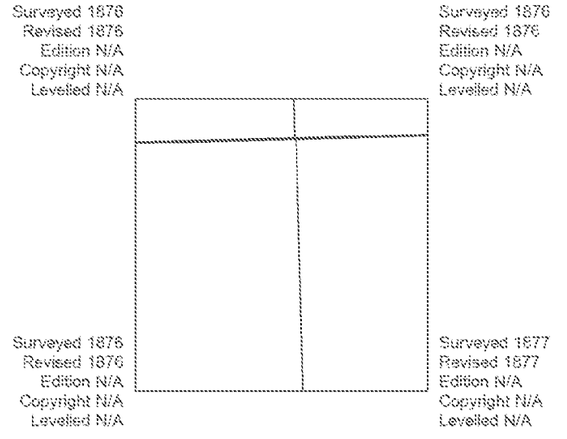
Map Name: County Series

Map date: **1876-1877**

Scale: 1:2,500

Printed at: 1:2,500

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Licensed Partner

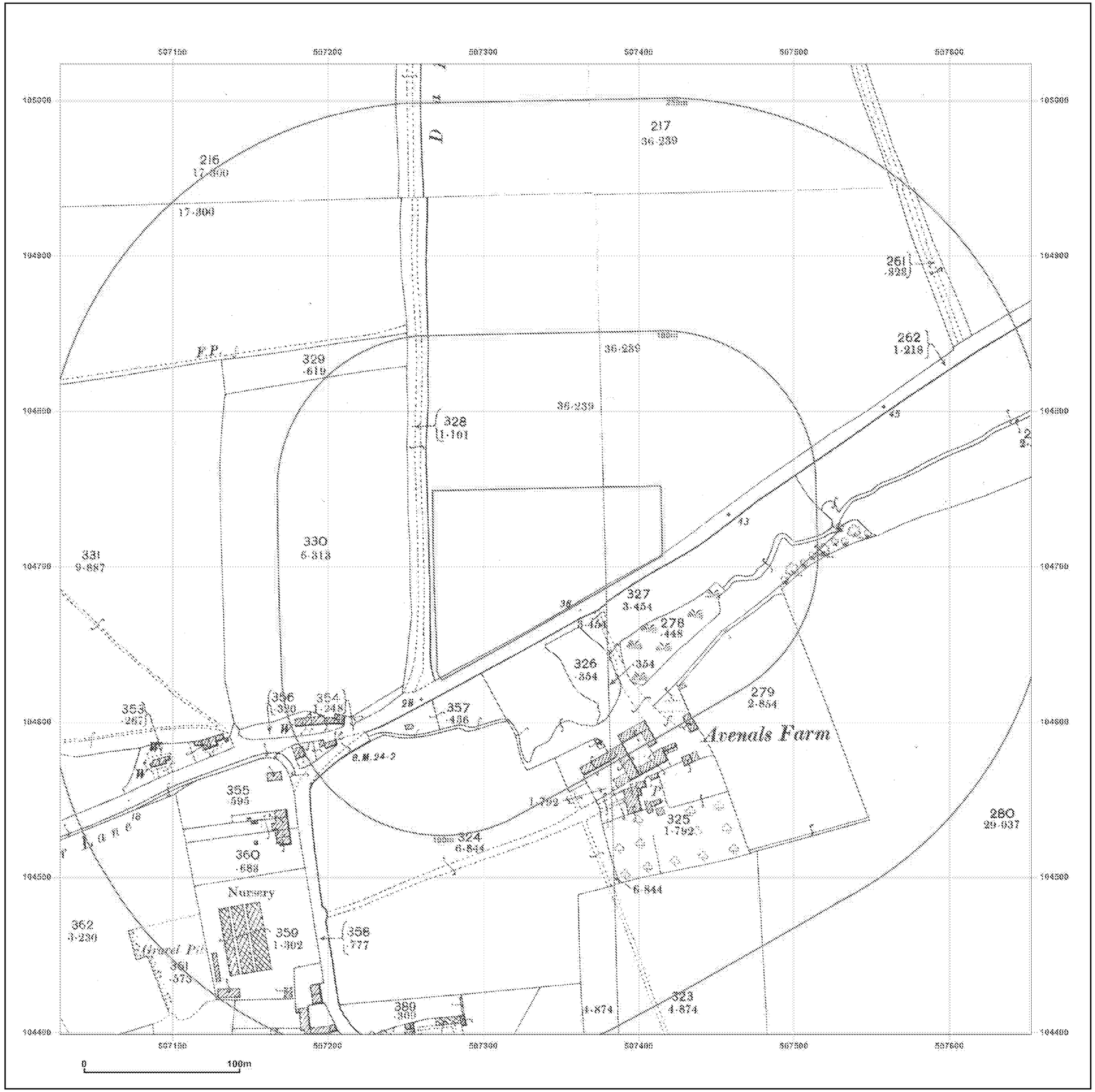
Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

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Production date: 12 November 2014

To view map legend click here *Legend*

ARUN DISTRICT COUNCIL A/114/18/PL



GroundSure
ENVIRONMENTAL INSIGHT

Site Details:

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N, BN16 4DA

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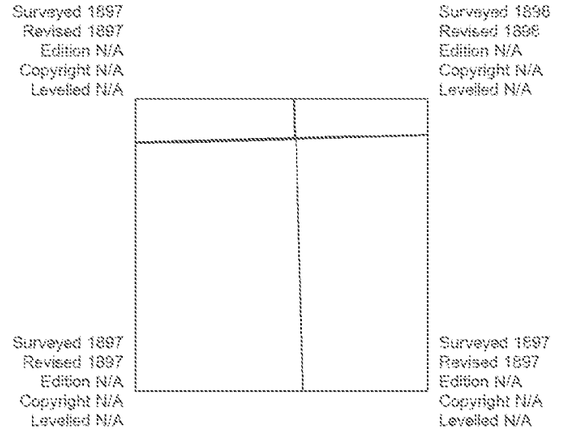
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Scale: 1:2,500

Printed at: 1:2,500

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Licensed Partner

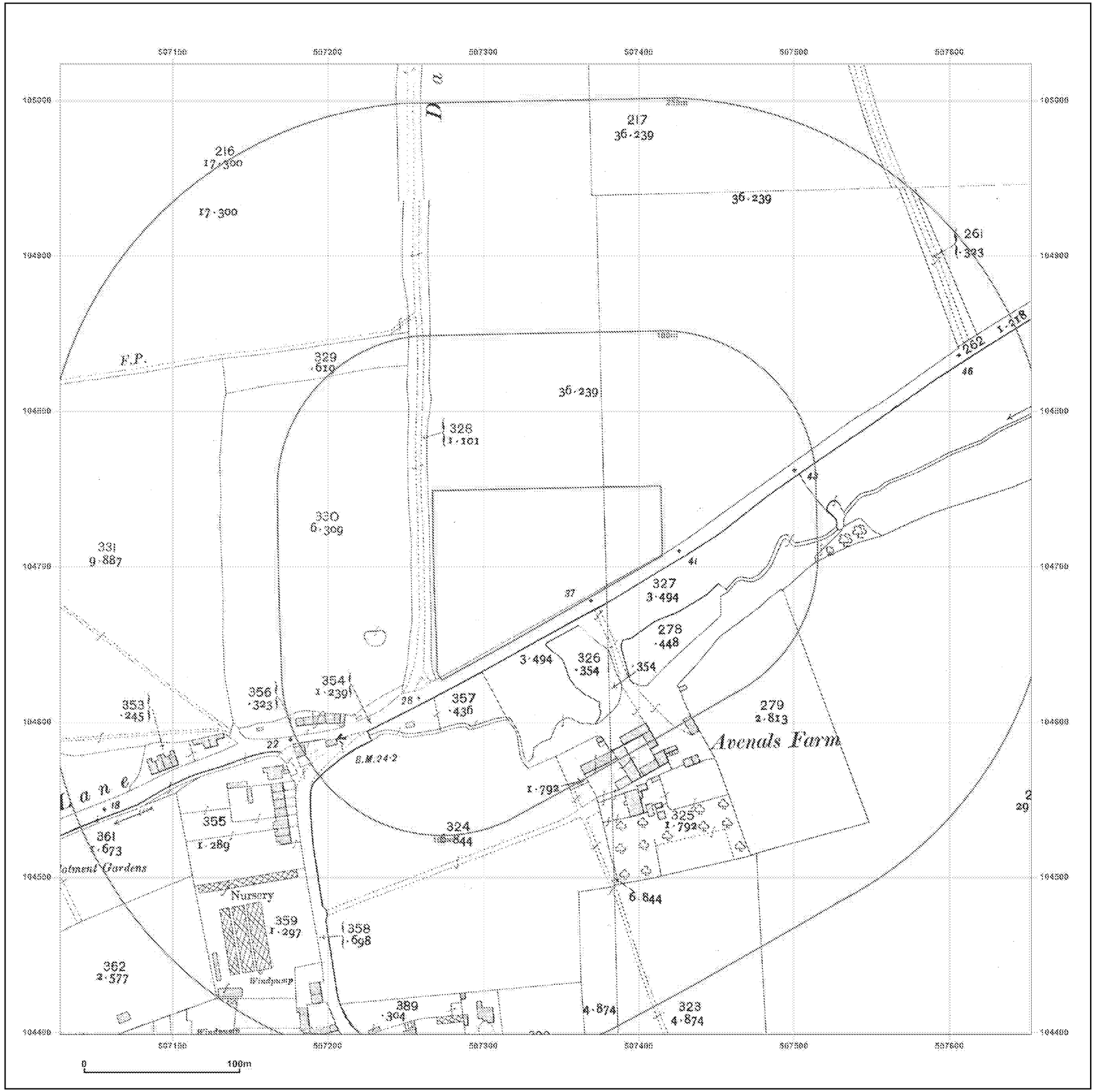
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Production date: 12 November 2014

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ARUN DISTRICT COUNCIL A/114/18/PL



GroundSure
ENVIRONMENTAL INSIGHT

Site Details:

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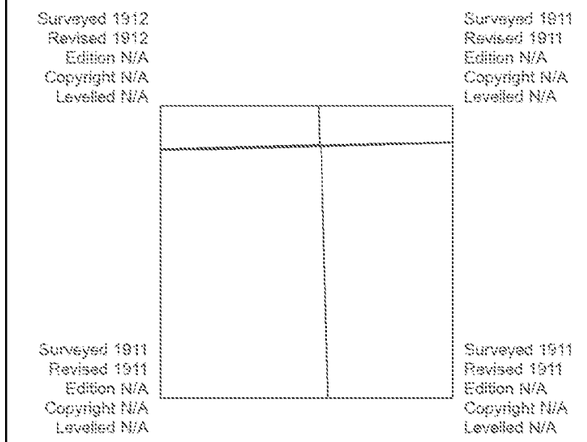
Map Name: County Series

Map date: **1911-1912**

Scale: 1:2,500

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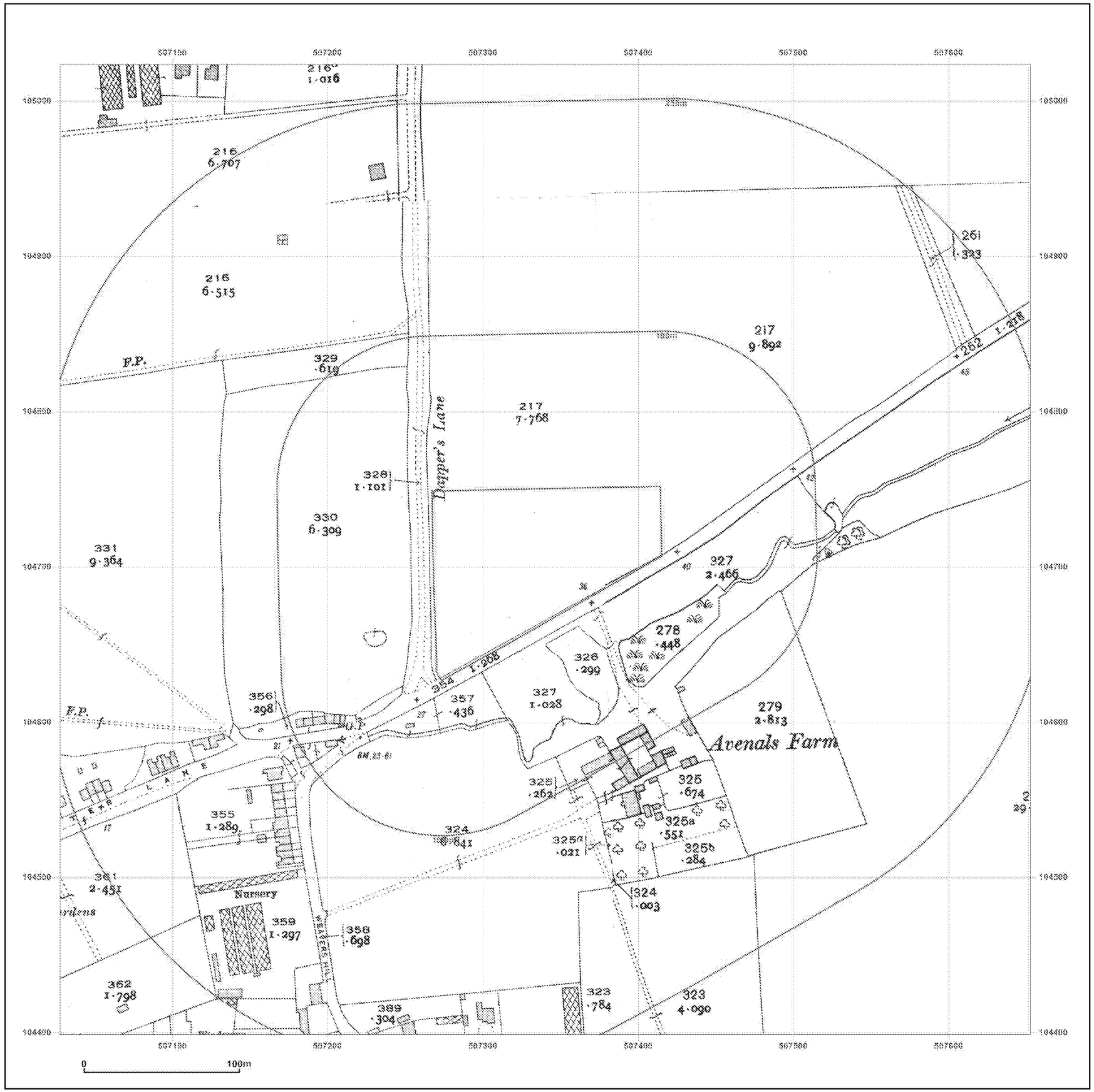
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Production date: 12 November 2014

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ARUN DISTRICT COUNCIL A/114/18/PL



GroundSure
ENVIRONMENTAL INSIGHT

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N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: County Series

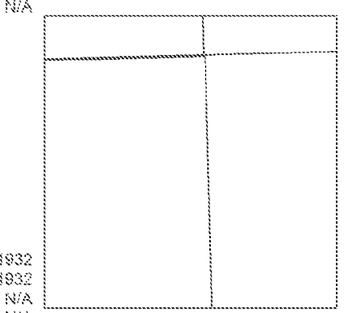
Map date: **1932-1937**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1937
Revised 1937
Edition N/A
Copyright N/A
Levelled N/A



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

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

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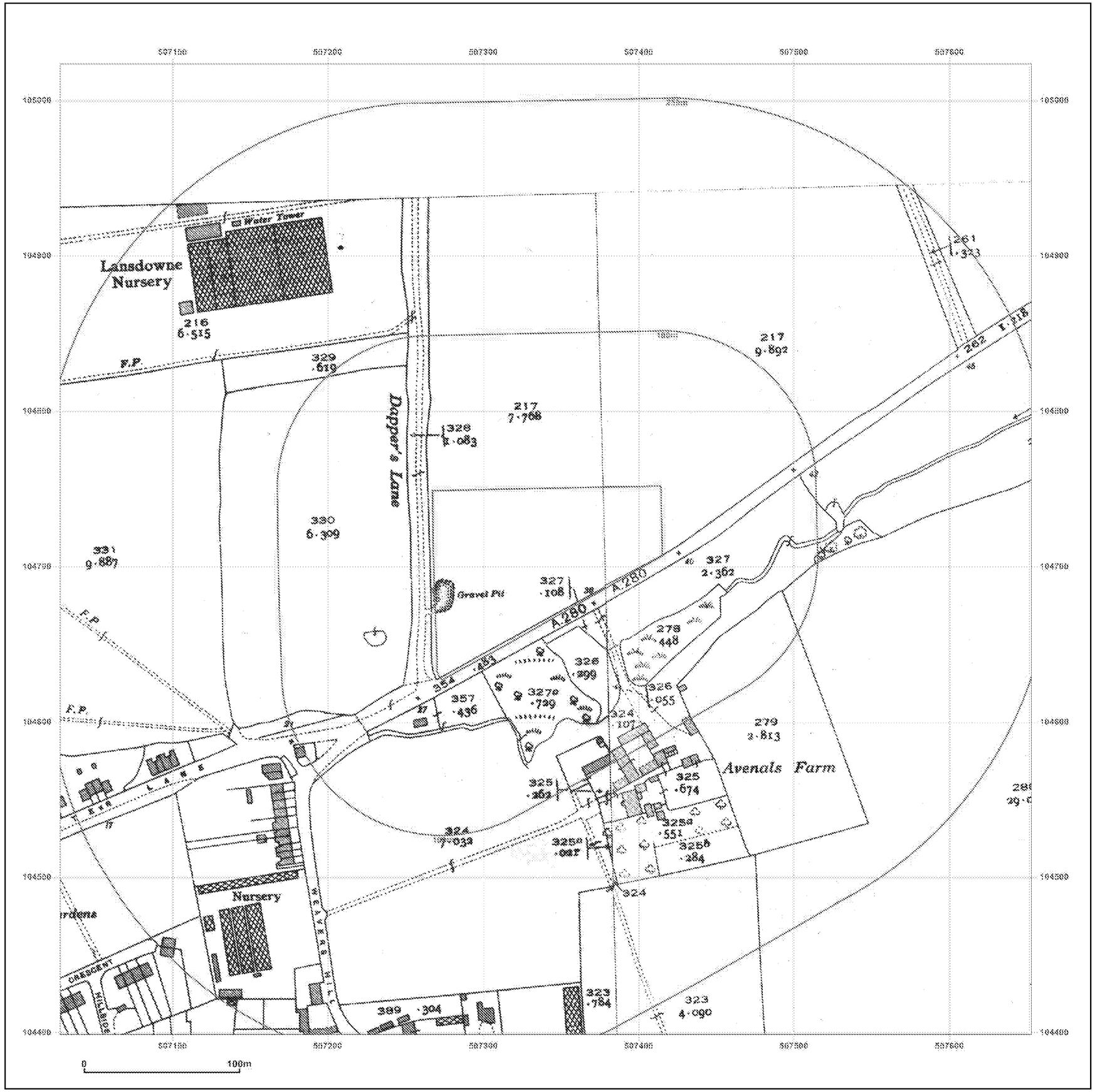
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ENVIRONMENTAL INSIGHT

Site Details:

Dappers Lane & Water Lane,
,ANGMERING,LITTLEHAMPTO
N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

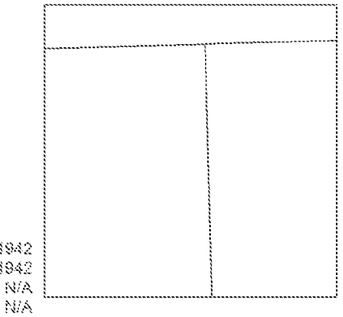
Map Name: County Series

Map date: **1942**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1942
Revised 1942
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1942
Revised 1942
Edition N/A
Copyright N/A
Levelled N/A

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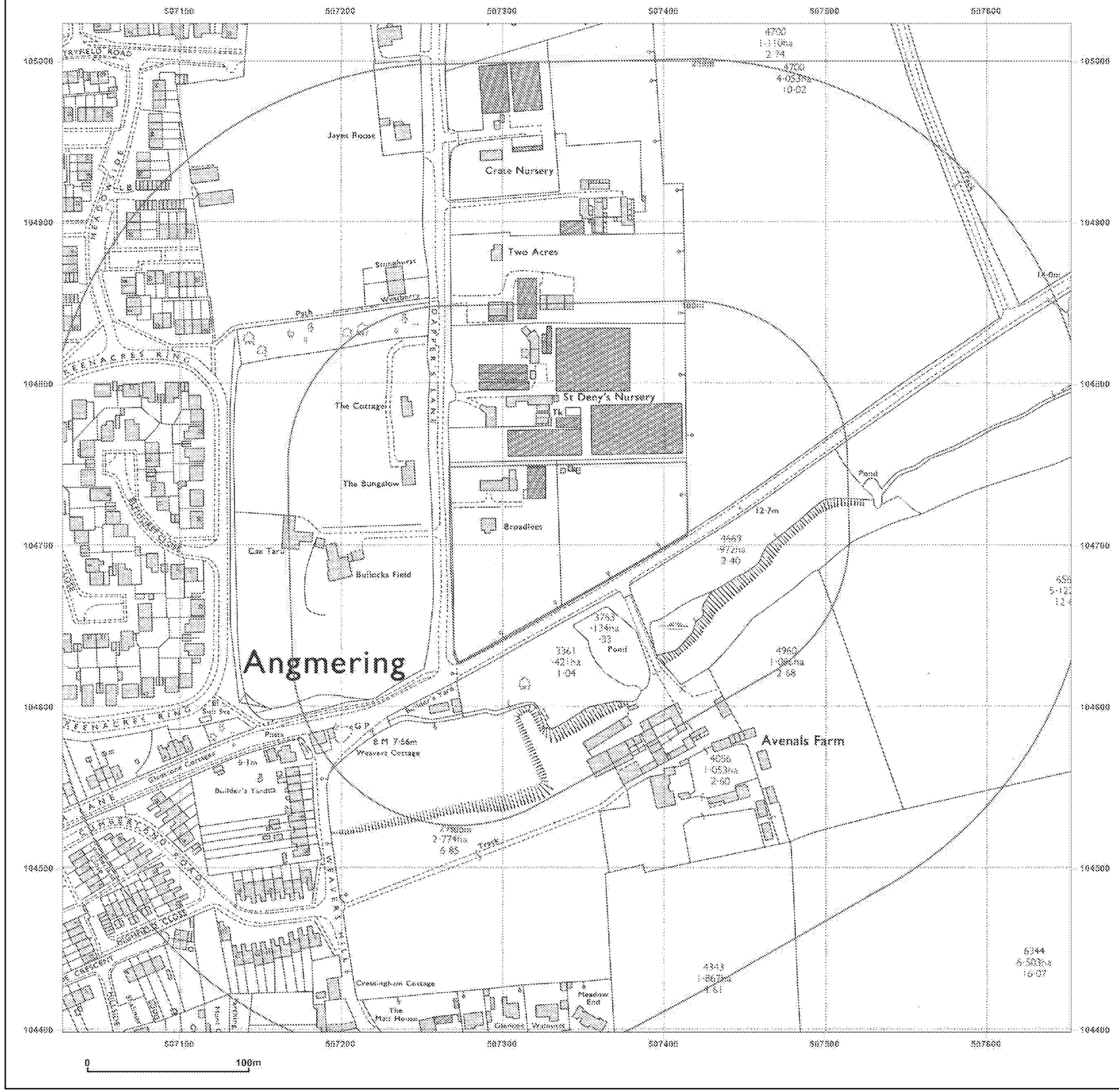
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N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: National Grid

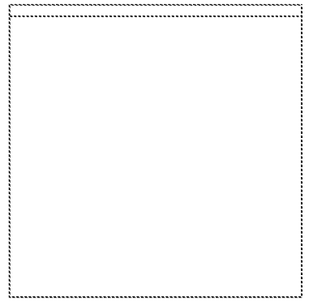
Map date: **1970**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1970
Revised 1970
Edition N/A
Copyright 1971
Levelled 1966



Surveyed 1970
Revised 1970
Edition N/A
Copyright 1971
Levelled 1966

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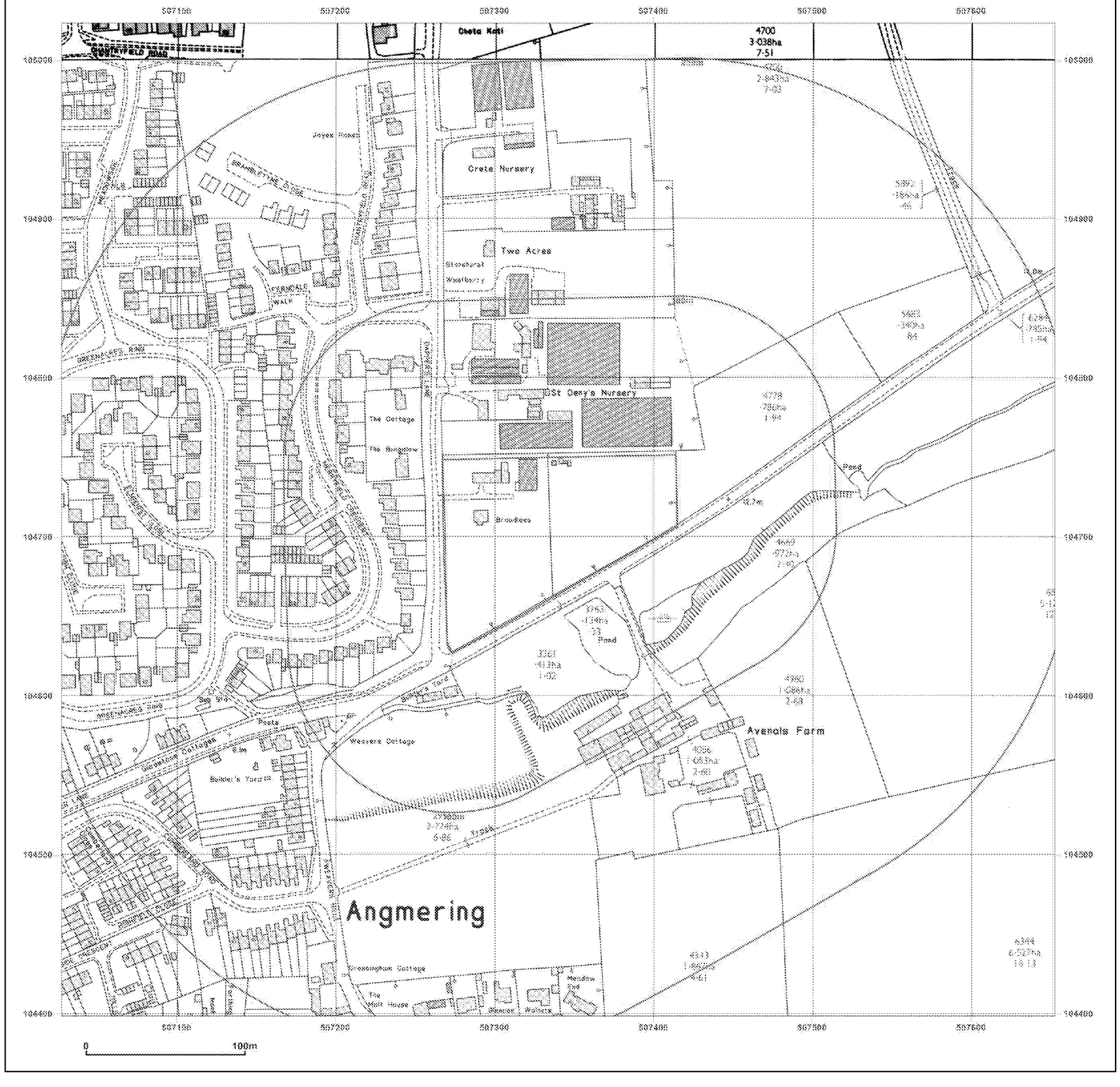
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Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: National Grid

Map date: **1974-1977**

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 1977
Revised 1977
Edition N/A
Copyright 1979
Levelled 1966

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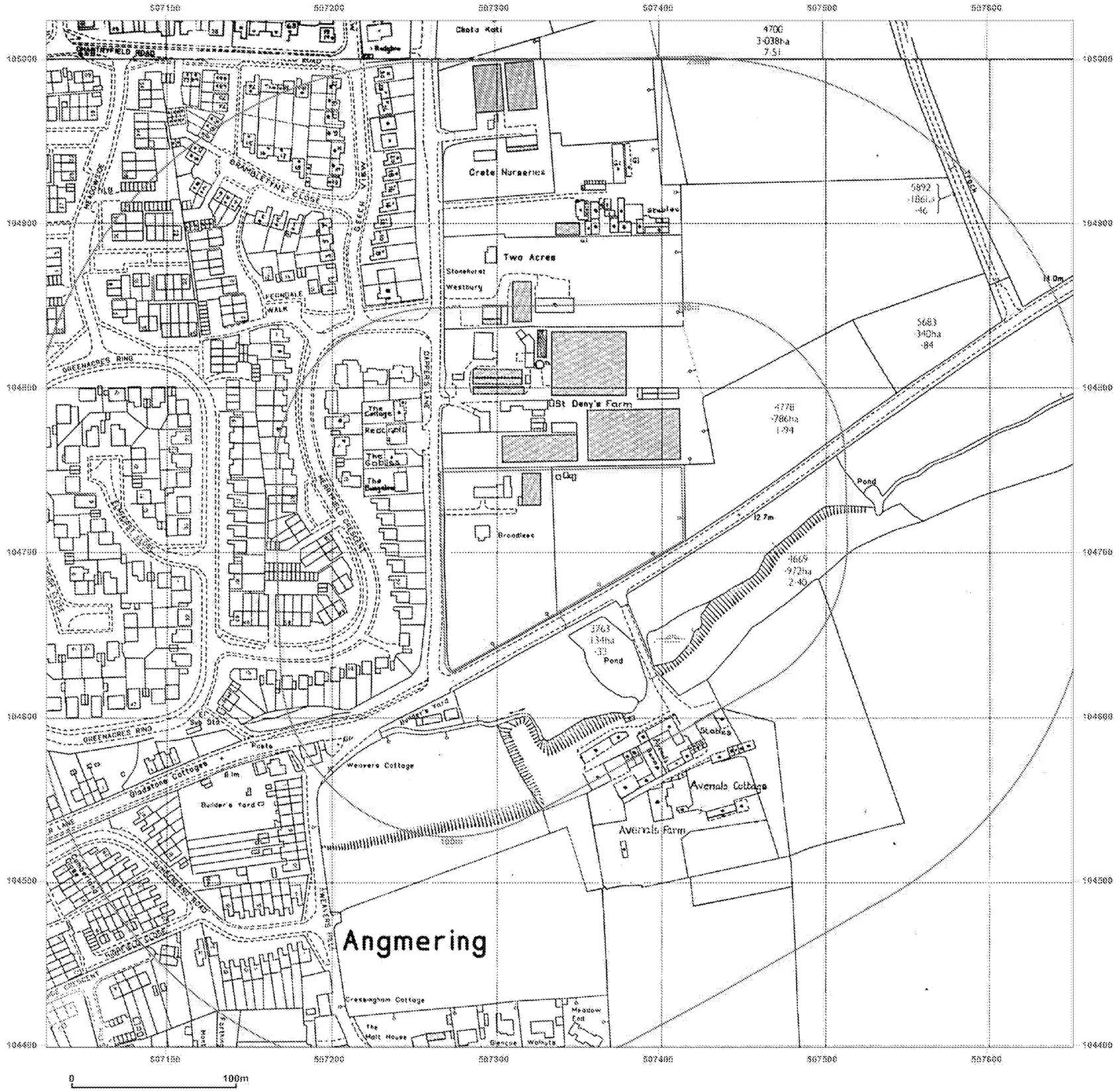
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Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: National Grid

Map date: **1985**

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 1966
Revised 1965
Edition N/A
Copyright 1965
Levelled 1966

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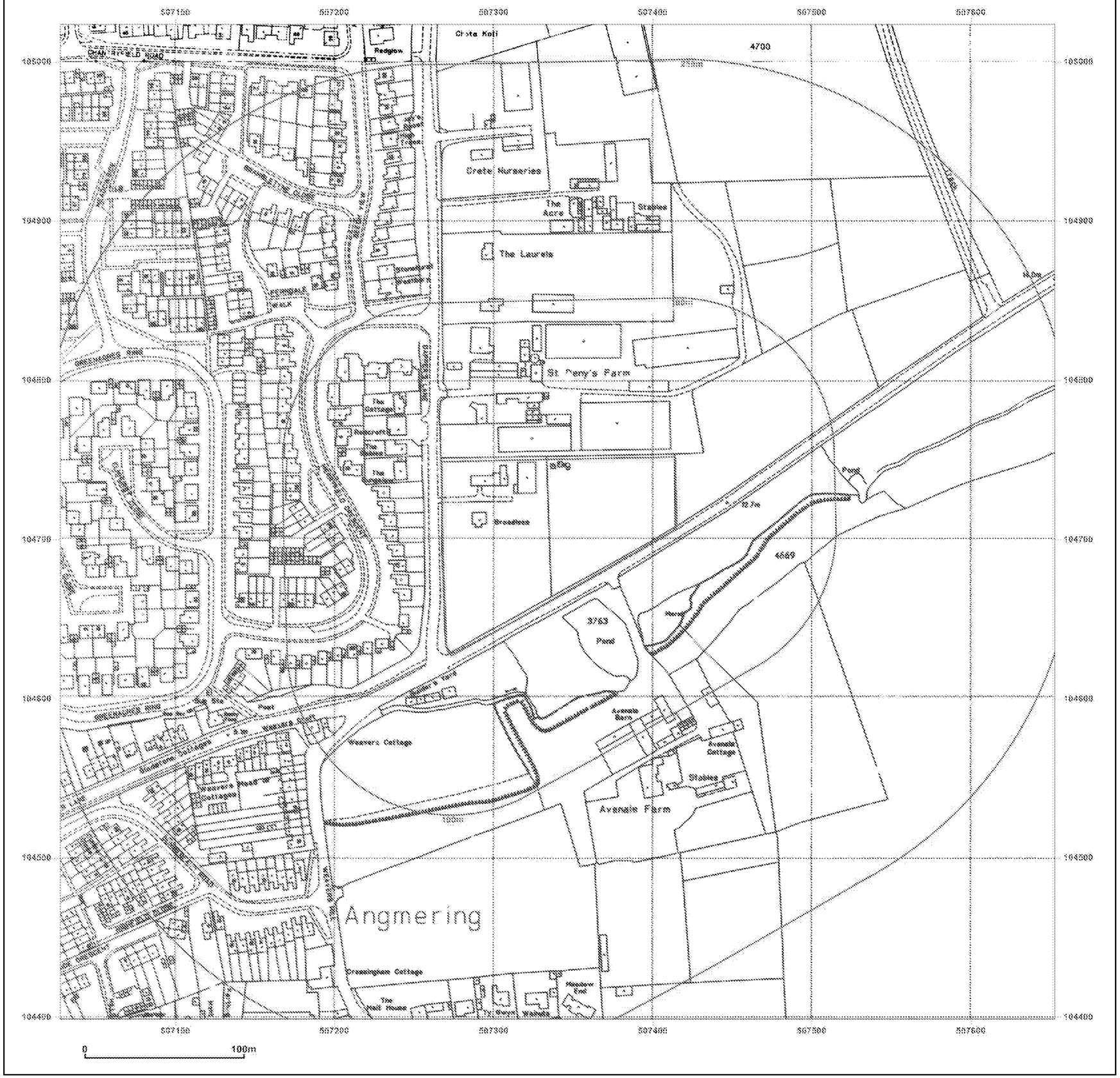
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Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: National Grid

Map date: **1994**

Scale: 1:2,500

Printed at: 1:2,500

N
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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 N/A
Levelled N/A

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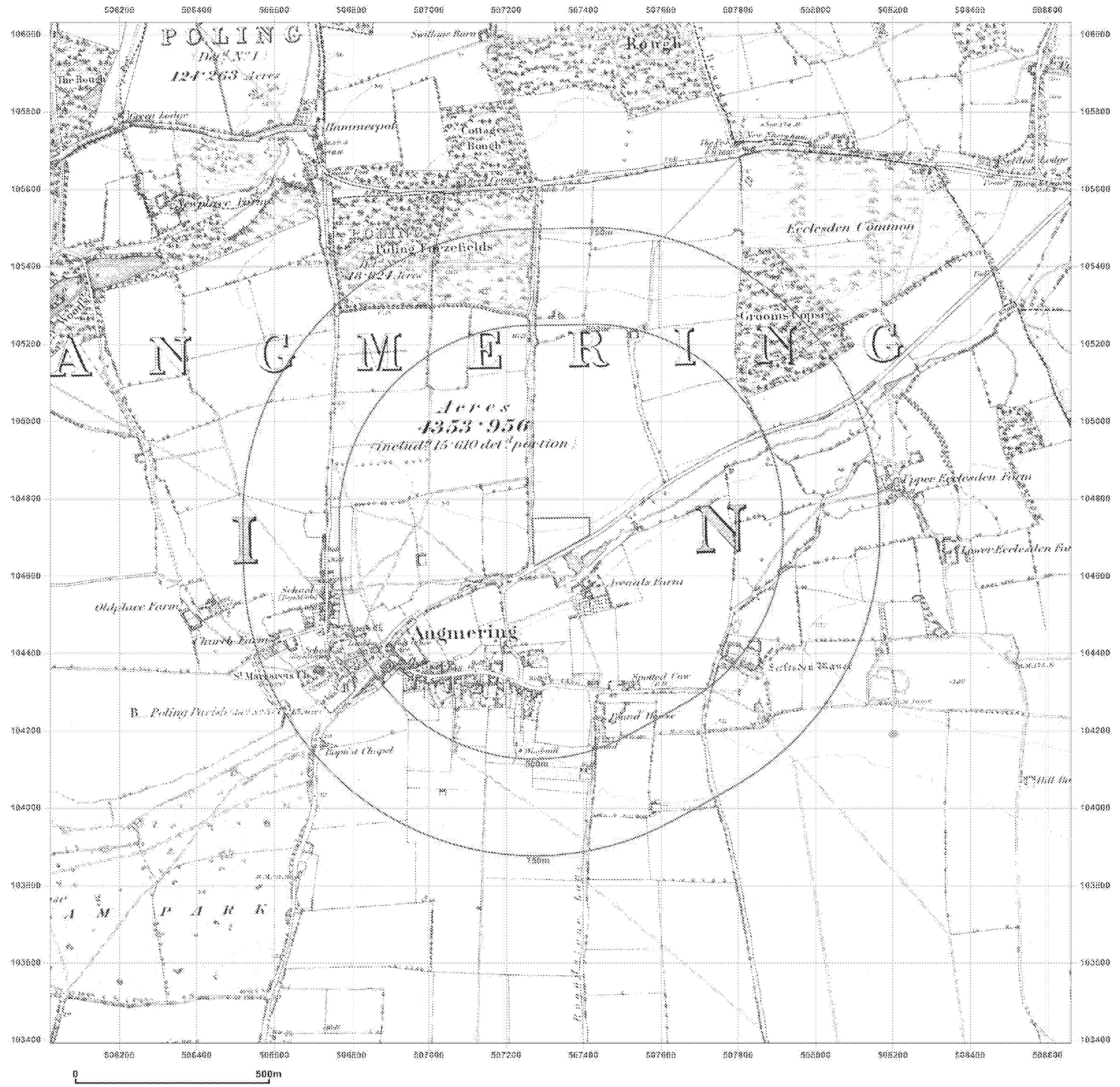
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Site Details:

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Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: County Series

Map date: **1876**

Scale: 1:10,560

Printed at: 1:10,560

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

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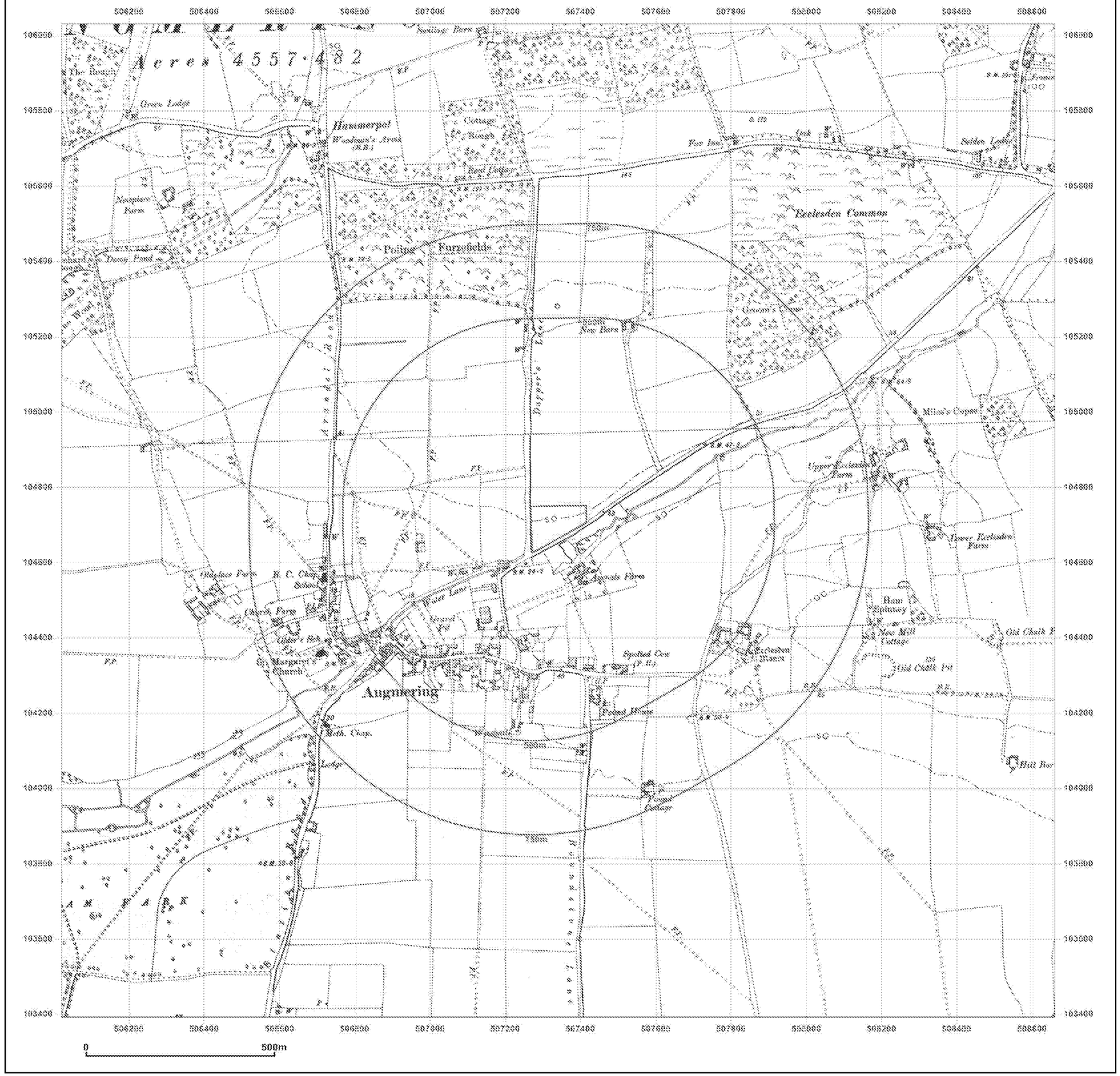
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Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: County Series

Map date: **1896-1899**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1876
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1876
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

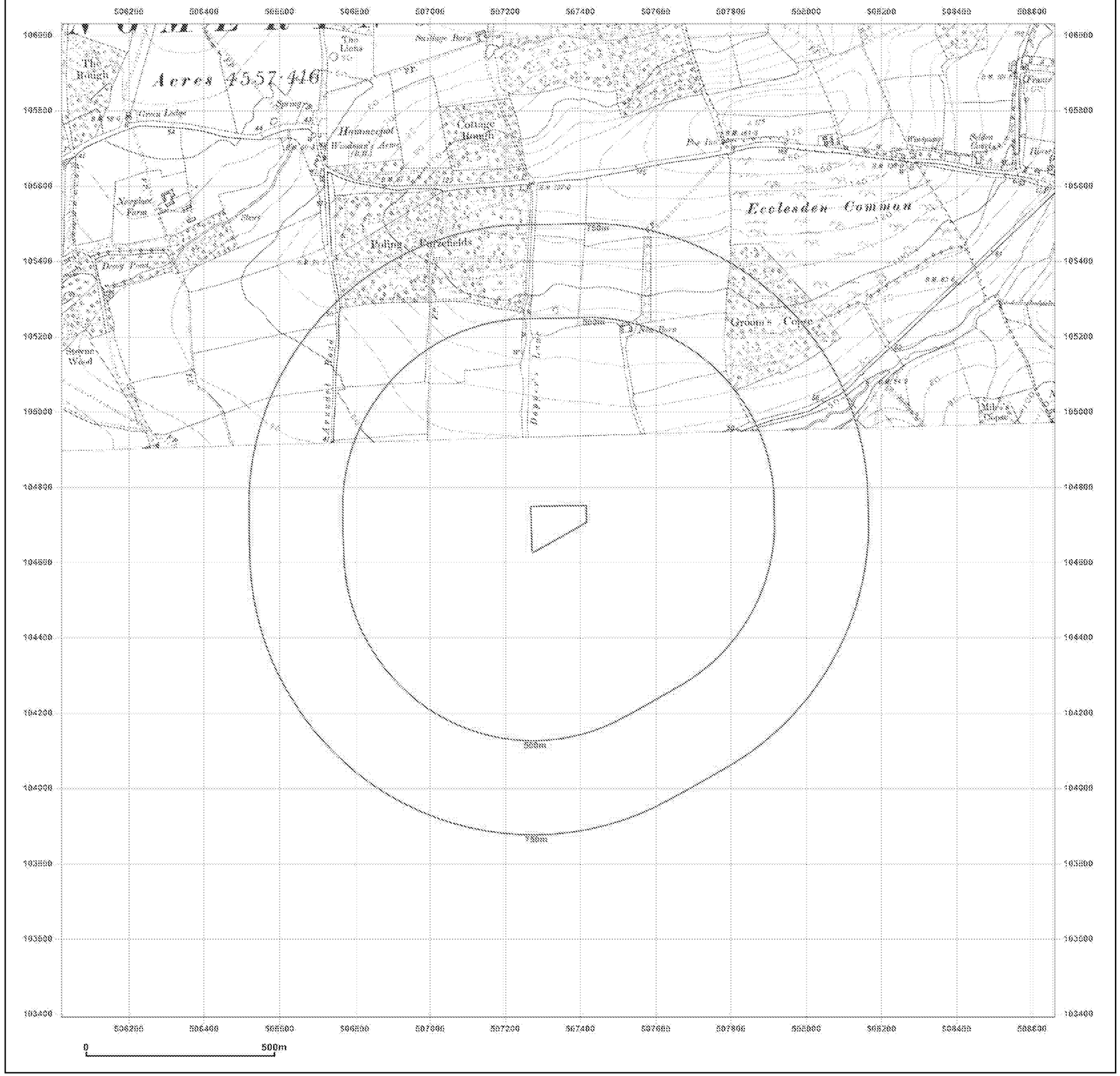
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Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: County Series

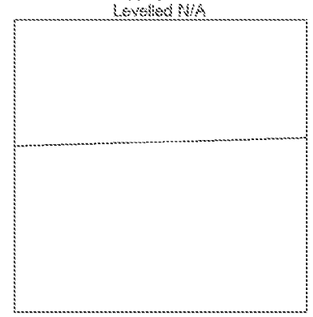
Map date: **1909**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1875
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A



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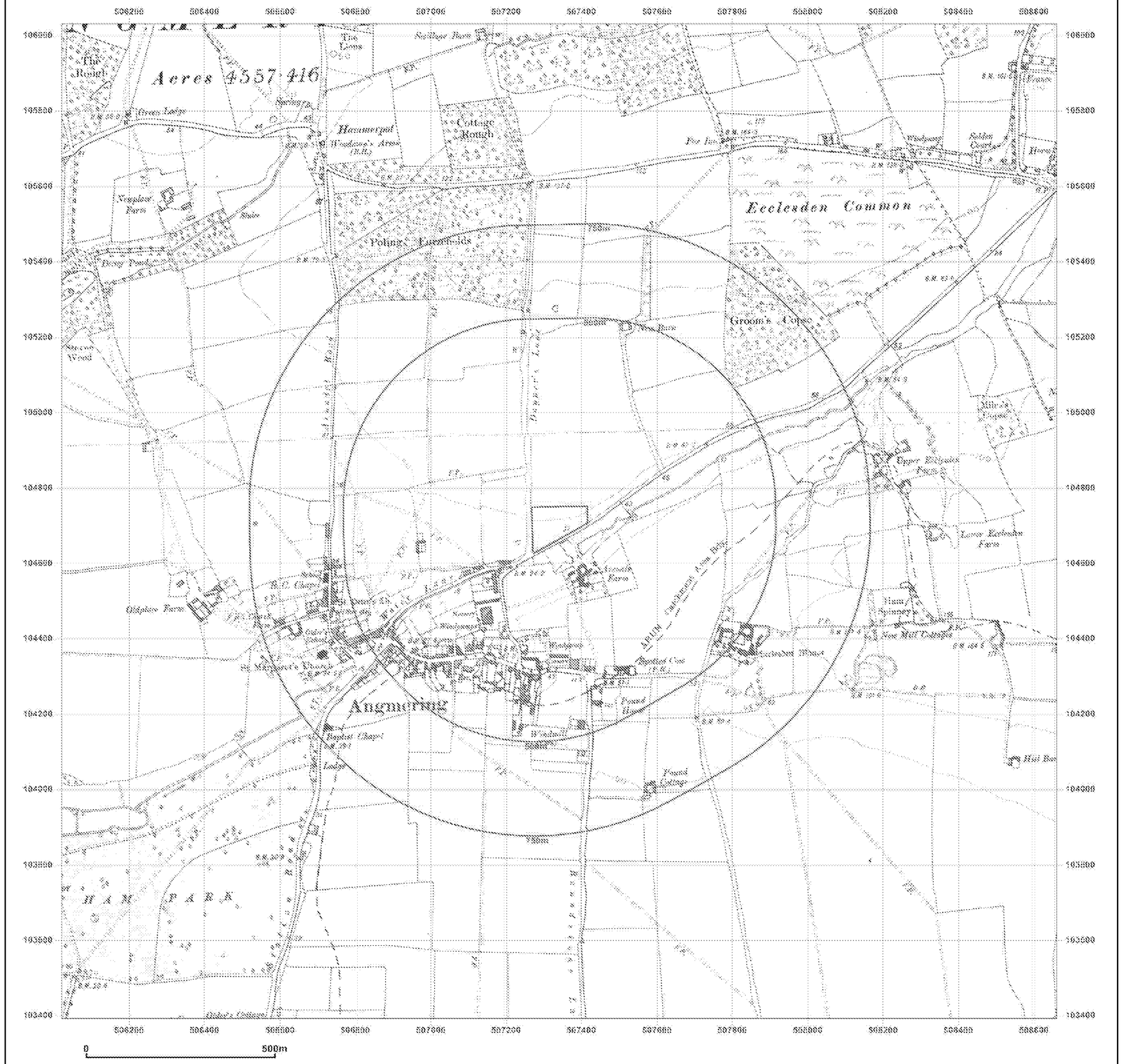
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N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: County Series

Map date: **1909-1910**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1875
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A

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

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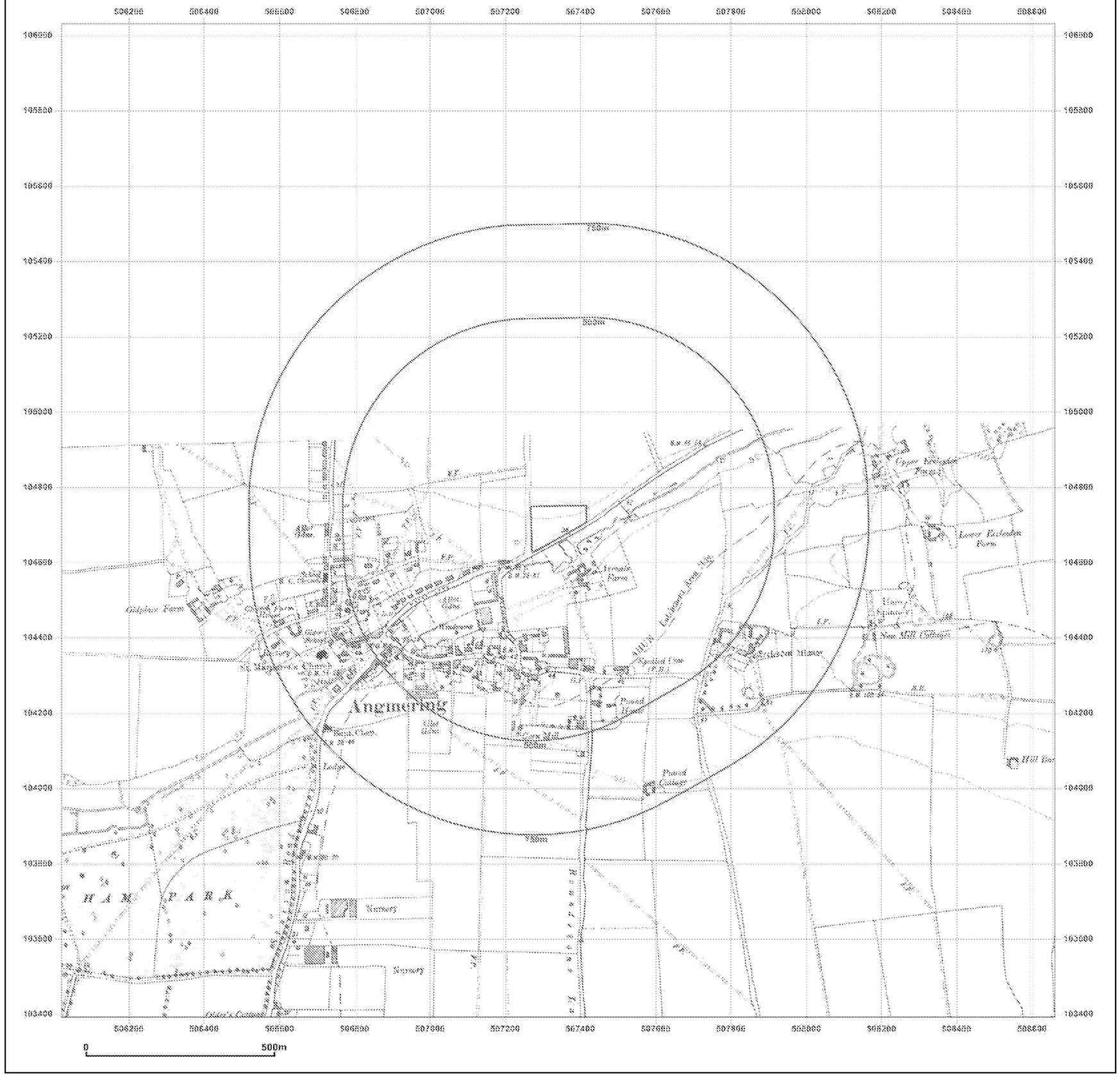
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N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: County Series

Map date: **1932**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1875
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

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N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: County Series

Map date: **1938-1943**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1875
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1875
Revised 1943
Edition N/A
Copyright N/A
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Site Details:

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N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: Provisional

Map date: **1957**

Scale: 1:10,560

Printed at: 1:10,560

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

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

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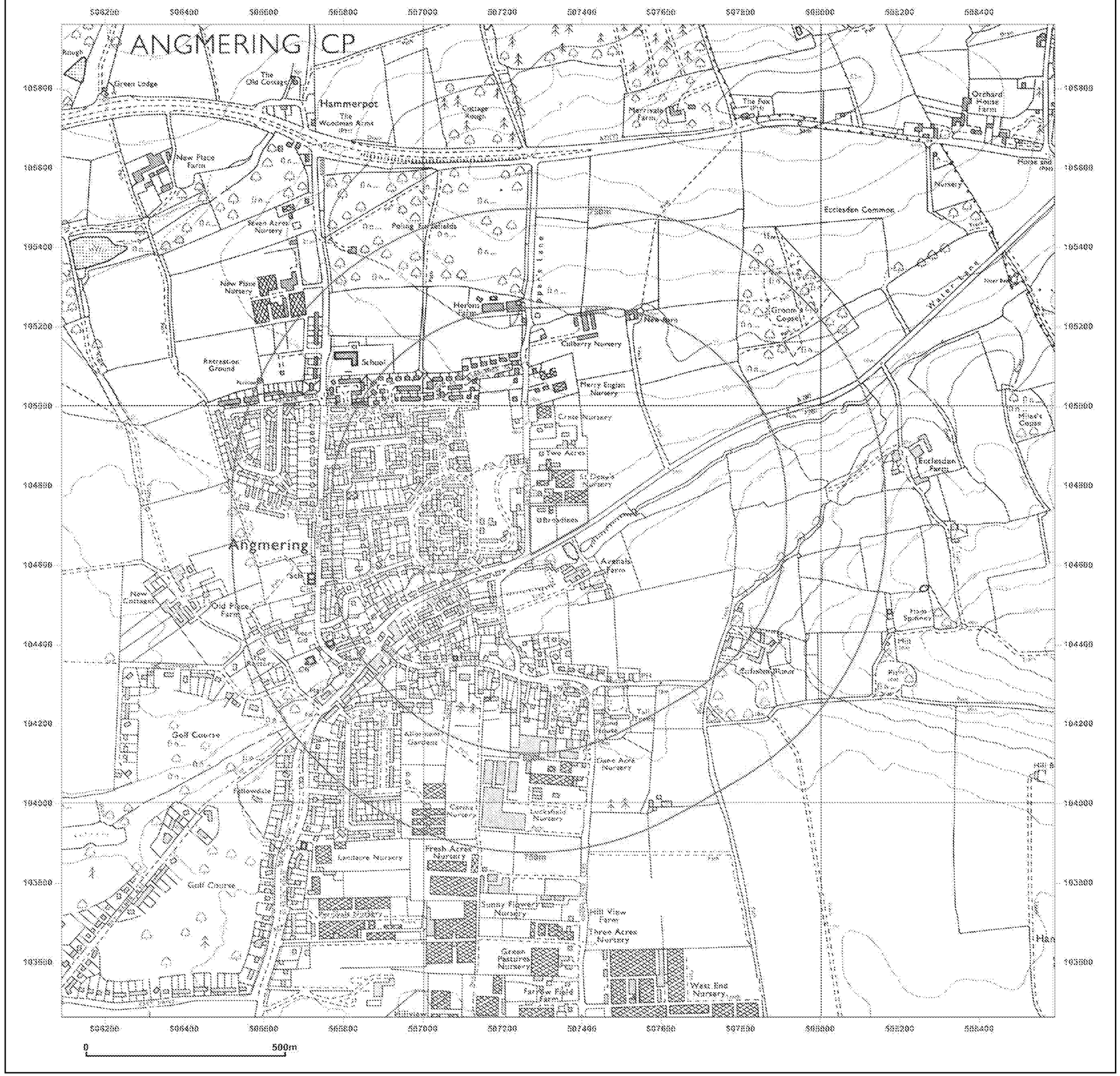
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Site Details:

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N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: National Grid

Map date: **1974-1976**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1972
Revised 1976
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1973
Revised 1974
Edition N/A
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Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

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2002

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Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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2010

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N, BN16 4DA

Client Ref: 14.11.004/654
Report Ref: GS-1765010
Grid Ref: 507340, 104711

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

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2014

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