Phase 1 Desk Study, Site Reconnaissance & Phase II Site Investigation Report

at Liss Forest Nursery,
Greatham, Liss
GU33 6EY

for Cove Homes Ltd, Peter Catt, Vincent Catt and Neill Catt

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EXECUTIVE SUMMARY

The site is located in Greatham, Liss, along Petersfield Road, north of the A3. It is occupied by a wholesale horticulture nursery comprising open beds, greenhouses, polytunnels and sheds. A residential dwelling with front and rear gardens is located in the south-western corner of the site. The site is rectangular in shape and covers an area of approximately 2.4Ha. It is proposed to redevelop the site with a maximum 3 storey care home in the northern part of the site with associated public open space; and residential dwellings with private gardens in the south.

The site has been part of agricultural/pasture fields and undeveloped until the late 1970s when the Liss Forest Nursery was built. The surrounding area show agricultural fields with woodland areas and occasional farms.

The desk study has identified a number of potential sources of contamination associated with the site's land use, namely: five oil storage tanks used to supply greenhouse heaters; the repeated application of fertilisers and pesticides and the potential presence of asbestos materials within the buildings structures present on-site. The site is not affected by radon gas.

The site is mapped as being underlain by the Sandstone of the Folkstone Formation with no superficial deposits present on-site.

Overall, ground conditions comprised topsoil over made ground to 0.5mbgl over sandy/silty clay deposits encountered to 3.5mbgl underlain by sand deposits to the maximum investigation depth of 4.3mbgl. Groundwater was encountered in the sandy silty clay deposits at 2.05mbgl.

The site is not included within a flood risk zone as classified by the Environment Agency.

An allowable bearing capacity of 80kPa is recommended for shallow foundations within the clay deposits; however, piled foundations may be the preferred option due to the soft consistency of the clay deposits encountered on-site. Further deep borehole investigation would be required to provide an outline pile design.

Soil sulphates both in the sand/silty clay and sand deposits fall within BRE design class DS-1 and the site conditions fall within the ACEC class AC-1.

From the soakage tests undertaken, the sandy clay soils would not be suitable for soakaway drainage whilst the sand deposits at depth might be suitable for soakaway design.

A preliminary design CBR value of 5% is recommended for the clay soils.

A geo-environmental risk assessment has been undertaken. Contamination testing of topsoil, made ground and natural ground identified low concentrations of the contaminants tested which did not exceed the relevant assessment criteria. Only borehole WS2 presented a marginal exceedance for benzo(a)pyrene at 1.0mbgl.

No further investigation works are recommended at this stage. However, the made ground deposits identified on-site are not considered to be suitable as growing medium to be retained within the garden areas of the future development, and therefore, allowance for a minimum of 150mm clean topsoil should be considered on top of the made ground on-site.

To date, 2 No. gas monitoring visits have been completed out of six scheduled. On the basis of the data collected to date, a preliminary assessment has been carried out and the site has been tentatively identified as having negligible impact from land gas. As such, at this stage gas protection measures are not considered necessary. However, this is subject to completion of the gas monitoring programme.

As with any redevelopment site, there is always the risk of hitherto undetected contamination, and further investigations should be carried out prior to redevelopment.

Signed:	 Chiara D'Antonio BSc MSc MCIWEM
Signed:	 Philip Clare BSc FGS
Countersigned:	 Richard Brinkworth BEng
Date:	20 November 2018
Revision:	Issue 1

A INTRODUCTION

1 Authority

Leap Environmental Ltd (hereafter referred to as LEAP) has been appointed by Cove Homes Ltd to undertake a Phase 1 Desk Study, Site Reconnaissance and Phase II Site Investigation Report of a site referred to as Liss Forest Nursery located in Greatham, Liss, Hampshire GU33 6EY. This report has been prepared jointly for Mr Peter Catt, Mr Vincent Catt, Mr Neill Catt and Cove Homes Ltd. The instruction was given in a signed contract dated 15th August 2017 and signed by Tony Webber of Cove Homes Ltd.

2 Objective

LEAP understands that it is proposed to redevelop the site with 37 No. 1-2 storey residential dwellings, a 3 storey Care Home unit and public open space as per the preliminary layout drawing attached as Figure 1, Appendix B.

The proposed development is currently at a preplanning phase and has been assessed in accordance with BS EN 1997[1], as being a Geotechnical Category 1 structure.

The objectives of this report are to:

- Provide information on the geotechnical and environmental quality of the ground present on the site;
- Assess the potential health and other environmental risks posed by the site to the proposed development and to other specifically identified receptors; and
- Assess the potential for offsite contamination to adversely affect the proposed development.

3 Scope of Works

This report describes a two-stage process whereby the site is investigated and risks are assessed. The terms geotechnical and geoenvironmental are referred to throughout the report.

[1] BS EN 1997-1(2004) Eurocode 7: Geotechnical Design - Part 1: General Rules

Geoenvironmental refers principally to the chemical nature of the ground and the degree of soil, water and/or land gas contamination and the impact that contamination may have on current or future development and also on the wider environment.

Geotechnical refers to all other aspects of the ground conditions and the impact they may have on the physical construction of existing or future development, principally foundations, slope stability, drainage, pavement and road design and groundwater control.

The investigation comprises two phases of work.

3.1 Phase 1 Scope

The first part of this report presents the results of a desk study and site reconnaissance. The site has not been the subject of previous investigations undertaken by LEAP and/or by others. The following sources of information have been reviewed:

- Envirocheck database report;
- Envirocheck historical map search;
- British Geological Survey (BGS) mapping;
- British Geological Survey website (www.bgs.ac.uk) including historic BGS boreholes data;
- Unexploded WWII aerial delivered bomb (UXB) regional risk maps produced by Zetica;
- Interrogation of the Environment Agency website on 25th August 2017;
- Interrogation of the World Wide Web on 19th of September 2017 for general information pertaining to the site history.

A site reconnaissance was carried out on the 29th of August 2017. One of the current site owners, Mr Peter Catt, was interviewed and additional anecdotal information pertaining to the beginning of the nursery activity on-site was provided by him and other members of the staff.

The desk study and site reconnaissance have been used to develop an initial conceptual site model, which forms the basis for the site investigation strategy. The initial site conceptual model is used to identify geotechnical and geoenvironmental hazards and the qualitative degree of risk associated with them. In terms of the geoenvironmental assessment the conceptual site model is used to identify potential sources of contamination, potential receptors and pathways by which the two may be connected. These are known as possible

pollutant linkages and it is these pollutant linkages that are key to contaminated land risk assessment.

The Phase I investigation is also referred to as a Preliminary Investigation[2] .

3.2 Intrusive Investigation Scope

The Phase II work comprises intrusive investigation, on-site monitoring and laboratory analysis. The results of this report are used to validate and/or update the initial site conceptual model. This phase of site investigation comprised the following tasks:

- 14 No. 3-5mbgl deep windowless sampling boreholes drilled with a tracked rig;
- 1 No. small scale soakage tests carried out in accordance with NHBC 5.3 within the drilled borehole;
- 3 No. falling head soakage tests were carried out in the windowless sampler boreholes in accordance with BRE 365;
- 3 No. gas monitoring installations to up to 3mbgl in the drilled boreholes;
- In-situ dynamic cone penetrometer CBR tests;
- In-situ geotechnical testing including Standard Penetrometer Tests in the windowless sampled boreholes;
- Geotechnical Laboratory testing including Atterberg Limit tests, and sulphate tests;
- Chemical Laboratory tests including 15No. LEAP standard soil suite tests. 3No. pesticide screen suites and 6 No. speciated total petroleum hydrocarbons CWG.

The intrusive works were completed by contractors who have been scrutinised and are on LEAP's approved contractor list. The windowless sampler holes were conducted by Oakland Site Investigation Limited and supervised by LEAP.

Selected samples of soil were scheduled for laboratory testing for a wide range of potential contaminants including metals, non-metals, polycyclic aromatic and petroleum hydrocarbons and pesticides. The laboratory testing has been carried out by i2 Analytical laboratory.

[2] BS 10175:2011 Investigation of Potentially Contaminated Sites – Code of Practice.

Selected soil samples have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd in Watford.

The final stage in the geoenvironmental assessment comprises a quantitative risk assessment and revision of the preliminary Conceptual Site Model. Preliminary recommendations for remediation have been provided, based on various development assumptions which are detailed in the following section and in the text of this report. The risk assessment has been carried out in accordance with UK industry standards and in particular in accordance with CLR11[3] and BS10175:2011.

The final stage of the geotechnical assessment is the provision of preliminary soil parameters for use in geotechnical design, and broad recommendations for appropriate foundation options. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in Section 6 of Eurocode7[4].

4 Limitations

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

[3] Environment Agency, 2004. Model Procedures for the management of land contamination. Contaminated Land Report 11.

[4] BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General rules (2004) Part 2: Ground Investigation and Testing (2007)

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk.

Full details of the limitations are provided in Appendix A.

B PHASE I – DESK STUDY

5 Environmental Setting

5.1 Site Location and Description

The site occupies a rectangular plot of land located to the east of Petersfield Road, in Greatham, Liss, Hampshire, GU33 6EY. It is a wholesale horticulture nursery comprising greenhouses, polytunnels, open planting beds, and sheds. The total area of the site is approximately 2.4Ha.

The approximate National Grid Reference of the site is SU 77675 30708. The site lies at an estimated elevation of 78m Above Ordnance Datum (mAOD).

5.1.1 General Description and Boundaries

The current site layout is shown in Figure 1, Appendix B. A walkover survey was carried out on the 29th of August 2017 and photographs are included within Appendix E.

The site comprises a wholesale horticulture nursery, that grows a variety of plant species in various beds and structures across the site. The majority of the middle part of the site is therefore, occupied by greenhouses, poly tunnels and uncovered watering beds. As all of the plants are grown for resale they are within pots and not in the ground.

The site is located on the southern side of a shallow valley and as such a number of level terraces have been formed into the slope to allow development across the site.

The site is bound by residential buildings with gardens to the north; an agricultural field to the east, Greatham Primary School with associated playground to the south and Petersfield Road to the east with a nursery with the Greatham Village Hall and residential properties beyond. Petersfield Road was located in an approximately 2 to 3m deep cutting with the eastern side of the cutting forming the site boundary.

The site is accessed from Petersfield Road via a blacktop surfaced road which enters the site at the south-western corner. The track runs along the southern boundary to a car park area in the south east. The greenhouses and polytunnels are generally located across the central part of the site. In addition, a single storey bungalow, with gardens surrounding it to the front and rear is located adjacent to access road in the south west corner of the site. Two additional single storey brick buildings used as a domestic garage, offices and a staff room are present to the east of the house. A rising main pump chamber is located between the staff room and office buildings.

A concrete loading bay and associated hard surfaced loading area is present in the middle of the site with a double height machinery shed and compost store located to the north. A second double height store shed is located to the south of the car park. Both structures were noted to have corrugated roofs and pipework formed of potential asbestos containing materials.

Five, approximately 1000 to 2000 litre, plastic oil storage tanks have been identified within the south-eastern portion of the site. They are elevated from the ground level using concrete plinths and are understood to have replaced the original steel tanks. It is not known whether these tanks are bunded. The tanks were used to fuel disused heaters located in four greenhouses in the immediate vicinity. Four cylindrical corrugated steel water tanks, shown on the Ordnance Survey (OS) maps, are noted within the central extent of the site.

The site is located on a slope which drops down towards the north east at an angle of approximately 1-2° with the site surface presenting three cut slopes associated with the development terraces: one located in the central section of the site (approximately 0.5m fall); another one within the northern portion of the site (approximately 1.5m fall), and a third one located at the northern site boundary (approximately 0.60m fall). The slope located within the central section also includes a small concrete retaining wall.

Petersfield Road, adjacent to the western boundary of the site is located in a cutting at approximately 3m lower than the site surface level within the central section of the site, decreasing to 1.5m fall towards the north of the site. The agricultural field to the east of the site is also located at approximately 1.0m below the ground level of the nursery.

The site boundaries are marked with mixed hedges formed mainly of deciduous trees and shrubs, including oaks, leylandii, fir and birch. The garden to the south of the site and the residential dwelling gardens, present a high number of local and exotic plant species. In particular, a mature silver beech is located in the middle of the front garden while Japanese maples are identified within the species in the garden to the south. A leylandii hedge was noted to form the northern and eastern boundary between the bungalow and the rest of the nursery.

5.2 Geology

The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey sheet 300 Alresford, solid and drift edition, the BGS website (www.bgs.ac.uk) and the Envirocheck report. The site is mapped as being underlain by Folkstone Formation – Sandstone in its entirety. No superficial deposits are shown to be present on-site or in the immediate vicinity of the site boundaries.

5.2.1 Folkestone Formation - Sandstone

The site is underlain by the Folkestone Formation - Sandstone. The Folkestone Formation is a Cretaceous deposit and part of the Lower Greensand Group, described as fine to coarse-grained sandstones. It is often encountered as yellow or red-brown weakly cemented fine to medium sands, with seams of clay, pebbles, and sandstone.

5.2.2 BGS Boreholes

The online BGS Geoindex (http://www.bgs.ac.uk/geoindex/) has been reviewed for detailed local geological and hydrogeological information. No historical boreholes have been identified within 250m of the site boundary. The nearest BGS historical borehole (SU73SE10 - Swains Cottage Greatham) is located approximately 400m south-west of the site and the log indicates Folkstone Bed for approximately 7.0mbgl (end of the borehole). The resting water level (RWL) is indicated as being at 5.8mbgl.

5.3 Hydrogeology

The hydrogeology of the site has been ascertained from the Envirocheck data report. The source of the data is reported to be the Environment Agency groundwater vulnerability mapping.

The Folkestone Formation is classified as Principal Aquifer which is described as layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. The Head deposits identified off-site to the north are classified as Secondary Undifferentiated Aquifer.

The vulnerability of the Principal Aquifer has been deemed by the Environment Agency as a Major Aquifer with intermediate to high leaching potential.

The site is situated within a Total Catchment area (Zone 3) of a Groundwater Source Protection Zone (SPZ) as classified within the Policy and Practice for the Protection of the Groundwater. Therefore, any works or development, which may have an impact on surface water, aquifer or groundwater quality, must be approved by the Environment Agency prior to implementation.

The Envirocheck report lists one active abstraction licence within 1000m of the subject site. It is located 940m north-east of the site and is licensed to South East Water for public potable water supply.

5.4 Hydrology

There are no surface water features within the site or in the immediate vicinity of the site boundaries.

The Envirocheck report lists the River Rother as the nearest main surface water body, located 943m north-west of the site. Seven linear surface water features identified as surface water drains are located to the north-east and south-east of the site and within 250m of the site boundary. The nearest is mapped 147m south-east of the site.

The Envirocheck report indicates no discharge consents within 500m of the site boundaries. Six discharge consents are reported between 500m and 1000m from the site. They are all registered to domestic properties (including farm houses) and they are associated with final/treated effluents of sewage discharges directly into soakaways or freshwater streams

5.5 Flooding

According to the Environment Agency and information contained in the Envirocheck report, the site is not located within a flooding risk zone.

5.6 Designated Environmentally Sensitive Sites

A review of designated environmentally sensitive sites presented within the Envirocheck report has been carried out. The dataset makes reference to a number of sensitive sites including the following:

- National Parks;
- Sites of Special Scientific Interest (SSSI);
- Records of National Nature Reserves (NNR);
- Areas of Special Conservation (SAC);
- Records of Special Protection Areas (SPA);
- Records of Ramsar Sites;
- Records of Local Nature Reserves;
- Ancient Woodland Records.

The whole site is situated within the South Downs National Park. No other environmentally sensitive areas are indicated within the site or within 500m of the site boundaries. Woolmer Forest is located 597m to the east of the site. It is listed as a Site of Special Scientific Interest (SSSI) based on the large diverse lowland heathland that it supports, and itself is part of the Special Protection Area of the Wealden Heaths.

The site is not located within a Nitrate Vulnerable Zone.

5.7 Ground Workings

No current or historical ground workings are reported by the Envirocheck report within 500m of the site. According to the review of the historical maps, two sand pits were indicated on maps 250m north-east and 550m south-east respectively. The first is shown to be part of a caravan park in the 1970s and the second is not shown on maps since 1910.

5.8 Mining, Extraction and Natural Cavities

The Envirocheck report indicates the site is not situated within an area affected by coal mining.

6 Site Usage

6.1 Current Land Use

The current site layout is shown in Figure 2, Appendix B.

There are no active contemporary trade directory entries on-site reported in the Envirocheck database search, however the site is currently used as a horticulture nursery, for a diverse range of garden and bedding plants and the owner's current residential property is located within the south-western section of the subject site.

According to the Envirocheck database search, there are no trade directories entries within 500m.

6.2 Evidence of On-site Contamination

A walkover survey was carried out on the 29th of August 2017.

The following features on-site were identified as possible sources of contamination:

- Potential asbestos materials associated with on-site structures;
- 5 No. above ground plastic oil tanks which were elevated from the ground surface on concrete pillars;
- 6 No. old oil heaters located within the glasshouses now disused;

6.2.1 Chemical Storage

With the exception of the oils storage tanks no evidence of onsite chemical storage was noted during the site walkover.

6.3 Neighbouring Land Use

According to the Envirocheck database search, there are no active trade directory entries within 500m of the site. There is one inactive trade directory entry 559m to the west of the site referring to an oil fuel distributor.

6.4 Site History

The contaminative and development history of the site has been ascertained with reference to the Ordnance Survey historical maps available through the Envirocheck report.

In summary, the site has been part of agricultural/pasture fields and relatively undeveloped until the early 1990s when nursery structures appear to be represented within the site boundary. However, anecdotal evidence provided by the owner of the current Liss Forest Nursery, reported that the activity on-site started in the late 1970s. The surrounding areas show agricultural/pasture fields with woodland areas and occasional farms. Urban developed is associated with the hamlet of Greatham to the south of the site which expands to the north of the site during the 20th century. Two sand pits are identified 250m north-east and 550m south-east respectively. The nearest sand pit is shown as a caravan park from the early 1970s and the furthest is no longer indicated since 1910 map edition.

6.4.1 Historical Map Evidence

A review of the historical Ordnance Survey maps has been undertaken and spanned the period from 1870 to present day at scales of 1:10,000, 1:10,560 and 1:2,500. It should be noted that the maps available do not cover the periods: 1915 to 1960, 1963 to 1978, 1983 to 1999.

The maps are included in full in Appendix C.

Table 1: Summary of historical map evidence

Year	On-site	Surrounding area
1870-1882 1:2,500 1872 1:10,560	The site is part of a larger agricultural/grazing area. A main road (later Petersfield Road) is indicated adjacent to the western site boundary. A track is indicated adjacent to the eastern site boundary in a north-east to south direction.	The surrounding areas generally present agricultural and rough pasture fields with occasional farms. Woodland and furze areas are also indicated. Deal Farm is adjacent to the north-western corner of the western site boundary, to the west of the main road. The hamlet of Greatham is indicated approximately 170m to the south of the site, along the main road. An unnamed river is shown 225m to the north and 280m to the east of the site. Six wells are indicated within 500m of the site: three located within Greatham (the nearest is 110m south of the site); one well is located within Deal Farm; one is approximately 500m west of the site and the remaining are located along the Petersfield Road to the north of the site, with the nearest indicated approximately 100m from the site. A sand pit with associated well and some structures, is

		shown 250m north-east of the site adjacent to the north of a road (later Longmoor Road).
1896-1898 1:2,500 1898 1:10,560	No obvious changes noted.	Additional wells are indicated within Deal Farm and to the east of the sand pit to the north-east, within 500m. An additional sand pit area is indicated approximately 550m to the south-west of the site.
1910 1:2,500 1:10,560	No obvious changes noted.	The sand pit to the north-east is labelled as an Old Sand Pit. The sand pit to the south-east is instead no longer indicated. A smithy is shown 400m to the north of the site, along the main road; this area also presents an urban development along the Petersfield Road and Longmoor Road and it appears to be part of the Greatham village expansion.
1961-1962 1:10,000	No obvious changes noted.	A school (Greatham County Primary School) is now identified 50m south of the site and residential buildings are indicated adjacent to the northern boundary of the site.
1974 1:2,500 1982 1:10,000	No obvious changes noted within the site. A cutting appears along the western boundary.	A telephone exchange is located adjacent to the south-western corner of the southern boundary. A number of buildings are indicated adjacent to the west of Petersfield Road and south-west of the site, with associated playing field indicated 60m from the site. A caravan park is now indicated where the former sand pit to the north-east was. A network of drainage ditches is indicated between 250m and 500m east of the site. Additional development is shown immediately to the north of the site (residential buildings in Baker's Field) and along Petersfield Road and Longmoor Road.
1993 1:2,500	The site is now indicated as nursery and presents a number of structures and potentially two tanks within it.	No obvious changes noted.
1996 1:10,000	Not represented in map.	The A3 road appears to be built and is indicated 450m east of the site.
2000-2017 1:10,000	Nine glasshouses and six buildings are present within the site extensions.	The former sand pit to the north-east is now indicated as a green area. A drain is indicated approximately 150m south-east of the site.

6.5 Unexploded Ordnance (UXO)

The risks from unexploded ordnance have been assessed in accordance with CIRIA guidance[5]. A non-UXO specialist preliminary screening assessment has been carried out. The risks have been assessed by considering firstly the likelihood of military activities on, or in the vicinity of the site as determined from the desk study and historical review. Secondly the risk of UXO has been assessed by reference to the unexploded WWII aerial delivered bomb (UXB) regional risk maps produced by Zetica.

The Zetica risk map for Hampshire shows that the site is not included in an area at risk from UXB. Hence the overall risk of UXO is rated as low.

6.6 Waste Planning and Landfill Records

6.6.1 Recorded Landfill Sites

The Environment Agency website and Envirocheck report contain details on areas of historical and active landfilling in the vicinity of the site.

There are no areas of historical or active landfill listed on-site. Hatchmoor Farm historical landfill site is indicated 431m south-west of the subject site. No data or operating dates are available for this site.

According to the Envirocheck report, landfill records have been provided by the Environment Agency.

No Waste Management facilities or Waste Treatment/Transfer sites are indicated within 250m of the site.

6.7 Other Regulatory Records

Four minor Pollution Incidents to Controlled Waters within 250m of the site boundaries have been recorded 112m, 224m and 218m to 229m north-east of the site. All incidents caused minor impact on Controlled Waters (Category 3) and occurred between 1992 and 1997. Two incidents are associated with the release of organic farm waste whilst the remaining are associated with release of sewage.

6.8 Radon

According to the Envirocheck database search, the site is within the lowest probability of a radon affected area (less than 1% of homes are above the action level for radon). Therefore,

[5] CIRIA C681 2009. Unexploded ordnance (UXO) - A guide for the construction industry

no special protective measures are required in the construction of buildings on this site, in respect of radon gas.

C PRELIMINARY CONCEPTUAL SITE MODEL

7 Environmental Risk Assessment

7.1 Conceptual Site Model (CSM)

A risk based approach is used to assess contaminated or potentially contaminated land within the UK. For a potential risk to exist, there must be a pollutant linkage in place, i.e. there must be a source of contamination, a potential receptor, and a pathway linking the two.

In order to quantify the magnitude of the risk, it is necessary to first calculate the potential exposure of the receptor as a result of all the individual active pollutant linkages affecting that receptor. Secondly it is necessary to ascertain "what is an acceptable exposure level for each of the identified receptors and contaminants?".

The purpose of the Conceptual Site Model, in this instance, is to identify all of the potential pollutant linkages by considering, in turn, the potential sources, receptors and pathways.

7.2 Sources

7.2.1 On-site Sources

Based on a review of the available site information, the following contaminants of concern are proposed:

Table 2: On-site sources of contamination

Source	Contaminants of Concern
Bunded oil storage tanks	Heavy metals, TPH, PAH, phenols, SVOC, VOC
Old oil heaters within the glasshouses	Heavy metals, TPH, PAH, phenols, SVOC, VOC
Buildings	Asbestos containing Materials (ACM)
Made Ground	Heavy metals, TPH, PAH, asbestos
Nursery activities	Pesticides/herbicides, fertilisers, PAH, heavy metals

The oil storage tanks appear to have been renewed relatively recently with plastic tanks that appeared to be in good condition, and elevated from the ground surface on concrete plinths. However, it is unknown what the condition of the original tanks were or how they were filled in the past and therefore oil leakages and spills cannot be discounted.

An inspection of the pipework between the tanks and the disused heaters was beyond the scope of this report and as such leaks cannot be discounted however no obvious evidence of leaks was noted during the walkover survey.

Being a developed site, there is the potential for the presence of made ground of unknown origin on-site. In addition, existing buildings on-site might have asbestos containing materials as part of their structures.

The site has a history of use as a horticulture nursery comprising greenhouses, polytunnels, open planting beds, and sheds. It is therefore likely that pesticides/herbicides have been used as part of the site activities.

7.2.2 Off-site Sources

The desk study has highlighted the following potential off-site sources of contamination:

Table 3: Off-site sources of contamination

Source	Distance from Site (m)	Contaminants of Concern
Hatchmoor Farm landfill	431m south-west	Heavy metals, Polycyclic Aromatic Hydrocarbons (PAH), Total Petroleum Hydrocarbons (TPH), ground gases/vapours, SVOC, VOC

The historic landfill could be a potential source of ground gases; however, given the distance from the site this is considered unlikely to present a risk to the site.

7.3 Receptors

Potential receptors are those which may be impacted by any of the contaminants of concern identified above, and include the following:

- Construction workers;
- Future site residents;
- Groundwater – Principal Aquifer
- Surface waters (e.g. surface drainage to the south-east and north of the site);
- Material construction of buildings and infrastructure;
- Users of adjacent sites.

7.4 Pathways and Potential Pollutant Linkages

At the time of writing, it is understood that the development will include a care home with public open space and a number of residential dwellings with private gardens.

According to the information available, the following pathways have been identified for on-site sources:

- direct ingestion of impacted soil;
- direct dermal contact with impacted soil;
- inhalation of impacted wind-blown soil particles and/or dust including asbestos;
- inhalation of ground gases and vapours outdoor and within confined spaces;
- ingestion of soil attached to plants as well as via plant uptake;
- ingestion of water carried by plastic water pipes through potentially contaminated ground;
- surface water runoff of potential contaminants and impacted soil to nearby water features (i.e. small river/drainages to the south-east and north of the site);
- given the local geology, potential shallow and/or perched groundwater might be encountered during the construction phase and therefore, the risk of ingestion of potentially contaminated groundwater and dermal contact cannot be entirely discounted at this stage.

Construction workers during the development phase are potentially at risk as a result from all of the above pathways identified, except for those involving edible plants, surface water runoff and ingestion of water carried through pipes. However, risks to construction workers are usually readily mitigated by the use of appropriate PPE where anticipated levels of contamination are low.

Future residents can be exposed to all of the above pathways except for surface water runoff of potential contaminants and groundwater ingestion and contact.

There is a potential risk for users of adjacent sites to be impacted by inhalation of ground gases and vapours outdoor and within confined spaces and inhalation of impacted airborne soil particles/dust.

The site is underlain by a Principal Aquifer. Hence there is a potential pathway for leachate from soil pollutants and for mobile liquid contaminants to enter the groundwater due to the high permeability of the solid geology.

The surface water drains approximately 150m south-east and 200m north of the site are located at a lower elevation compared to the site elevation and hence it is considered to be potentially at risk from surface water runoff of potential on-site contaminants within the soil.

7.5 Qualitative Risk Assessment of Pollutant Linkages

Risk levels within the preliminary CSM are determined on a qualitative basis following review of the available desk-based information. The significance of particular pollutant linkages is dependant both upon the severity and likelihood of the risk. These two factors are summarised in the following tables.

The potential pollutant linkages are summarised in the table appended in Appendix D and given a qualitative risk classification in accordance with current guidance. The details of the risk assessment methodology are presented in Appendix D.

7.6 Conclusions

From the Qualitative Risk Assessment table in Appendix D, the majority of the pollutant linkages identified by the CSM have been rated as very low and low risk. However, the following pollutant linkages have been rated as moderate-low to moderate:

- Moderate risk to construction workers from asbestos materials present within the existing structures on-site (especially during the demolition phase);
- Moderate/low to moderate risk to groundwater from potential intergranular flow of contaminants given the fact that the site lies on a Principal Aquifer and considering the high permeability of the local solid geology (sand deposits of the Folkestone Formation);
- Moderate/low risk to construction workers and future site residents due to inhalation of ground gas/vapours in confined spaces;
- Moderate/low risk to construction workers due to inhalation of impacted wind-blown soil dust (including asbestos fibres).

A detailed assessment of the potential pollutant linkages associated with the site can be found in the QRA table within Appendix D.

8 Geotechnical Risk Assessment

8.1 Geotechnical Risk Register

The preliminary geotechnical risk register for the proposed development is summarised in the table in Appendix D.

8.2 Conclusions

The following geotechnical hazards have been identified as significant risks:

- Significant risks from the potential presence of made ground which might cause unstable excavations and require deepened foundations;
- Significant risk from the potential presence of unstable excavations/running sands due to the local geology and perched groundwater in the Folkestone Formation;
- Substantial risk from local slope instability associated with development terraces.

On the basis of the initial review and preliminary risk assessment, the site is given a Geotechnical Classification of **Geotechnical Category 1** in accordance with EN1997-1 §2.1(14)-(21).

9 Recommendations for Intrusive Ground Investigation

Based on the findings of the preliminary Conceptual Site Model, an intrusive investigation is recommended to ascertain ground conditions across the site and to assess whether conventional foundations are feasible.

On this basis, windowless sampler boreholes are proposed to provide further information on ground conditions. In addition to this, disturbed sampling is also recommended for geotechnical and geo-environmental purposes.

A series of dynamic cone CBR tests are recommended to provide in situ CBR values for future development plans.

With regard to assessing the potential land contamination risks on-site, the following is also recommended as part of any future ground investigation works:

- Appropriate sampling and contamination testing of soils across the site in order to establish the baseline land quality conditions;
- Appropriate geotechnical testing of samples in order to establish the characteristics of the ground;
- Monitoring of ground gas and groundwater levels;
- An assessment of the soils to allow classification of their suitability for off-site disposal if required as part of the proposed developments.

Overall, it is considered that risks in respect of land contamination during development phase are ‘low to moderate’.

D PHASE II - INTRUSIVE INVESTIGATION

10 Investigation Rationale

A total of 17 No. trial holes were excavated across the site. These included 15 No. windowless sampler holes (WS1 to WS15) to a depth of between 2.1mbgl and 4.3mbgl and 2 No. hand dug excavated (HA1 and HAS2) to depths of 0.60mbgl and 1.0mbgl. In addition, 4No. in situ CBR tests (DCP CBR) were conducted across the site.

The trial holes were located to give general coverage, taking into consideration the proposed development and the potential geo-environmental and geotechnical risks/hazards highlighted by the CSM in accordance with BS10175. In particular, trial holes were positioned in the location of the proposed building footprints, as well as areas of public open space. Furthermore HA1, HA2 and WS3 were targeted in the vicinity of the identified oil storage bunded tanks.

The trial holes have been located in accordance with the recommendations for the spacing and depth of investigation given in EC7 Part 2 Annex B.

Gas monitoring wells have been installed in trial holes WS6, WS10 and WS12, to provide an initial assessment regards to ground gases.

The investigation rationale for the trial holes is summarised below.

Table 4: Rationale for investigation locations

Trial Hole/Test Location	Rationale	Depth (mbGL)	Notes
WS1 to WS5, WS7 to WS9, WS11, WS13 to WS15	Provide information on ground conditions and geotechnical parameters and provide samples for contamination testing	2.10 – 4.30	All holes refused on dense sand deposits; WS2 presented made ground up to 2.9mbgl and collapsed below 1.2mbgl WS8, WS9, WS15 were used as locations for BRE365 soakage tests
WS6, WS10 and WS12	Provide information on the ground conditions, geotechnical parameters and provide samples for	2.70 - 3.85	Gas monitoring wells installed

	contamination testing. location of gas monitoring wells		
CBR1 to CBR4	Provide in situ CBR values for road and pavement design	-	-
WS6, HA1 and HA2	Targeted at location of fuel storage tanks	0.6 – 2.7	HA1 was used as a location for NHBC 5.3 soakage test

The site investigation locations are shown on Figure 2, Appendix B.

11 Site Work

11.1 Date and Weather Conditions

The intrusive investigations were undertaken on the 29th and 30th August 2017. At the time of the investigations, the weather was sunny occasionally overcast, dry and warm with a maximum temperature of 24˚C on the 29th August. The weather was rainy and cooler with a maximum temperature recorded of 15˚C on the 30th August.

July 2017 was warm in the south east, although fairly unsettled. The mean temperature for the month was equal to the 1981-2001 average for the same period. Rainfall in the south was above the average. August 2017 presented an overall rainy and cooler weather with only brief intervals of fine weather. The provisional UK mean temperature was 14.5 °C, which is 0.4 °C below the 1981-2010 long-term average.

11.2 Site Work Methods

11.2.1 Borehole Drilling

Boreholes were drilled using a windowless sampler tracked rig. The boreholes were excavated at 110mm diameter, reducing to 100mm and 90mm with depth.

11.2.2 Hand Pitting

Hand pits were excavated using a hand auger at 150mm diameter. Spoil was placed on plastic sheeting to prevent cross contamination and was reinstated in reverse order.

11.2.3 Soil Logging and Sampling

Soil samples were recovered from the boreholes and trial pits for field screening, logging and sampling.

Boreholes were logged in general accordance with the requirements of BS 5930: 1999+A2:2010 and BS EN ISO 14688 Pt 1&2. Borehole logs are presented in Appendix F.

Visual and olfactory evidence of contamination was noted if encountered. These observations were used to aid scheduling of samples for chemical laboratory analyses, and are included on the borehole logs.

Samples were collected with a clean sampling trowel or by hand (using dedicated nitrile gloves for each sampling location). Samples were placed into laboratory supplied sampling containers, specific to the type of analyses required.

All sample containers were sealed and labelled with a unique location identity, depth and date of sampling.

11.2.4 Monitoring Well Installation

Three monitoring wells were installed during this investigation within the windowless sample boreholes. The monitoring wells were constructed of 50mm diameter HDPE pipe. The response zone was typically targeted to intercept any ground gas which may be generated, and was surrounded by washed filter gravel. The plain zone was surrounded with bentonite to provide a seal. The monitoring wells were finished with bungs with gas taps and steel covers. Monitoring well installations are shown on the borehole logs and summarised in the following table.

Table 5: Borehole installation details

Borehole	Internal diameter of pipe (mm)	Plain Well Screen (mbgl)	Slotted Well Screen (mbgl)	Bentonite Seal (mbgl)	Comments
WS6	50	0 - 1	1 – 2.7	0 - 1	Monitor ground gases and groundwater adjacent to fuel tank
WS10	50	0 - 1	1 – 3.0	0 - 1	Monitor ground gases
WS12	50	0 - 1	1 – 4.0	0 - 1	Monitor ground gases

11.3 Field Tests

11.3.1 Standard Penetration Tests

Standard penetration tests were undertaken in the boreholes at 1m centres in granular soils in accordance with BS EN ISO 22476-3;2005. Uncorrected blow counts, 'N values', are recorded on the borehole logs in Appendix F.

11.3.2 In-situ California Bearing Ratio Test – Dynamic Cone Penetrometer

Four in-situ CBR tests (CBR1 to CBR4) have been undertaken across the site using the UK Transport Research Laboratory (TRL) Dynamic Cone Penetrometer, recording blow counts over 900mm of penetration from test level. The results of the DCP tests are converted to equivalent CBR values using the Kleyn and Van Heerden[6] correlations. The results are attached in Appendix F.

11.3.3 Percolation Test

One percolation test has been carried out in 150mm diameter hand augered borehole(HA1) in accordance with the NHBC Standards Chapter 5.3 [7]methodology.

11.3.4 BRE365 Soakage Tests

Three. soakage tests have been carried out in windowless sampler holes (WS8, WS9 and WS15) in accordance with BRE Digest 365[8].

11.4 Ground Gas Monitoring

11.4.1 Ground gas monitoring

Six rounds of ground gas monitoring are planned to be completed in approximately 3 months. To date, three visits have been completed and the results are reported and discussed within Section G. It should be noted that the assessment included within this report is preliminary and subject to modifications due to the partial completion of the gas monitoring programme at the time of writing.

The wells were monitored for methane, carbon dioxide, oxygen, hydrogen sulphide and carbon monoxide using a GFM436 Infra-Red gas analyser.

The wells were monitored for volatile organic compounds using a PhoCheck+ Portable Ionisation Detector (PID).

11.5 Laboratory Analysis

11.5.1 Chemical Soil Analysis

Selected samples of soil have been subjected to laboratory testing. Sampling techniques and storage have been undertaken as per BS 10175:2011 Code of Practice for Investigation of

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[6] Klyen EG and Van Heerden. Using DCP Soundings to Optimize Pavement Rehabilitation. Annual Transportation Convention, Johannesburg July 1983 Report LS/83

[7] NHBC Technical Standards 2014

[8] Building Research Establishment Digest 365 Soakaway Design (2003)

Potentially Contaminated Sites. The laboratory testing has been carried out by i2 Analytical laboratory. Where available, the tests procedures are UKAS and MCERTS accredited.

The following analyses were completed on selected samples:

- LEAP Standard soil suite (heavy metals, speciated PAH compounds, asbestos identification);
- Petroleum Hydrocarbons;
- Pesticides and herbicides screening;
- Asbestos Quantification.

The full laboratory test results are presented in Appendix H.

12.5.2 Geotechnical Laboratory Testing

Selected samples of the soils have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd at its laboratories in Watford, in accordance with BS1377[9]. The sampling technique, type, storage and transport and the number of laboratory tests have been undertaken where possible in accordance with BS EN 1997-2:2007 and EN ISO 22475.

The following laboratory tests have been undertaken:

Table 6: Geotechnical laboratory testing

Test	Number of tests	
	Sandy silty clays	Sand
Moisture Content	9	-
Atterberg Limit Test	9	-
Particle Size Distribution Test	-	4
Sulphate Determination	3	1
pH	3	1

12 Ground Conditions

The ground conditions are described in detail in the logs attached in Appendix F. In summary, the soil conditions were as follows:

[9] BS1377 Parts 1-9:1990 Methods of test for Soils for Civil Engineering Purposes

Table 7: Summary of soils encountered

Depth From (m)	Depth To (m)	Soil Type	Description
GL	0.2 / 0.5	**TOPSOIL**	Grass over grey/brown gravelly silty/sandy clay/sand TOPSOIL with roots and rootlets. Gravel is fine to coarse angular to sub rounded flint, siltstone and brick.
GL	0.05 / 0.10	**MADE GROUND**	Pale yellow/pale brown-orange layer of medium to coarse grained sand with occasional gravel of fine to medium sub angular flint. Black plastic membrane at the bottom, in HA2, WS4, WS6, WS9, WS11 (Capillary watering beds)
GL	0.05 / 0.10	**MADE GROUND**	Pea shingle gravel in WS13 and WS14. MADE GROUND (Capillary beds)
GL – 0.05	0.5 / 2.9	**MADE GROUND**	Grey/brown slightly gravelly sand/clay MADE GROUND. Gravel is fine to coarse sub angular to sub rounded flint, brick, concrete and siltstone.
0.2 / 2.9	1.5 / 3.5	**SANDY/SILTY CLAY**	Soft to stiff orange mottled brown gravelly silty sandy CLAY. Gravel is fine to medium-coarse angular to sub rounded flint, siltstone with occasional organic speckling and staining and roots and rootlets. Becoming sandier and more gravelly with depth.
1.5 / 3.5	4.3*	**SAND**	Medium dense to dense orange/pale yellow and white medium grained SAND occasionally moist and silty

*denotes full depth of the investigation

The site is underlain by made ground in variable thickness but generally to a maximum depth of 0.5mbgl across the site. Only borehole WS2 located in the rear garden of the residential property on-site encountered made ground to a maximum depth of 2.9mbgl.

The trial holes within the glasshouses and polytunnel areas generally presented a layer of medium grained sand (capillary bed) from GL to 0.05-0.1mbgl with a plastic membrane located at the bottom of the layer. WS13 and WS14 presented a layer of pea shingle gravel from GL to 0.05-0.1mbgl also used as capillary bed for the plants.

The natural soils were generally encountered below the made ground from 0.2-2.9mbgl and were found to comprise soft to stiff gravelly silty sandy clays to 1.5-3.5mbgl over medium dense to dense medium grained sand to a maximum depth of 4.3mbgl, which denoted the maximum depth of the investigation. Gravel is fine to medium-coarse angular to sub rounded flint, siltstone with occasional organic speckling and staining and roots and rootlets.

12.1.1 Groundwater

Groundwater strikes were recorded in the following trial holes:

Table 8: Groundwater strikes

Trial Hole	Date of water strike	Depth to Groundwater strike (mbGL)	Comments
WS8	29/08/2017	2.05	Slight seepage

Groundwater encountered at 2.05m in WS8 during drilling. During the site investigation, clay and sand deposits at depth were found to be occasionally moist. Groundwater level checks during gas monitoring visits found wells to be dry aside from WS12, which had a water level of 3.97-4.0mbgl on two of the visits.

12.1.2 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of contamination was noted during the investigation works except for inclusions in the made ground identified with fragments of brick, and concrete. Fragments of blacktop and plastic pipe were encountered in the made ground deposits in WS2.

E GEOTECHNICAL INFORMATION

13 Strata Encountered

13.1 Made Ground

The site is underlain by made ground in variable thicknesses but generally to a maximum depth of 0.5mbgl across the site. Borehole WS2 located in the rear garden of the residential property on-site presented made ground to a maximum depth of 2.9mbgl.

Made ground or fill is by nature highly variable in both composition and bearing capacity, and can be subject to large differential settlements when loaded. It is therefore generally unsuitable for use as a bearing stratum. In addition, made ground may contain contaminated and/or putrescible material. It can therefore be potential source of contamination and landfill gas.

13.2 Sandy silty Clay

The made ground was underlain by generally soft to firm orange mottled brown gravelly silty sandy clays to a maximum depth of 3.5mbgl. Results of the Particle Size Distribution tests and the geotechnical results for sandy silty clay deposits is presented in the table below.

Table 9: Summary of Particle Size Distribution tests for sandy clay deposits

Strata	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Cobbles (%)
Sandy clays	14-17	19-25	56-57	1-11	0

Table 10: Summary of geotechnical test results for sandy/silty clay

Test	Range
SPT 'N value'	1 - 28
Moisture Content (%)	15.1 - 26.9
Liquid Limit (%)	24 - 56
Plastic Limit (%)	12 - 20
Plasticity Index (%)	9 - 36
Sulphate Content (g/l)	<0.01 - 0.01
pH	6.7 – 7.7

The majority of the "N values" obtained were below N=10 with few above with higher values in excess of N=20 at the base of the sandy clay deposits. The Plasticity index results are noted

to vary widely which is likely to be due to the variable sand and silt content within the cohesive soils.

The recorded compressive strength of the clays is variable with recorded values varying between 20 and 200kPa. This variability and general decrease with depth is probably due to an increase in sand content having a negative effect on the hand penetrometer results. Where high sand content clay is encountered a reciprocal increase in the 'N' value is often recorded however, a noticeable decrease in both results has been noted between 1 and 2m depth across the site. These correlations are shown in a graph within Appendix F which plots SPT 'N' values and hand pen results related to depth.

13.3 Sands

The clay deposits were underlain by sand to the maximum extent of the investigation (4.3mbgl). The results of the geotechnical laboratory testing are summarised in Table and Table below.

Table 11: Summary of Particle Size Distribution tests for sand

Strata	Clay (%) & Silt (%)	Sand (%)	Gravel (%)	Cobbles (%)
WS6 at 2.7mbgl	9-14	74-90	1-12	0

Table 12: Summary of geotechnical test results for sand

Test	Range
SPT 'N value'	9 – 112
Sulphate Content (g/l)	0.02
pH	6.6

The SPT 'N' Values generally ranged between 'N'= 25 and 78 with values generally increasing with depth.

F GEOTECHNICAL APPRAISAL

The foregoing geotechnical appraisal does not constitute a Geotechnical Design Report in accordance with EN1997. The following recommendations are for preliminary design purposes only.

For the detailed design, the short-term and long-term design situations must be considered. Where relevant, the following limit states should be considered:

- Loss of equilibrium of the structure or the ground, considered as a rigid body, in which the strengths of structural material and the ground are significant in providing resistance (EQU);
- Internal failure or excessive deformation of the structure or structural elements in which the strength of structural materials is significant in providing resistance (STR);
- Failure or excessive deformation of the ground, in which the strength of soil or rock is significant in providing resistance (GEO);
- Loss of equilibrium of the structure or the ground due to uplift by water pressure or other vertical actions (UPL);
- Hydraulic heave, internal erosion and piping in the ground caused by hydraulic gradients (HYD).

The following factors should also be considered:

- Overall stability and ground movements;
- Nature and size of the proposed construction including the design life;
- Conditions with regards to the surroundings (e.g. neighbouring structures, traffic, utilities, vegetation, contamination etc.)
- Ground and groundwater conditions;
- Influence of the environment.

14 Swelling and Shrinkage

Based on the laboratory test results in Section E, an overall classification of NHBC **MEDIUM** Volume Change Potential (VCP) is recommended for the clay soils.

Foundations will require deepening in accordance with NHBC Chapter 4.2 where clay soils are encountered near existing, felled or proposed trees. Foundation depths should be calculated based on the mature height of the tree, however, the existing height is relevant for trees which are to be removed.

15 Sulphates

Three samples of the sandy/silty clays deposits were tested for sulphate content and pH. In accordance with the BRE[10] methodology and the number of samples tested, the site has been classified on the highest measured sulphate content. Based on the results detailed in Section E and the above, the soils are classified by the BRE as sulphate design class DS-1, and, assuming a mobile groundwater table, the ACEC class is AC-1.

One sample of the sand deposits was tested for sulphate content and pH. Based on the results detailed in Section E and the above, the soils are classified by the BRE as sulphate design class DS-1, and, assuming a mobile groundwater table, the ACEC class is AC-1.

16 Groundwater

Groundwater was encountered during the investigation only in borehole WS8 at 2.05mbgl however the sand deposits at depth and the base of the clay deposits stratum have been occasionally found to be moist. Given the local geology and the site investigation findings, potential shallow and/or perched groundwater can be encountered on-site.

Light pumping from sumps maybe required to maintain suitably dry conditions for shallow excavations.

Long term groundwater monitoring was beyond the scope of works and would be required to fully assess the groundwater regime. During the gas monitoring works, groundwater levels were measured at the monitoring points. The wells were found to be dry aside from WS12, which had a water level of 3.97-4.0mbgl on two of the three visits.

17 Soakage Potential

17.1 Test Results

Four soakage tests in total were undertaken on-site, 1 No. to NHBC 5.3 in a hand dug hole and 3 No. deeper soakage tests to BRE365 standards within the windowless sampler boreholes. Given the time restrictions, it was only possible to fill and test three boreholes once except

[10] Building Research Establishment Special Digest 1: 2005. Concrete in aggressive ground. Part 1: Assessing the aggressive chemical environment.

for WS9 for which the test was repeated twice. The results are attached in Appendix F and are summarised below.

Table 13: Summary of BRE365 tests for WS8, WS9 and WS15

Test Location	Soakage Rate (m/s)	Comments
WS8	$1.77x10^{-6}$	Result not compliant with BRE365 requirement since water did not fall to 25% of the max water depth
WS9	First test: $7.1x10^{-6}$ Second test: $1.9x10^{-6}$	First test: The pit was nearly empty at the end of the test Second test: Result not compliant with BRE365 requirement since water did not fall to 25% of the max water depth
WS15	$1.88x10^{-6}$	Result not compliant with BRE365 requirement since water did not fall to 25% of the max water depth

One shallow percolation test was undertaken in the hand dug hole in accordance with the NHBC Standards Chapter 5.3 methodology. Given the time constrictions, it was only possible to complete one test at a single depth in each borehole. The results are summarised below.

Table 14: Summary of shallow soakage test for HA1

Test Location	Depth of Water (mbGL)	Comments
HA1	1.0	Water level did not change over time. It remained 0.69mbgl

The NHBC 5.3 test carried out in HA1 did not indicate any soakage. Therefore, a further 3 No. soakage tests were carried out an increased depth in the sand soils in accordance with BRE365 standards. On the basis of the information on the logs, the tests were undertaken covering both the sandy silty clay deposits and the more permeable sand deposits at depth, returning an overall permeability representative of both strata described containing clay and sand.

17.2 Recommendations

Based on the above results obtained from the soakage tests undertaken within the sand deposits, soakage rates ranged between 0.11 and 0.42 l/m^2/s with the first test undertaken on WS9 recording a soakage rate of 0.42 l/m^2/s.

Therefore, according to the calculations, an average BRE365 soakage rate of 3.2x10^{-6} m/s is recommended for the design of soakaways within the sands at this stage. It should be noted that due to the fact that the site is located within a Total Catchment area for Groundwater SPZ, it is recommended to check with the Environment Agency before designing soakaways to ensure that a consent to discharge could be obtained.

The clay deposits are unsuitable for conventional soakaways.

Overall, it is recommended that an allowance should be made for at surface water to be piped off-site at this stage.

18 Bearing Capacity and Foundations

18.1 Shallow Foundations

It should be noted that soft clays have been encountered in the majority of the boreholes drilled (WS3, WS5 to WS11, WS13 and WS15) generally soft below 1.0mbgl and at depth. Therefore, it is recommended that foundations a piled foundation might be a more viable option.

18.2 Piling

An outline pile design was beyond the scope of the investigation. Assuming that the dense sands encountered to date extend to depth, it may be possible to construct piles at a depth of around 10m. However, cable percussion boreholes and additional testing would be required to confirm the ground conditions at depth and provide an outline design.

19 Floor Slabs

With reference to NHBC Standard 5.1, ground bearing floor slabs may be applicable on-site provided:

- Trenches are backfilled with suitable material and fill is properly compacted;
- Infill is less than 600mm in depth and properly compacted;
- Bearing capacity and nature of the soils encountered are consistent across the proposed development;
- Foundations are not affected by trees.

In addition, ground bearing floor slabs are not suitable where vibratory ground improvement techniques have been employed on site. Further consideration to the suitability of ground bearing floor slabs should also be given on sloping or waterlogged sites, and where a chemical, particularly sulphate, hazard has been identified,

The site has been assessed as at negligible risk from radon and ground gases on-site. On the basis of the gas monitoring to date, in accordance with CIRIA C665, the site has been characterised by the NHBC traffic light system as GREEN. Therefore, special precautions are therefore not required to be incorporated into the floor slab design, in accordance with BR414[11].

20 Roads

20.1.1 Test Results

A series of 4 No. dynamic cone CBR tests were carried out along the line of the proposed access roads. The majority of the results were in the range of 1.2 - 5.9% with one result of 9.3% for CBR2 at 250-350mm of depth.

20.1.2 Recommendations

Based on the measured insitu testing, a preliminary design CBR value of 2% is recommended for the sandy clay subgrade.

The made ground soils are highly variable, comprising silty clays with various building rubble. Where made ground is encountered at formation level, over excavation to, say 1m below ground level, such as within WS3 and WS5, proof rolling and then controlled back filling to formation level with a suitable granular fill may be acceptable. Soft spots should also be anticipated and will require over excavation and controlled back filling.

The shallow soils are assessed as frost susceptible, based on the results of the plasticity testing (see Section E).

21 Excavations

Excavations in made ground and loose superficial soils are likely to be unstable and subject to collapse. Close lateral support will be required in all excavations where man entry is required.

Excavations in the silty sandy clays should be stable in the short term. However, groundwater seepages should be anticipated along the more granular horizons. Excavations will therefore

[11] BRE414 Protective measures for housing on gas-contaminated land. Roger Johnson (2001)

be unstable in the long term and should be backfilled as soon as possible. Allowance should be made for light pumping.

Appropriate Health and Safety precautions must be adhered to where man entry into excavations is required. Even stiff clay soils at shallow depth can collapse, particularly following wet weather, and great care should be taken at all times.

22 Filling

The preliminary recommendations contained within this report assume that ground levels are to remain at a similar level across the site for the proposed development, and that no significant changes in level are proposed. In the event that ground levels are to be raised, this may induce significant settlement, particularly across the areas of deep made ground around WS2 which could adversely affect foundation design, drainage etc. Where significant changes in ground levels are proposed then further investigation will be required to assess the impact of such earthworks on the above recommendations.

23 Slope Stability

The site is located on a gentle slope, with a fall of approximately 4.0m over the whole site. The development terraces have given rise to a number of low but steep banks which vary between 0.5m and 1.5m in height. With the most significant slope being that forming the site's western boundary with Petersfield Road where a maximum slope angle of approximately 36° has been calculated. At this stage, no specific testing or assessment has been carried on these slopes but further investigation and assessment is recommended. At this point however, the following general recommendations for developing on slopes are provided:

- Care must be taken to ensure that any cut and fill operations do not destabilise the slope. As a general principal, loading at the crest and cutting at the toe would have such an effect;
- Retaining walls should be avoided if possible, kept to a maximum height of 900mm where necessary, and include adequate drainage. Retaining structures over 900mm in height will require global stability checks and detailed design;
- Filling of subfloor voids should be avoided;
- Drainage of the site will be crucial;
- All drains should be laid at twice the normal fall to accommodate any local ground movement;

- Where houses include partial basements, allowance should be made for the design of the walls as retaining structures;
- Vegetation will have stabilising effect and should be maintained for as long as possible;
- Introduction of water into the slope must be avoided. Soakaways should be kept remote from slopes and services at the slope crest should be designed accordingly, with, for example, clay breaks in the surround;
- Excavations across the slope should be avoided if possible. Where necessary, they should be kept to short lengths, say 5m, and backfilled immediately.

Global stability checks will be required when developing on slopes and allowance should be made for slope stability analyses at the design stage.

24 Retaining Walls

The project is currently at a preplanning stage and as such no detailed drawings have been provided for assessment.

General recommendations for retaining walls are provided for consideration:

Care should be taken to ensure any retaining walls are founded on competent soils and do not upset the overall stability of the slope. Low retaining walls up to 900mm high may be used providing the overall safe slope is not exceeded. Detailed global stability checks will be required for any walls exceeding 900mm in height.

Care must be taken to ensure any loads are kept remote from the retaining walls, or extend below the base of the retained soils.

Retained soils must be adequately drained to prevent the build up excess porewater pressures. For some of the smaller retaining structures proposed, alternatives such as gabion walls, soil nailing or the use of ground improvement techniques may be considered as an alternative.

25 Settlement

Based on the allowable bearing capacity given in Section 18, settlements should be within typical tolerable limits for the low-rise development proposed.

If soft clays are encountered at formation level or below, significant settlement should be anticipated and serviceable limit state analyses will be required. For Geotechnical Category 2 and 3 structures, detailed settlement analyses are usually required.

At this stage, it is assumed that ground levels will remain at the current level for the proposed development. If significant level raises are proposed, this may induce significant settlement in the natural soils and detailed settlement analyses will be required.

Where foundations are stepped or span different soil types, differential settlement should be anticipated and allowance should be made for nominal reinforcement.

26 Heave and Uplift

In accordance with NHBC Standards Chapter 4.2, precautions against heave should be used where foundations are within the influence of trees and the resulting foundation depth is greater than 1.5m. Compressible material must be provided against the inside faces of all external wall foundations greater than 1.5m in depth. For pier and beam foundations, additional voids are required below ring beams.

Heave may also occur where shrinkable soils are unloaded, in say, basement excavations. To avoid uplift pressures, voids or buffer zones should be left beneath floor slabs. As a preliminary guide, allowance should be made for a 300mm void for highly shrinkable clays, reducing for lower plasticity soils. This should be confirmed at the detailed design stage.

For piled foundations, the effect of uplift induced by heave must be included in the pile design. Piles should be reinforced for the length of pile governed by the heave design, and allowance should be made for the inclusion of void former or similar on the underside of ground beams.

G GEO-ENVIRONMENTAL APPRAISAL

27 Conceptual Site Model

The preliminary conceptual site model has identified a number of potential pollutant linkages.

On-site sources of contamination have been identified, with the oil storage tanks and the obsolete heaters located within the south-eastern extent of the site, the potential presence of made ground of unknown origin on-site and asbestos cement materials within the buildings' structures, and the repeated application of pesticides/herbicides and fertilisers as part of the nursery activities.

All of these are likely to impact the site posing a risk to construction workers, future residents of the areas and users of adjacent sites. Potential contaminants include: heavy metals, petroleum hydrocarbons, volatile and semi-volatile gases, polycyclic aromatic hydrocarbons, asbestos and pesticides.

There are no off-site sources of potential contamination that are likely to impact the site.

28 Testing Strategy

28.1 Soil Sampling

Trial hole locations were both designed to target specific sources of contamination (i.e. the oil tanks present on-site) and non-targeted locations in order to provide even coverage of the site. The trial hole spacing was consistent with the recommended density of 25 to 50m for an exploratory investigation after BS10175 Section 7.7.

Samples have been tested for the presence of the identified contaminants of concern (heavy metals, speciated PAH compounds, targeted speciated total petroleum hydrocarbon including MBTE and BTEX compounds, pesticides and asbestos screening).

Whilst many of the potential sources of contamination have been targeted, it has not been possible to target all the sources due to the presence of services, operational buildings and vehicle access roads.

28.2 Land gas monitoring

The land gas investigation strategy has been designed generally in accordance with CIRIA[12] and NHBC[13] guidance.

Monitoring wells have been placed in 3 No. holes, WS6, WS10 and WS12.

The sensitivity of the development has been combined with the generation potential of the source to determine an ideal well spacing, together with monitoring frequency and period. In this instance, the sensitivity of the development (residential with gardens) is rated as HIGH. The generation potential of the source has been assessed using the modified form of the Wilson and Card Classification scheme as presented in CIRIA665, as MODERATE risk.

On-site, the well spacing is <25-50m and the monitoring frequency scheduled is 6 visits over 3 months.

29 Assessment Criteria

29.1 Human Health Assessment Criteria

Pollutant linkages containing human health have been risk assessed by comparing the soil laboratory test results to Tier 1 Generic Assessment Criteria. These are based on published Suitable for Use Levels (S4UL[14]) and Category Four Screening Levels (C4SL[15]) assuming a residential with plant uptake land use.

Concentrations of seven genotoxic PAH compounds have been compared to ratio reported from coal tars by Culp et al, 1999. The ratios have been found to typically be within an order

[12] Wilson S, Oliver s, Mallett H, Hutchings H and Card G. 2007. Assessing risks posed by hazardous ground gases to buildings. CIRIA Report 665.

[13] Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present, incorporating "traffic lights", Report 10627-R01-(02) for NHBC 2006 Boyle, R and Witherington, P

[14] The LQM/CIEH S4ULs for Human Health Risk Assessment, Nathaniel P et al, 2015. Copyright Land Quality Management Ltd, reproduced with permission: Publication Number S4UL3509

[15] CL:AIRE Final Project Report. SP1010 – Development of Category 4 Screening Levels for assessment of land affected by contamination. CL:AIRE, December 2013

of magnitude and thus the concentrations of benzo(a)pyrene have been used a proxy for the genotoxic PAH compounds in accordance with current HPA guidance. The remaining non-genotoxic PAH compounds have been screened individually against S4ULs.

In accordance with current HPA guidance[16], the assessment of PAHs has been carried out using a surrogate marker approach, whereby the assessment of risk from benzo(a)pyrene also captures potential risks from other carcinogenic PAHs that may be present. The threshold PAHs have been assessed similarly, by using Naphthalene as a marker compound.

29.1.1 Statistical Assessment

In assessing soil test results and comparing them to any threshold or screening value, an assessment must first be made as to how accurately the test results reflect the true mean of the contaminant level within the ground. In this assessment for each parameter the test data have been subjected to statistical assessment based on the methodology set out in *CIEH report 2008: Guidance on comparing Soil Contamination Data with a Critical Concentration*. The Upper Confidence Level or U_{95} value is thereby calculated as being the level at which we would be 95% confident that the true mean is **less** than this value. For the purposes of this assessment, a conservative approach has been adopted in the statistics. All non-detect values have been treated as being equal to half the limit of detection.

It should be noted that for the purposes of these assessments, no statistical outliers have been excluded. The CIEH guidance document that accompanies the statistics calculator states:

> ***outliers should be excluded from a dataset ONLY where they:***
>
> - *are obviously and demonstrably the result of an error that can be identified and explained,* ***or***
> - *clearly indicate that more than one soil population exists within the dataset and this can be justified by (or informs the further development of) the conceptual model.*

29.2 Land Gas Assessment Criteria

By way of a preliminary risk assessment we have adopted "The pragmatic approach to ground gas risk assessment" as presented by Card et al 2012[17]. This approach considers the Total Organic Content (TOC) of the made ground as well as the age and depth of the fill.

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[16] HPA Contaminated Land Information Sheet. Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs). Version 3. Health Protection Agency, 2010.

[17] Card G., Wilson S, Mortimer S. 2012. A pragmatic approach to ground gas risk assessment. CL:AIRE Research Bulletin RB17.

An initial assessment has been made using the method outlined in CIRIA 665[18] for low rise housing. This is consistent with current NHBC guidance for low rise housing.

In this assessment, the model low rise house is assumed, i.e. one with a floor plan area of 8mx8m, a well-ventilated sub-floor void of 150mm and a minimum ventilation rate of one complete volume change per 24 hours.

A risk based method is used to allow for identification of gas protection measures for such housing by comparing measured emission rates to generic "Traffic Lights". Typical maximum concentrations of methane and carbon dioxide are considered and where these exceed typical maximums for the generation potential of the particular source then risk based Gas Screening Values are considered. In this assessment, the highest concentrations have been combined with the highest flow rates to provide a conservative Tier 1 assessment.

The source is then rated as Green, Amber 1, Amber 2 or Red and appropriate design protection measures recommended in line with NHBC guidance

30 Analytical Test Results – Soils

The soil samples collected and tested have been subdivided into three populations representing topsoil, made ground and natural ground present on-site. The test results for each population have been subjected to statistical analysis as described above and the results presented in the following sections.

30.1 Metals and Non-Metals – Topsoil

Three topsoil samples have been recovered on-site and tested in the laboratory. The results have been presented in the following table.

[18] Wilson S, Oliver s, Mallett H, Hutchings H and Card G. 2007. Assessing risks posed by hazardous ground gases to buildings. CIRIA Report 665.

Table 15: Summary of soil contamination test results within TOPSOIL (3 samples)

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier 1 Generic Assessment Criteria Residential with private gardens (mg/kg)	Samples which exceed GAC (Including outliers)
Arsenic	15	28.08	98	37	None
Cadmium	0.1	0.1	100	26	None
Hexavalent Chromium	0.2	0.2	100	21	None
Trivalent Chromium	16	17.68	100	910	None
Copper	10.67	12.12	100	2400	None
Lead	21.33	23.91	100	200	None
Mercury	0.15	0.15	100	40[1]	None
Nickel	8.7	10.64	100	170	None
Selenium	1.3	2.56	100	250	None
Zinc	58	84.97	100	3700	None

Notes to table

1. *Assessment criterion based on inorganic Mercury*

There is at least a 95% confidence limit that the true mean of each of the above parameters for all the samples tested is below the relevant acceptance criteria. That is to say that, statistically, there is an acceptable degree of confidence that the soils are not contaminated with any of the above parameters.

30.2 Polycyclic Aromatic Hydrocarbons (PAH) - Topsoil

Polycyclic aromatic hydrocarbons (PAH) are widespread within made ground and the urban environment generally. They are one of the most common contaminants in made ground and the one that most commonly drives remediation. Benzo(a)pyrene (BaP) is a particular

problem, being very commonly found in association with tarmac, clinker and any burnt products and also being highly toxic to human health. The assessment criterion for BaP is close to levels that are found naturally in many topsoils and this makes it very difficult for any population of soils to pass the CIEH statistics with a 100% evidence level.

The BaP and naphthalene results have been subject to statistical analysis as for the metals.

The mean Soil Organic Matter of the population has been used to determine an appropriate Tier 1 GAC for each population. The results are summarised as follows:

Table16: Summary of BaP and naphthalene in TOPSOIL (3 samples) - mean SOM 1%

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier1 Generic Assessment Criteria[1] (mg/kg) Residential with plant uptake 1% SOM	Samples that exceed GAC (Including outliers)
Benzo(a)pyrene	0.22	0.52	100	2.2	None
Naphthalene	0.025	0.025	100	2.3	None

From the statistical results in the table above, no exceedances of the relevant assessment criteria for marker contaminants specified has been detected among the samples tested. There is at least a 95% confidence limit that the true mean of each of the above parameters for all the samples tested is below the relevant acceptance criteria. That is to say that, statistically, there is an acceptable degree of confidence that the soils are not contaminated with any of the above parameters.

30.3 Metals and Non-Metals – Made Ground

Four samples have been retrieved from made ground present on-site. The tests results are presented in the following table.

Table 17: Summary of soil contamination test results within MADE GROUND (5 samples)

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier 1 Generic Assessment Criteria Residential with private gardens (mg/kg)	Samples which exceed GAC (Including outliers)
Arsenic	10.54	14.84	100	37	None
Cadmium	0.16	0.42	100	26	None
Hexavalent Chromium	2	2	100	21	None
Trivalent Chromium	13.28	16.65	100	910	None
Copper	13.84	18.38	100	2400	None
Lead	50.6	148.58	98	200	None
Mercury	0.15	0.15	100	40[1]	None
Nickel	11.76	17.45	100	170	None
Selenium	1.32	3.51	100	250	None
Zinc	115.8	185.69	100	3700	None

Notes to table

1. *Assessment criterion based on inorganic Mercury*

From the results presented in the table above, there is at least 95% confidence that the true mean of the above contaminants is below the GAC. No exceedances of the relevant assessment criteria have been recorded for the parameters tested across the site.

30.4 Polycyclic Aromatic Hydrocarbons (PAH) – Made Ground

Five samples recovered have been tested for polycyclic aromatic hydrocarbons compounds (PAH). The mean Soil Organic Matter of the population has been used to determine an appropriate Tier 1 GAC for each population. The results are summarised as follows:

Table 18: Summary of BaP and naphthalene in MADE GROUND (5 samples) - mean SOM 1%

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier1 Generic Assessment Criteria[1] (mg/kg) Residential with plant uptake 1% SOM	Samples that exceed GAC (Including outliers)
Benzo(a)pyrene	0.81	1.9	97	2.2	WS2 at 1.0mbgl (2.7mg/kg)
Naphthalene	0.025	0.025	100	2.3	None

There is at least 97% confidence limit that the true mean of each of the above marker parameters for the samples tested is below the relevant assessment criteria. Therefore, statistically, there is an acceptable degree of confidence that the soils are not contaminated with any of the above parameters.

However, one marginal exceedance has been identified in the sample recovered from hole WS2 at 1.0mbgl presenting a concentration of 2.7mg/kg benzo(a)pyrene (assessment criterion: 2.2mg/kg). Trial hole WS2 is located in the rear garden of the nursery owner's property on-site and it is also the only location which encountered made ground to a maximum depth of 2.90mbgl. Information on the borehole log describes the made ground containing fragments of blacktop, and therefore the benzo(a)pyrene higher concentration compared to the other hole locations can be associated with this. It is further noted that the measured concentration is below the Category 4 Screening Level of 5mg/kg for this contaminant.

Due to the fact that the made ground deposits found in WS2 were considerably different from the made ground encountered in the rest of the site, the statistical assessment with the results for WS2 removed is presented in the following table.

Table 19: Summary of BaP and naphthalene in MADE GROUND (4 samples) - mean SOM 1%

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier1 Generic Assessment Criteria[1] (mg/kg) Residential with plant uptake 1% SOM	Samples that exceed GAC (Including outliers)
Benzo(a)pyrene	0.33	1.46	98	2.2	None
Naphthalene	0.025	0.025	100	2.3	None

There is not a significant difference between the two statistical analysis undertaken and there is now at least 98% confidence limit that the true mean of each of the above marker parameters for the samples tested is below the relevant assessment criteria.

30.5 Metals and Non-Metals – Natural Ground

Four samples have been retrieved from natural geology present on-site. The tests results are presented in the tables below.

Table 20: Summary of soil contamination test results within NATURAL GROUND (3 samples)

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier 1 Generic Assessment Criteria Residential with private gardens (mg/kg)	Samples which exceed GAC (Including outliers)
Arsenic	10.63	33.23	96	37	None
Cadmium	0.1	0.1	100	26	None
Hexavalent Chromium	2	2	100	21	None
Trivalent Chromium	12.67	24.51	100	910	None

Copper	9.07	10.08	100	2400	None
Lead	23.33	52.06	99	200	None
Mercury	0.15	0.15	100	40[1]	None
Nickel	8.83	15.38	100	170	None
Selenium	0.5	0.5	100	250	None
Zinc	37.33	49.17	100	3700	None

Notes to table

1. *Assessment criterion based on inorganic Mercury*

There is at least 95% confidence limit that the true mean of each of the above parameters for the samples tested is below the relevant assessment criteria. Therefore, statistically, there is an acceptable degree of confidence that the soils contain no contamination with any of the above parameters.

30.6 Polycyclic Aromatic Hydrocarbons (PAH) – Natural Ground

Three samples from the natural geology have been tested for PAH compounds. The mean Soil Organic Matter of the population has been used to determine an appropriate Tier 1 GAC for each population. The results are summarised as follows:

Table 21: Summary of BaP and naphthalene in NATURAL GROUND (3 samples) - mean SOM 6%

Determinant	Arithmetic Mean (mg/kg)	UCL U_{95} (mg/kg)	Evidence Level (%)	Tier1 Generic Assessment Criteria[1] (mg/kg) Residential with plant uptake 6% SOM	Samples that exceed GAC (Including outliers)
Benzo(a)pyrene	0.025	0.025	100	3	None
Naphthalene	0.025	0.025	100	13	None

There is 100% confidence limit that the true mean of each of the above marker parameters for the samples tested is below the relevant acceptance criteria. Therefore, statistically, there is an acceptable degree of confidence that the soils are not contaminated with any of the above parameters.

30.7 Petroleum Hydrocarbons (PHC) – Made Ground

The petroleum hydrocarbon (PHC) testing on the made ground has been undertaken on targeted samples near the existing oil storage tanks for the most part and as such statistical analysis is not appropriate. Three samples collected from made ground deposits (HA2 at 0.20mbgl, WS3 at 0.3mbgl and WS8 at 0.10mbgl) have been tested in the laboratory and the results are summarised as follows.

Table 22: Summary of petroleum hydrocarbon test results for MADE GROUND (3 soil samples)

Determinant	Results (mg/kg)	Tier 1 Generic Assessment Criteria (mg/kg) Residential with plant uptake 1% SOM	Samples that exceed GAC (including outliers)
PHC Aliphatic C5-6	< 0.001	42	None
PHC Aliphatic C6-8	< 0.001	100	None
PHC Aliphatic C8-10	< 0.001	27	None
PHC Aliphatic C10-12	< 1.0	130(48)^{vap}	None
PHC Aliphatic C12-16	< 2.0	1100(24)^{sol}	None
PHC Aliphatic C16-21	< 16.0	65000(8.48)$^{f, sol}$	None
PHC Aromatic C5-7	< 0.001	70	None
PHC Aromatic C7-8	< 0.001	130	None
PHC Aromatic C8-10	< 0.001	34	None

PHC Aromatic C10-12	< 1.0	74	None
PHC Aromatic C12-16	< 2.0	140	None
PHC Aromatic C16-21	< 10	260	None
PHC Aromatic C21-35	< 10	1100	None

Notes to Table

Assessment Criteria assume that no free phase product is present
Assessment Criteria based on subsurface soil to indoor air correction factor of 10
Oral dermal and inhalation exposure compared with Oral Health Criteria value
[sol] Assessment Criteria presented exceeds the solubility saturation limit which is presented in brackets
[vap] Assessment Criteria presented exceeds the vapour saturation limit which is presented in brackets

All samples tested presented concentrations of PHC below the laboratory detection limit and therefore no contamination in the made ground associated with PHC compounds has been identified.

30.8 Petroleum Hydrocarbons (PHC) – Natural Ground

The PHC testing on natural soils has been carried out on targeted samples for the most part and as such statistical analysis is not appropriate. Two samples from natural ground have been tested for these compounds and the test results are summarised below.

Table 23: Summary of petroleum hydrocarbon test results for NATURAL GROUND (2 soil samples)

Determinant	Results (mg/kg)	Tier 1 Generic Assessment Criteria (mg/kg) Residential with plant uptake 6% SOM	Samples that exceed GAC (including outliers)
PHC Aliphatic C5-6	< 0.001	160	None
PHC Aliphatic C6-8	< 0.001	530	None
PHC Aliphatic C8-10	< 0.001	150	None
PHC Aliphatic C10-12	< 1.0	760(283)[vap]	None
PHC Aliphatic C12-16	<2.0 to 2.3	4300(142)[sol]	None

PHC Aliphatic C16-35	<8.0 to 20	110000[f]	None
PHC Aromatic C5-7	< 0.001	300	None
PHC Aromatic C7-8	< 0.001	660	None
PHC Aromatic C8-10	< 0.001	190	None
PHC Aromatic C10-12	< 1.0	380	None
PHC Aromatic C12-16	< 2.0	660	None
PHC Aromatic C16-21	<10 to 12	930	None
PHC Aromatic C21-35	<10 to 20	1700	None

Notes to Table

Assessment Criteria assume that no free phase product is present
Assessment Criteria based on subsurface soil to indoor air correction factor of 10
Oral dermal and inhalation exposure compared with Oral Health Criteria value
[sol] Assessment Criteria presented exceeds the solubility saturation limit which is presented in brackets
[vap] Assessment Criteria presented exceeds the vapour saturation limit which is presented in brackets

Despite the presence of low concentrations of the heaviest fractions of both aromatic and aliphatic PHC compounds identified in HA1 at 0.20mbgl, the majority of the test results were below the laboratory detection limit and no exceedances of the assessment criteria were reported among the samples tested.

30.9 Asbestos

All of the soil samples tested were subjected to asbestos screening and identification in order to detect presence of asbestos containing materials (ACM) and/or loose asbestos fibres. None of the samples were found to contain asbestos.

30.10 Pesticides Screening

Three samples collected from made ground in WS4 at 0.07mbgl, WS11 at 0.03mbgl and WS15 at 0.15mbgl were tested for pesticides and herbicides screening. None of the samples tested reported the presence of such compounds above the laboratory detection limits.

31 Land Gas Monitoring Results

Three gas monitoring wells have been installed in WS6, WS10 and WS12. The gas monitoring programme planned for the site includes 6 visits over a period of approximately 3 months with a two-week frequency.

Details of the monitoring result for the individual holes and visit are reported in the following tables.

Table 24: Summary of land gas monitoring results for hole WS6

Monitoring Visit Date	WS6					
	CO_2 (%)	CH_4 (%)	CO (%)	O_2 (%)	Flow rate (l/hr)	Atmospheric Pressure (mB)
07/09/2017	1.69	0	0	16.64	0.28	1007
20/09/2017	2.55	0	0	14	0	1011

Table 25: Summary of land gas monitoring results for hole WS10

Monitoring Visit Date	WS10					
	CO_2 (%)	CH_4 (%)	CO (%)	O_2 (%)	Flow rate (l/hr)	Atmospheric Pressure (mB)
07/09/2017	2.6	0	0	16.82	4.27	1008
20/09/2017	2.75	0	0	16.25	0	1011

Table 26: Summary of land gas monitoring results for hole WS12

Monitoring Visit Date	WS12					
	CO_2 (%)	CH_4 (%)	CO (%)	O_2 (%)	Flow rate (l/hr)	Atmospheric Pressure (mB)
07/09/2017	1.53	0	0	17.14	0	1010

20/09/2017	4.62	0	0	13.78	0	1011

32 Risk Assessment

32.1 Human Health

The works to date have not identified any significant contamination with respect to identified human health receptors.

The works carried out to date have indicated that the topsoils and natural soils beneath the site contains low concentrations of the tested contaminants, significantly below the relevant assessment criteria. Similarly, made ground deposits present low concentrations of the tested contaminant in all locations tested except for WS2 located in the rear garden of the owner's property on-site. One sample recovered from1.0mbgl from the area of deeper made ground presented a concentration of 2.7mg/kg for benzo(a)pyrene which marginally exceeded the generic assessment criterion of 2.2mg/kg. This exceedance has been however correlated to the noted presence of fragments of blacktop noted within the recovered hole core. It is further noted that it is below the category 4 screening level of 5mg/kg for this contaminant, so is not of sufficient concern to warrant remediation in and of itself.

Targeted samples and locations tested for petroleum hydrocarbons did not contain exceedances of the assessment criteria, being the majority of the compounds below the laboratory detection limit, despite the presence of low concentrations of the heaviest fractions of both aromatic and aliphatic hydrocarbons compounds identified in HA1 at 0.20mbgl.

Asbestos, pesticides and herbicides were not detected among any of the samples tested.

Benzo(a)pyrene contamination may impact human health receptors through the direct ingestion, inhalation, skin contact and/or plant uptake pathways that would be present in a residential setting if retained in the near surface of garden/outdoor soft covered areas where direct human contact is feasible. However, the contaminated spot identified on-site is considered to pose a low risk given the marginal exceedance and the depth of the sample.

32.2 Controlled Waters

32.2.1 Groundwater

The site is located above a Principal Aquifer within the Folkestone Formation. The site is also situated within the Total Catchment Source Protection Zone, and the nearest active

abstraction licence is located 940m north-east of the site, licensed to South East Water for public potable water supply.

Specific laboratory testing has not been carried out as part of this investigation to enable a detailed quantitative risk assessment in respect of groundwater. The measured levels of potential contaminants within the soils present on-site are generally low, with only a marginal and localised exceedance for benzo(a)pyrene recorded in hole WS2, which could potentially pose a risk to human health receptors. However, it should be noted that the clay deposits above the sand might mitigate the leaching and the migration of it to the groundwater table. Therefore, despite the potential for shallow/perched groundwater to be encountered, and considering the marginal exceedance recorded and the presence of less permeable clay deposits, this source is unlikely to pose a significant risk to groundwater at this stage. This assessment should be reconsidered if significant contamination is identified at a later stage.

32.2.2 Surface Water

There are no surface water features on-site. The closest surface water features are located approximately 150m south-east and 200m north of the site and are surface drainages. Despite being downhill from the site and therefore likely to receive potentially contaminated surface water runoff from the site, the laboratory tests results reported low concentrations of contaminants; hence, the site is not considered to pose a risk to the mentioned surface water receptors.

32.3 Land gases

The methodology set out in CIRIA 665[19] has been used to assess the risks to human health and structures. The gassing potential for this site has been assessed as LOW. The sensitivity of this development would be classified as MODERATE and hence the minimum number of monitoring visits as recommended by CIRIA would be six visits over three months.

To date, two monitoring visits have been completed on the 7th and 20th of September 2017.

Adopting this method, the worst-case gas flow rate (4.7/hr) recorded in WS10 on the 7th of September, the highest CO_2 concentration (4.7%) measured in WS12 on the 20th of September and the highest methane concentration, in this case 0% recorded during all visits in all holes, are assumed and used to obtain preliminary Gas Screening Values referred to the two visits undertaken so far. It should be noted that a maximum methane concentration of 0.1% is assumed for sites that present no methane concentrations as it occurred in the subject site. This limit concentration corresponds to the detection limit of the equipment used by LEAP.

[19] CIRIA 665 Assessing risks posed by hazardous ground gases to buildings 2007

Table 26: Calculated Gas Screening values

	Carbon Dioxide	Methane
Gas Screening Value	0.22 l/hr	0.0047 l/hr

In calculating these gas screening values, a maximum flow rate of 0.1l/hr has been assumed (the detection limit of the equipment used by LEAP).

Adopting the modified Card and Wilson classification system as set out in CIRIA 665 then the gas regime would be classified as GREEN. According to this and to the information available to date, the preliminary gas regime identified at the site can be considered negligible and gas protection measures are not required.

33 Waste Disposal

It is anticipated that the proposed development will generate waste soils, and materials will need to be removed from site as part of the construction process.

Where soils are to be disposed off-site, it is the duty of the waste producer, in this case Cove Homes Ltd, to ensure that all waste is disposed of appropriately and that any that is sent to landfill is sent to an appropriately licensed one. All waste sent to landfill must be classified and must be pre-treated. The form of pre-treatment should be documented in the Site Waste Management Plan. There are various forms of pre-treatment that are acceptable. In this case it could include "reduction in volume", which could be achieved by segregating the Made Ground and re-using part of it on site.

Where made ground soil is to be re-used on site then it is recommended that this is carried out under the CL:AIRE Definition of Waste Industry Code of Practice (DoWCoP) for re-use of soils[20].

It is strongly advised that detailed discussions be held with remediation/groundworks contractors and that receiving landfill sites are identified in advance of commencing any waste removal.

[20] The Definition of Waste: Development Industry Code of Practice. Version 2 2011. CL:AIRE

34 Recommendations

No further investigation works are recommended at this stage. However, the made ground deposits identified on-site are not considered to be suitable as growing medium to be retained within the garden areas of the future development, and therefore, allowance for a minimum of 150mm clean topsoil should be considered to be placed on top of the made ground on-site.

Access into some areas of the site was restricted due to buildings, roads and services. It is recommended that once the structures have been demolished and hard standing removed, formation inspections and potentially further intrusive investigations will be undertaken.

35 Conclusions

- The environmental risk assessment has indicated that the topsoil and the natural ground beneath the site presented low concentrations of contaminants but none above the relevant assessment criteria;
- Made ground identified on-site was free of significant contamination although is locally impacted with benzo(a)pyrene. The identified benzo(a)pyrene contamination is localised to WS2 and is not considered to pose a sufficient risk to human health receptors to warrant remediation;
- No pesticides/herbicides where detected on-site according to the tests undertaken, whilst speciated petroleum hydrocarbons were found to be generally below the laboratory detection limit or present in low concentrations;
- Given the laboratory tests results highlighting no significant contamination within soils on-site, risks to controlled waters receptors can be discounted at this stage;
- Gas monitoring undertaken to date (2 No. visits out of 6 No. scheduled visits) has identified a negligible gas risk at the site and therefore at this stage, no gas protection measures are required.

APPENDIX A - LIMITATIONS

Limitations

LIMITATIONS

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or client's specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7[21], although this is subject to the restrictions imposed on the investigation as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and

[21] BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

APPENDIX B - FIGURES

Figures

TYPE	DESCRIPTION			
PRIVATE				
TYPE A				
TYPE B				
TYPE C				
TYPE D				
TYPE E				
TYPE F				
AFFORDABLE				
2B				
3B				
4B				
CARE HOME				
TOTAL				

Drawn by : KP Checked by :

Date: JUL'17

Revisions

Rev	Date	Drawn	Checked

Project:
LISS FOREST NURSERY
PETERSFIELD ROAD
GREATHAM

Drawing Title:
SKETCH LAYOUT
DISCUSSION DRAWING
37 UNIT SCHEME

carlton design partnership

Scale: 1:1000 @ A3

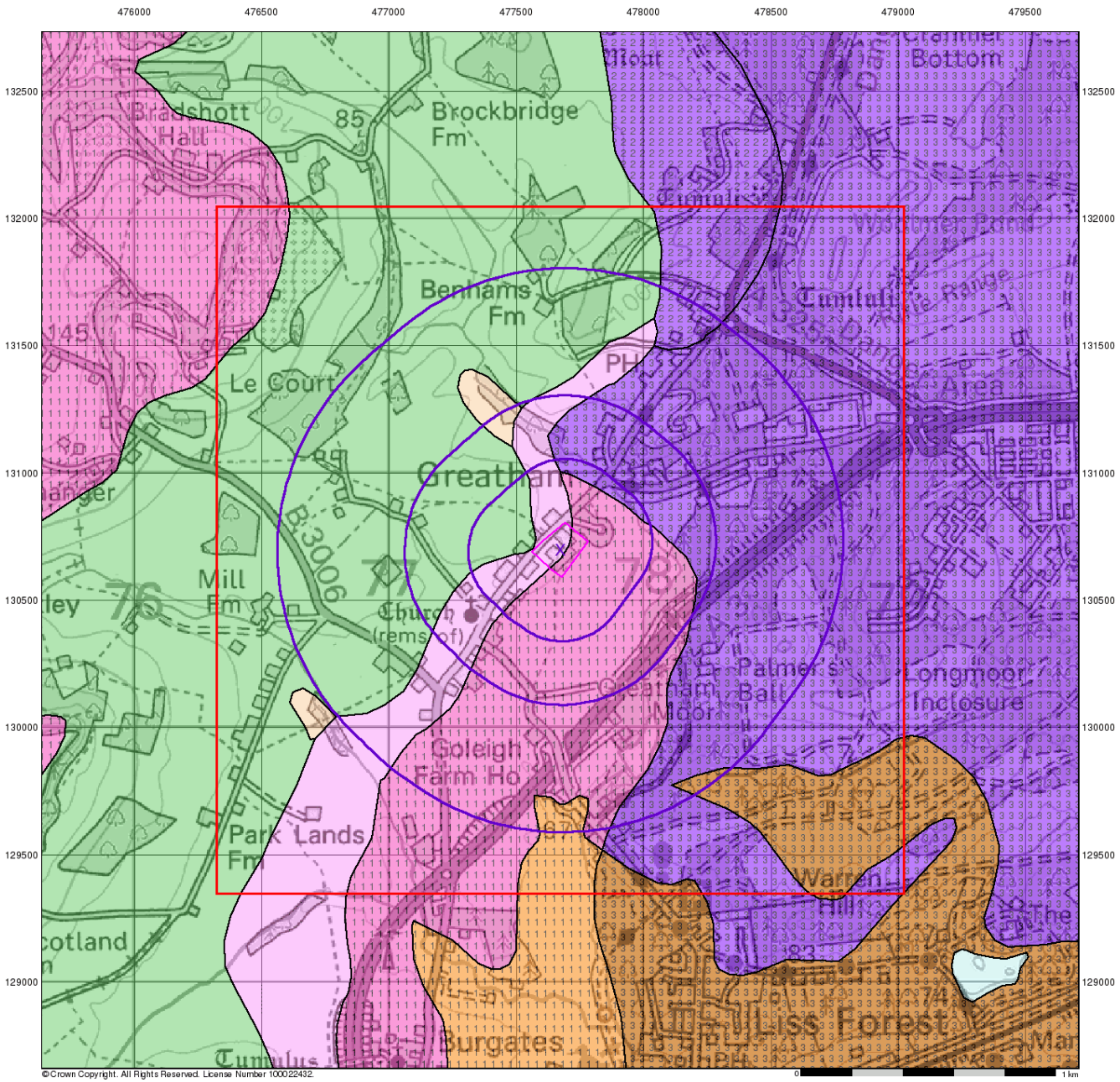
Drg No: 150713/SL/DD/37 Rev:

leap environmental	Client :	Cove Homes Ltd	Date :	5/10/2017	Project ID:	LP01457
	Project :	Liss Forest Nursery, Greatham	Title :	Proposed Site Layout	Fig. No.	1

leap environmental	**Liss Forest Nursery, Greatham**		**Client:** Cove Homes Ltd
	Project ID: LP1457	**Figure No.** 2	**Title:** Site Investigation Plan

APPENDIX C – HISTORIC MAPS AND ENVIRONMENTAL DATABASE SEARCHES

Historic Maps and Environmental Database Searches



Groundwater Vulnerability

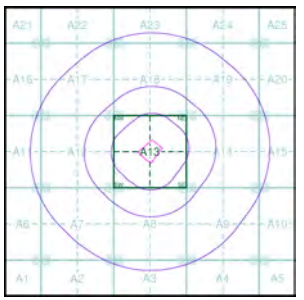
General

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

Agency and Hydrological

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

Site Sensitivity Context Map - Slice A



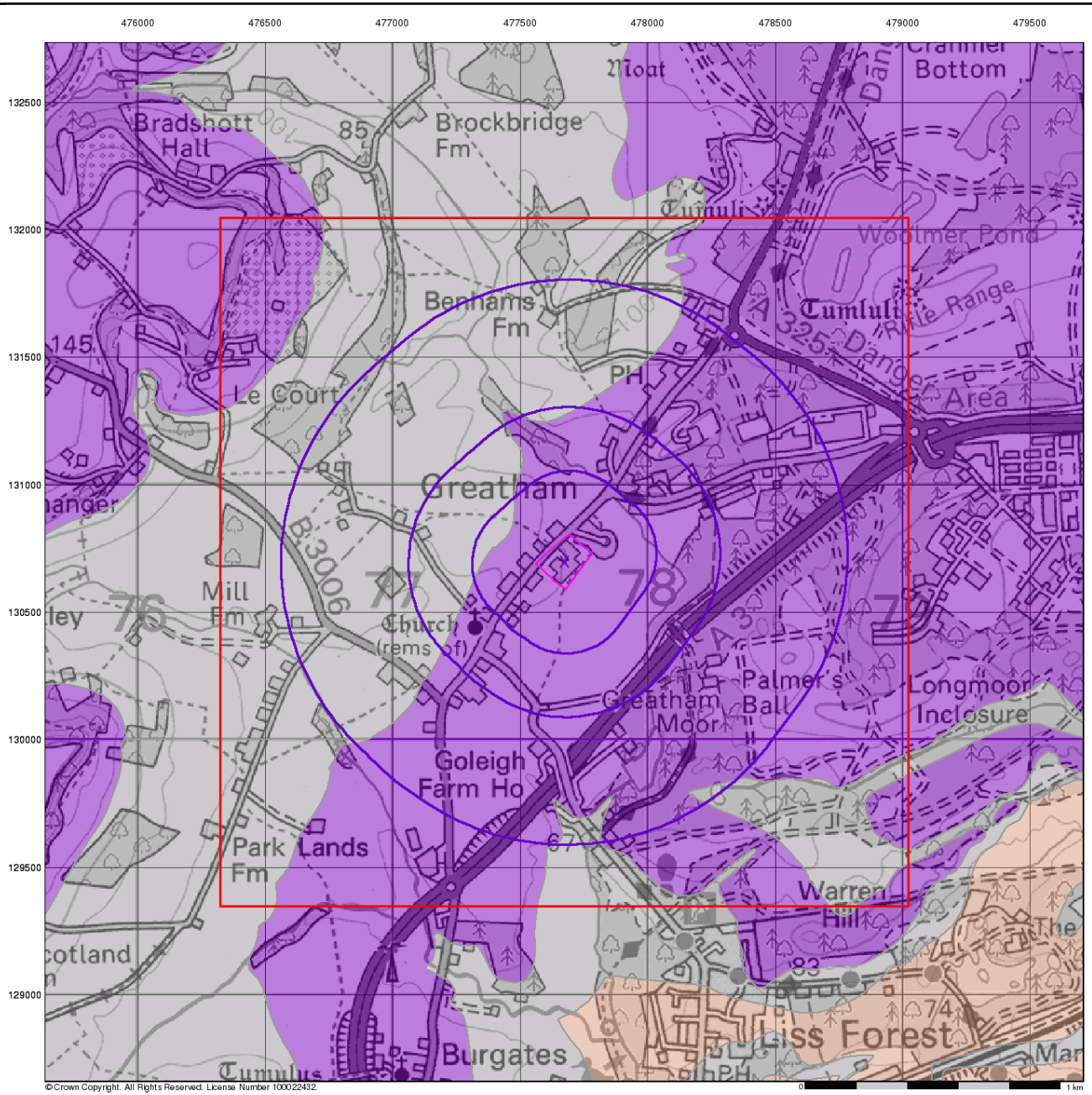
Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

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



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Bedrock Aquifer Designation

General

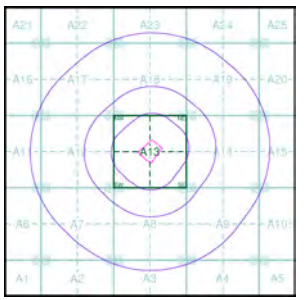
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
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Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

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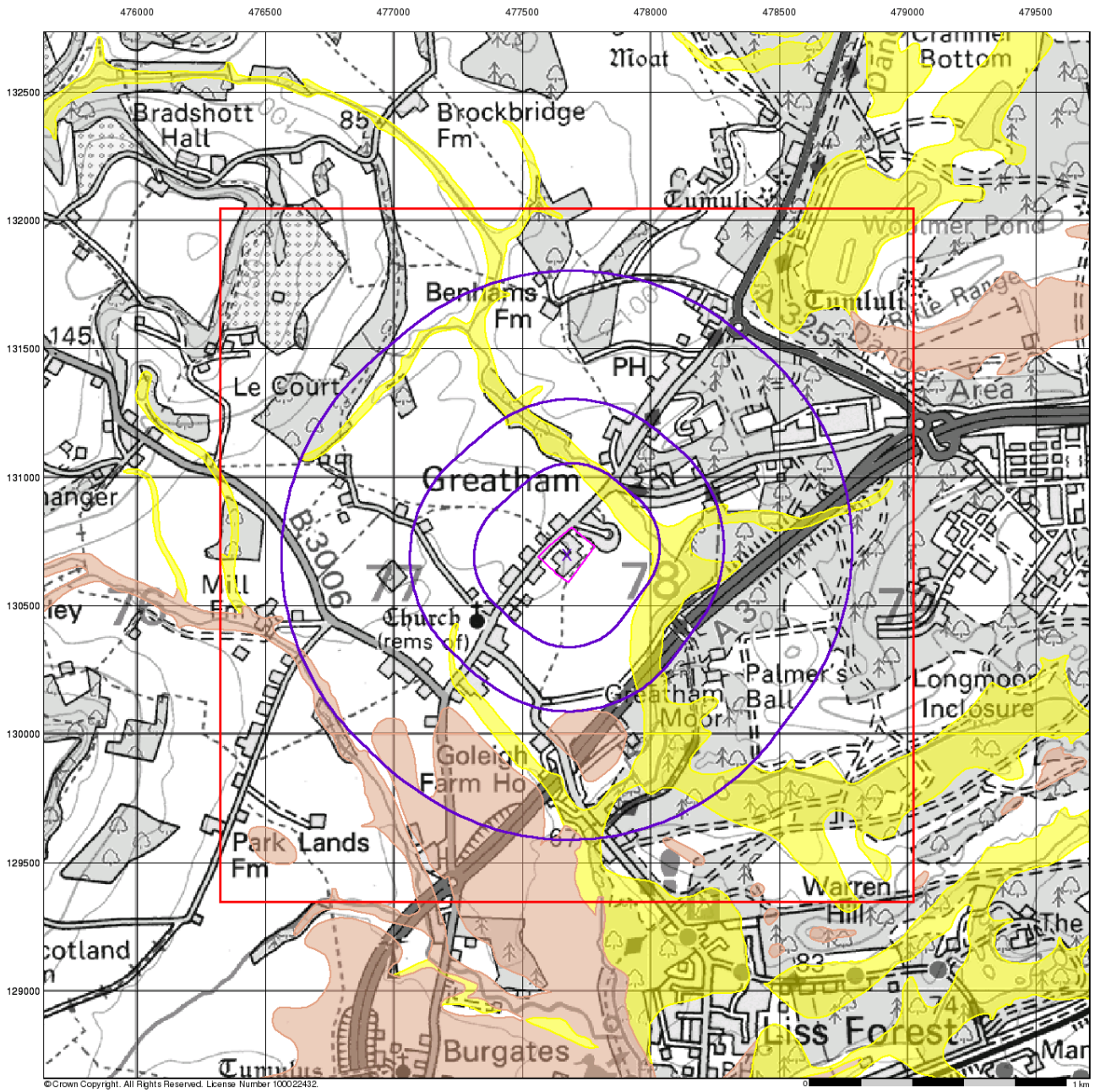

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Superficial Aquifer Designation

General

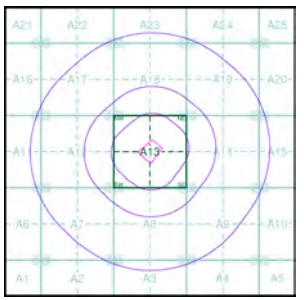
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A

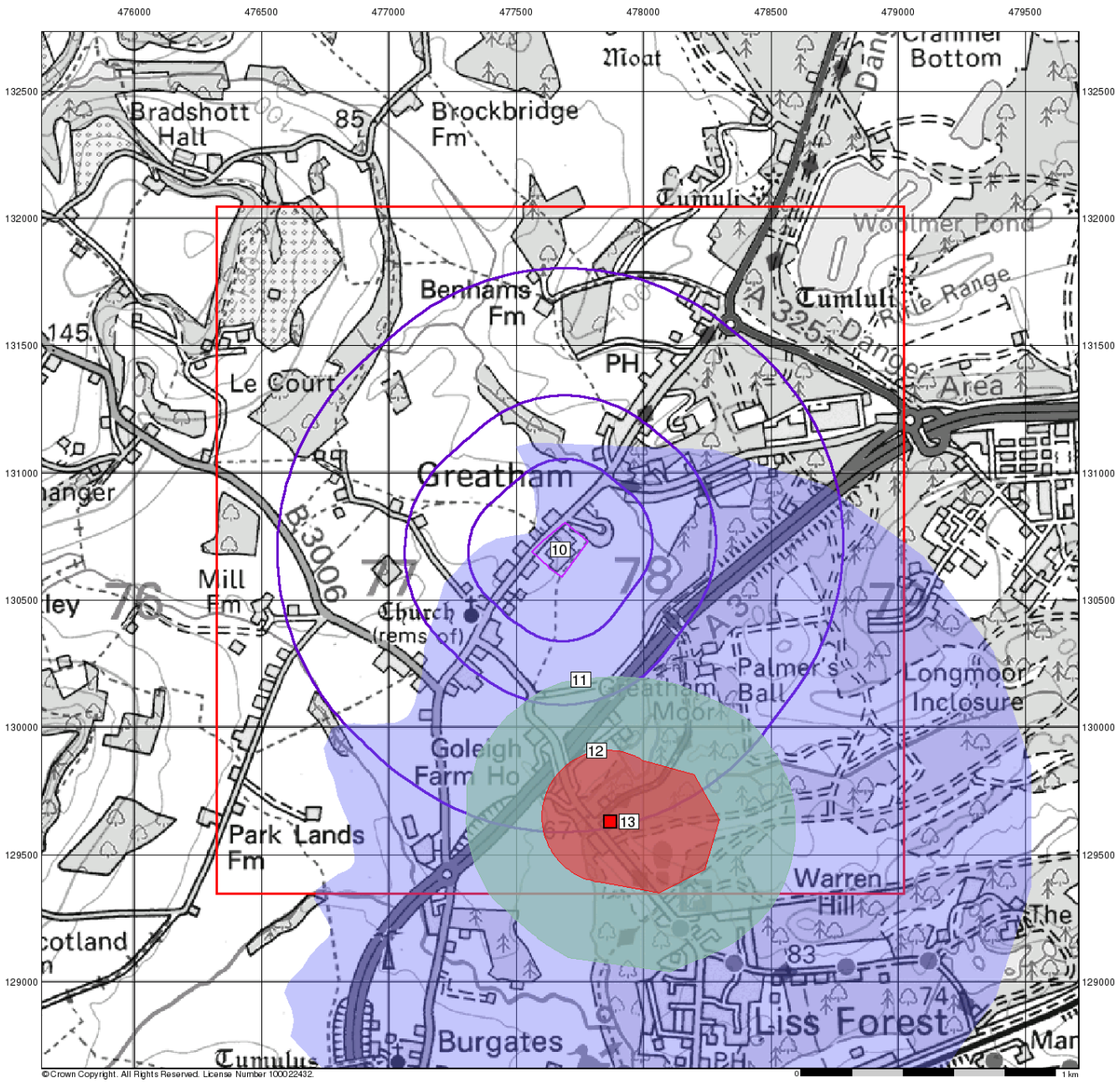


Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire



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Source Protection Zones

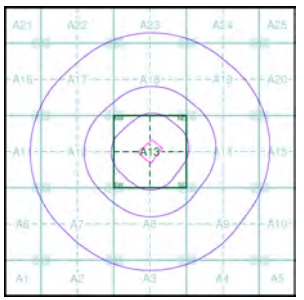
General

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

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



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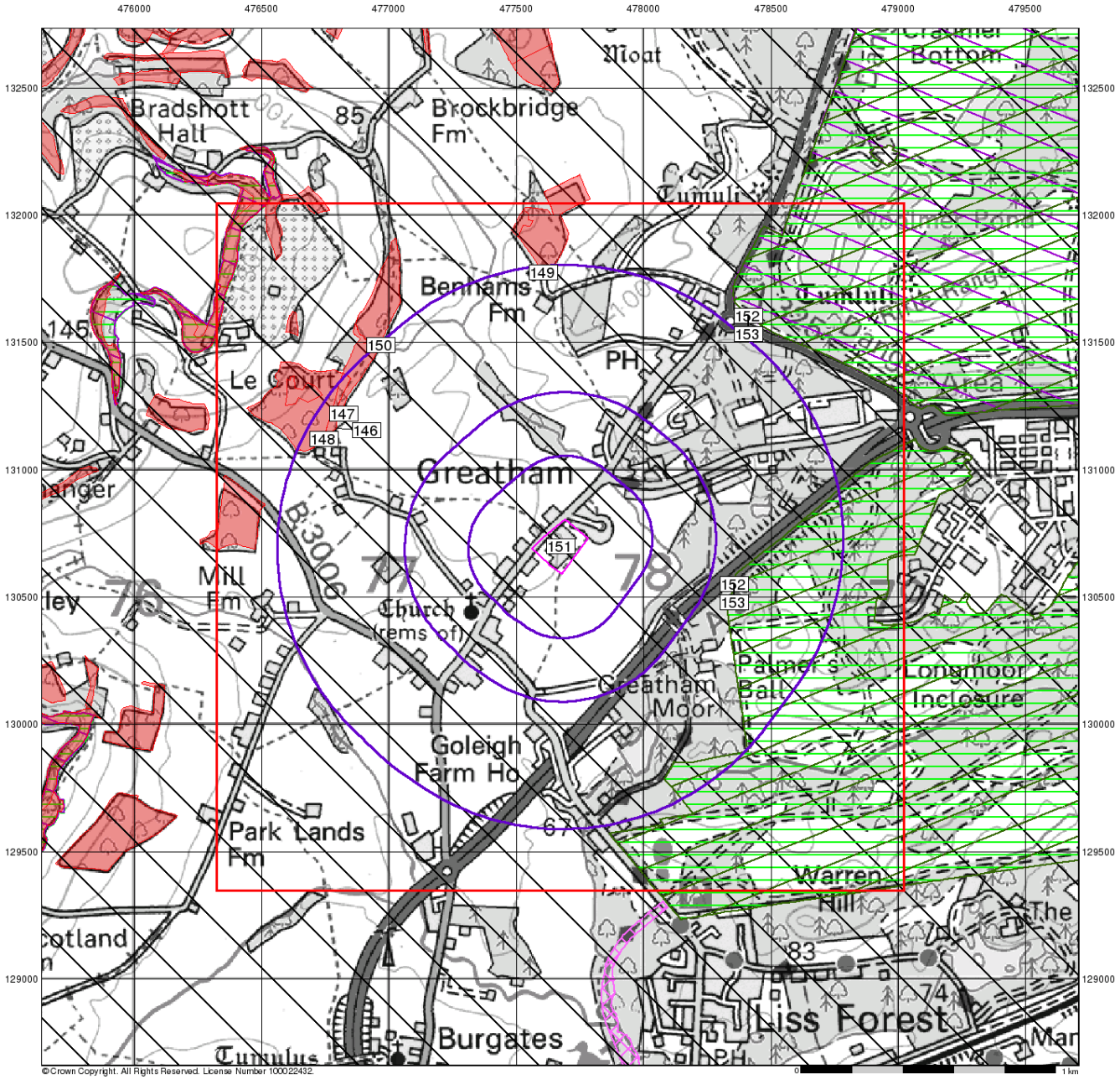
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

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



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Sensitive Land Uses

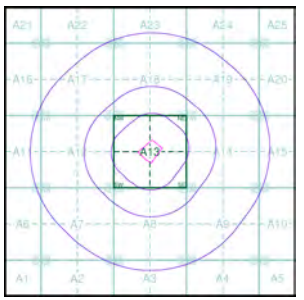
General

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

Sensitive Land Uses

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

Site Sensitivity Context Map - Slice A



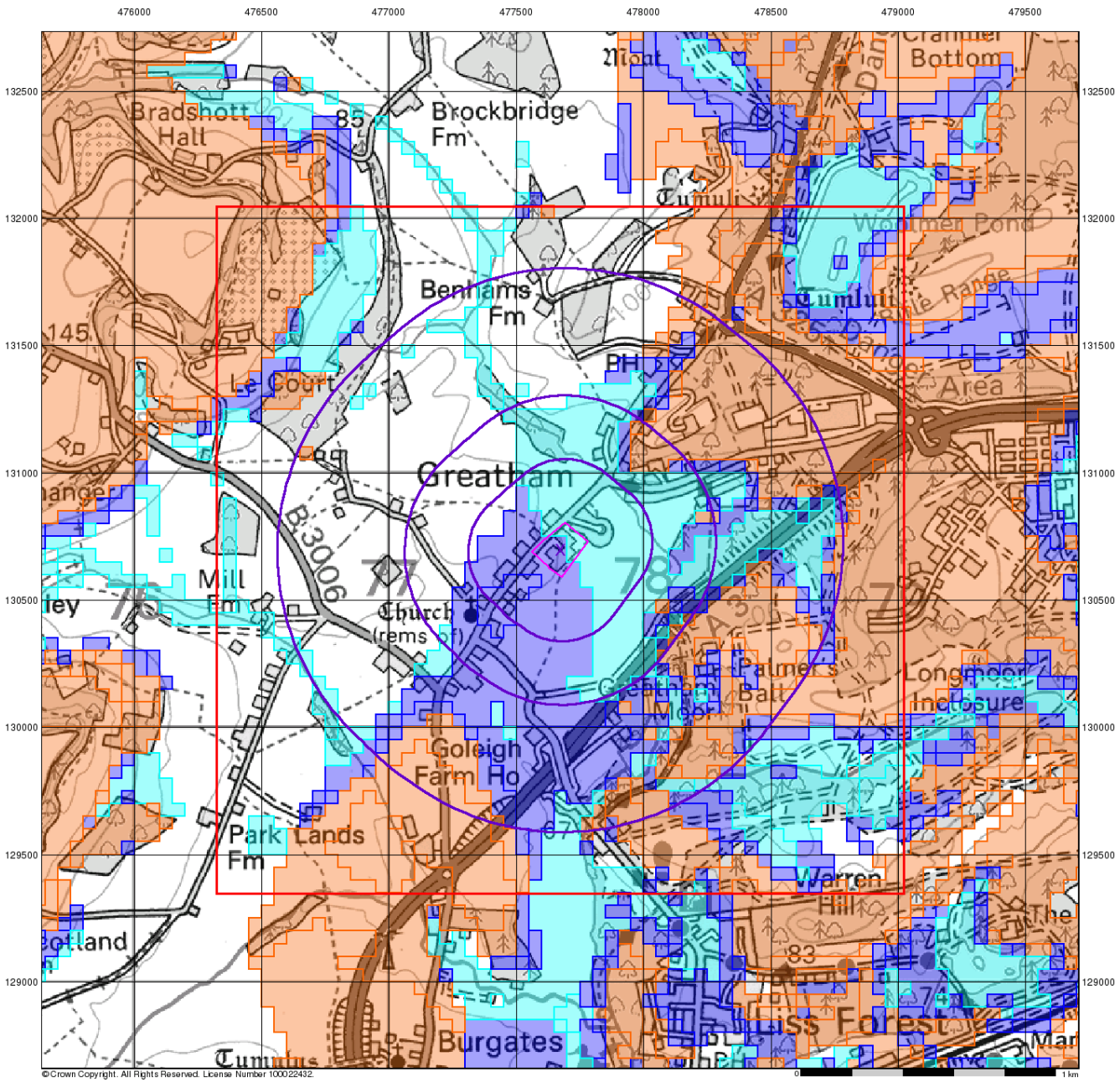
Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

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



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BGS Flood GFS Data

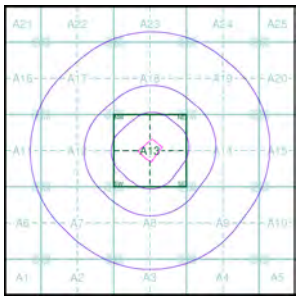
General

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

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



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Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

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Tel: 0844 844 9952
Fax: 0844 844 9951
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Envirocheck® Report:

Datasheet

Order Details:

Order Number:
137092287_1_1

Customer Reference:
LP1457

National Grid Reference:
477680, 130700

Slice:
A

Site Area (Ha):
2.42

Search Buffer (m):
1000

Site Details:

Liss Forest Nursery
Petersfield Road
Greatham - Liss
Hampshire

Client Details:

Mrs H Smith
Leap Environmental Ltd
The Atrium Business Centre
Curtis Road
Dorking
Surrey
RH4 1XA

Prepared For:

Cove Homes Ltd

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Contents

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	22
Hazardous Substances	-
Geological	23
Industrial Land Use	25
Sensitive Land Use	26
Data Currency	27
Data Suppliers	32
Useful Contacts	33

Introduction

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

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

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Ove Arup Copyright Notice

Peter Brett Associates Copyright Notice

Radon Potential dataset Copyright Notice

Report Version v53.0

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 2				6
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls					
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 3		Yes		
Pollution Incidents to Controlled Waters	pg 3		5		1
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality	pg 4				1
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 5				2 (*5)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 6	Yes	n/a	n/a	n/a
Drift Deposits			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 6	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones	pg 6	1		1	2
Extreme Flooding from Rivers or Sea without Defences	pg 7		Yes	n/a	n/a
Flooding from Rivers or Sea without Defences	pg 7		Yes	n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 7		7	25	92

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 22			1	
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 22	2	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 23	Yes	n/a	n/a	n/a
BGS Recorded Mineral Sites	pg 23				3
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 23	Yes		n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 23	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 23	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 23	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 24		Yes	n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries	pg 25				4
Fuel Station Entries					
Gas Pipelines					
Underground Electrical Cables					
Sensitive Land Use					
Ancient Woodland	pg 26				5
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks	pg 26	1			
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest	pg 26				1
Special Areas of Conservation					
Special Protection Areas	pg 26				1
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (SW)	0	1	477675 130699
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NE (E)	0	1	477700 130699
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (SW)	38	1	477600 130600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (NE)	283	1	477900 131000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (NE)	315	1	477950 131000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (E)	318	1	478100 130699
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	340	1	478000 130450
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (SE)	351	1	478050 130500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (E)	364	1	478100 130550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (SE)	391	1	478100 130500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14SW (SE)	410	1	478050 130400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NE)	417	1	478100 131000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14SW (SE)	421	1	478100 130450
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (E)	423	1	478200 130800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12SE (SW)	426	1	477250 130400
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SE (NE)	431	1	477950 131150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A9NW (SE)	440	1	478050 130350
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (SE)	451	1	478100 130400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NE)	456	1	478150 131000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (SE)	461	1	478150 130450
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A9NW (SE)	470	1	478050 130300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (NE)	472	1	477950 131200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (SE)	474	1	477950 130200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (E)	482	1	478250 130850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (S)	491	1	477900 130150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NE)	497	1	478200 131000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (E)	500	1	478250 130550
1	**Discharge Consents** Operator: Mr & Mrs S Ashby-Rudd Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: The Coach House, Greatham Moor The Coach House, Greatham Moor, Greatham, Liss, Hampshire, Gu33 6he Authority: Environment Agency, Southern Region Catchment Area: Rother Reference: P11935 Permit Version: 1 Effective Date: 5th February 2004 Issued Date: 5th February 2004 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Land/Soakaway Receiving Water: Soakaway **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A9NW (SE)	677	2	478300 130290
2	**Discharge Consents** Operator: MR J ROZARIO Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Winfield, Church Lane, Greatham, Hampshire, Gu33 6hb Authority: Environment Agency, Southern Region Catchment Area: Not Supplied Reference: P07569 Permit Version: 1 Effective Date: 18th July 1999 Issued Date: 18th July 1999 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Freshwater River **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A12NW (W)	758	2	476850 130950
3	**Discharge Consents** Operator: Mr Christopher Davis Property Type: DOMESTIC PROPERTY (MULTIPLE) (INCL FARM HOUSES) Location: Heath Harrison & Teasel Cottages, Church Lane, Greatham, Liss, Hampshire, Gu33 6hb Authority: Environment Agency, Southern Region Catchment Area: Rother Reference: Npswqd006266 Permit Version: 1 Effective Date: 26th January 2009 Issued Date: 26th January 2009 Revocation Date: 24th March 2010 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A17SW (W)	873	2	476763 131042

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
3	**Discharge Consents** Operator: Miss Kim Brooksbank Property Type: DOMESTIC PROPERTY (MULTIPLE) (INCL FARM HOUSES) Location: Heath Harrison & Teasel Cottages, Church Lane, Greatham, Liss, Hampshire, Gu33 6hb Authority: Environment Agency, Southern Region Catchment Area: Rother Reference: Npswqd006266 Permit Version: 1 Effective Date: 26th January 2009 Issued Date: 26th January 2009 Revocation Date: 24th March 2010 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A17SW (W)	873	2	476763 131042
4	**Discharge Consents** Operator: Miss Kim Brooksbank Property Type: DOMESTIC PROPERTY (MULTIPLE) (INCL FARM HOUSES) Location: Heath Harrison & Teasel Cottages, Church Lane, Greatham, Liss, Hampshire, Gu33 6hb Authority: Environment Agency, Southern Region Catchment Area: Rother Reference: Npswqd006266 Permit Version: 2 Effective Date: 25th March 2010 Issued Date: 25th March 2010 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A17SW (NW)	901	2	476794 131162
4	**Discharge Consents** Operator: Mr Christopher Davis Property Type: DOMESTIC PROPERTY (MULTIPLE) (INCL FARM HOUSES) Location: Heath Harrison & Teasel Cottages, Church Lane, Greatham, Liss, Hampshire, Gu33 6hb Authority: Environment Agency, Southern Region Catchment Area: Rother Reference: Npswqd006266 Permit Version: 2 Effective Date: 25th March 2010 Issued Date: 25th March 2010 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A17SW (NW)	901	2	476794 131162
	Nearest Surface Water Feature	A13SE (S)	147	-	477729 130451
5	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Other Location: GREATHAM Authority: Environment Agency, Southern Region Pollutant: Crude Sewage Note: Sewage From Manhole In Field; Water Company Sewage: Foul Sewer Incident Date: 25th March 1995 Incident Reference: 1757 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Plc Sewage Other Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (N)	112	2	477750 130900

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Manhole, Into Tributary Of River Rother Authority: Environment Agency, Southern Region Pollutant: Crude Sewage Note: Sws Sewage Manhole Overflowing Incident Date: 22nd February 1997 Incident Reference: 2032 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Plc Sewage Other Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (NE)	218	2	477900 130915
6	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Rear Of Garden, Into River Rother Authority: Environment Agency, Southern Region Pollutant: Crude Sewage Note: Sws Sewage Manhole Overflowing Incident Date: 4th August 1996 Incident Reference: 1818 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Sewage Works Effluent Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (NE)	222	2	477900 130920
6	**Pollution Incidents to Controlled Waters** Property Type: Agricultural Location: Greatham Stream, Longmoor Road, LISS, Hampshire Authority: Environment Agency, Southern Region Pollutant: Agricultural: Solid Manure Note: Effluent Runoff From Land Incident Date: 22nd May 1992 Incident Reference: 362 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Organic Farm Waste Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (NE)	229	2	477900 130930
7	**Pollution Incidents to Controlled Waters** Property Type: Agricultural Location: Longmoor Road, GREATHAM Authority: Environment Agency, Southern Region Pollutant: Organic Wastes: Unknown Note: Headwaters Rother Discoloured Brown; Other Farming Incident Date: 16th April 1995 Incident Reference: 1274 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Organic Farm Waste Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (N)	224	2	477800 131000
8	**Pollution Incidents to Controlled Waters** Property Type: Other Utilities Location: Unnamed Stream, By New A3 Road, Liss Forest Authority: Environment Agency, Southern Region Pollutant: Crude Sewage Note: Fractured Foul Sewer Incident Date: 26th February 1992 Incident Reference: 309 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Plc Sewage Other Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SE (S)	897	2	477800 129700
	River Quality Name: Rother (West Sussex) GQA Grade: River Quality A Reach: Trib 3-290 Conf - Liss Stw Estimated Distance (km): 5.3 Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A7NW (SW)	943	2	476771 130176

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
9	**Water Abstractions** Operator: South East Water Limited Licence Number: 10/41/436301 Permit Version: 101 Location: Borehole No 1 At Greatham Pumping Station Authority: Environment Agency, Southern Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NE (S)	941	2	477880 129670
9	**Water Abstractions** Operator: South East Water Plc Licence Number: 10/41/436301 Permit Version: 100 Location: Borehole No 1 At Greatham Pumping Station Authority: Environment Agency, Southern Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 10227 Yearly Rate (m3): 2490909.1 Details: H2B Hythe Beds Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st January 1999 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3NE (S)	941	2	477880 129670
	Water Abstractions Operator: South East Water Limited Licence Number: 10/41/436301 Permit Version: 101 Location: Borehole No. 3 At Greatham Pumping Station Authority: Environment Agency, Southern Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NE (S)	1016	2	477950 129610
	Water Abstractions Operator: South East Water Plc Licence Number: 10/41/436301 Permit Version: 100 Location: Borehole No. 3 At Greatham Pumping Station Authority: Environment Agency, Southern Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st January 1999 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A3NE (S)	1016	2	477950 129610

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: South East Water Limited Licence Number: 10/41/436301 Permit Version: 101 Location: Borehole No. 2 At Greatham Pumping Station Authority: Environment Agency, Southern Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A4NW (S)	1025	2	478040 129630
	Water Abstractions Operator: South East Water Plc Licence Number: 10/41/436301 Permit Version: 100 Location: Borehole No. 2 At Greatham Pumping Station Authority: Environment Agency, Southern Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: H2B Hythe Beds Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st January 1999 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A4NW (S)	1025	2	478040 129630
	Water Abstractions Operator: Hillier Nurseries Ltd Licence Number: 10/41/436004 Permit Version: 100 Location: Point A On River Rother At Liss Authority: Environment Agency, Southern Region Abstraction: Horticulture And Nurseries: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Lands And Buildings Shown Coloured Pink On Plan Accompanying Licence Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 9th June 2009 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(S)	1785	2	477830 128810
	Groundwater Vulnerability Soil Classification: Soils of Intermediate Leaching Potential (I1) - Soils which can possibly transmit a wide range of pollutants Map Sheet: Sheet 45 West Sussex and Surrey Scale: 1:100,000	A13SE (SE)	0	2	477693 130687
	Groundwater Vulnerability Soil Classification: Soils of Low Leaching Potential - Soils in which pollutants are unlikely to penetrate the soil layer because water movement is largely horizontal or they have large ability to attenuate diffuse pollutants. Lateral flow from these soils contribute to groundwater recharge elsewhere in the catchment Map Sheet: Sheet 45 West Sussex and Surrey Scale: 1:100,000	A13NE (SW)	0	2	477675 130699
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A13NE (SW)	0	1	477675 130699
	Superficial Aquifer Designations No Data Available				
10	**Source Protection Zones** Name: Greatham Source: Environment Agency, Head Office Reference: Su048 Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	A13NE (SW)	0	2	477675 130699

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
11	**Source Protection Zones** Name: Greatham Source: Environment Agency, Head Office Reference: Su048 Type: Zone II (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater.	A8NE (S)	409	2	477756 130187
12	**Source Protection Zones** Name: Greatham Source: Environment Agency, Head Office Reference: Su048 Type: Zone I (Inner Protection Zone): Travel time of 50 days or less to the groundwater source.	A8SE (S)	696	2	477817 129906
13	**Source Protection Zones** Name: Greatham Source: Environment Agency, Head Office Reference: Su048 Type: Groundwater Source	A3NE (S)	978	2	477870 129630
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	116	2	477835 130850
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	135	2	477845 130870
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
14	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 299.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13SE (S)	147	3	477729 130451
15	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 321.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13NE (E)	203	3	477982 130772
16	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 842.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13NE (E)	207	3	477982 130788
17	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 198.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13NE (NE)	232	3	477841 130983
18	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 14.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13NE (NE)	232	3	477853 130974

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
19	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 15.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A18SE (N)	246	3	477705 131050
20	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 154.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A18SE (N)	247	3	477703 131051
21	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 197.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A18SE (N)	260	3	477710 131063
22	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 9.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13SE (SE)	307	3	477973 130470
23	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 33.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13SE (SE)	307	3	477982 130482
24	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A12SE (W)	310	3	477291 130540
25	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 58.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13SE (SE)	310	3	477970 130461
26	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A12SE (SW)	312	3	477291 130535
27	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 324.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A12SE (SW)	313	3	477292 130532

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
28	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13SE (SE)	332	3	477956 130405
29	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 91.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A13SE (SE)	334	3	477956 130401
30	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.3 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A18SW (N)	354	3	477579 131140
31	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 47.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A18SW (N)	357	3	477575 131141
32	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 308.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SW (SE)	387	3	478045 130432
33	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	390	3	477952 130310
34	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 19.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	393	3	477952 130305
35	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 276.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A18SW (N)	394	3	477590 131185
36	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 76.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SW (E)	404	3	478181 130657

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
37	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 56.2 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	408	3	477953 130287
38	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	410	3	478005 130340
39	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 86.7 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	413	3	478006 130337
40	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 116.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SW (E)	420	3	478176 130581
41	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 43.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	464	3	477996 130250
42	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 40.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	473	3	478009 130249
43	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 40.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	484	3	478028 130253
44	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	499	3	478001 130207
45	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 66.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	500	3	477956 130172

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
46	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 46.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8NE (SE)	502	3	478001 130203
47	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 52.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SW (E)	507	3	478278 130610
48	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 54.2 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SW (E)	509	3	478278 130610
49	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 7.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	511	3	478024 130212
50	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 44.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	517	3	478025 130205
51	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 8.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	523	3	478047 130217
52	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 46.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	531	3	478049 130208
53	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 38.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	546	3	478022 130163
54	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 38.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	555	3	478034 130162

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
55	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 10.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	555	3	478042 130168
56	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 29.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SW (E)	556	3	478329 130627
57	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 24.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A7NE (SW)	559	3	477235 130228
58	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 42.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A7NE (SW)	561	3	477298 130171
59	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A7NE (SW)	564	3	477331 130145
60	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 319.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A7NE (SW)	564	3	477335 130143
61	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 39.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A7NE (SW)	576	3	477236 130203
62	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 171.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SE (E)	578	3	478354 130637
63	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 124.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	583	3	478035 130127

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
64	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.7 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A7NE (SW)	584	3	477262 130169
65	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 398.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A7NE (SW)	584	3	477262 130169
66	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 117.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SW (S)	615	3	477601 129979
67	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 97.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A18SW (NW)	623	3	477390 131348
68	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 89.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A18SW (NW)	624	3	477390 131350
69	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 14.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A18NW (NW)	690	3	477345 131400
70	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 187.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	698	3	478153 130071
71	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 61.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	700	3	478070 130009
72	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 93.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A18NW (NW)	702	3	477347 131415

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
73	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 155.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A18NW (NW)	702	3	477347 131415
74	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 41.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	714	3	478219 130122
75	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 143.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SW (S)	715	3	477525 129892
76	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 28.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	723	3	478037 129961
77	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 53.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14NE (E)	727	3	478510 130708
78	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 33.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	739	3	478260 130132
79	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 86.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	745	3	478062 129950
80	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 330.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NW (SE)	760	3	478293 130140
81	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 72.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A8SE (S)	770	3	477924 129859

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
82	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 47.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A8SE (S)	770	3	477924 129859
83	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 39.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14NE (E)	776	3	478560 130724
84	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 105.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14NE (E)	776	3	478560 130724
85	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 39.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SE (S)	784	3	477971 129861
86	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 51.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SE (S)	784	3	477971 129861
87	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 54.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NE (NW)	792	3	477322 131504
88	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SW (S)	805	3	477620 129786
89	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 78.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SW (S)	810	3	477622 129781
90	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 85.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14NE (E)	814	3	478597 130736

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
91	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 48.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14NE (E)	814	3	478597 130736
92	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 45.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SE (S)	822	3	477959 129816
93	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 35.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SE (S)	822	3	477992 129828
94	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 297.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SE (S)	823	3	477919 129802
95	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 37.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SE (S)	823	3	477992 129828
96	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 53.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SE (S)	831	3	477676 129758
97	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 152.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (S)	839	3	478030 129827
98	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 185.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NE (NW)	846	3	477299 131552
99	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 346.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NE (NW)	846	3	477299 131552

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
100	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SE (E)	850	3	478629 130645
101	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 67.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14NE (E)	852	3	478635 130766
102	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 74.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14NE (E)	852	3	478635 130766
103	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 226.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A14SE (E)	853	3	478631 130641
104	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 150.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17SW (NW)	876	3	476990 131354
105	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 198.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17SW (NW)	877	3	476923 131291
106	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SW (S)	878	3	477651 129712
107	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 185.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A8SW (S)	880	3	477654 129710
108	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 232.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17SW (NW)	889	3	476844 131215

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
109	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NE (NW)	899	3	477073 131457
110	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 121.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NE (NW)	899	3	477073 131457
111	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 20.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NE (NW)	903	3	477070 131460
112	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 32.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A15NW (E)	910	3	478690 130802
113	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 67.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A15NW (E)	910	3	478690 130802
114	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 56.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A15NW (E)	910	3	478690 130802
115	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NE (NW)	923	3	477054 131473
116	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 103.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NE (NW)	926	3	477050 131473
117	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 47.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	928	3	478205 129825

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
118	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 1.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A15NW (E)	934	3	478708 130867
119	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 2.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A15NW (E)	936	3	478709 130868
120	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 219.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A15NW (E)	939	3	478712 130869
121	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 100.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	940	3	478176 129791
122	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 13.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NE (SE)	954	3	478591 130222
123	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NE (SE)	959	3	478602 130231
124	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 11.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NE (SE)	960	3	478606 130235
125	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 30.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9NE (SE)	960	3	478606 130235
126	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.8 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17SW (W)	963	3	476679 131075

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
127	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 40.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17SW (W)	966	3	476675 131073
128	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 27.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	971	3	478265 129815
129	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 264.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 2	A7NW (SW)	979	3	476758 130131
130	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 350.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Rother and Arun Primacy: 1	A7NW (SW)	979	3	476723 130186
131	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 26.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	990	3	478296 129815
132	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 9.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	994	3	478286 129802
133	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 11.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	994	3	478286 129802
134	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 246.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Rother and Arun Primacy: 1	A7NW (SW)	994	3	476734 130140
135	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 43.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A9SW (SE)	998	3	478282 129793

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
136	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 2.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NW (NW)	999	3	476950 131484
137	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 133.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Rother and Arun Primacy: 1	A17NW (NW)	999	3	476948 131483

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
138	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Greatham Name: Hatchmoor Farm Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD34232 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Not Supplied EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: Not Supplied BGS Ref: Not Supplied Other Ref: Not Supplied	A7NE (SW)	431	2	477321 130324
	Local Authority Landfill Coverage Name: East Hampshire District Council - Has no landfill data to supply		0	4	477675 130699
	Local Authority Landfill Coverage Name: Hampshire County Council - Had landfill data but passed it to the relevant environment agency		0	5	477675 130699

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Lower Greensand Group	A13NE (SW)	0	1	477675 130699
139	**BGS Recorded Mineral Sites** Site Name: Manor House Pit Location: , Greatham, Liss, Hampshire Source: British Geological Survey, National Geoscience Information Service Reference: 159249 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Cretaceous Geology: Folkestone Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A8NW (S)	557	1	477515 130057
140	**BGS Recorded Mineral Sites** Site Name: Greatham Moor Sand Pit Location: , Greatham, Liss, Hampshire Source: British Geological Survey, National Geoscience Information Service Reference: 159247 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Cretaceous Geology: Folkestone Formation Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A9NW (SE)	578	1	478066 130160
141	**BGS Recorded Mineral Sites** Site Name: Moor Park Farm Sand Pit Location: Forest Road, Greatham, Greatham, Petersfield, Hampshire Source: British Geological Survey, National Geoscience Information Service Reference: 126459 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Cretaceous Geology: Folkestone Formation Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A3NE (S)	987	1	477927 129634
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	135	1	477864 130843
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	156	1	477459 130814
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	233	1	477918 130927

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	135	1	477864 130843
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	156	1	477459 130814
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	233	1	477918 130927
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	477675 130699

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
142	**Contemporary Trade Directory Entries** Name: Stephen Rozario Oil Tanks Location: Cam Green Cottage, Church Lane, Greatham, Liss, Hampshire, GU33 6HB Classification: Oil Fuel Distributors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NE (W)	559	-	477036 130880
143	**Contemporary Trade Directory Entries** Name: Phonewarehouse Location: Rooklea, Petersfield Road, Greatham, Liss, Hampshire, GU33 6AA Classification: Telecommunications Equipment & Systems **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	587	-	478015 131295
144	**Contemporary Trade Directory Entries** Name: Atelier 19 Location: Copse House, Church Lane, Greatham, LISS, Hampshire, GU33 6HB Classification: Homefurnishings - Manufacturers **Status: Active** Positional Accuracy: Automatically positioned to the address	A17SW (NW)	871	-	476796 131103
145	**Contemporary Trade Directory Entries** Name: J Mclauchlan Car Collection & Disposal Location: Woodside, Petersfield Road, Greatham, LISS, Hampshire, GU33 6AS Classification: Car Body Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19NW (NE)	968	-	478242 131601

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
146	**Ancient Woodland** Name: Great Wood Reference: 1490398 Area(m²): 6608.93 Type: Ancient and Semi-Natural Woodland	A17SW (NW)	903	6	476793 131164
147	**Ancient Woodland** Name: Not Supplied Reference: 1490255 Area(m²): 15074.15 Type: Ancient and Semi-Natural Woodland	A17SW (NW)	910	6	476821 131218
148	**Ancient Woodland** Name: Great Wood Reference: 1490353 Area(m²): 66361.7 Type: Ancient and Semi-Natural Woodland	A17SW (NW)	924	6	476744 131120
149	**Ancient Woodland** Name: Knightsfield Copse Firsplat Copse Reference: 1490357 Area(m²): 48104.24 Type: Ancient and Semi-Natural Woodland	A23SW (N)	973	6	477606 131773
150	**Ancient Woodland** Name: Not Supplied Reference: 1490273 Area(m²): 36377.19 Type: Ancient and Semi-Natural Woodland	A17NW (NW)	992	6	476966 131489
151	**National Parks** Name: South Downs Multiple Area: N Area (m2): 1652679314.3 Source: Natural England **Status: Fully Designated - designated as a National Park** Designation Date: 2nd November 2009	A13NE (SW)	0	6	477675 130699
152	**Sites of Special Scientific Interest** Name: Woolmer Forest Multiple Areas: Y Total Area (m2): 12985616.15 Source: Natural England Reference: 1004188 Designation Details: Ministry Of Defence Reserve Designation Date: 28th June 1994 Date Type: Notified Designation Details: Nature Conservation Review Designation Date: 28th June 1994 Date Type: Notified Designation Details: Special Area Of Conservation Designation Date: 28th June 1994 Date Type: Notified Designation Details: Special Protection Area Designation Date: 28th June 1994 Date Type: Notified Designation Details: Site Of Special Scientific Interest Designation Date: 28th June 1994 Date Type: Notified Designation Details: Water Framework Directive (WFD) Designation Date: 28th June 1994 Date Type: Notified	A14SE (E)	597	6	478356 130551
153	**Special Protection Areas** Name: Wealden Heaths Phase Ii Multiple Areas: Y Total Area (m2): 20603801.73 Source: Natural England Reference: UK9012132 Designation Date: Not Supplied	A14SE (E)	597	6	478356 130551

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
East Hampshire District Council - Environmental Health Department	January 2015	Annual Rolling Update
Chichester District Council - Environmental Health Department	July 2013	Annual Rolling Update
Discharge Consents		
Environment Agency - Southern Region	July 2017	Quarterly
Environment Agency - Thames Region	July 2017	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - Southern Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - Southern Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control		
Environment Agency - South East Region - Solent & South Downs Area	July 2017	Quarterly
Environment Agency - Southern Region	July 2017	Quarterly
Local Authority Integrated Pollution Prevention And Control		
East Hampshire District Council - Environmental Health Department	December 2014	Annual Rolling Update
Chichester District Council - Environmental Health Department	October 2014	Annual Rolling Update
Local Authority Pollution Prevention and Controls		
East Hampshire District Council - Environmental Health Department	December 2014	Annual Rolling Update
Chichester District Council - Environmental Health Department	October 2014	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
East Hampshire District Council - Environmental Health Department	December 2014	Annual Rolling Update
Chichester District Council - Environmental Health Department	October 2014	Annual Rolling Update
Nearest Surface Water Feature		
Ordnance Survey	May 2017	
Pollution Incidents to Controlled Waters		
Environment Agency - Southern Region	December 1999	Not Applicable
Environment Agency - Thames Region	September 1999	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - Southern Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - Southern Region	March 2013	As notified
Registered Radioactive Substances		
Environment Agency - Southern Region	January 2015	
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register		
Environment Agency - South East Region - Solent & South Downs Area	April 2017	Quarterly
Environment Agency - Southern Region - Hampshire and Isle of Wight Area Office	April 2017	Quarterly
Environment Agency - Southern Region - Solent and South Downs	April 2017	Quarterly
Environment Agency - Southern Region - Sussex Area	April 2017	Quarterly
Water Abstractions		
Environment Agency - Southern Region	April 2017	Quarterly
Environment Agency - Thames Region	April 2017	Quarterly
Water Industry Act Referrals		
Environment Agency - Southern Region	July 2017	Quarterly
Groundwater Vulnerability		
Environment Agency - Head Office	April 2015	Not Applicable

Agency & Hydrological	Version	Update Cycle
Drift Deposits Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations British Geological Survey - National Geoscience Information Service	August 2015	As notified
Superficial Aquifer Designations British Geological Survey - National Geoscience Information Service	August 2015	As notified
Source Protection Zones Environment Agency - Head Office	July 2017	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	August 2017	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	August 2017	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	August 2017	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	August 2017	Quarterly
Flood Defences Environment Agency - Head Office	August 2017	Quarterly
OS Water Network Lines Ordnance Survey	April 2017	6 Weekly
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	Annually

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - Head Office	May 2017	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - Southern Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - South East Region - Solent & South Downs Area	May 2017	Quarterly
Environment Agency - Southern Region - Hampshire and Isle of Wight Area Office	May 2017	Quarterly
Environment Agency - Southern Region - Solent and South Downs	May 2017	Quarterly
Environment Agency - Southern Region - Sussex Area	May 2017	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - South East Region - Solent & South Downs Area	July 2017	Quarterly
Environment Agency - Southern Region - Hampshire and Isle of Wight Area Office	July 2017	Quarterly
Environment Agency - Southern Region - Solent and South Downs	July 2017	Quarterly
Environment Agency - Southern Region - Sussex Area	July 2017	Quarterly
Local Authority Landfill Coverage		
Chichester District Council - Environmental Health Department	May 2000	Not Applicable
East Hampshire District Council	May 2000	Not Applicable
Hampshire County Council - Minerals and Waste Planning	May 2000	Not Applicable
West Sussex County Council - Environment & Development	May 2000	Not Applicable
Local Authority Recorded Landfill Sites		
Chichester District Council - Environmental Health Department	May 2000	Not Applicable
East Hampshire District Council	May 2000	Not Applicable
Hampshire County Council - Minerals and Waste Planning	May 2000	Not Applicable
West Sussex County Council - Environment & Development	May 2000	Not Applicable
Registered Landfill Sites		
Environment Agency - Southern Region - Hampshire Area	March 2003	Not Applicable
Environment Agency - Southern Region - Solent and South Downs	March 2003	Not Applicable
Environment Agency - Southern Region - Sussex Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - Southern Region - Hampshire Area	March 2003	Not Applicable
Environment Agency - Southern Region - Solent and South Downs	March 2003	Not Applicable
Environment Agency - Southern Region - Sussex Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		
Environment Agency - Southern Region - Hampshire Area	March 2003	Not Applicable
Environment Agency - Southern Region - Solent and South Downs	March 2003	Not Applicable
Environment Agency - Southern Region - Sussex Area	March 2003	Not Applicable

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	March 2017	Bi-Annually
Explosive Sites		
Health and Safety Executive	March 2017	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements		
Chichester District Council - Planning Department	February 2016	Annual Rolling Update
East Hampshire District Council	February 2016	Annual Rolling Update
Hampshire County Council - Minerals and Waste Planning	February 2016	Annual Rolling Update
West Sussex County Council - Environment & Development	October 2006	Annual Rolling Update
Planning Hazardous Substance Consents		
Chichester District Council - Planning Department	February 2016	Annual Rolling Update
East Hampshire District Council	February 2016	Annual Rolling Update
Hampshire County Council - Minerals and Waste Planning	February 2016	Annual Rolling Update
West Sussex County Council - Environment & Development	October 2006	Annual Rolling Update

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology		
British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Recorded Mineral Sites		
British Geological Survey - National Geoscience Information Service	April 2017	Bi-Annually
CBSCB Compensation District		
Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Coal Mining Affected Areas		
The Coal Authority - Property Searches	March 2014	As notified
Mining Instability		
Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain		
British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards		
British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	June 2015	Annually
Radon Potential - Radon Affected Areas		
British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures		
British Geological Survey - National Geoscience Information Service	July 2011	As notified

Data Currency

Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	June 2017	Quarterly
Fuel Station Entries Catalist Ltd - Experian	May 2017	Quarterly
Gas Pipelines National Grid	July 2014	Quarterly
Underground Electrical Cables National Grid	December 2015	Bi-Annually
Sensitive Land Use	**Version**	**Update Cycle**
Ancient Woodland Natural England	May 2017	Bi-Annually
Areas of Outstanding Natural Beauty Natural England	August 2017	Bi-Annually
Environmentally Sensitive Areas Natural England	January 2017	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	August 2017	Bi-Annually
Marine Nature Reserves Natural England	August 2017	Bi-Annually
National Nature Reserves Natural England	August 2017	Bi-Annually
National Parks Natural England	August 2017	Bi-Annually
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	October 2015	Annually
Ramsar Sites Natural England	August 2017	Bi-Annually
Sites of Special Scientific Interest Natural England	August 2017	Bi-Annually
Special Areas of Conservation Natural England	August 2017	Bi-Annually
Special Protection Areas Natural England	August 2017	Bi-Annually

Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	**Ordnance Survey** Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 023 8079 2000 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
4	**East Hampshire District Council** Penns Place, Petersfield, Hampshire, GU31 4EX	Telephone: 01730 266551 Fax: 01730 267366 Website: www.easthants.gov.uk
5	**Hampshire County Council - Minerals and Waste Planning** Room 130, Ashburton Court West, The Castle, Winchester, Hampshire, SO23 8UD	Telephone: 01962 841841 Fax: 01962 847055 Website: www.hants.gov.uk
6	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

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

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

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

Ordnance Survey Plan 1:10,000

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

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

1:10,000 Raster Mapping

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

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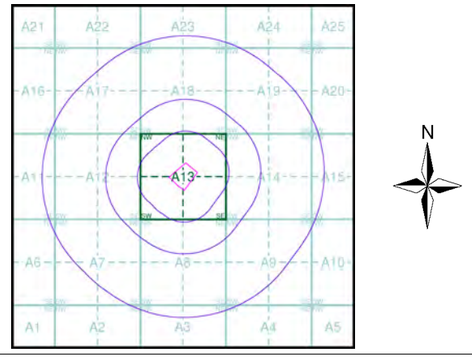
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Hampshire & Isle Of Wight	1:10,560	1872	2
Sussex	1:10,560	1877	3
Hampshire & Isle Of Wight	1:10,560	1898	4
Sussex	1:10,560	1899	5
Hampshire & Isle Of Wight	1:10,560	1910	6
Hampshire & Isle Of Wight	1:10,560	1910	7
Sussex	1:10,560	1914	8
Ordnance Survey Plan	1:10,000	1961 - 1962	9
Ordnance Survey Plan	1:10,000	1979	10
Ordnance Survey Plan	1:10,000	1982	11
Ordnance Survey Plan	1:10,000	1996	12
10K Raster Mapping	1:10,000	2000	13
Street View	Variable		14

Historical Map - Slice A



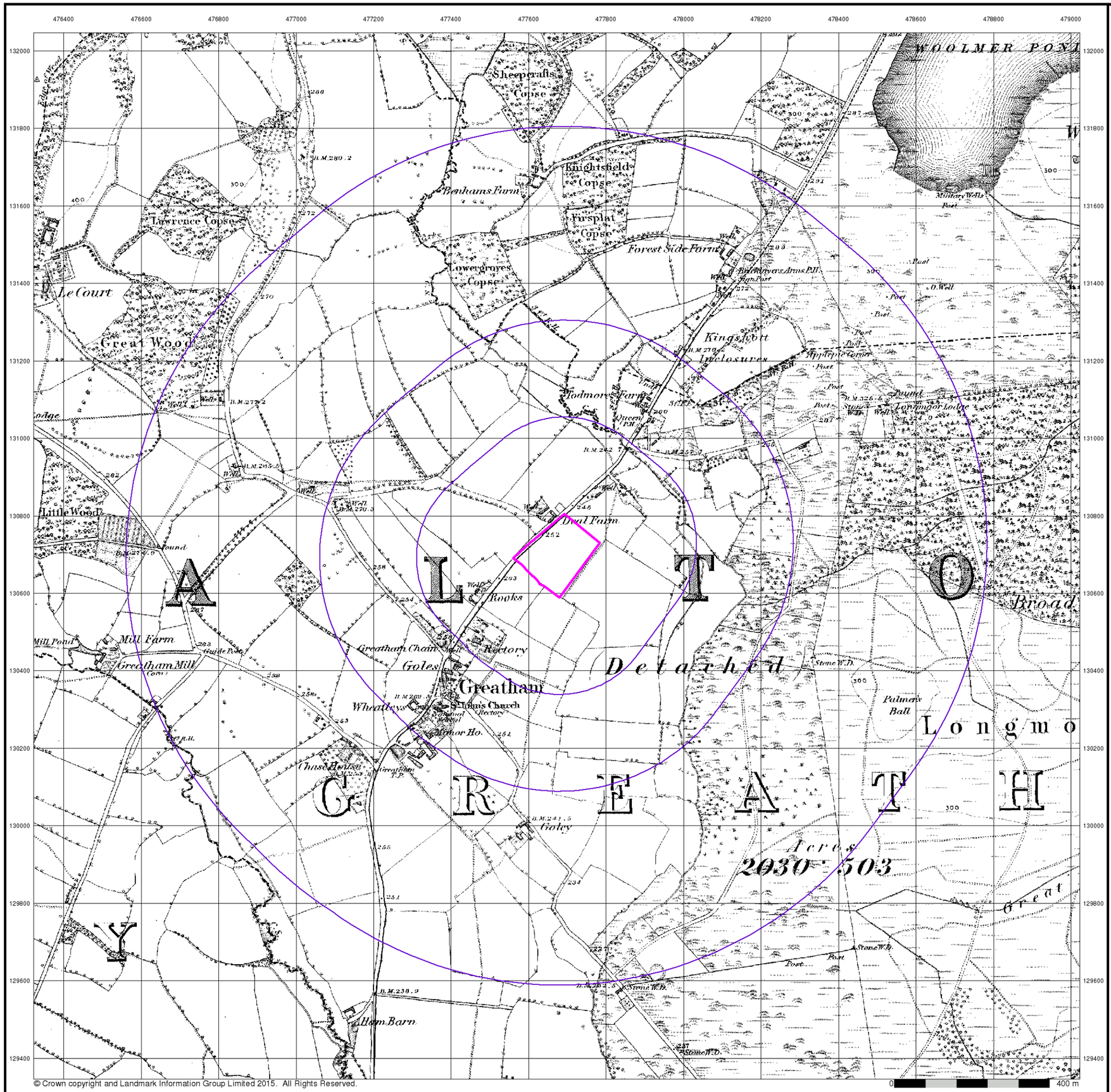
Order Details

Order Number: 137092287_1_1
Customer Ref: LP1457
National Grid Reference: 477680, 130700
Slice: A
Site Area (Ha): 2.42
Search Buffer (m): 1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

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



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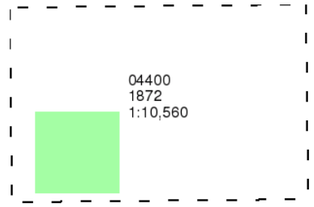
Hampshire & Isle Of Wight

Published 1872

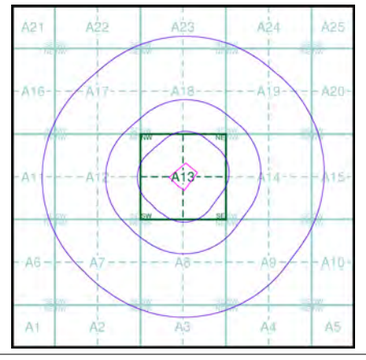
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	137092287_1_1
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Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

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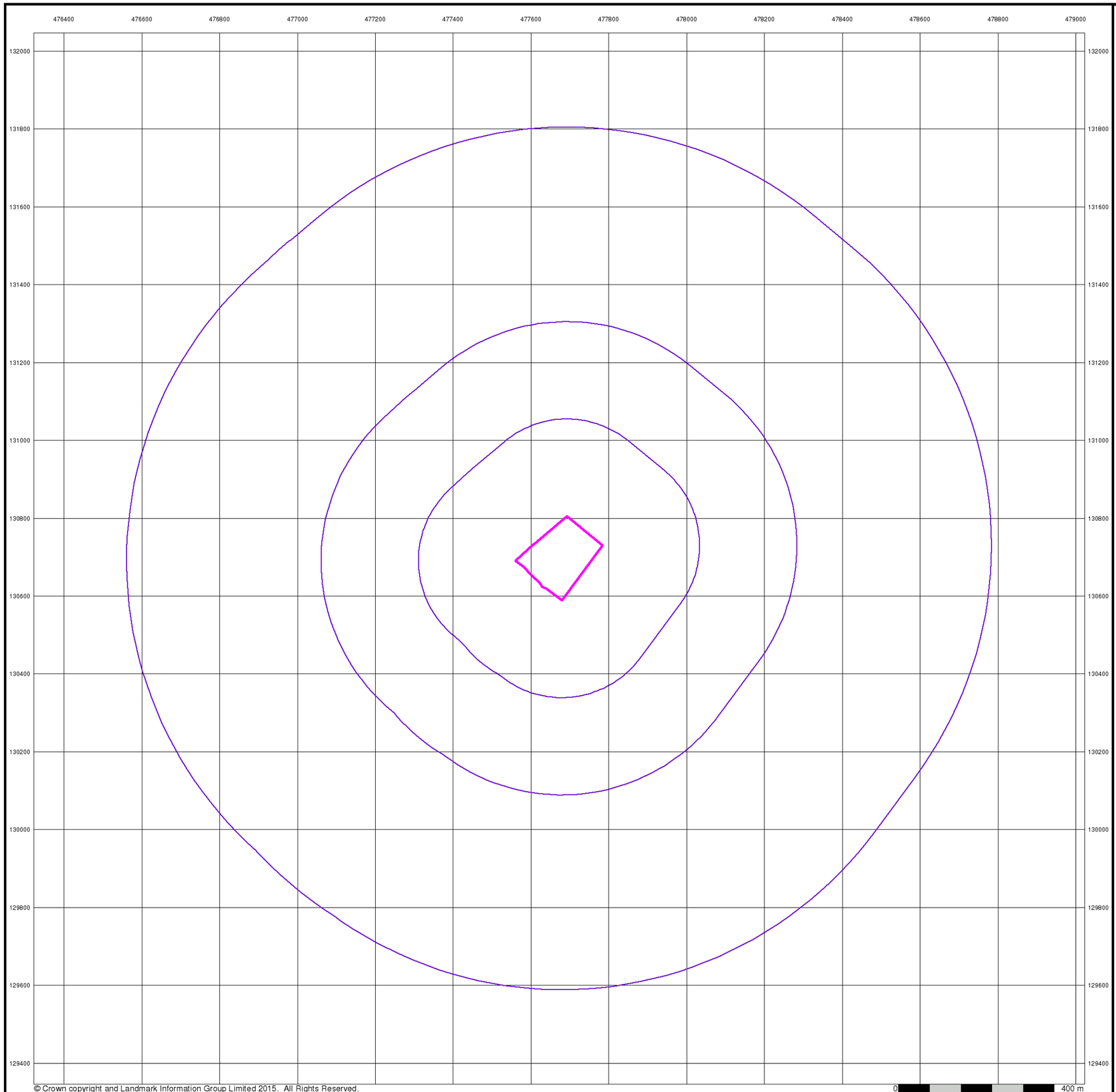

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Sussex

Published 1877

Source map scale - 1:10,560

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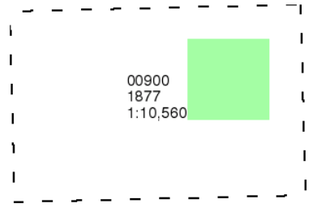
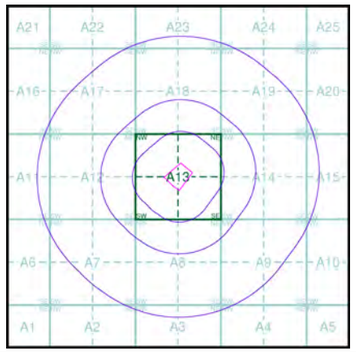


Historical Map - Slice A



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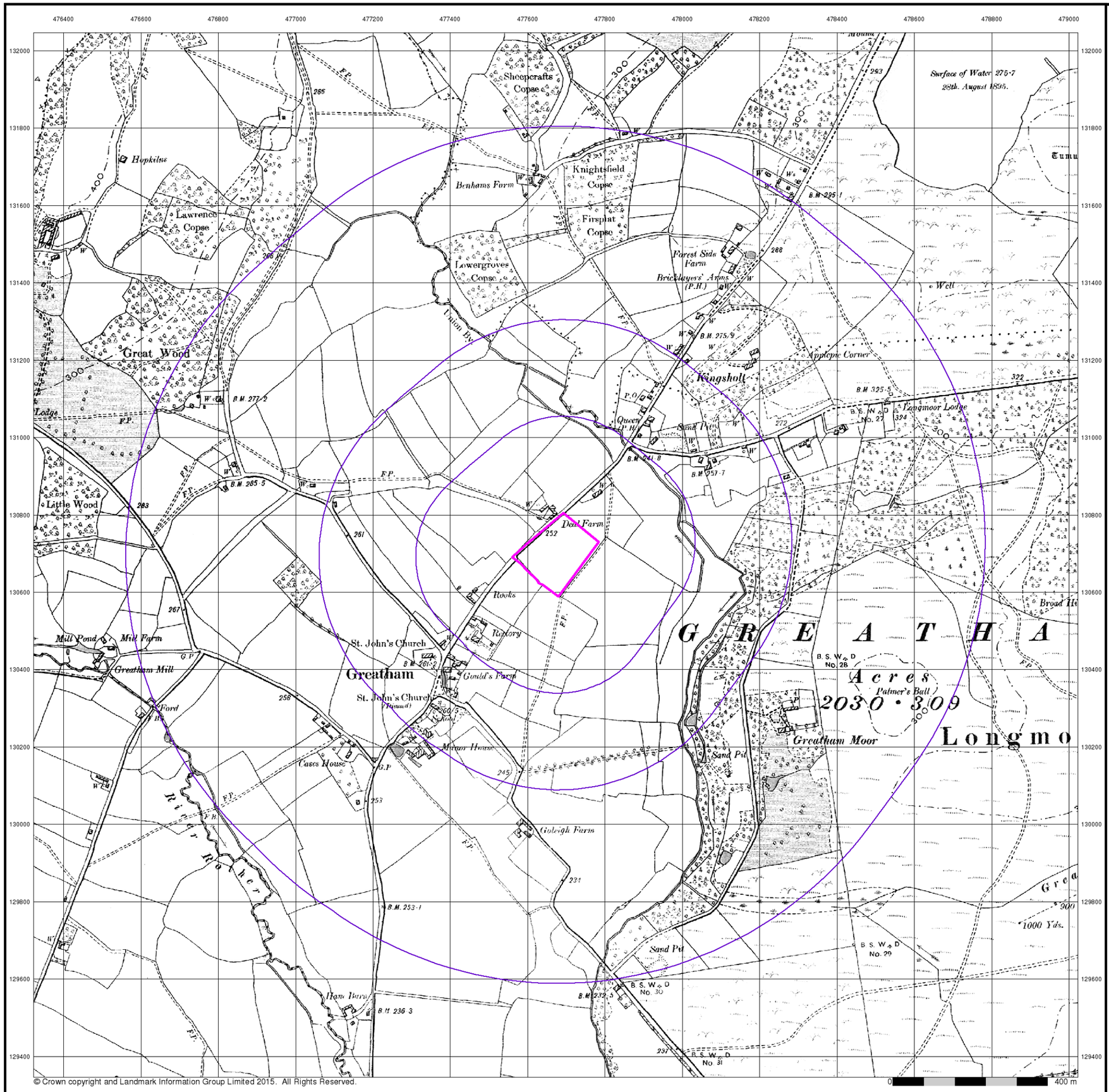

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Hampshire & Isle Of Wight

Published 1898

Source map scale - 1:10,560

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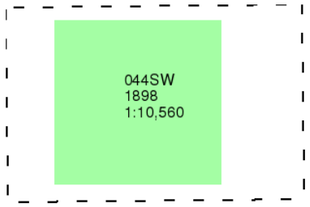
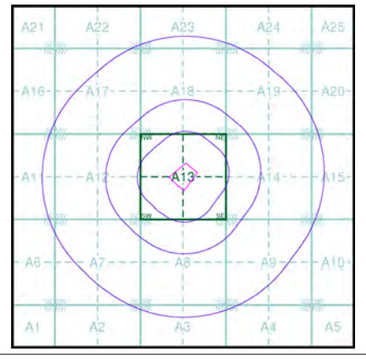


Historical Map - Slice A



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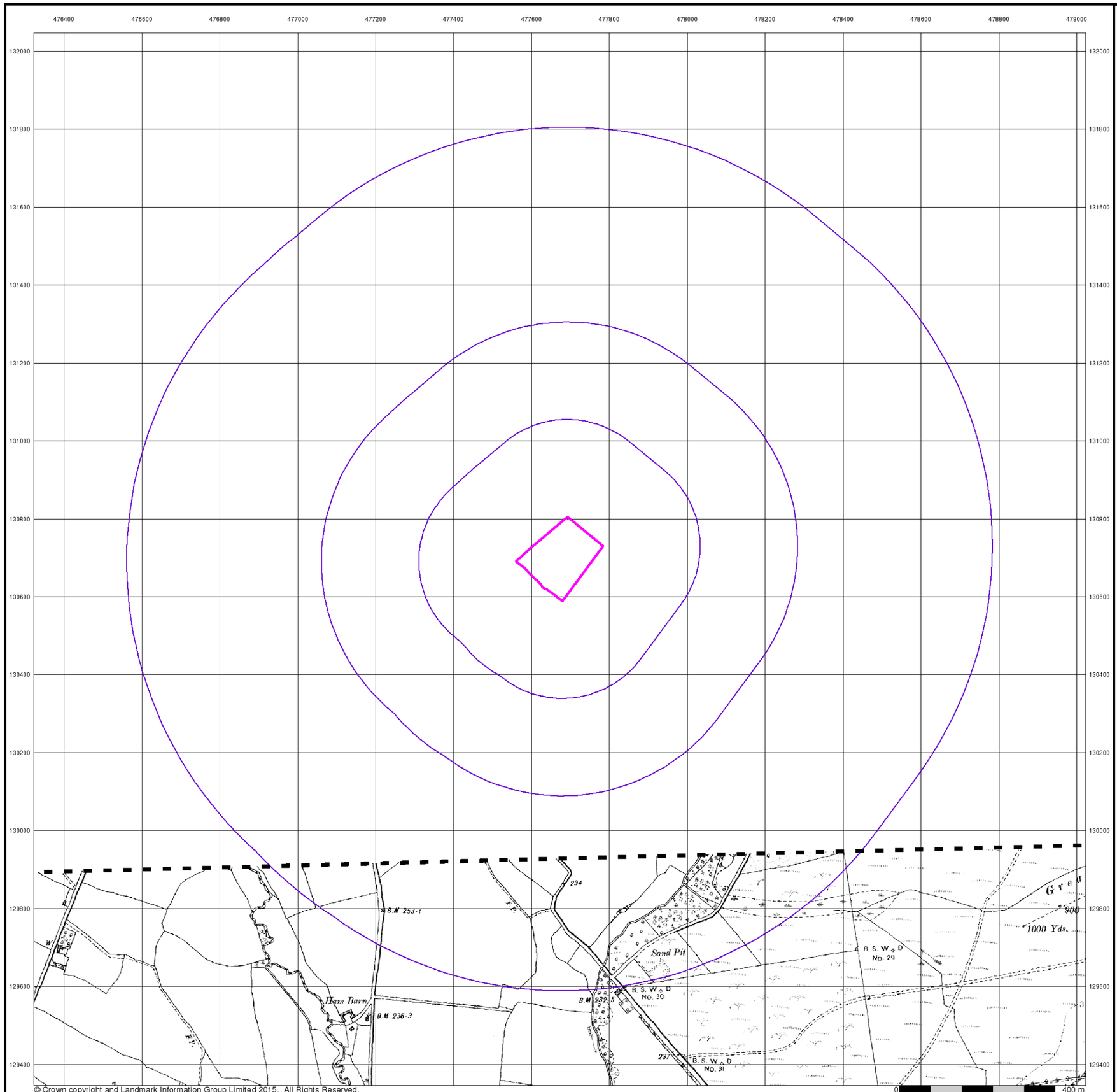

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Sussex

Published 1899

Source map scale - 1:10,560

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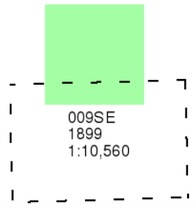
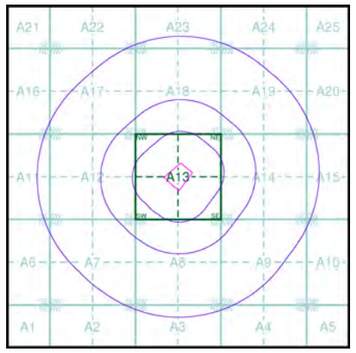


Historical Map - Slice A



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Slice:	A
Site Area (Ha):	2.42
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Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

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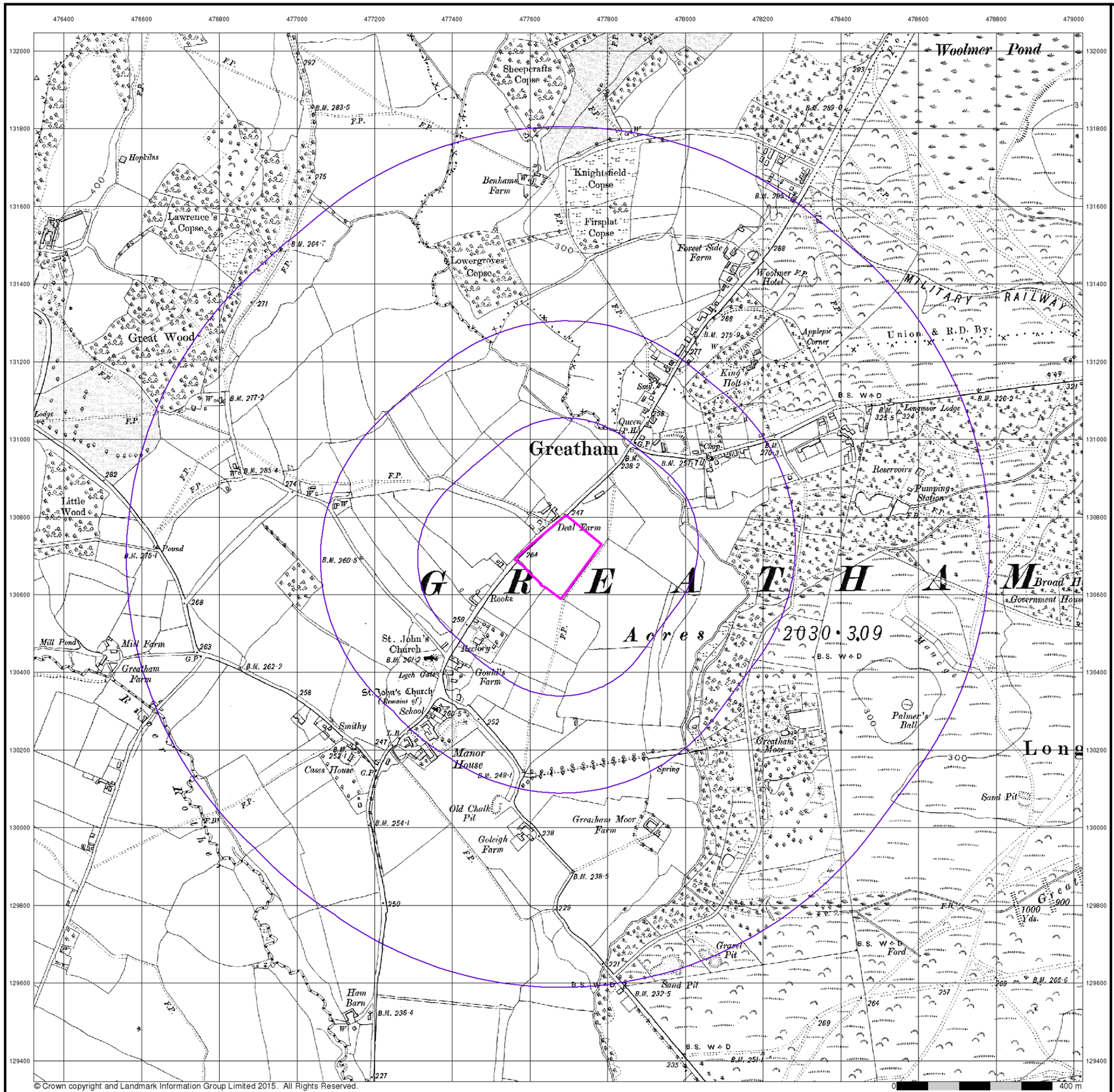

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LANDMARK INFORMATION GROUP®

Hampshire & Isle Of Wight

Published 1910

Source map scale - 1:10,560

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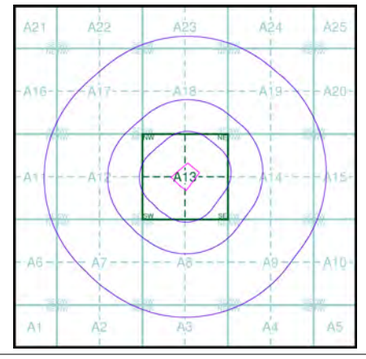
Map Name(s) and Date(s)

044SW
1910
1:10,560

Historical Map - Slice A



N

Order Details

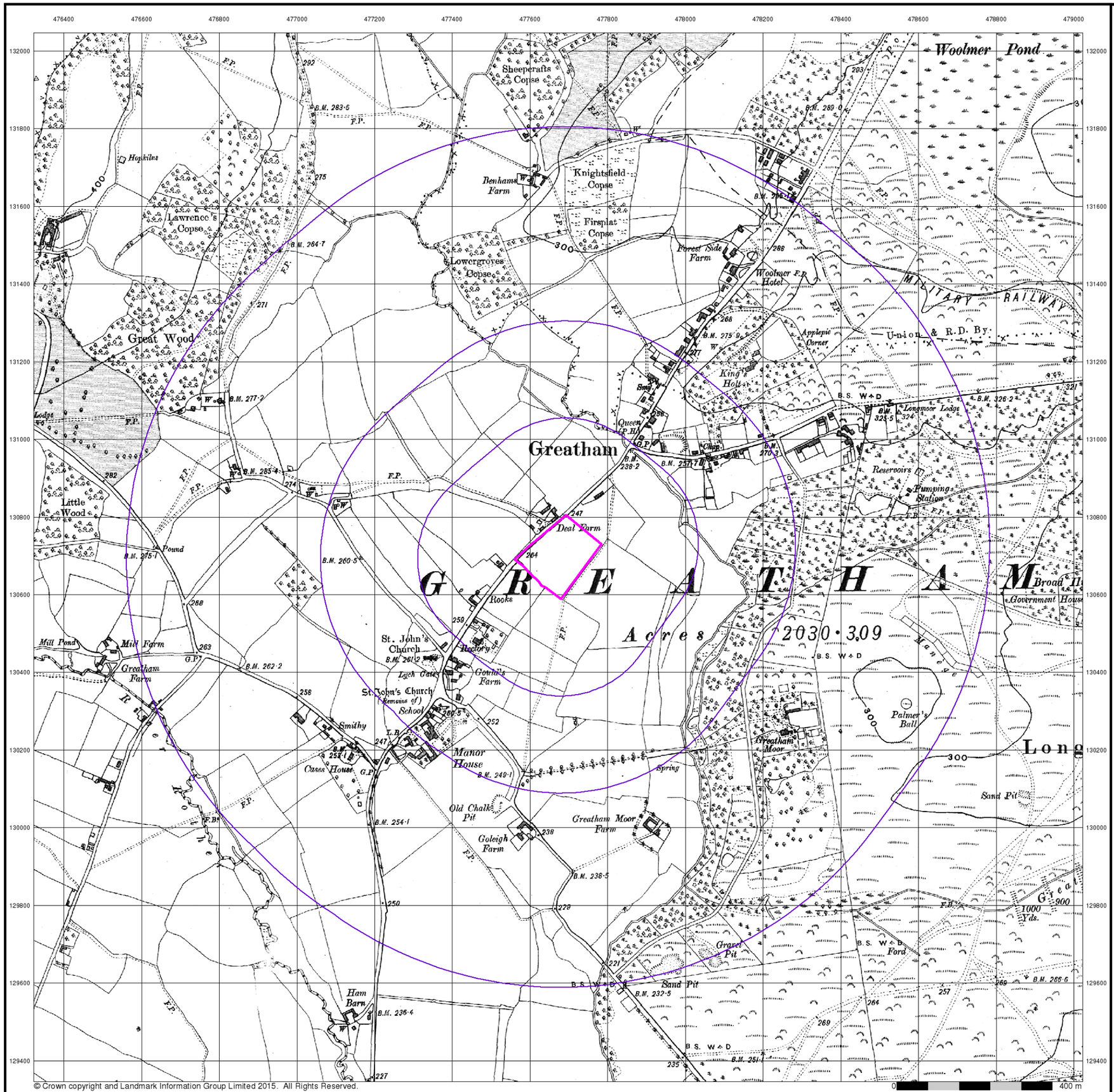
Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

Landmark INFORMATION GROUP

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



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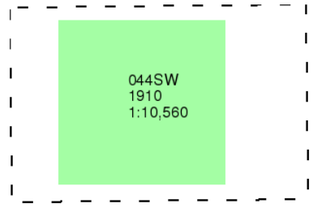
Hampshire & Isle Of Wight

Published 1910

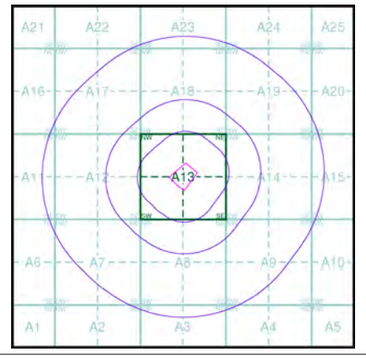
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

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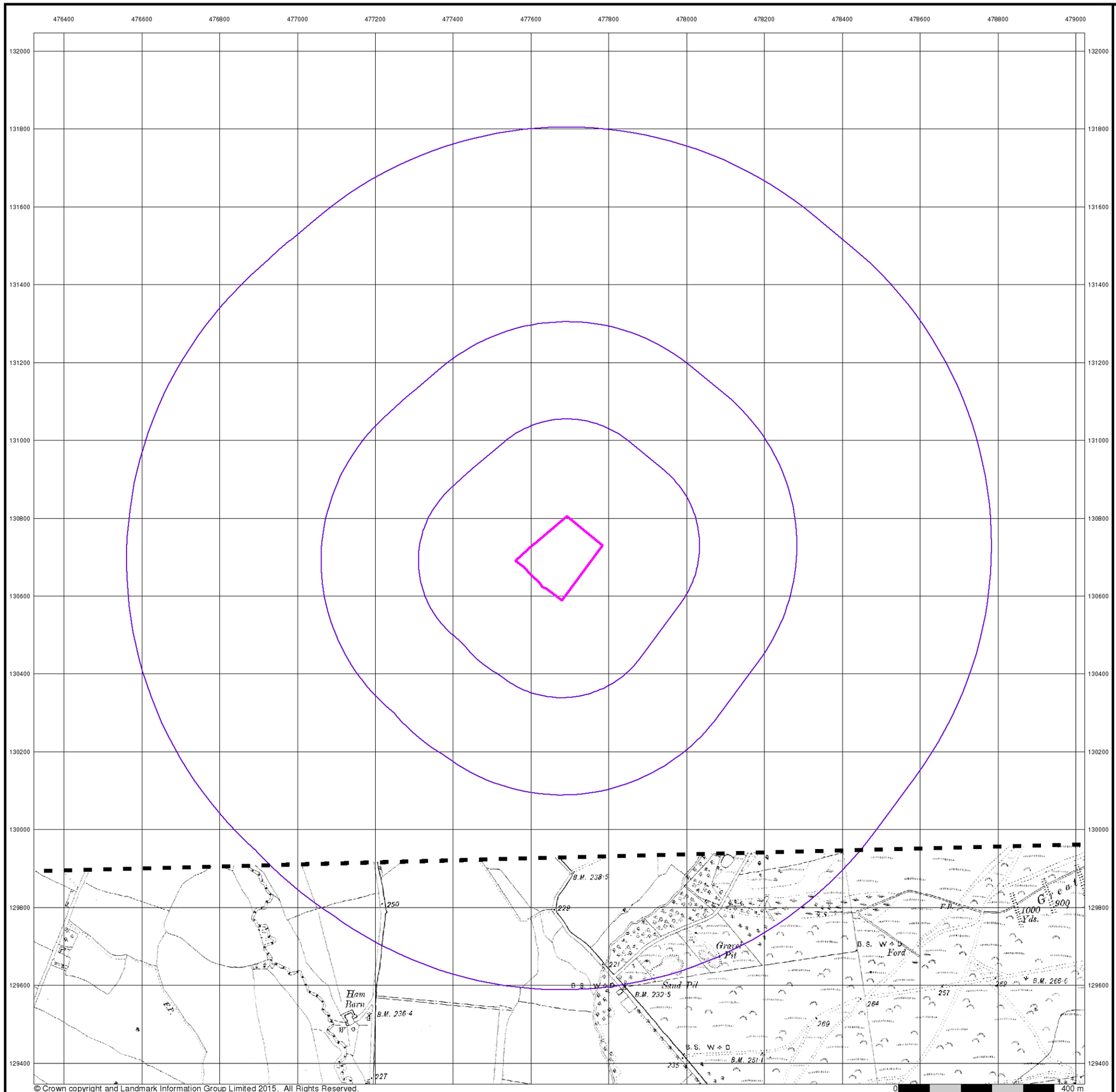

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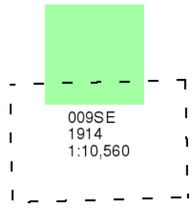
Sussex

Published 1914

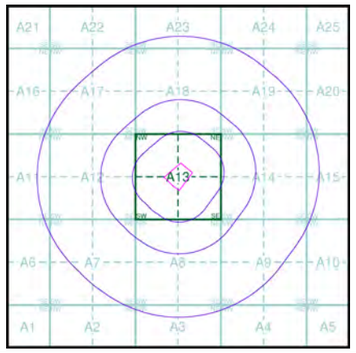
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
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Site Area (Ha):	2.42
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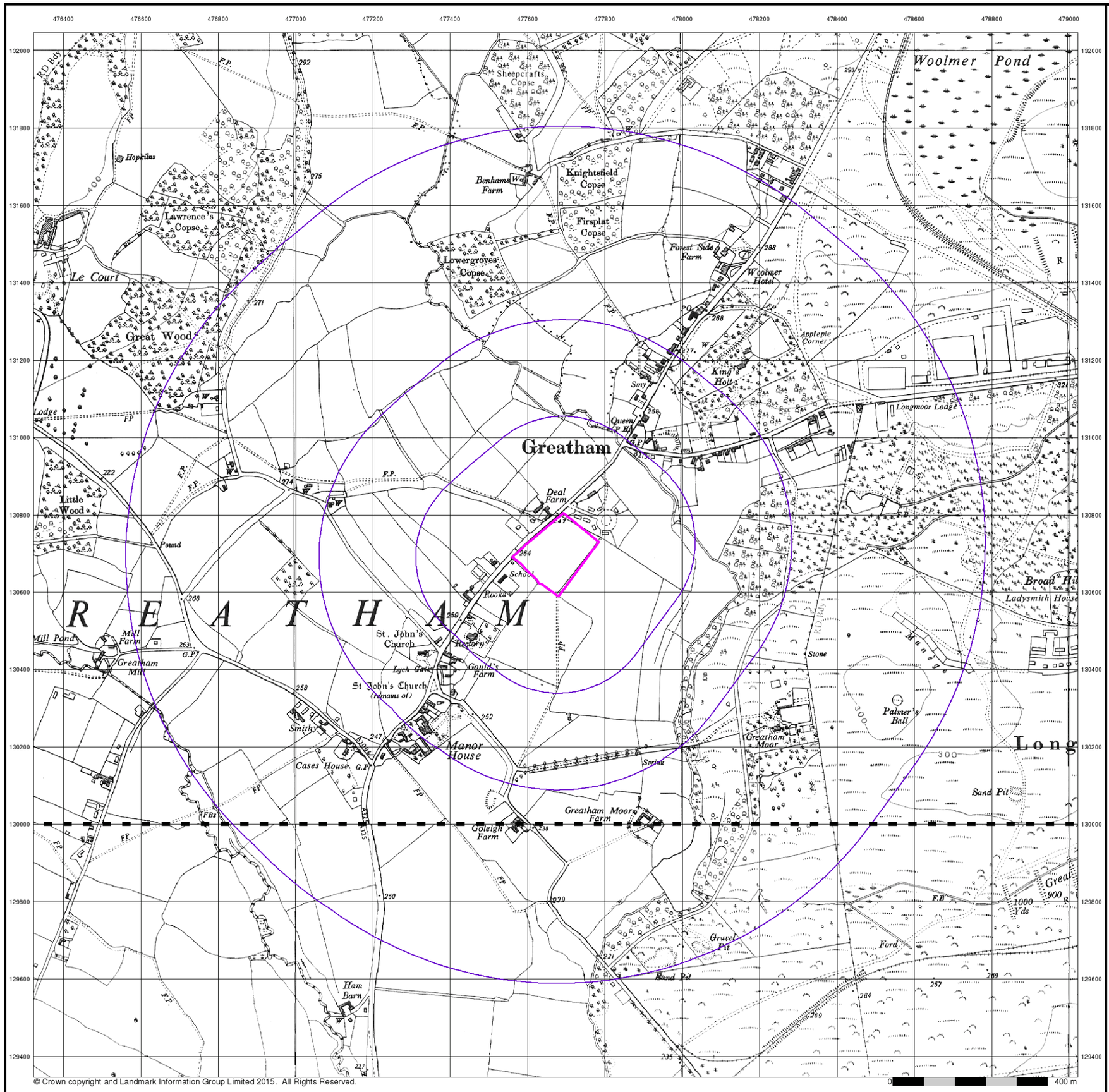

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Ordnance Survey Plan

Published 1961 - 1962

Source map scale - 1:10,000

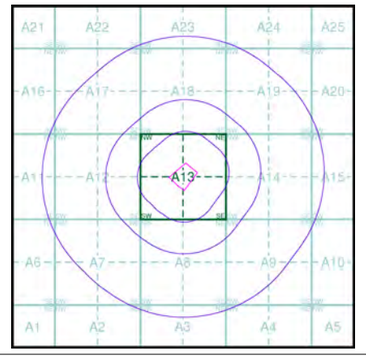
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SU73SE
1961
1:10,560

SU72NE
1962
1:10,560

Historical Map - Slice A



Order Details

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National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

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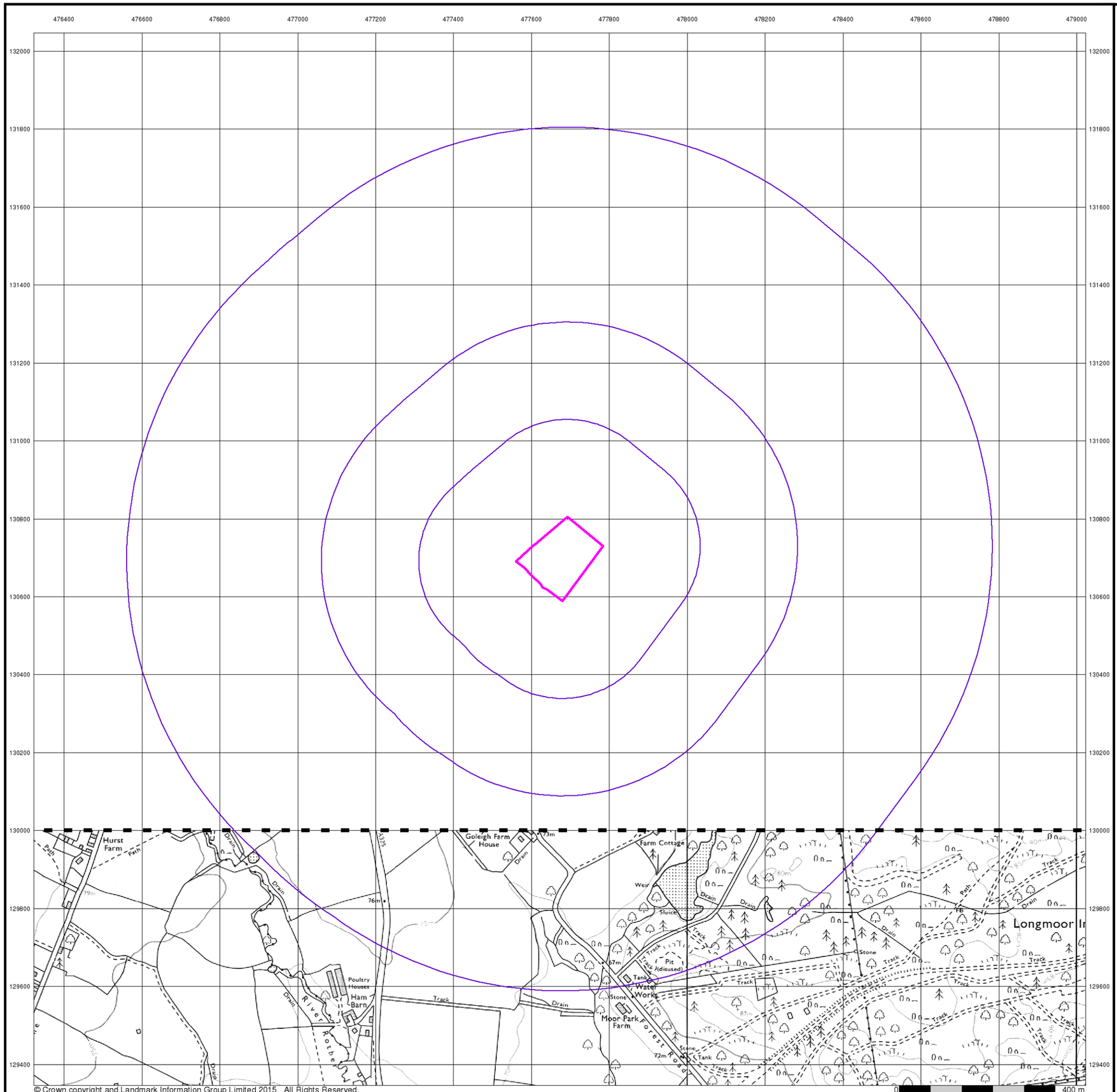

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Ordnance Survey Plan

Published 1979

Source map scale - 1:10,000

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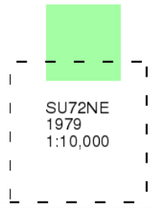
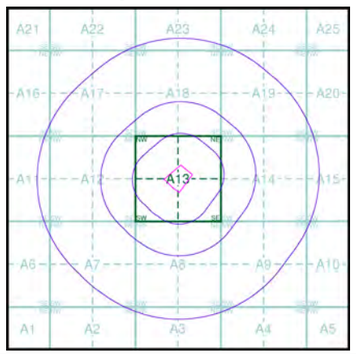
Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
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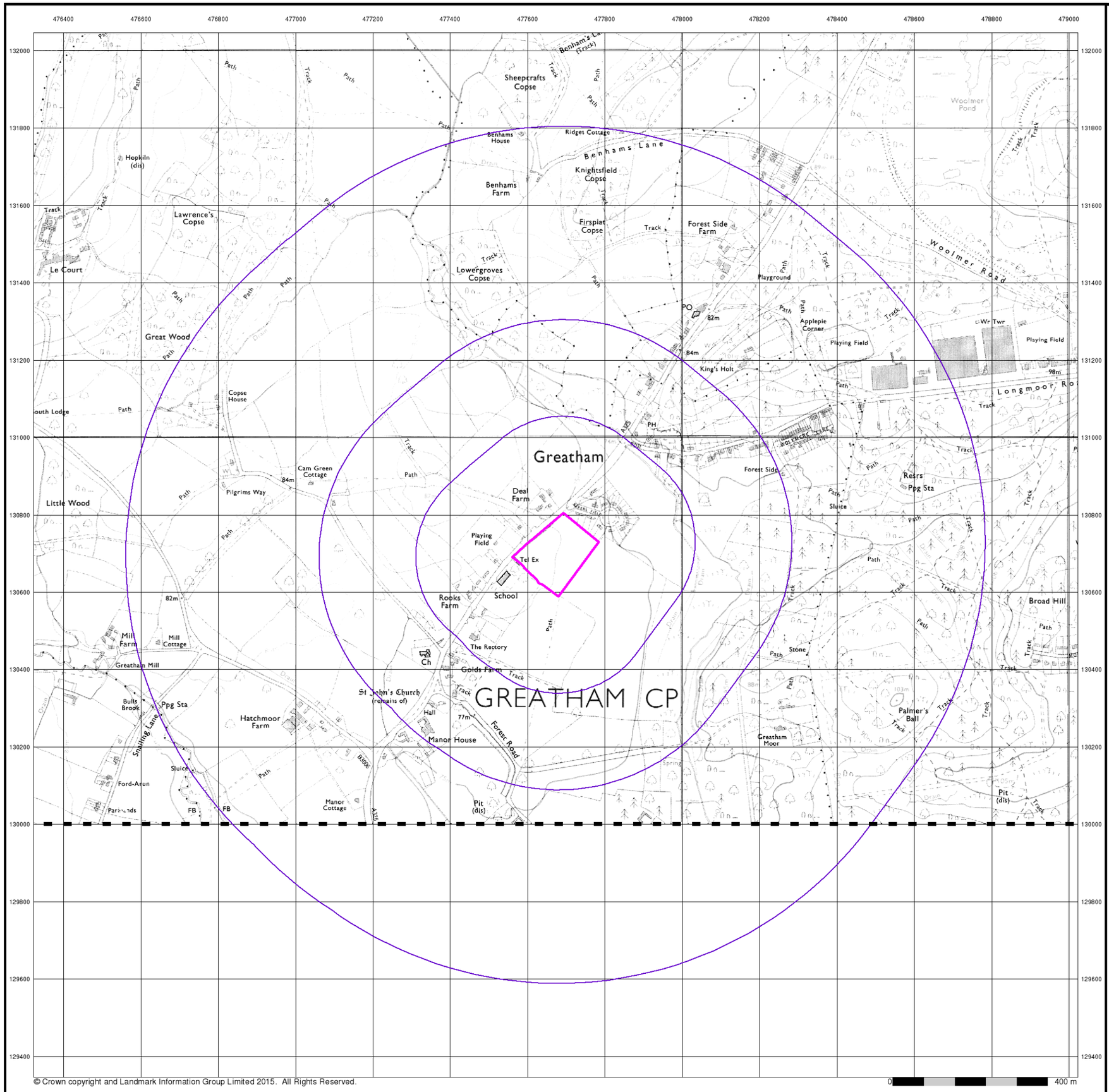

0 400 m

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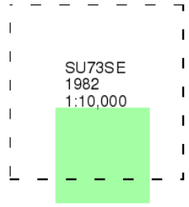
Ordnance Survey Plan

Published 1982

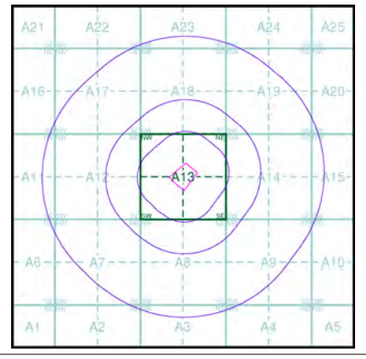
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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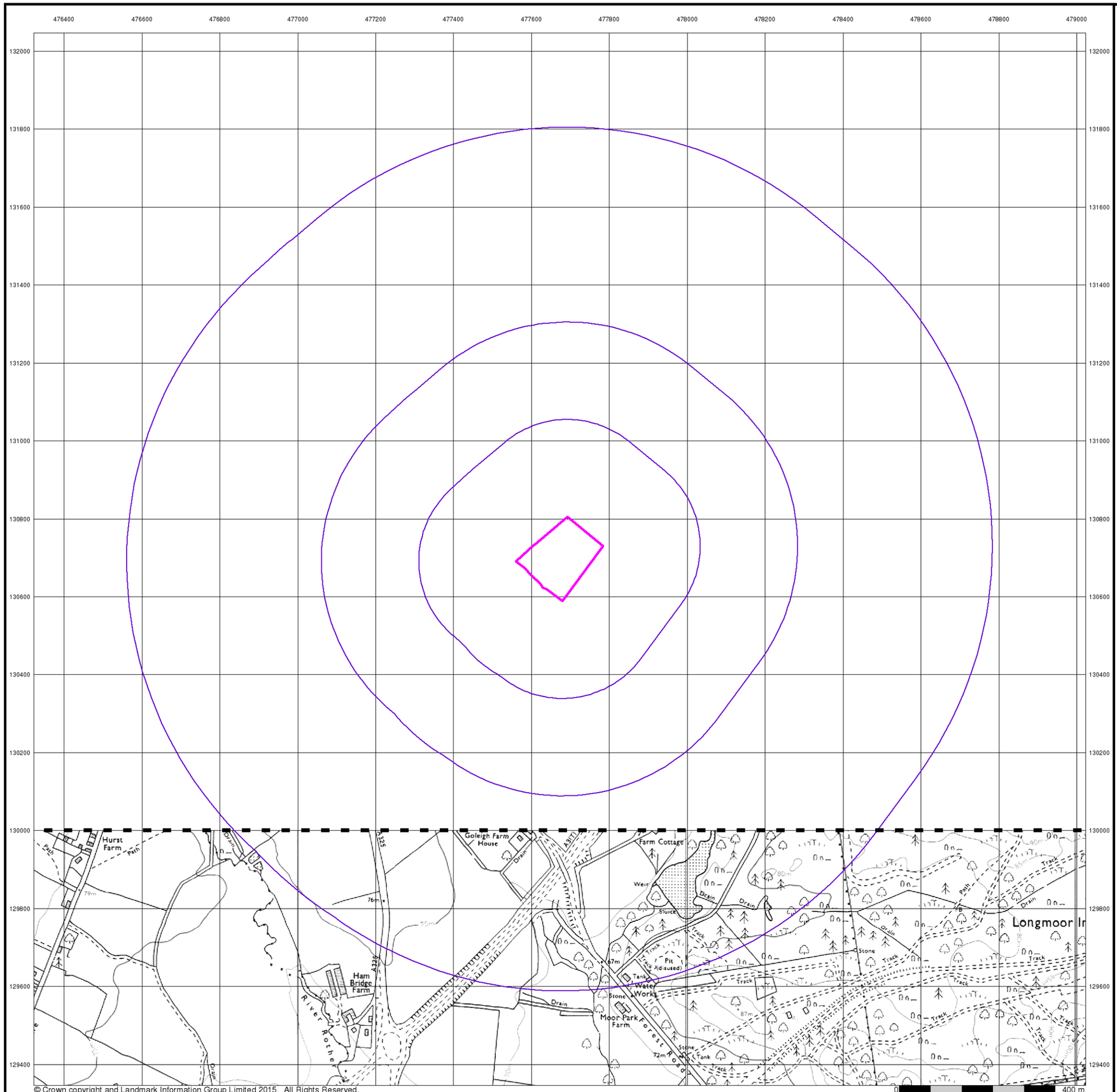

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Ordnance Survey Plan

Published 1996

Source map scale - 1:10,000

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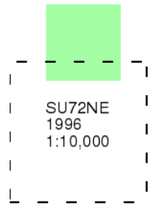
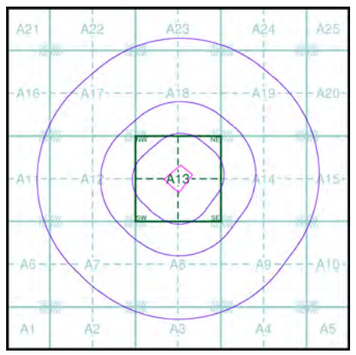
Map Name(s) and Date(s)



Historical Map - Slice A

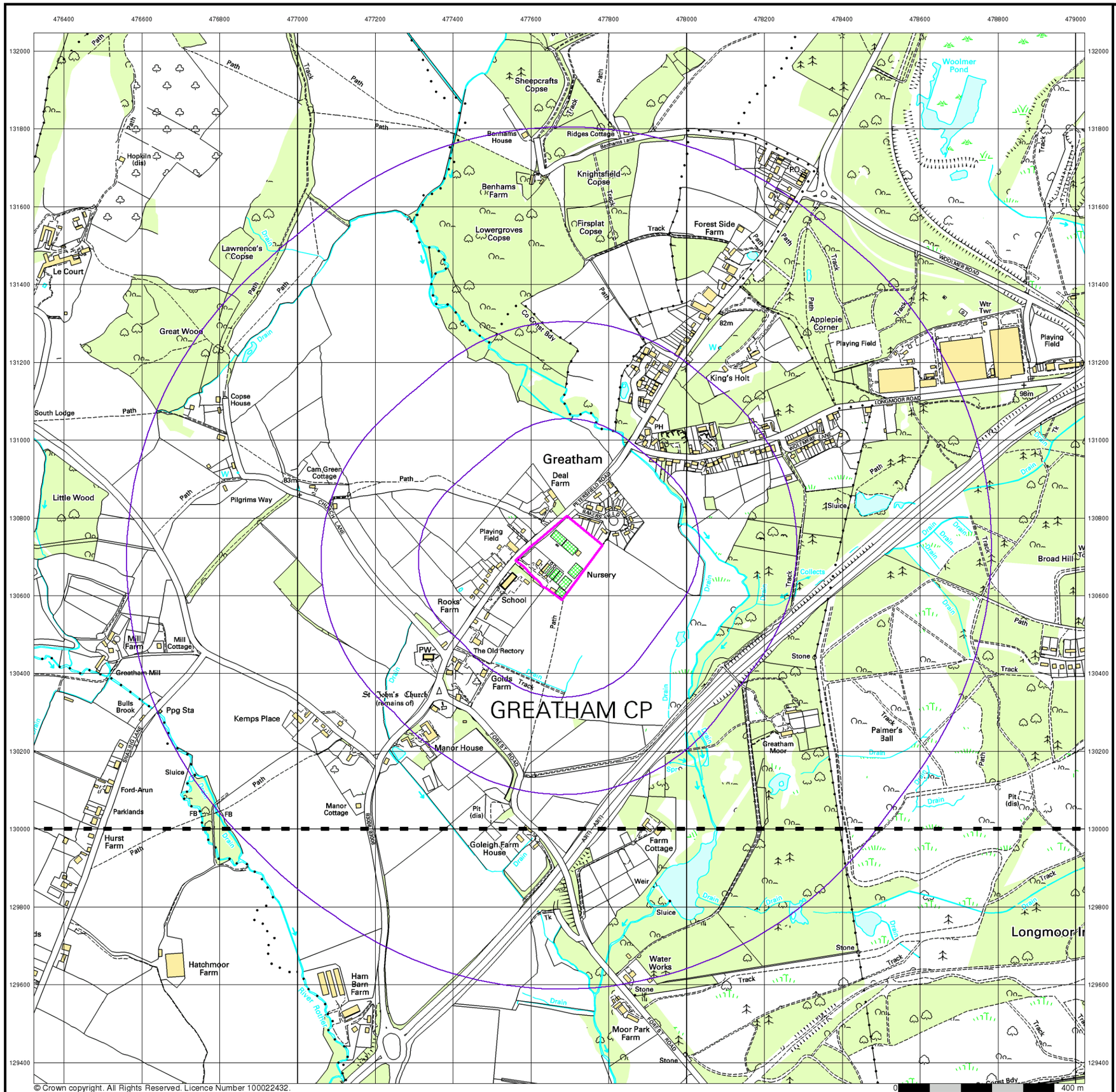


Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire



Envirocheck®

LANDMARK INFORMATION GROUP®

10k Raster Mapping

Published 2000

Source map scale - 1:10,000

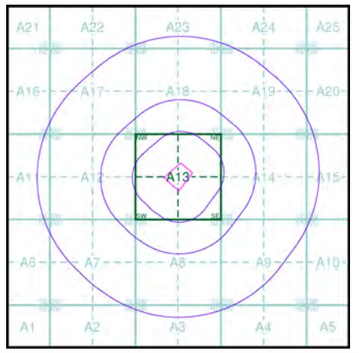
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks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

Map Name(s) and Date(s)

SU73SE
2000
1:10,000

SU72NE
2000
1:10,000

Historical Map - Slice A



Order Details

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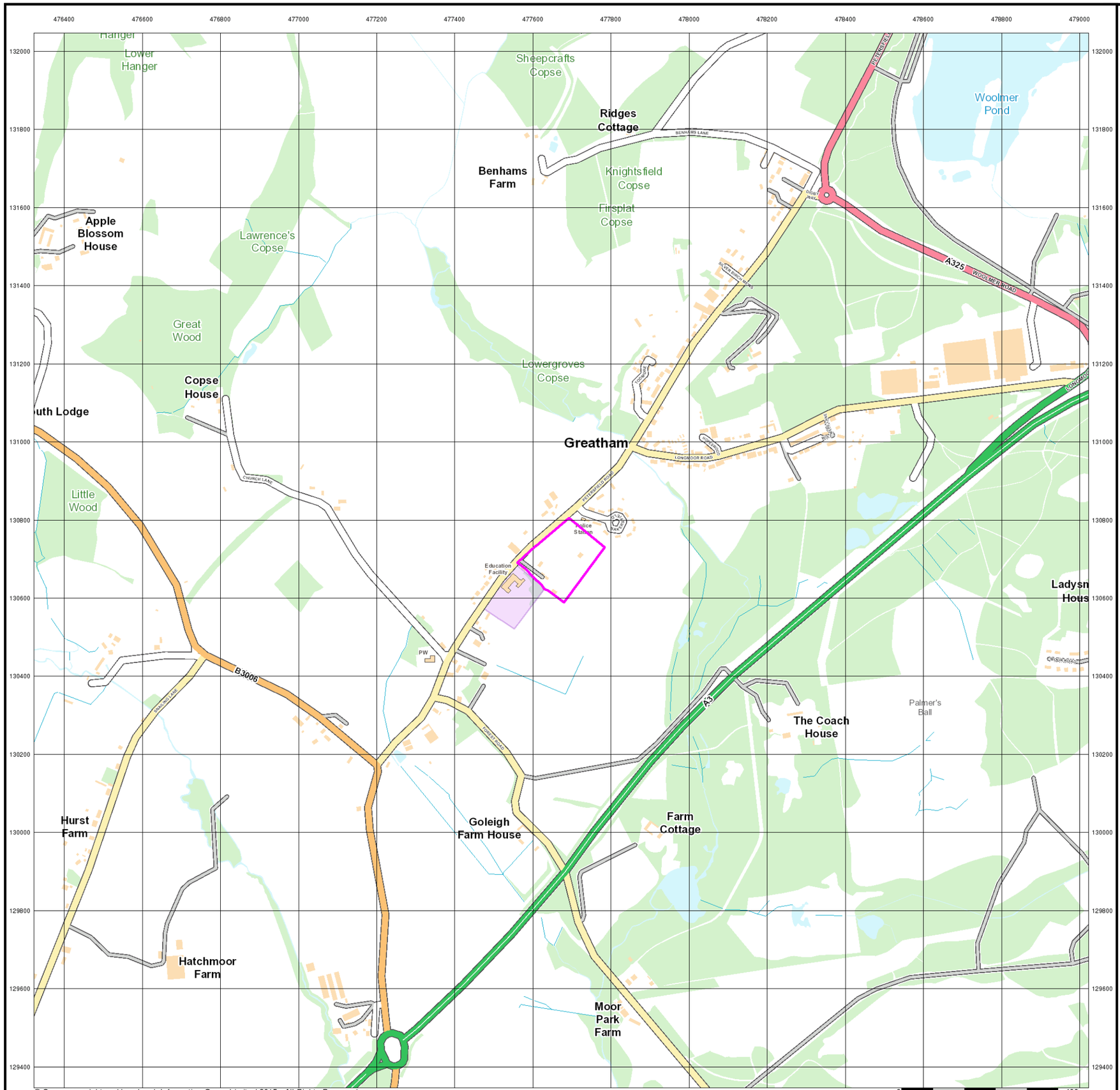
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

Landmark INFORMATION GROUP

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



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Street View

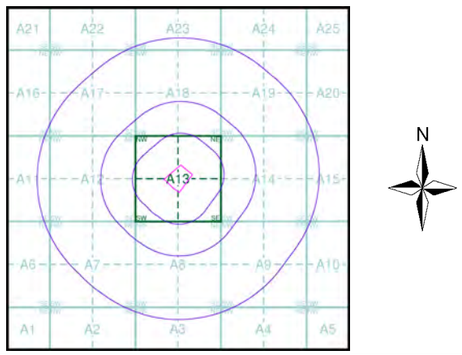
Published 2017

Source map scale - 1:10,000

Street View is a street-level map for the whole of Great Britain produced by the Ordnance Survey. These maps are provided at a nominal scale of 1:10,000

Map Name(s) and Date(s)

Street View Map - Slice A



Order Details

Order Number:	137092287_1_1
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National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
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Site Details

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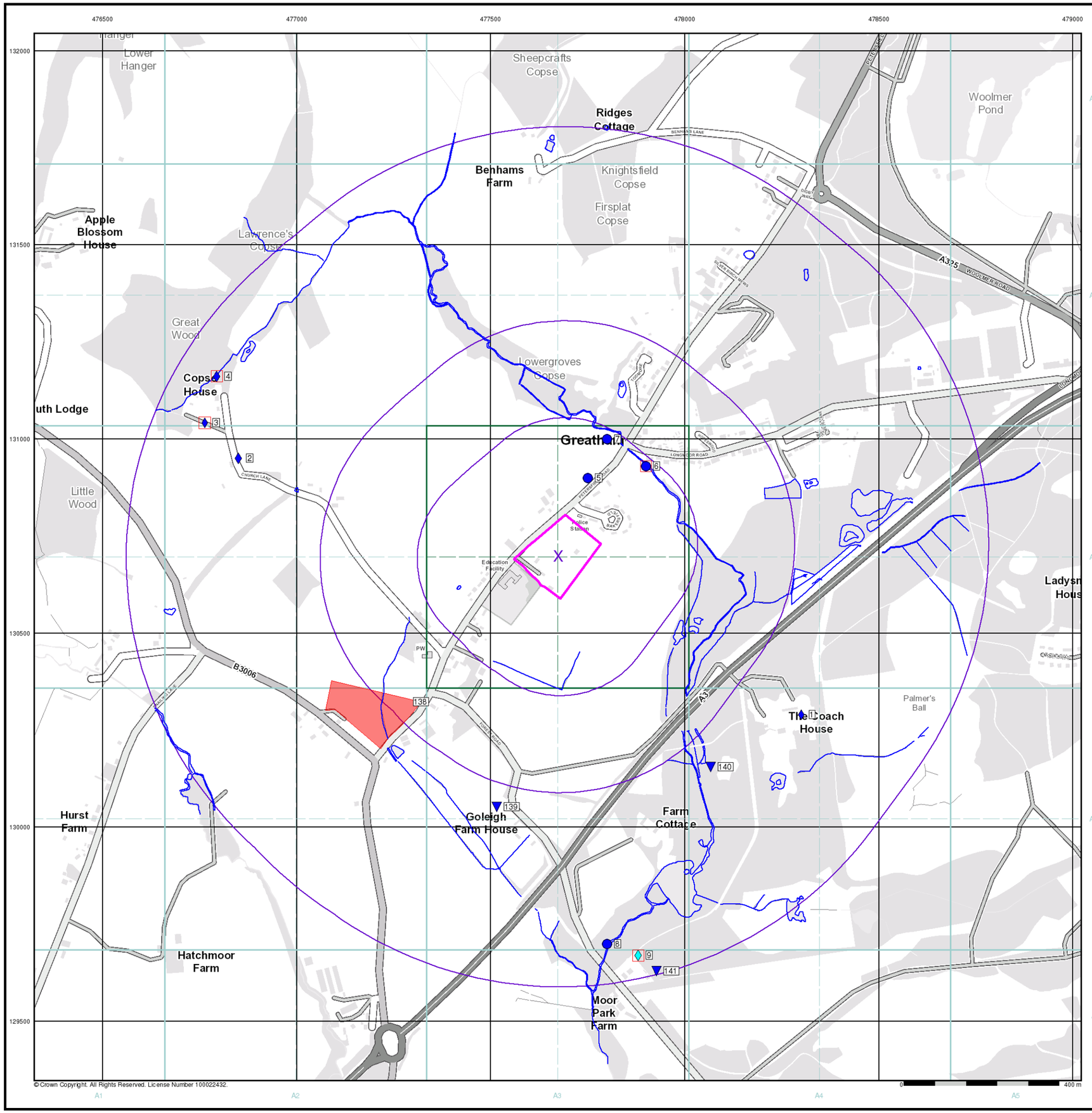

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LANDMARK INFORMATION GROUP®

General

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

Agency and Hydrological

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

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

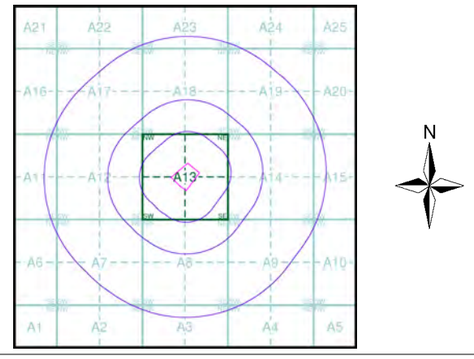
Waste

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

Hazardous Substances

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

Site Sensitivity Map - Slice A



Order Details

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Slice:	A
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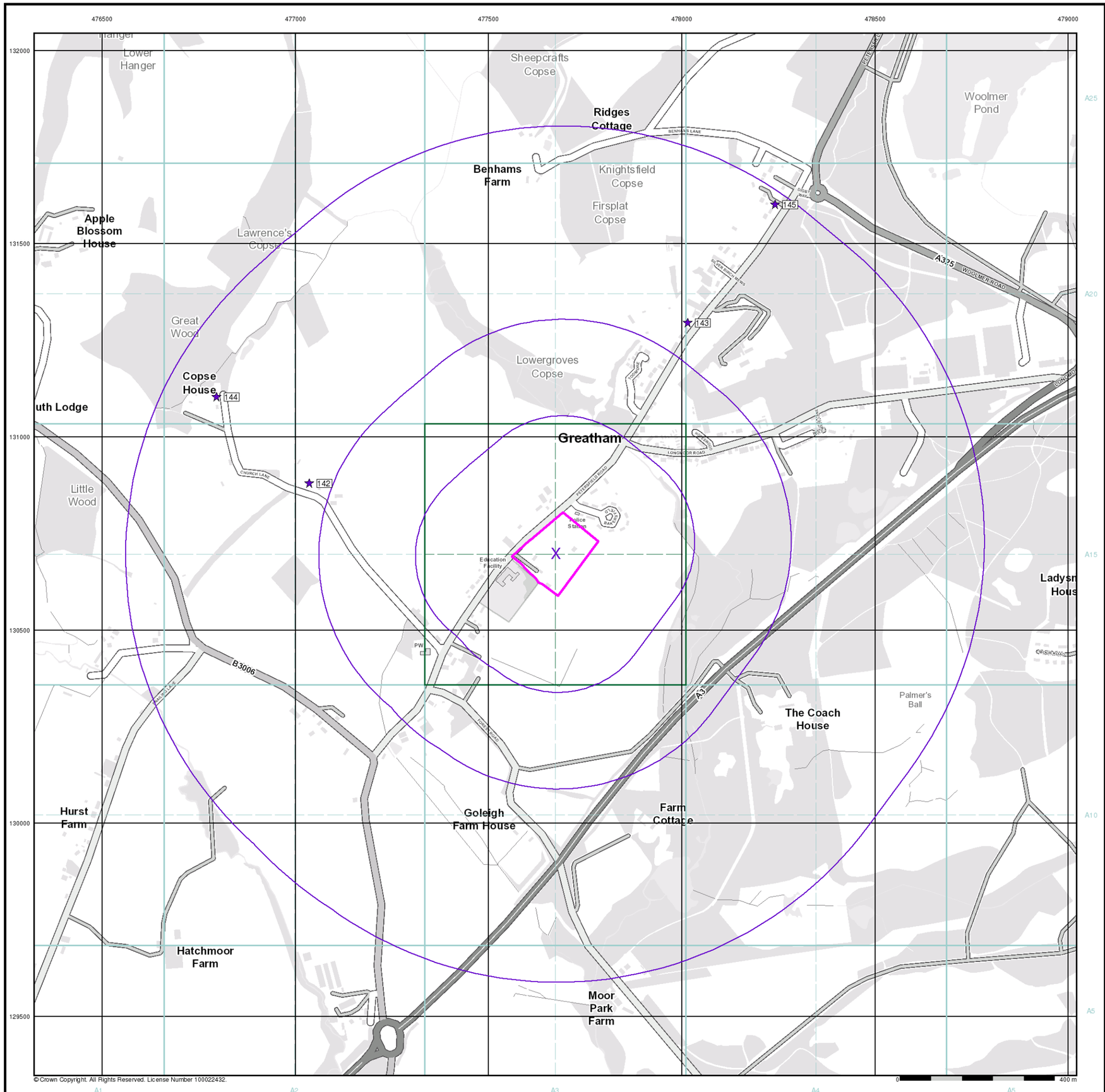

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Industrial Land Use Map

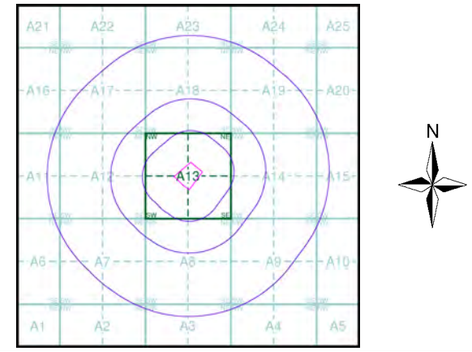
General

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

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Underground Electrical Cables

Industrial Land Use Map - Slice A



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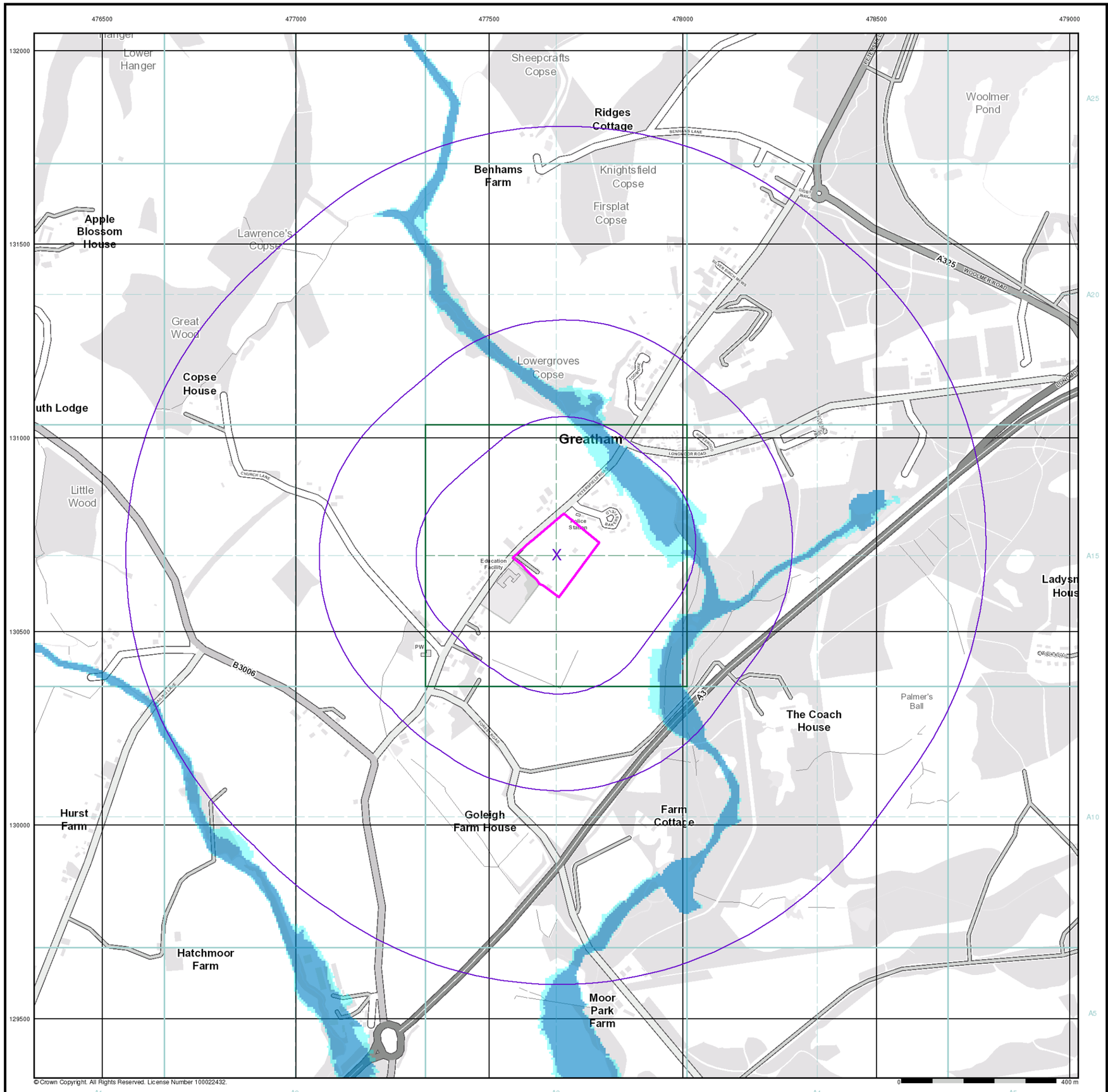


Envirocheck®

LANDMARK INFORMATION GROUP®

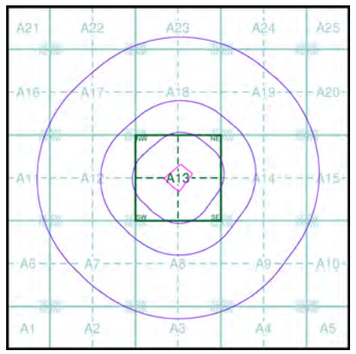
General

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

Agency and Hydrological (Flood)

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

Flood Map - Slice A



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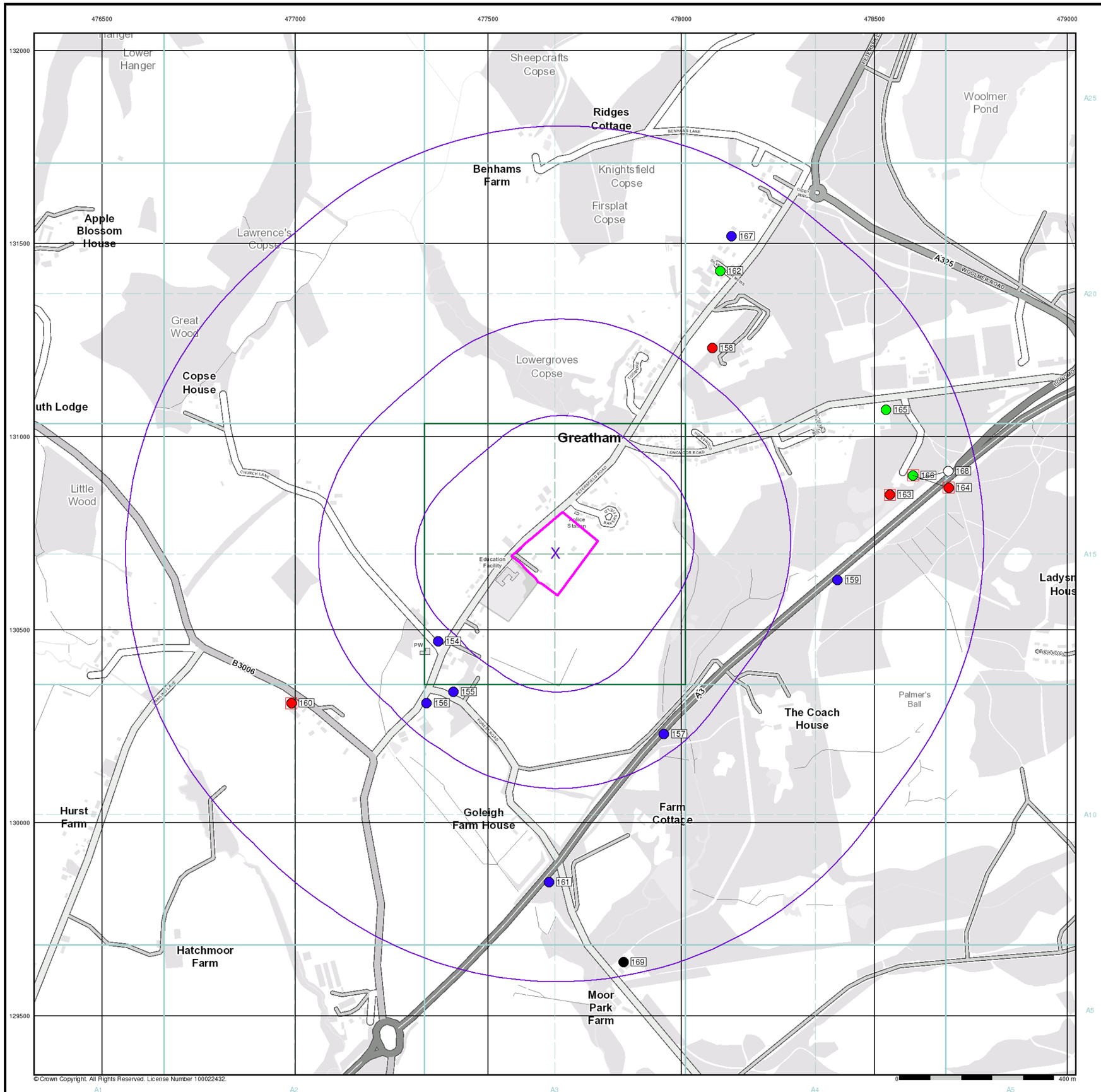


Envirocheck®

LANDMARK INFORMATION GROUP®

General

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

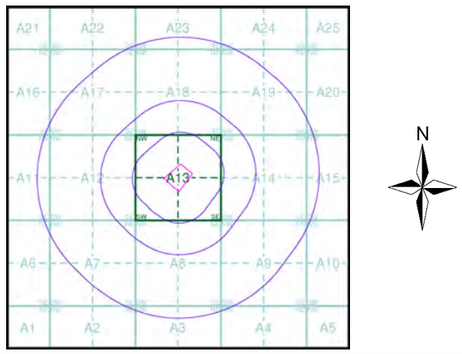
Agency and Hydrological (Boreholes)

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

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

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

Borehole Map - Slice A



Order Details

Order Number:	137092287_1_1
Customer Ref:	LP1457
National Grid Reference:	477680, 130700
Slice:	A
Site Area (Ha):	2.42
Search Buffer (m):	1000

Site Details

Liss Forest Nursery, Petersfield Road, Greatham - Liss, Hampshire

Landmark INFORMATION GROUP

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