Phase I Geo-Environmental Desk Study

Land Between 357 & 363 Broadgate
Weston Hills
Spalding
PE12 6DB

Prepared for:

HB Developments
Manor Barn
Fitton End Road
Newton
PE13 5EL

EPS Reference Number:	UK23.6651
Date Issued:	4th October 2023
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LAND BETWEEN 357 & 363 BROADGATE, WESTON HILLS

NON-TECHNICAL CLIENT SUMMARY

This report presents the findings of an extended Phase I Geo-Environmental Desk Study which was carried out to identify potential contamination from a previous or current uses of the site and the surrounding area and to provide an initial assessment of geological and geotechnical aspects of the site and how the proposed development or surrounding environment might be affected.

- The site is currently the western section of a larger agricultural field that is being redeveloped for residential use in the form of two single storey dwellings. It lies to the north of Weston Hills, east off Broad Gate.
- Ground conditions are reported to comprise a superficial layer of Tidal Flat Deposits followed by a bedrock layer of Oxford Clay. The bedrock geology is classified as unproductive strata and does not lie within a source protection zone for groundwater abstraction. As such, the site is considered to have relatively low environmental sensitivity.
- Historically the land only appears to have been used as farmland, however it was noted that there was a pond present onsite until around 1970 and then potentially infilled. As a result of this a small intrusive investigation was undertaken to determine the nature of the material, which found the soils to comprise a thin layer of topsoil overlying natural clays with no evidence of infilling with anthropogenic fill material.
- On this basis, no risks have been identified to either human health or controlled waters and as such the site is considered suitable for its proposed end use, with no further investigation or assessment warranted.
- It is recommended that a copy of this report be forwarded to the Environmental Health Department of South Holland District Council.

The above points represent a simplified summary of the findings of this assessment and must not form the basis for key decisions for the proposed development. A thorough review of the details is contained within the following report, or alternatively get in touch and we'll talk you through it.

Project Reference:	UK23.6651	
Title:	Phase I Geo-Environmental Desk Study – Land Between 357 & 363 Broadgate	
Client:	HB Developments	
Date:	4th October 2023	
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Where ground investigations have been conducted, these have been limited to the level of detail required for the site in order to achieve the objectives of the investigation.

The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

The National Planning Policy Framework 2019 requires a competent person to prepare site investigation information, which is defined as a person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation. EPS considers that it fulfils these criteria and would welcome any request for staff CVs or case studies to demonstrate it.

As stated within DEFRA's Contaminated Land Statutory Guidance (2012), with any complex risk assessment it is possible that different suitably qualified people may reach slightly different conclusions when interpreting the same information. EPS recognises this and considers the conclusions presented within this report to be robust and appropriate but input from the Local Authority and their judgement in line with this guidance would still be welcomed.

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1 INTRODUCTION

In August 2023, Environmental Protection Strategies Ltd (EPS) was commissioned by HB Developments to complete a Phase I Geo-Environmental Desk Study Report at Land Between 357 & 363 Broadgate, Weston Hills, Spalding PE12 6DB ('the site'); see Figure 1.

The work was commissioned in order to fulfil pre-planning requirements for the erection of two single-storey dwellings with associated car parking, private gardens and landscaping (planning ref: H22-0769-23 for South Holland District Council).

1.1 Objectives

The objectives of this investigation were as follows:

a) Compile a Phase I Desk Study and Conceptual Site Model through a Preliminary Risk Assessment to evaluate the potential risks the site may pose to human and environmental receptors, both currently and in future.
b) Investigate potential contaminant linkages identified in the CSM by means of an initial assessment of shallow soils.
c) Determine the potential risks posed by the site and make recommendations for further work that may be required, to ensure safe development in accordance the Environment Agency's *Land Contamination: Risk Management* guidance (LC:RM, 2020) and the *National Planning Policy Framework.*

1.2 Scope of Work

To perform an exploratory assessment of the site in accordance with the principles and requirements of DEFRAs '*Contaminated Land Statutory Guidance*' (2012), BS10175 –'*Investigation of Potentially Contaminated Sites*', BS 5930:2015+A1:2020 '*Code of practice for ground investigations*' and BS EN 1997 '*Geotechnical Design*', the following tasks were undertaken:

<u>Desk Study:</u>

- Collection of site records.
- Study of existing geological, hydrogeological and historic maps of the area.
- Consultation of environmental databases, including records held by the local authority (where available).
- Review of proposed development plans.
- Development of a Conceptual Site Model (CSM) through a Preliminary Risk Assessment.

<u>Intrusive Investigation:</u>

- Site walkover, inspection of any visual evidence of contamination at the site, obtaining photographic records.
- Health and safety briefing / site supervision.
- Drilling of two hand auger boreholes to a depth of 1.0m below ground level (bgl) using a hand auger.
- Continual logging of ground conditions including inspection of samples for visual and olfactory contamination.

Reporting:

- Data collection
- Interpretation of data including completion of Generic Quantitative Risk Assessment

The findings and conclusions of these investigations are presented in the following sections.

1.3 Limitations and Constraints

The purpose of this report is to present the findings of a soil sampling investigation conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, Environmental Protection Strategies Ltd (EPS) makes the following statements:

No investigation method is capable of completely identifying all ground conditions that might be present in the soil or groundwater under a site. Where outlined in our report, we have examined the ground beneath a site by constructing a number of boreholes and / or trial pits to recover soil and / or groundwater samples. The locations of these excavations and sampling points are considered to be representative of the condition of the whole site subsurface however, ground conditions are naturally variable and it may be possible that the conditions encountered may differ to those found during the investigation.

No visible evidence of Japanese Knotweed was identified during the site walkover. However, this plant can be difficult to identify in the early stages of growth and therefore it is not always possible to identify its' presence at certain times of the year. For this reason, EPS cannot confirm that Japanese Knotweed rhizomes do not exist and it is recommended that if it is suspected that this species, or other similarly invasive plants are present at the site, a specialist contractor should be commissioned to make a detailed assessment.

The investigation was carried out to assess the significance of contamination resulting from the use of the site as identified in this report. Unless EPS has otherwise indicated, no assessment of potential impact of any other previous uses has been made.

2 SITE CONTEXT

The following section provides a summary of the information collected in relation to the site location and history.

2.1 Site & Location Description

Detail	Description
Location	The land lies to the east of Broadgate roughly 500m from the centre of the village of Weston Hills.
National Grid Reference	527749, 320414
Topographic Elevation	Approximately 4m Above Ordnance Datum (AOD)
Description of Site	Following a walkover on 21st September 2023 the site was found to be an undeveloped agricultural field set between two residential properties on the eastern side of Broad Gate. It was noted that the ground in the centre of the plot was very saturated with water present at the surface. In the south-western corner of the plot there is a telegraph pole with underground electricity connections running beneath the surface across the western side of site from the neighbouring house. Also, in this corner there is more plant life and shrubbery than across the rest of the ploughed muddy field. It is also the area of a suspected infilled land from a previous pond on the site. The site is lined on the northern and southern borders with fencing separating it from the neighbouring properties. The eastern border is undefined with an extension of the existing field, with the western boundary being set by the Broadgate road.
Surrounding Land Use	The site lies within a string of houses along Broadgate, with fields to the northeast and west. To the south is a single residential property beyond which lie more fields.

A plan showing the site location is provided as Figure 1, and an aerial photograph is included as Figure 2. Selected site photographs are included as Appendix A, a proposed development plan is included as Appendix B and relevant extracts of a Landmark Envirocheck report are included as Appendix C.

2.2 Geo-Environmental Setting

<table>
<tr><th>Detail</th><th colspan="2">Description</th></tr>
<tr><td>Geology</td><td colspan="2">Geological mapping shows the site lies on a superficial deposit known as Tidal Flat Deposits (clay and silt), underlain by bedrock of the Oxford Clay Formation (mudstone). Information on the site's geological context is included as Appendix D.

Through this desk study review, and prior to the site walkover, it was highlighted that a historic pond was present in the southwest of the site, that had potentially been infilled. As such, during the walkover, two shallow hand augers were formed to a depth of 1.0m; one within the confines of the potential infilled pond and one outside of it.

Ground conditions were noted to comprise topsoil to a maximum depth of 0.14m followed by clay in the area of the potential infilled pond. The soils outside of this area were found to be broadly similar, albeit notably more compact. On this basis, although the less compacted nature of the soils in the area of the potential former pond may suggest some form of backfilling, it would appear that this would only have been with reworked clays, as opposed to any anthropogenic fill material.</td></tr>
<tr><td>British Geological Survey (BGS)</td><td colspan="2">A historic borehole log was reviewed for a location around 470m north and on a similar elevation to the study area. It reports a thin layer of topsoil (0.3m) followed by a soft, brown and grey, mottled sandy clay to a max depth of 2.5m bgl. This is followed by a layer of very soft, grey, silty clay with traces of peat to a max depth of 7m and he termination of the borehole. No groundwater strike was recorded in this log. A copy of the full historic borehole log has been included within appendix D.</td></tr>
<tr><td rowspan="8">Geological Hazards</td><td>Hazard</td><td>On Site Risk</td></tr>
<tr><td>Mining Activities</td><td>No Hazard</td></tr>
<tr><td>Collapsible Ground</td><td>No Hazard</td></tr>
<tr><td>Compressible Ground</td><td>Moderate</td></tr>
<tr><td>Ground Dissolution</td><td>No Hazard</td></tr>
<tr><td>Running Sand</td><td>Moderate</td></tr>
<tr><td>Landslide</td><td>Very Low</td></tr>
<tr><td>Shrinking / Swelling Clay</td><td>Low</td></tr>
<tr><td>Radon</td><td colspan="2">The Envirocheck indicates the site to lie in a location where the percentage of homes above the radon action level is less than 1%. It further reports that the site will not require radon protection measures in the construction of new buildings.</td></tr>
<tr><td>Hydrogeology</td><td colspan="2">Groundwater vulnerability maps for the area show that the underlying superficial and bedrock geology are both classified as unproductive strata and the site does not lie within a Source Protection Zone (SPZ) for local groundwater abstraction. Groundwater vulnerability maps are included as Appendix E.

The Envirocheck report doesn't list any groundwater abstractions within 1km.</td></tr>
</table>

Detail	Description
Hydrology	The nearest surface water feature is located 43m southeast, which appears to be a drainage channel in the adjacent field. The Envirocheck report lists three discharge consents within 1000m with the closest being around 240m to the southwest with discharge onto land, albeit with groundwater noted as the receiving water. Report lists no surface water abstractions within a 1km radius. Review of the EA Flood Zone Map for the area indicates that the site lies predominantly within Flood Zone 3, which is defined as an area with high probability of flooding from rivers and the sea. It should be noted that the EA maps do not take into account flooding from poor drainage or groundwater. A copy of the flood map for the site and surrounding area is also included within Appendix E. It should also be noted that sites located within Flood Zones 2 or 3 will require a flood risk assessment to be submitted as part of any planning application.
Landfill & Waste	The BGS, Local Authority and historical records show no historical or active landfills within 1km. Nine areas of potentially infilled land have however been recorded in the Envirocheck report the local area, the nearest of which is recorded 21m east of the site. However, it was noted from the historic maps that one is potentially positioned on the site itself with a historic pond being recorded near the western boundary, which is no longer present. Although as per the above geology section, some shallow investigation does not indicate this was infilled with significant anthropogenic material.
Industrial Land Use	There is a single site licensed for industrial and commercial activity within the surrounding 1km, which is an agricultural engineers located 480m south and is now inactive.
Pollution Incidents	The Envirocheck report lists 3 pollution incidents to controlled waters within 1km, the closest of which being a category 3 (minor incident) of oils (diesel) released to the Whitmore Drain around 535m southwest on 16th March 1994.

2.3 Sensitive Land Use

The site does not lie within a Nitrate Vulnerable Zone.

No environmentally sensitive areas/ designations are present within 500m.

2.4 Site History

A summary of historical map data from 1888 to 2019 is provided below and copies of relevant historic maps and any others examined during the investigation are included in this report as Appendix F. A map detailing historic features in the area surrounding the site is displayed below.



- The earliest maps from 1888-1889 show the site itself to be in a similar state to the current day with the site being a field, however a pond is recorded along the southwestern boundary. Drains and some houses have been present in the surrounding area since 1888.
- The pond appears to have been infilled by around 1970.
- Houses were built in the surrounding area sporadically over the years with the house to the south being built in the 1980s and the neighbouring house to the north being built in the early 2000s.
- Across the road from the site a few barns were constructed in 1980 which remained until 2006, that were likely used for agricultural use.

3 PRELIMINARY RISK ASSESSMENT & CONCEPTUAL SITE MODEL

In accordance with the Environment Agency's Land Contamination: Risk Management, there are three stages to managing contaminated land (Risk Assessment/Remedial Options Appraisal/ Remediation and Verification). This section outlines the first tier of Stage 1, the Preliminary Risk Assessment.

The following section provides a review of the contaminant linkages that may be active at the site, whereby EPS have examined the potential sources that may be present as a result of historic and / or current site activities and where potential interaction between these sources and the identified human / environmental receptors may occur.

3.1 Background

A Desk Study comprises the first stage of any geo-environmental assessment, the purpose of which is to determine what potentially contaminative activities may have occurred at the property or the surrounding area which may pose an environmental or geological risk to site users, the surrounding environment or proposed development, either at present or in the future.

The method used in this investigation to assess the environmental risk posed is based on the concept of 'contaminant linkage', which considers the following three factors:

Source	The location from which an environmentally hazardous / contaminative substance is, (or was,) derived.
Pathway	A route or mechanism via which a source could come into contact with a receptor to cause significant harm.
Receptor	An environmentally sensitive object or condition e.g. person, property, controlled water, or ecological system, which may be present now or in future.

If all three factors are identified, there is the potential for a 'contaminant linkage' to be active, which could result in significant harm being caused to the environment or human health.

3.2 Source Characterisation

The following potential contaminant sources have been identified at the site and in the surrounding area:

Potential Source	Source Description	Principal Contaminants of Concern
Current Site Use	Potential for infill material of unknown origin (Made Ground) possibly used to fill pond.	PAH, Metals, ACM, Ground Gas (CH_4, CO_2)
Surrounding Land Use	Former farmyard / commercial use beyond Broadgate Road to the west.	Metals, PAH, TPH, VOC, ACM

Notes: PAH Polycyclic Aromatic Hydrocarbons; ACM Asbestos Containing Material; CO_2 Carbon Dioxide; CH_4 Methane; TPH Total Petroleum Hydrocarbons; VOC Volatile Organic Compounds

3.3 Potential Receptors

A framework for the assessment of risks arising from the presence of contamination in soils has been produced by the Environment Agency and the Department for the Environment, Food and Rural Affairs (DEFRA) and is presented with the report: '*Using Science to Create A Better Place: Updated Technical Background to the CLEA Model* – Science Report SC050021/SR3'. This guidance document defines a series of standard land-uses which have been further developed into six generic land uses in the Category 4 Screening Levels project for Land Affected by Contamination (DEFRA/Contaminated Land: Applications in Real Environments (CL:AIRE) Project Report SP1010, 2014) which form a basis for the development of the Conceptual Site Model.

Risks posed to controlled waters have been considered in line with the Environment Agency's *approach to groundwater protection* (v1.2, 2018) and associated position statements.

The proposed development plan includes the erection of two single-storey dwellings with associated car parking, private gardens and landscaping. As such, the proposed land use has been considered to be:

- Residential (with home-grown produce)

In view of the environmental setting, current and potential future land use of the site and surrounding sites, the potential receptors for any contaminant impact are discussed in the table below:

Receptor	Site Specific Description
Human	Future site users, site workers involved in the site redevelopment, and those working and living in the surrounding area have the potential to be at risk from exposure to potential contaminants of concern (CoCs).
Groundwater	The site is reported to be underlain by Tidal Flat Deposits and Oxford Clay Formation which are both defined by the EA as an unproductive aquifer, whilst the site does not lie within a SPZ for nearby groundwater abstraction and the historic borehole log does not indicate shallow groundwater is likely to be present at the site. Therefore, underlying groundwater has not been considered as a potential receptor to site derived contaminants.
Surface Water	The nearest surface watercourse is a small unnamed drain located 43m from the site. It is possible that site derived contaminants of concern may enter theses watercourses by overland flow, however migration through soils is unlikely due to the low permeability soils. As a result of this surface waters should be considered a sensitive receptor within the conceptual site model.
Flora and Fauna	The proposed development includes the provision of domestic garden areas. Some of the identified contaminants of concern are known to be phytotoxic and as such the potential for this impact should be considered.
Buildings & Infrastructure	Subsurface structures are likely to be present at the site which may be adversely affected by the potential presence of the identified contaminants of concern. These include concrete used in building foundations, buried potable water supply pipes and other service lines and pipes.
Adjacent Land	Adjacent properties including private residential dwellings could also be at risk from potential contaminants found at the site.

3.4 Potential Pathways

Where contaminants may be present in soil, there are a number of potential pathways that enable human receptors to come into contact with or be exposed to them. The most direct pathways, considered under current UK legislation, can be summarised as follows:

- Direct ingestion of contaminated soil
- Ingestion of household dust
- Ingestion of contaminated vegetables
- Ingestion of soil attached to vegetables
- Dermal contact with contaminated soil
- Dermal contact with household dust
- Inhalation of fugitive soil dust
- Inhalation of fugitive household dust
- Inhalation of vapours outside
- Inhalation of vapours inside

Clearly, not all of these potential pathways apply for every standard land-use. For example, ingestion of contaminated vegetables will not apply to land uses other than residential with plant uptake and allotments.

However, in addition to direct exposure pathways, a number of physical transport mechanisms / pathways may also exist at a site that allow remote or less accessible contaminants in soil or groundwater to reach human or environmental receptors both at a site and beyond the site boundary. These include the transport mechanisms listed below.

- Downward and lateral movement of contaminants in soil either by gravity or through being 'leached' by percolating rainwater
- Lateral migration of contaminants dissolved in groundwater.
- Direct seepage or leaching of contaminants from soil into subsurface drains or supply pipework.
- Volatilisation of contaminants from groundwater or unsaturated soils into buildings or outdoor air.

Through examination of the standard land use and environmental setting at each site, the presence of pathways and transport mechanisms described above must be considered when assessing whether a contaminant linkage may plausibly be active, and therefore be included in the conceptual site model.

3.5 Summary of Contaminant Linkages

No contaminant linkages have been identified which are considered to pose an unacceptable risk to future site users or controlled waters. However, the following comments are made with respect to contaminant linkages which have been considered through development of the conceptual model, but have not been concluded as 'plausible' – i.e. through which a significant possibility of significant harm could occur to an identified receptor:

- Whilst a former pond was located towards the southwest boundary and may have been historically in-filled, as detailed above, some limited intrusive investigation in this area did not identified any manmade soils and if any infilling occurred, it appears to have been with the natural geology which matches slightly outside this area. As such, a plausible contaminant linkage is not recognised from the migration of landfill gas into proposed buildings. Moreover, no made ground was encountered which is likely to pose a risk to future site users through interaction.
- A former farmyard / commercial land use was formerly present beyond Broadgate Road to the west, however given the low permeability of local ground conditions, risks are not considered to be present associated with the onsite migration of contaminants in soil or groundwater and subsequent volatilisation into future buildings.

4 GEOTECHNICAL GROUND MODEL

Geological records indicate ground conditions to comprise Tidal Flat Deposits underlain by Oxford Clay Formation. A conceptual geotechnical ground model is provided in the table below which assesses design elements anticipated strata and ground conditions:

Element	Anticipated Strata	Parameter(s)	Anticipated Conditions
Foundations	Tidal Flat Deposits	Allowable Bearing Pressure	Up to 75kN/m²
		Settlement	Moderate to high Sensitivity
		Volume Change	Moderate volume change potential
	Oxford Clay Formation	Allowable Bearing Pressure	Maximum of 125kN/m²
		Settlement	Moderate sensitivity / Long term consolidation under loading
		Volume Change	High volume change potential
Drainage	Tidal Flat Deposits	Permeability	Unlikely to be suitable for infiltration drainage
	Oxford Clay Formation	Permeability	
Concrete Grade	Tidal Flat Deposits	Grade	Low to moderate risks of high sulphate levels
	Oxford Clay Formation	Grade	High risk of high sulphate levels

5 CONCLUSIONS & RECOMMENDATIONS

Based upon the information obtained and reviewed in this report, it is concluded that there are currently no plausible contaminant linkages active at the site and the site is considered suitable for its proposed end use.

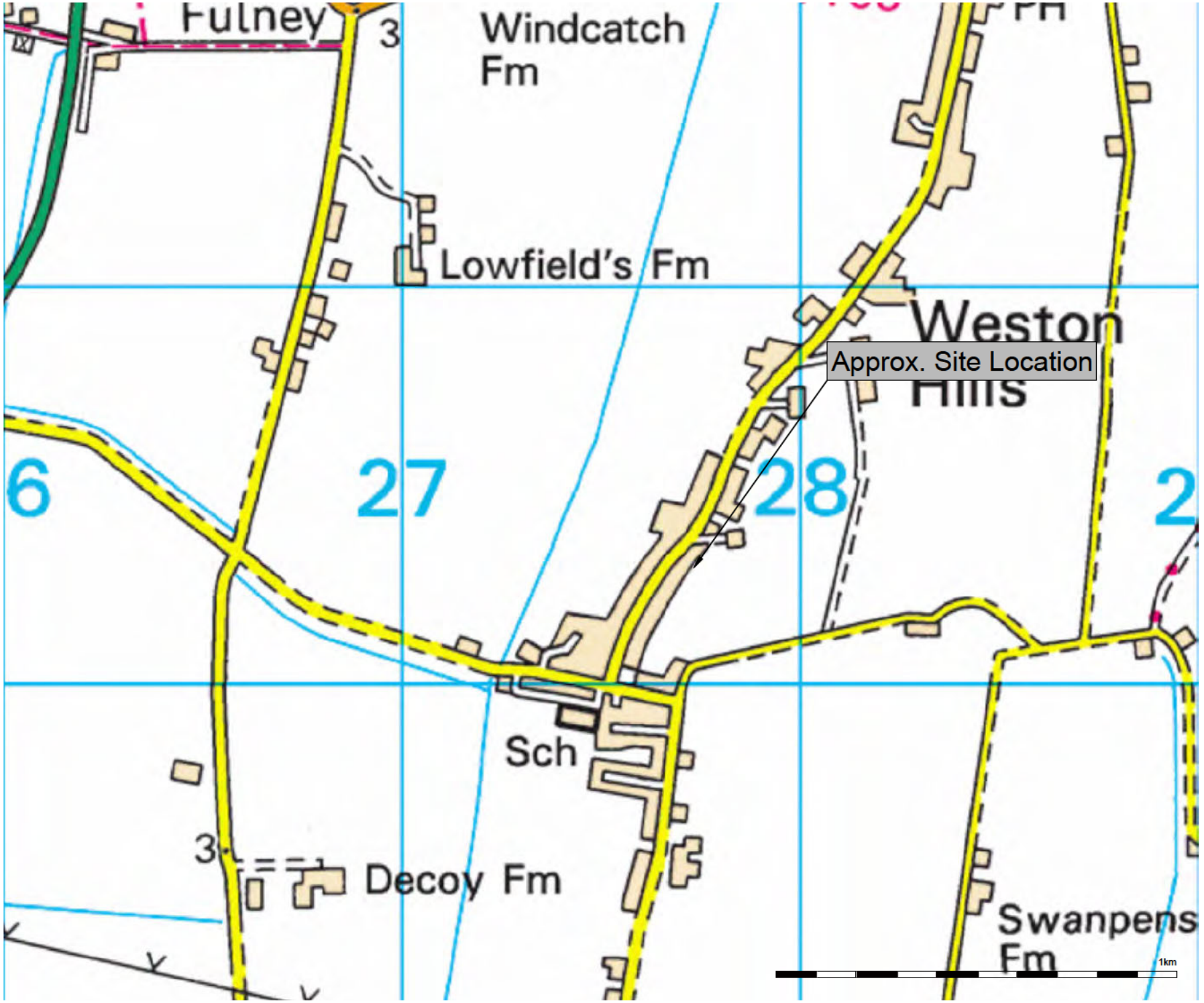
On this basis EPS therefore concludes that no further environmental investigation work is warranted, however the following precautionary measures have been recommended in order to ensure safe development.

- All construction workers operating at the site should be advised of the potential for contact with made ground material within shallow soils, particularly beneath the existing buildings and hardstanding. Appropriate health and safety precautions should be adopted during any excavation works to avoid exposure to infilled soils. Reference should be made to relevant health & safety guidance including the following CIRIA document: R132 Guide to Safe Working on Contaminated Sites.

- In the unlikely event that any palpable evidence of ground contamination is encountered during exposure of shallow soils beneath the site during redevelopment work, then it is recommended this should be reported to EPS so that an inspection can be made and appropriate sampling and assessment work carried out. Construction workers should have a procedure in place for dealing with any previously unidentified contamination if it is encountered during their redevelopment activities and to this end an example method statement has been provided as Appendix G.

It is recommended that a copy of this report be forwarded to the Environmental Health Department of South Holland District Council for inclusion into their land quality records.

FIGURES



N

Rev	Date	Drawn	Description	Chkd

The Geotechnical and Environmental Engineers
www.epstrategies.co.uk

Site: Land Between 357&363 Broad Gate
Weston Hills PE13 5EL

Client: HB Developments

Title: Figure 1 - Current Site Layout Plan

Surveyed:	XX	Drawn by:	TW
Checked by:	MJ	Date:	SEPT 2023
Scale [A Sheet]: 1:50,000		Drawing Reference: UK23.6651_01	
Job No: UK23.6651		Rev: 01	



N

KEY

SITE BOUNDARY

Rev	Date	Drawn	Description	Chkd

eps

The Geotechnical and Environmental Engineers
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Site
Land Between 357&363 Broad Gate
Weston Hills PE13 5EL

Client
HB Developments

Title
Figure 2 - Aerial Photograph

Surveyed:	XX	Drawn by:	TW
Checked by:	MJ	Date:	SEPT 2023
Scale [A Sheet]: Not to Scale		Drawing Reference: UK23.6651_02	
Job No: UK23.6651		Rev: 01	



N

KEY

SITE BOUNDARY

EPS WINDOW SAMPLE BOREHOLE

Rev	Date	Drawn	Description	Chkd

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Site
Land Between 357&363 Broad Gate
Weston Hills PE13 5EL

Client
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Title
Figure 3 - Borehole Location Plan

Surveyed:	XX	Drawn by:	TW
Checked by:	MJ	Date:	SEPT 2023
Scale [A Sheet]	Not to Scale	Drawing Reference	UK23.6651_03
Job No	UK23.6651	Rev	01

APPENDICES

APPENDIX A

Selected Site Photographs & Site Walkover Notes.

Photo 1: Photo from the western boundary facing south.



Photo 2: Photo from the western border facing north.



Photo 3: Photo down the southwestern boundary with the area of the infilled lake.



Photo 4: Photo from the south eastern corner facing north.



Photo 5: Photo from the southeastern corner facing northwest.



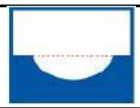
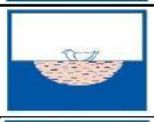
Photo 6: Photo from the entrance across the site.



Job No.	UK23.6651
Date	21/09/2023
Who?	TW

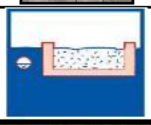
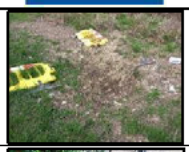
To be completed by consultant for all Phase I Desk Studies and completed form must be scanned/photographed and saved in job folder under 'Scanned Site Notes' EPS Lower Risk Assessment (EPS025a) also must be completed and scanned

Site Walkover Checklist V3.0

Geotechnical		COMMENTS
	Are there any abrupt changes in slope profiles?	No
	Is there evidence of overburden on the slopes?	No
	Is there evidence of excavation at the base of a slope?	No
	Are there signs of landslip, such as tilting trees/posts?	No
	Are there signs of subsidence?	No
	Is there evidence of cracked ground?	No
	Is there evidence of compressible ground (i.e. Peat)?	No
	Is there evidence of an abrupt change in ground conditions?	No
	Is there evidence of high groundwater, such as areas of waterlogged ground?	Yes waterlogged ground in centre of field
	Do signs of water loving plants such as reeds exist?	No
	Are there any ponds, streams, ditches (even if dry), springs or wells?	No
	What is the nature of the vegetation?	Weeds general shrubbery grasses
	Species & Height of trees	Trees on neighbouring properties too far to impact
	What is the nature and condition of vegetation on adjoining land?	Residential gardens with mixture of plant life, field to the east no signs of growth in this field
	Is there evidence of former vegetation?	No

Job No.	UK23.6651
Date	21/09/2023
Who?	TW

To be completed by consultant for all Phase I Desk Studies and completed form must be scanned/photographed and saved in job folder under 'Scanned Site Notes' EPS Lower Risk Assessment (EPS025a) also must be completed and scanned

	Is there evidence of movement in any existing structures?	No existing structure
	Evidence of below ground structures & services?	Power telegraph pole on eastern side of site with underground cables going to neighbouring properties
	Any evidence of mine shafts or adits? (Check Coal Authority Mapping)	No
	Is there any access issues for a digger/drilling rig (slopes, height, gates etc.)?	Gate wide enough for WLS rig
Any other comments?		

Contamination		COMMENTS
	Evidence of ground contamination?	No
	Evidence of groundwater /surface water contamination?	No
	Evidence of historic site use?	No
	Have all buildings been accessed internally, what was found?	No access to inside of building
 	Evidence of /suspected asbestos? In building fabric or on ground, describe condition and form (cement/fibrous).	UPDATE RAMS & WEAR PPE IF REQUIRED – DO NOT CLOSELY INSPECT OR DISTURB
	Any man-made surfacing present? Including bituminous road planings/scalpings. Describe condition of hardstanding.	No

Job No.	UK23.6651
Date	21/09/2023
Who?	TW

To be completed by consultant for all Phase I Desk Studies and completed form must be scanned/photographed and saved in job folder under 'Scanned Site Notes' EPS Lower Risk Assessment (EPS025a) also must be completed and scanned

	Any fuel or oil storage? If above ground, are tanks bunded/ steel/with above ground pipe or any staining?	No
	Obvious drainage features observed such as 3-chamber oil-water interceptor?	No
	Any waste deposition observed, such as fly-tipped soils or chemical containers/ drums or areas of burning?	No just some general refuse (mirror)
	Electricity substation present, maintained/operational? Are there any warning stickers on the gates/fence regarding chemicals?	No
	Evidence of previous investigation/remediation (e.g. old monitoring wells)?	No
	Walked around surrounding areas? Identify any off-site sources such as petrol stations, heating oil tanks.	No signs of off site sources
	Anecdotal evidence	Power telegraph pole on eastern side of site with underground cables going to neighbouring properties
Any other comments?		

Air Quality (ONLY NECESSARY IF INSTRUCTED – CHECK WITH AQ TEAM)	
Completed Air Quality Walkover Checklist?	No

APPENDIX B

Proposed Development Plan

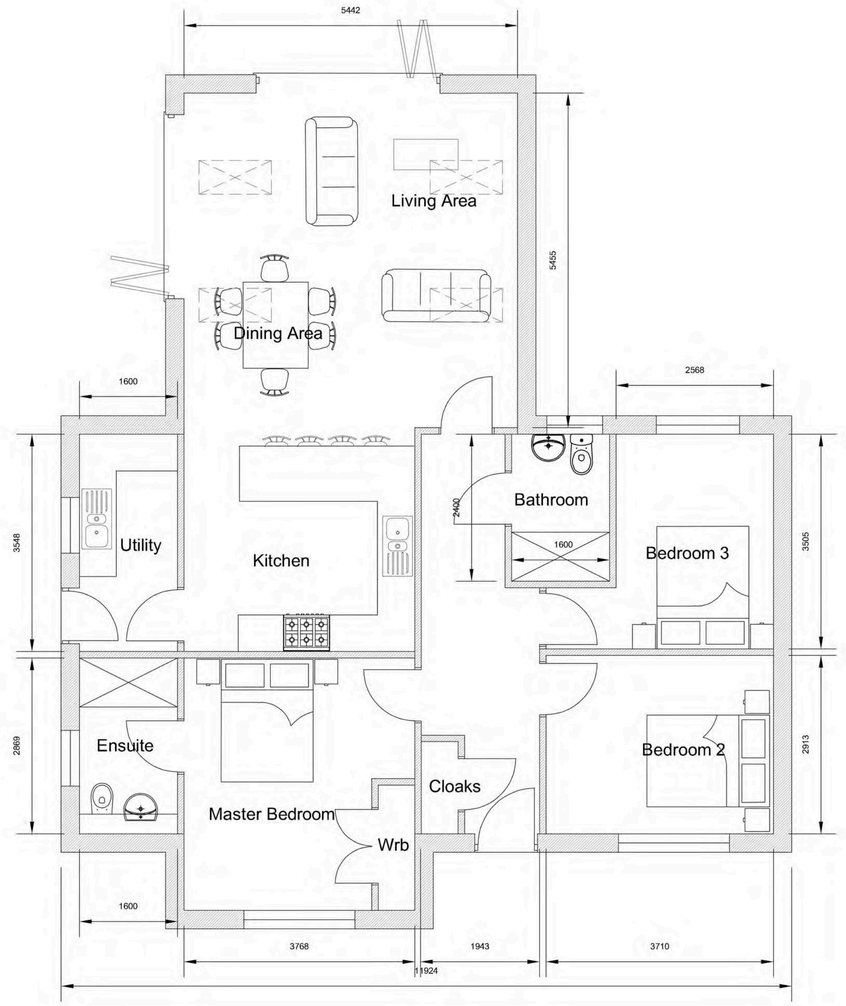
Do not scale directly from this drawing. All discrepancies are to be brought to the attention of the Practice.

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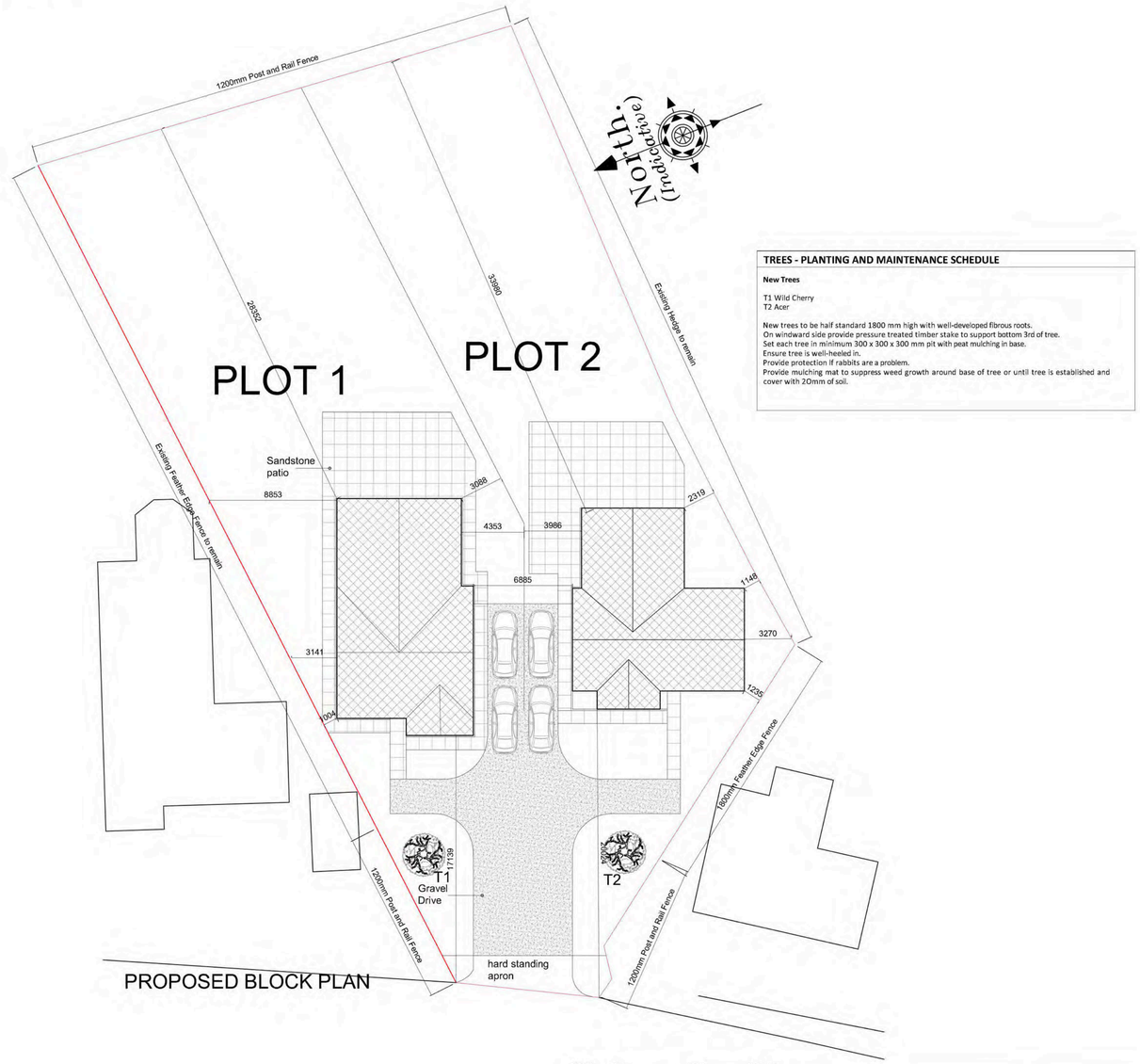




PROPOSED FRONT ELEVATIONS



PROPOSED FLOOR PLAN



PROPOSED BLOCK PLAN

TREES - PLANTING AND MAINTENANCE SCHEDULE

New Trees

T1 Wild Cherry
T2 Acer

New trees to be half standard 1800 mm high with well-developed fibrous roots.
On windward side provide pressure treated timber stake to support bottom 3rd of tree.
Set each tree in minimum 300 x 300 x 300 mm pit with peat mulching in base.
Ensure tree is well-heeled in.
Provide protection if rabbits are a problem.
Provide mulching mat to suppress weed growth around base of tree or until tree is established and cover with 20mm of soil.

Revision	Date	Drawn	Description

Client HB Developments Ltd

Project New dwellings between 357 - 363 Broadgate, Weston Hills

Drawing Planning Plot 2 and block plan

Scale 1:50, 1:100, 1:200 @ A1 Drawn AWM Checked TAC Date 22/08/23

Drawing No. 23/640/PA/002

TAC ARCHITECTS

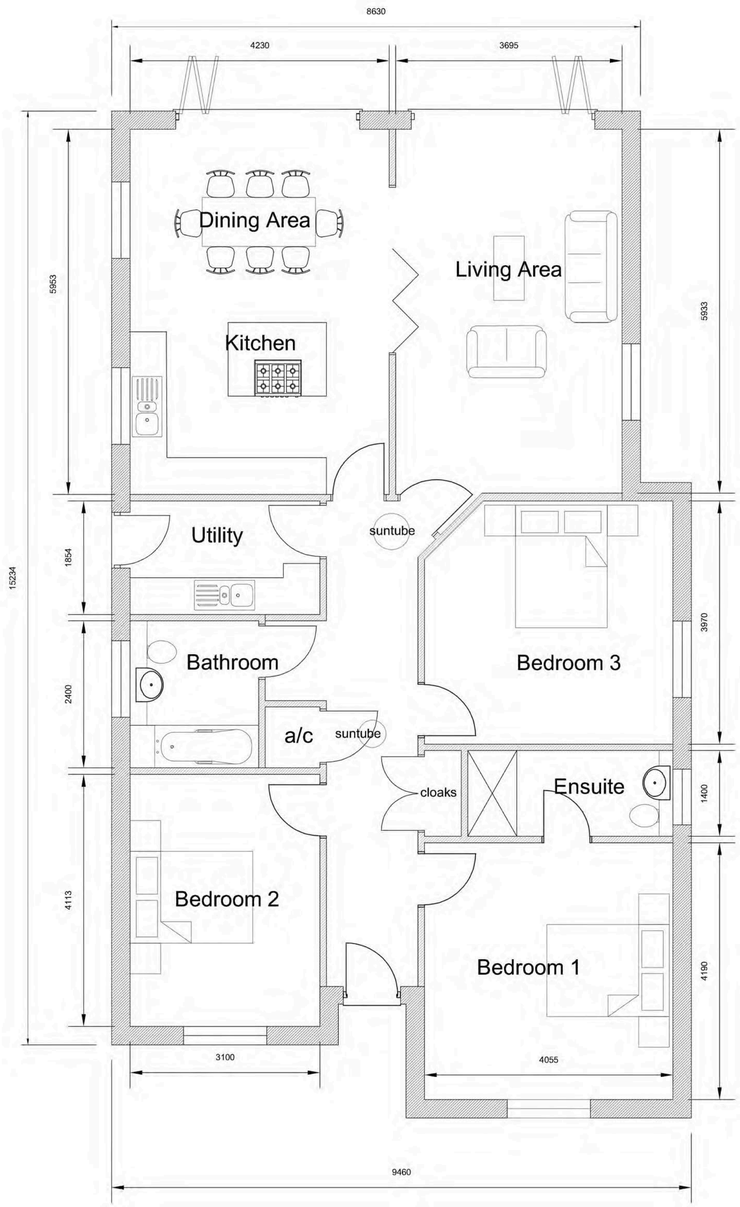
Trevor A Clay RIBA Ltd, 14 Old Fendike Road, Weston Hills, Spalding, Lincs. PE126DD
01406 380027 07778 597975 trevor@tacarchitects.co.uk www.tacarchitects.co.uk

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PROPOSED ELEVATIONS



PROPOSED FLOOR PLAN



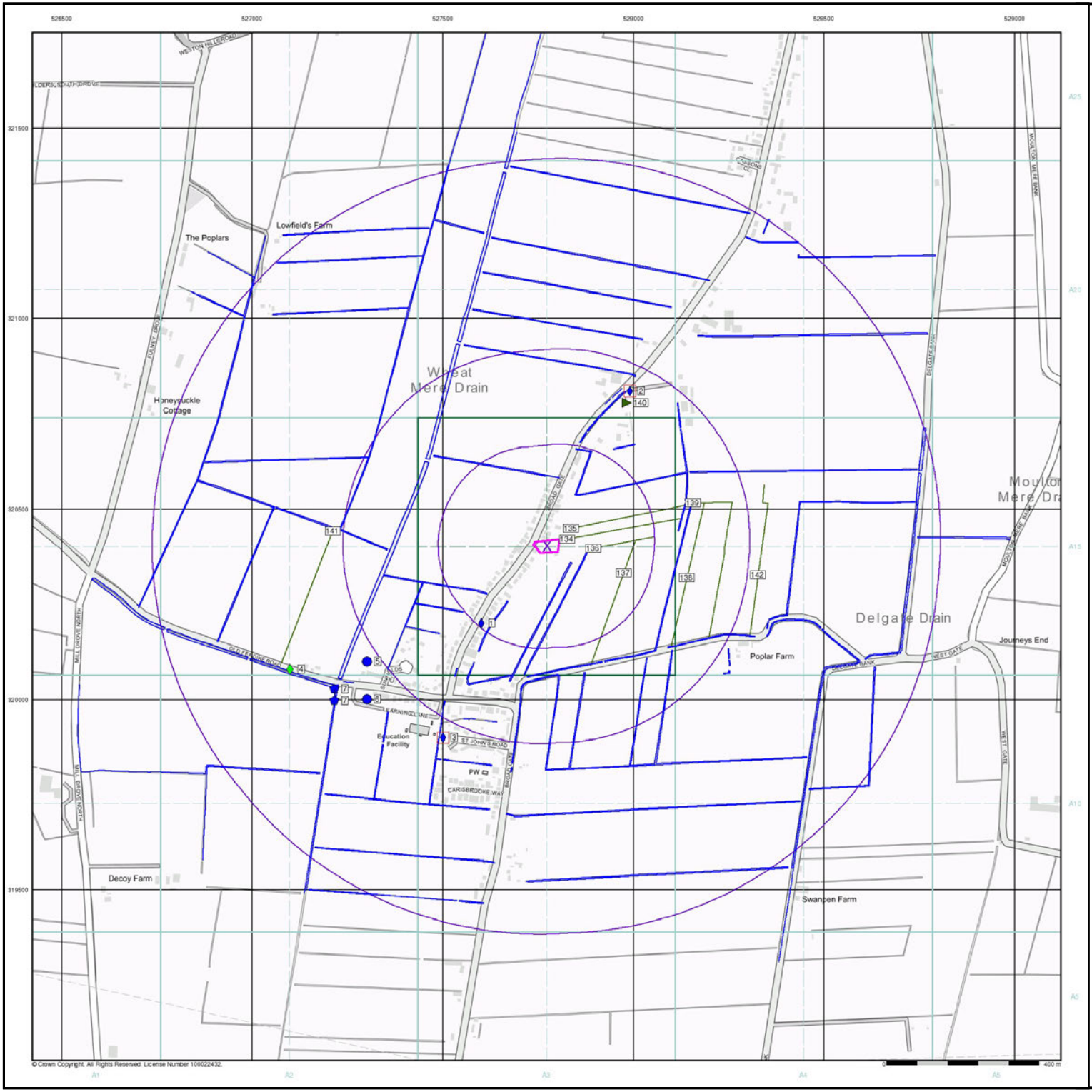
LOCATION PLAN

Revision	Date	Drawn	Description
Client	HB Developments Ltd		
Project	New dwellings between 357 - 363 Broadgate, Weston Hills		
Drawing	Planning Plot 1 and location plan		
Scale	1:50, 1:100, 1:1250 @ A1	Drawn AWM Checked TAC	Date 22/08/23
Drawing No.	23/640/PA/003		

Trevor A Clay RIBA Ltd, 14 Old Fendike Road, Weston Hills, Spalding, Lincs. PE126DD
01406 380027 07778 597975 trevor@tacarchitects.co.uk www.tacarchitects.co.uk

APPENDIX C

Surrounding Land Use



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

Hazardous Substances

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

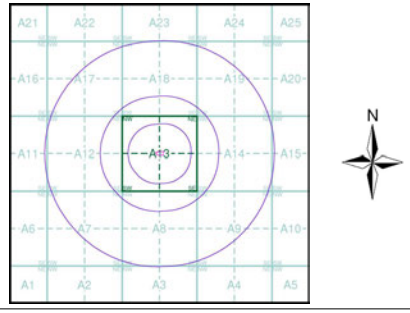
Geological

- BGS Recorded Mineral Site

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
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- 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

Site Sensitivity Map - Slice A



Order Details

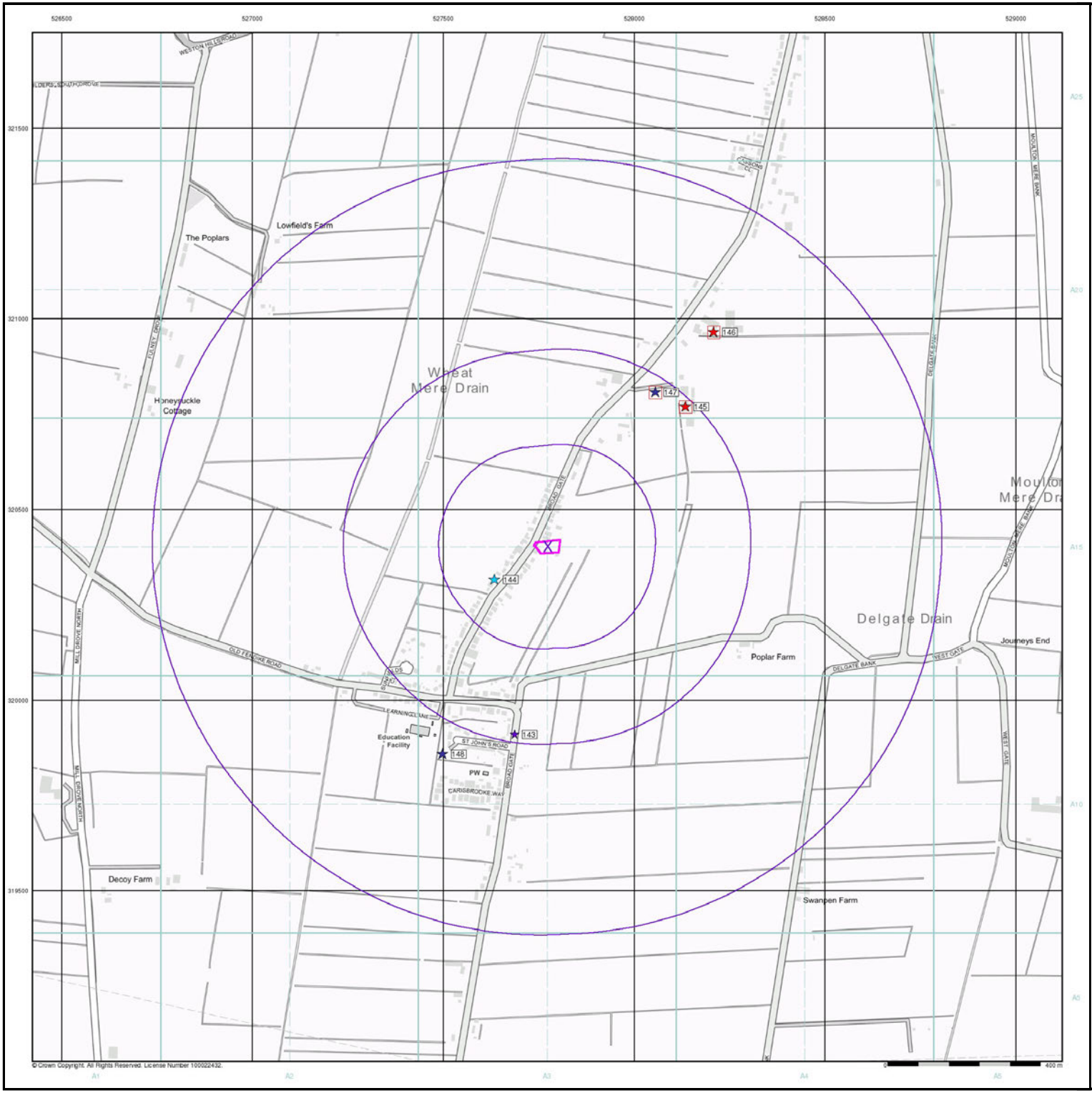
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Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

Site at 527780, 320410

Landmark INFORMATION GROUP

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



Industrial Land Use Map

General

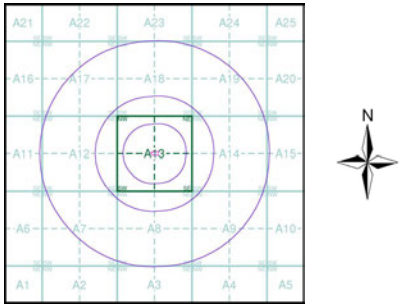
Specified Site | Specified Buffer(s) | Bearing Reference Point

Slice | Map ID

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

Industrial Land Use Map - Slice A



Order Details

Order Number:	316576892_1_1
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APPENDIX D

Geological Context

Geology 1:50,000 Maps Legends

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	TFD	Tidal Flat Deposits	Clay and Silt	Not Supplied - Holocene
	TFD1	Tidal Flat Deposits, 1	Clay and Silt	Not Supplied - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WWB	West Walton Formation	Mudstone and Siltstone	Not Supplied - Oxfordian
	OXC	Oxford Clay Formation	Mudstone	Not Supplied - Callovian

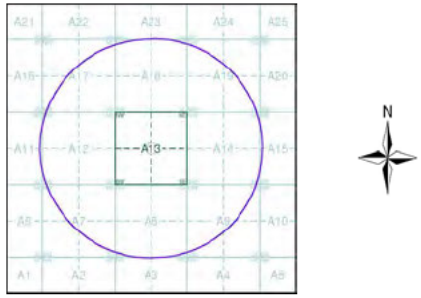
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	1
Map Sheet No:	144
Map Name:	Spalding
Map Date:	1992
Bedrock Geology:	Available
Superficial Geology:	Available
Artificial Geology:	Available
Faults:	Not Supplied
Landslip:	Not Available
Rock Segments:	Not Supplied

Geology 1:50,000 Maps - Slice A

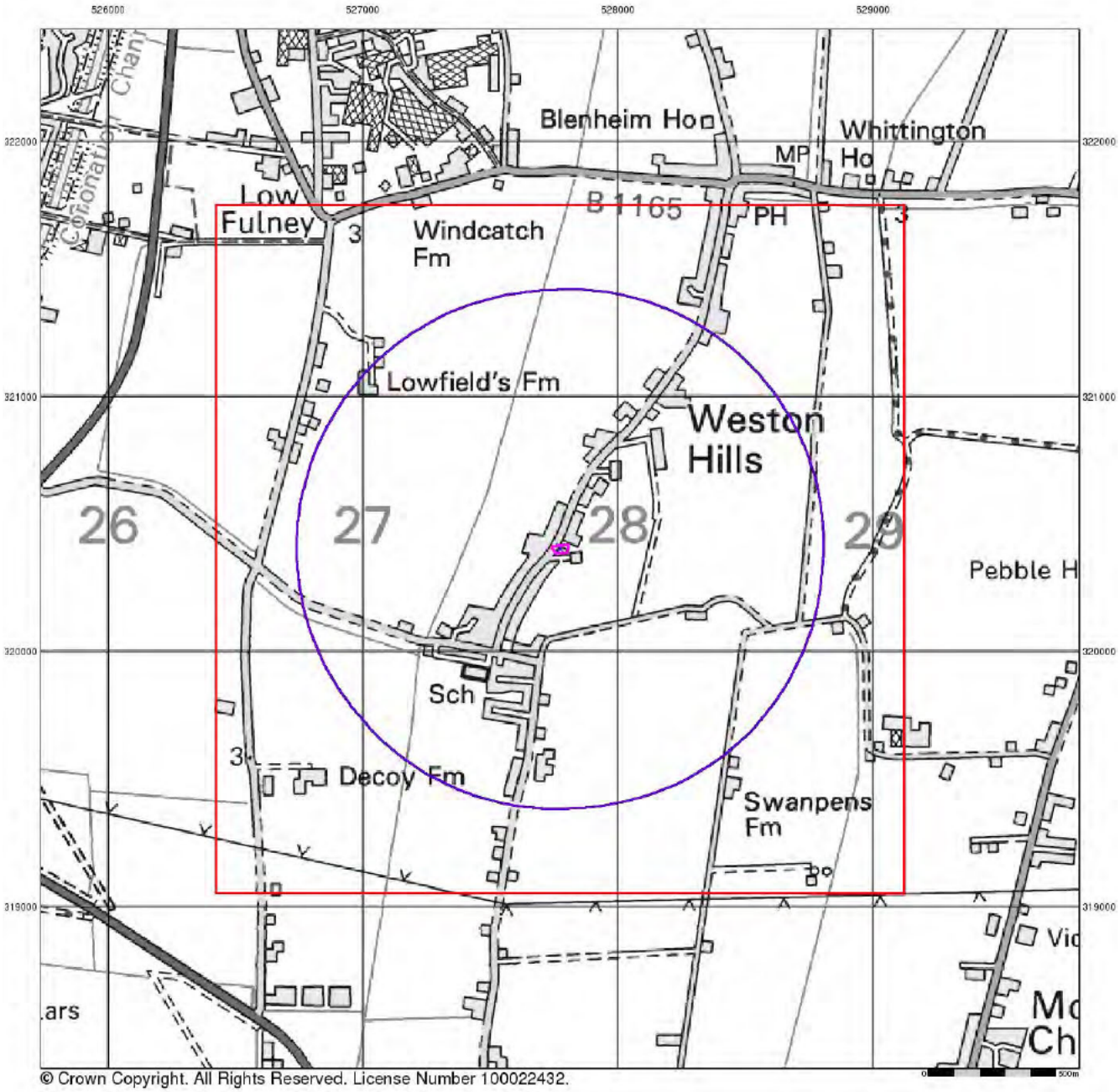


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Slice:	A
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Artificial Ground and Landslip

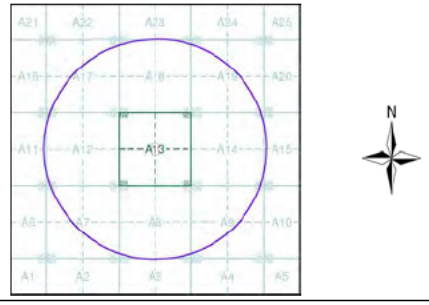
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



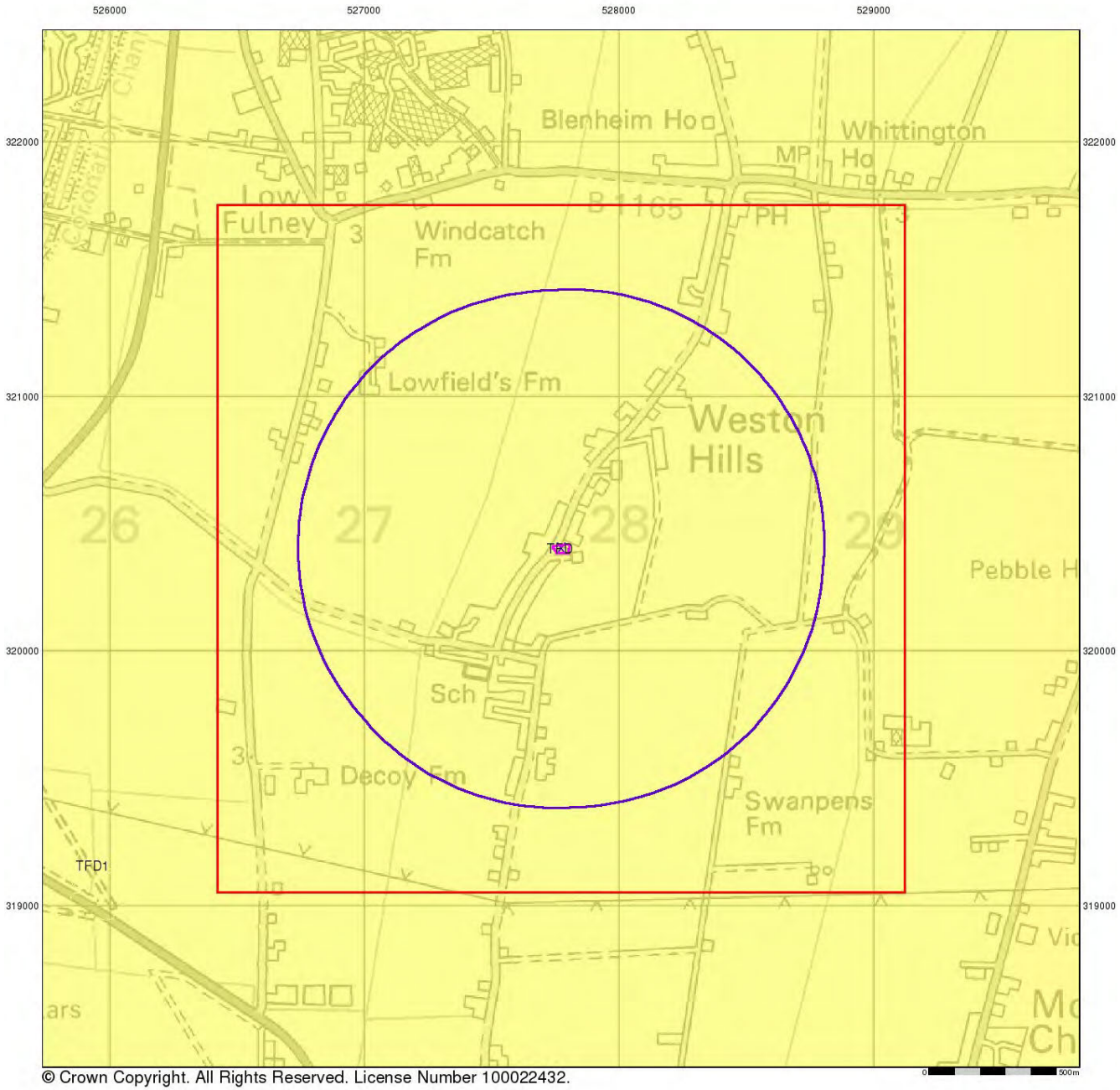
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Slice:	A
Site Area (Ha):	0.19
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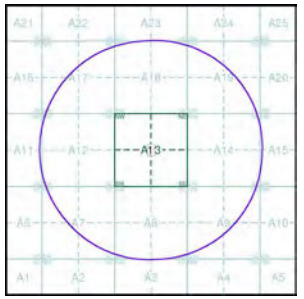
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



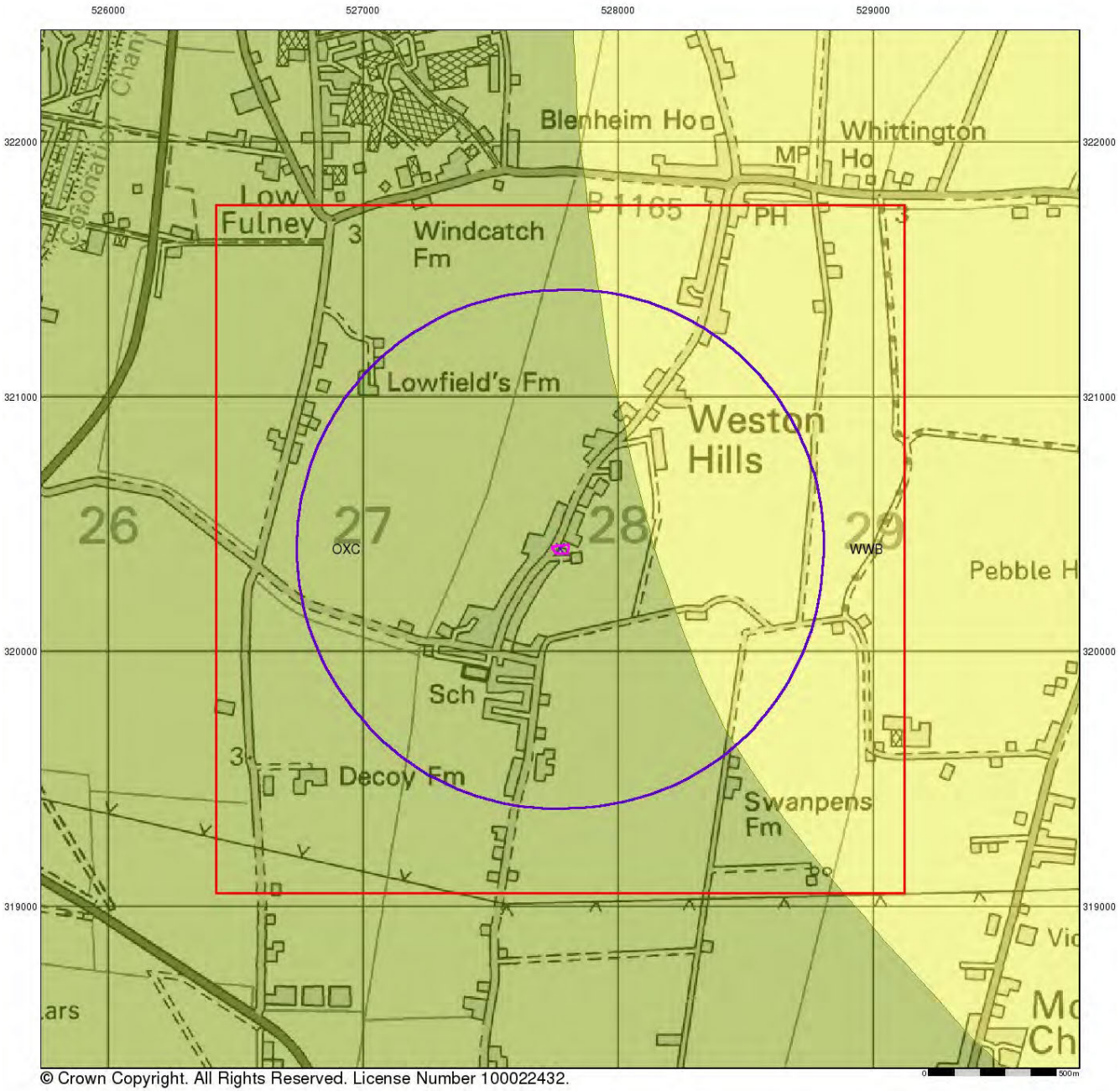
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Bedrock and Faults

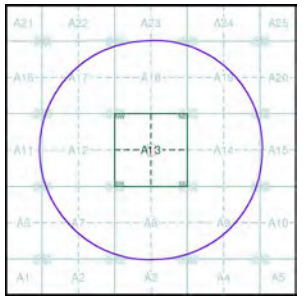
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



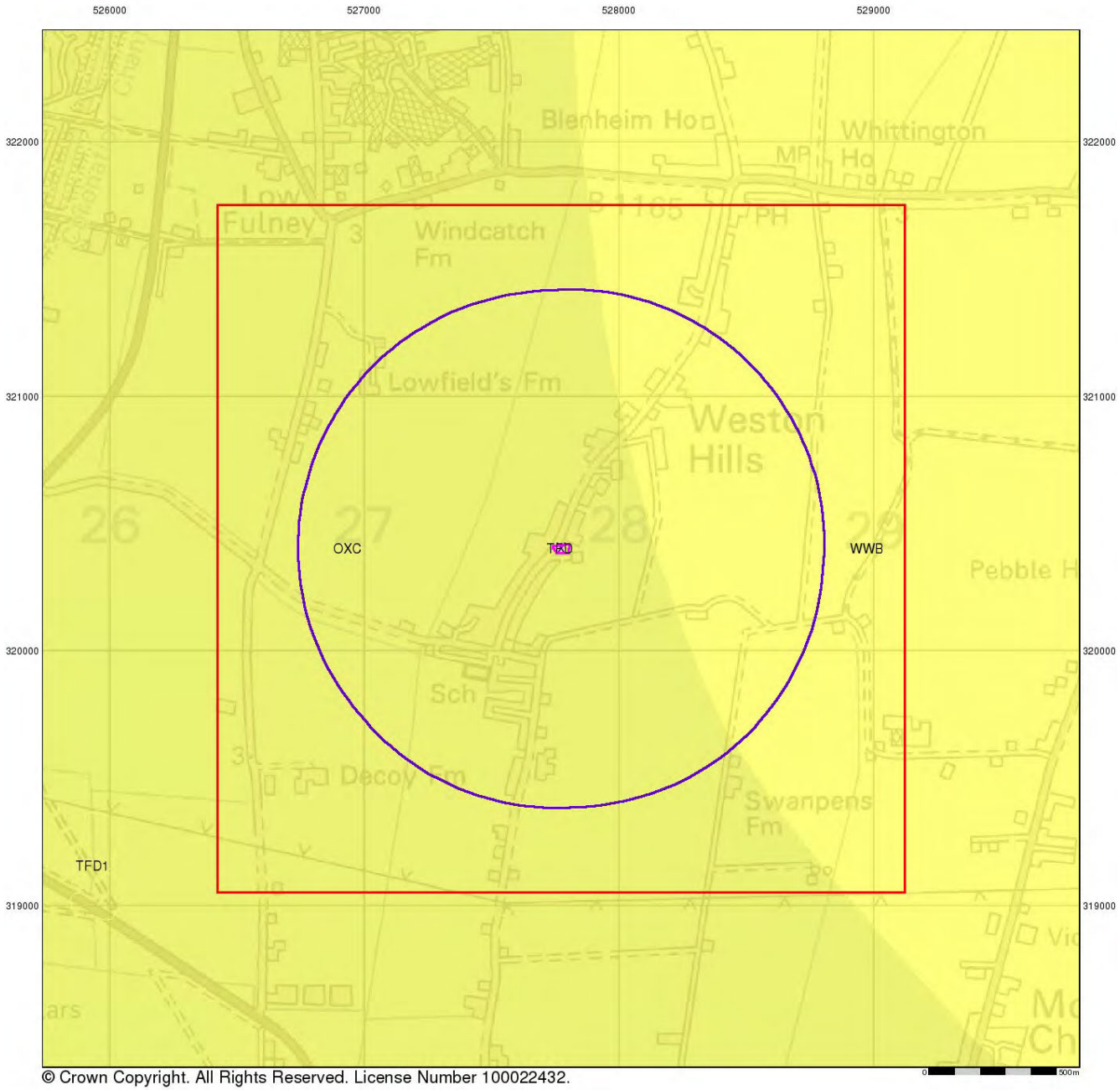
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Search Buffer (m):	1000

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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

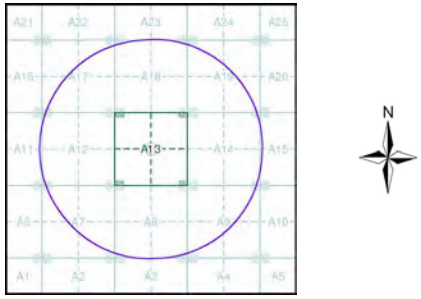
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number:	316576892_1_1
Customer Reference:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details:

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British Geological Survey

BGS ID: 473697 : BGS Reference: TF22SE6
British National Grid (27700) : 528010,320860

IGS 2A 2000 7/71

Institute of Geological Sciences

RECORD OF SHAFT OR BOREHOLE

6-in or 1:10 000 Map Registration No.

TF/22 SE/6

National Grid Reference

2801 2086

1-in or 1:50 000 New Series Map No.

144

Enter 'C' if Confidential

Name and Number of Shaft or Borehole.

W2 Weston Hills

For whom made Spalding Rural District Council

Town or Village Weston Hills *County* Lincs

Exact site (reference to a fixed point on 1-in or 1:50 000 Map:

Purpose for which made Proving sequence

Ground level at ~~shaft~~ bore *relative to O.D.* 2.5 *m. If not ground level give O.D. of beginning of* shaft bore ____ *m.*

Made by Pre-Piling Surveys *Date of sinking* 1971

Information from Report *Examined by* ____

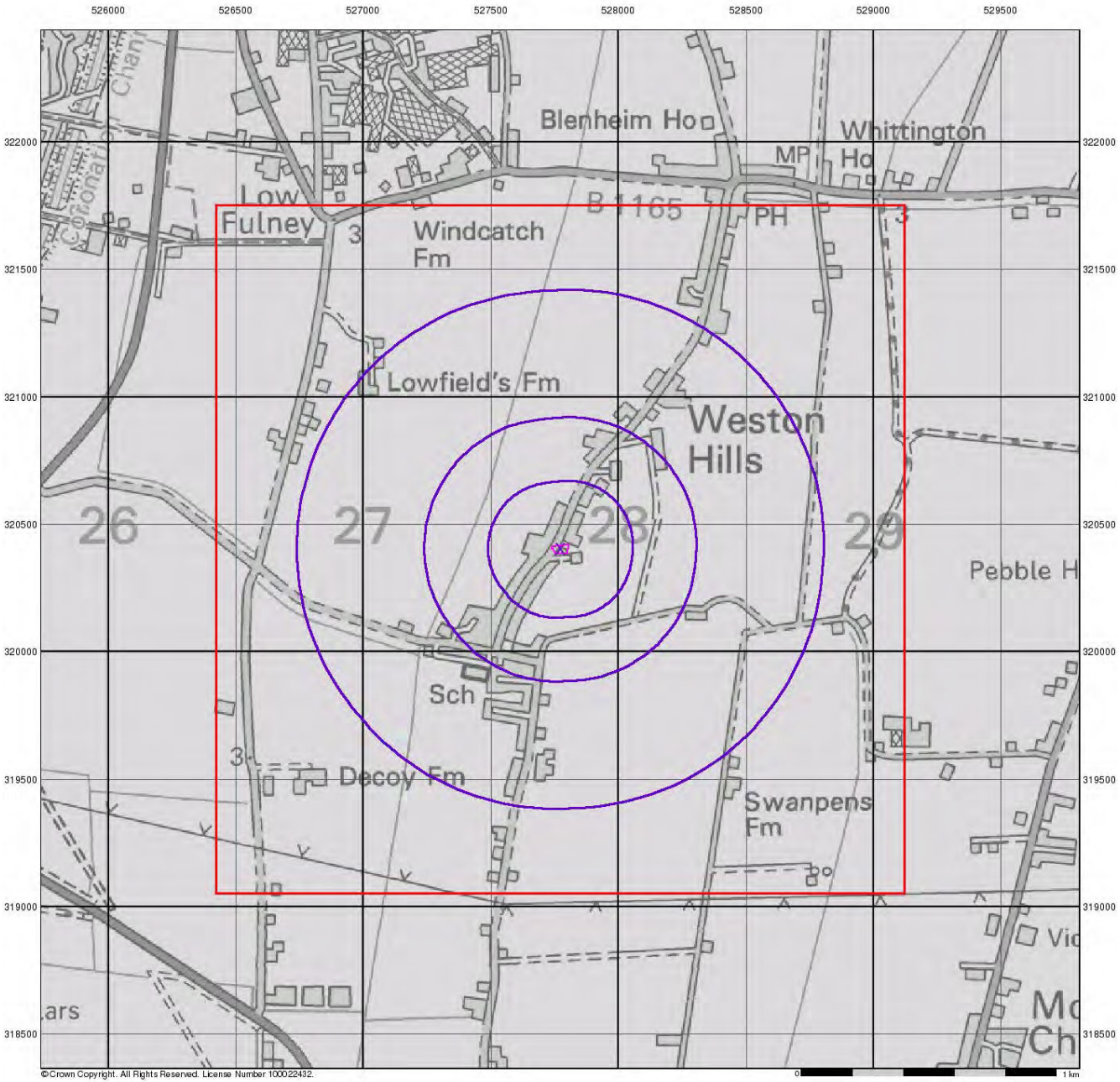
Specimen Numbers and Additional Notes

Geological Classification	Description of Strata	Thickness metres	Depth metres
	Topsoil	0.3	0.3
	Soft brown and grey mottled sandy clay	2.2	2.5
	Very soft grey silty clay with traces of peat	4.5	7.0

Contact BGS: ngdc@bgs.ac.uk

APPENDIX E

Groundwater Vulnerability and Flood Maps



Groundwater Vulnerability

General

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

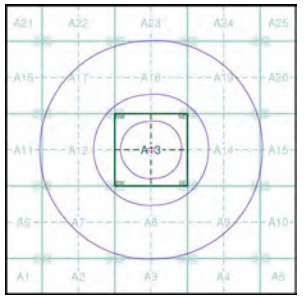
Agency and Hydrological

Bedrock Aquifers	Superficial Aquifers
High Vulnerability, Principal Aquifer	High Vulnerability, Principal Aquifer
High Vulnerability, Secondary Aquifer	High Vulnerability, Secondary Aquifer
Medium Vulnerability, Principal Aquifer	Medium Vulnerability, Principal Aquifer
Medium Vulnerability, Secondary Aquifer	Medium Vulnerability, Secondary Aquifer
Low Vulnerability, Principal Aquifer	Low Vulnerability, Principal Aquifer
Low Vulnerability, Secondary Aquifer	Low Vulnerability, Secondary Aquifer

Unproductive Aquifer

Soluble Rock

Site Sensitivity Context Map - Slice A



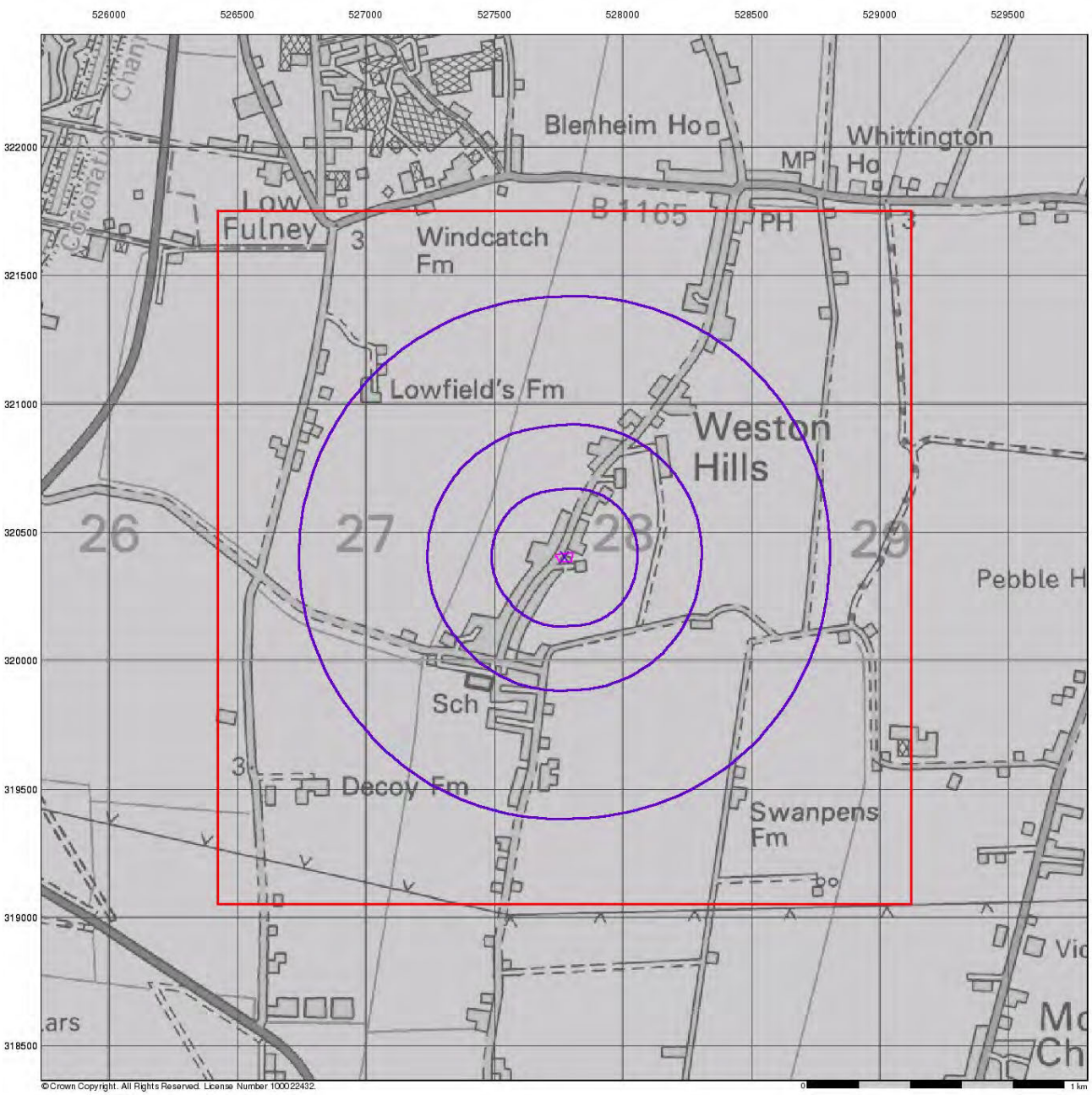
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Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

Site at 527780, 320410

Landmark INFORMATION GROUP
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Web: www.envirocheck.co.uk



Bedrock Aquifer Designation

General

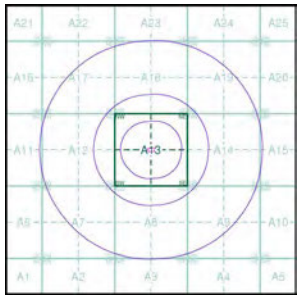
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

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



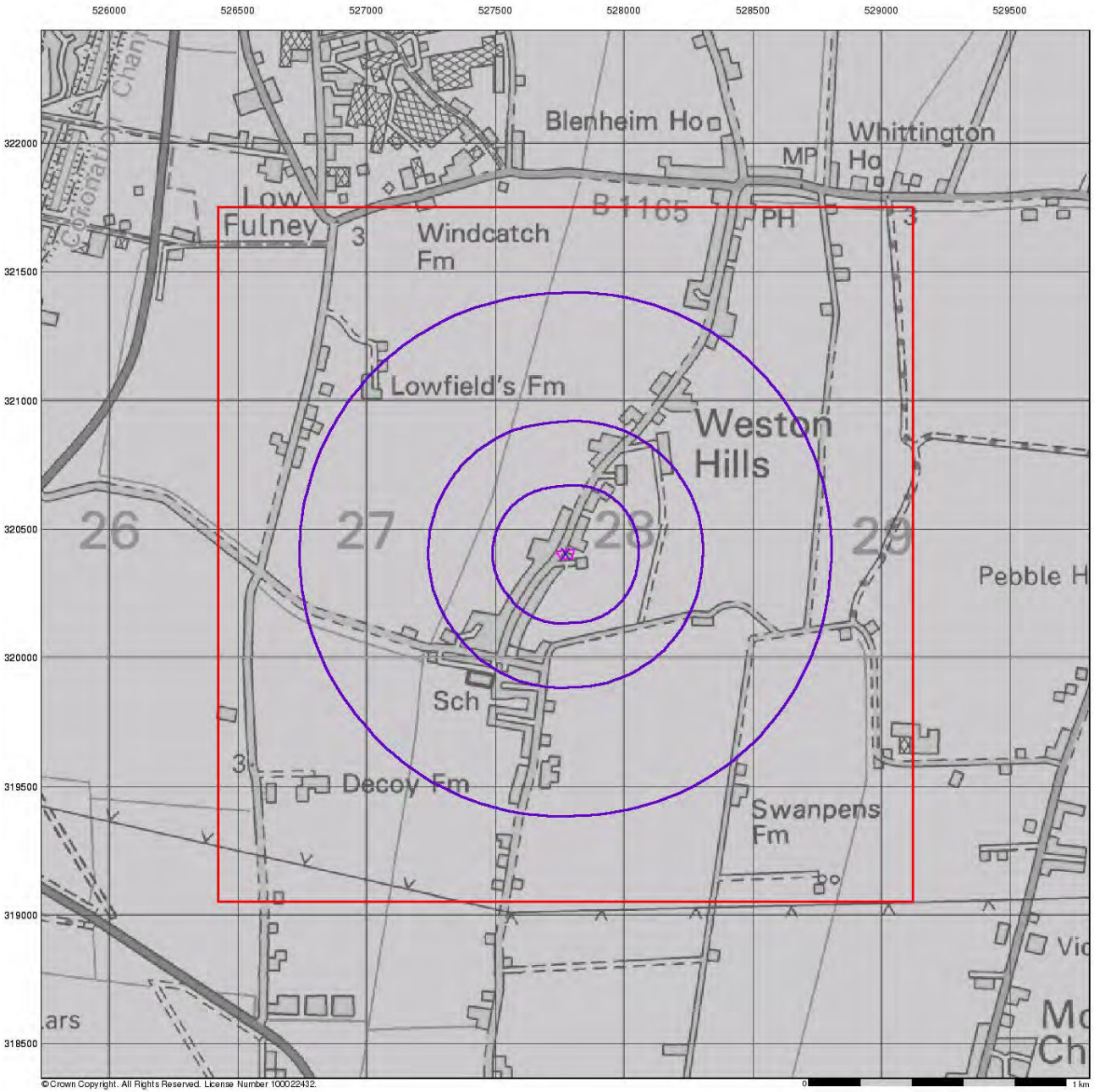
Order Details

Order Number:	316576892_1_1
Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

Site at 527780, 320410

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



Superficial Aquifer Designation

General

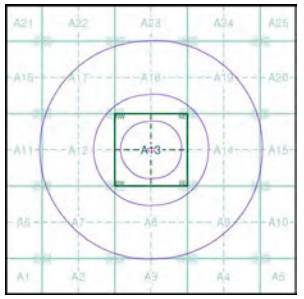
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

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



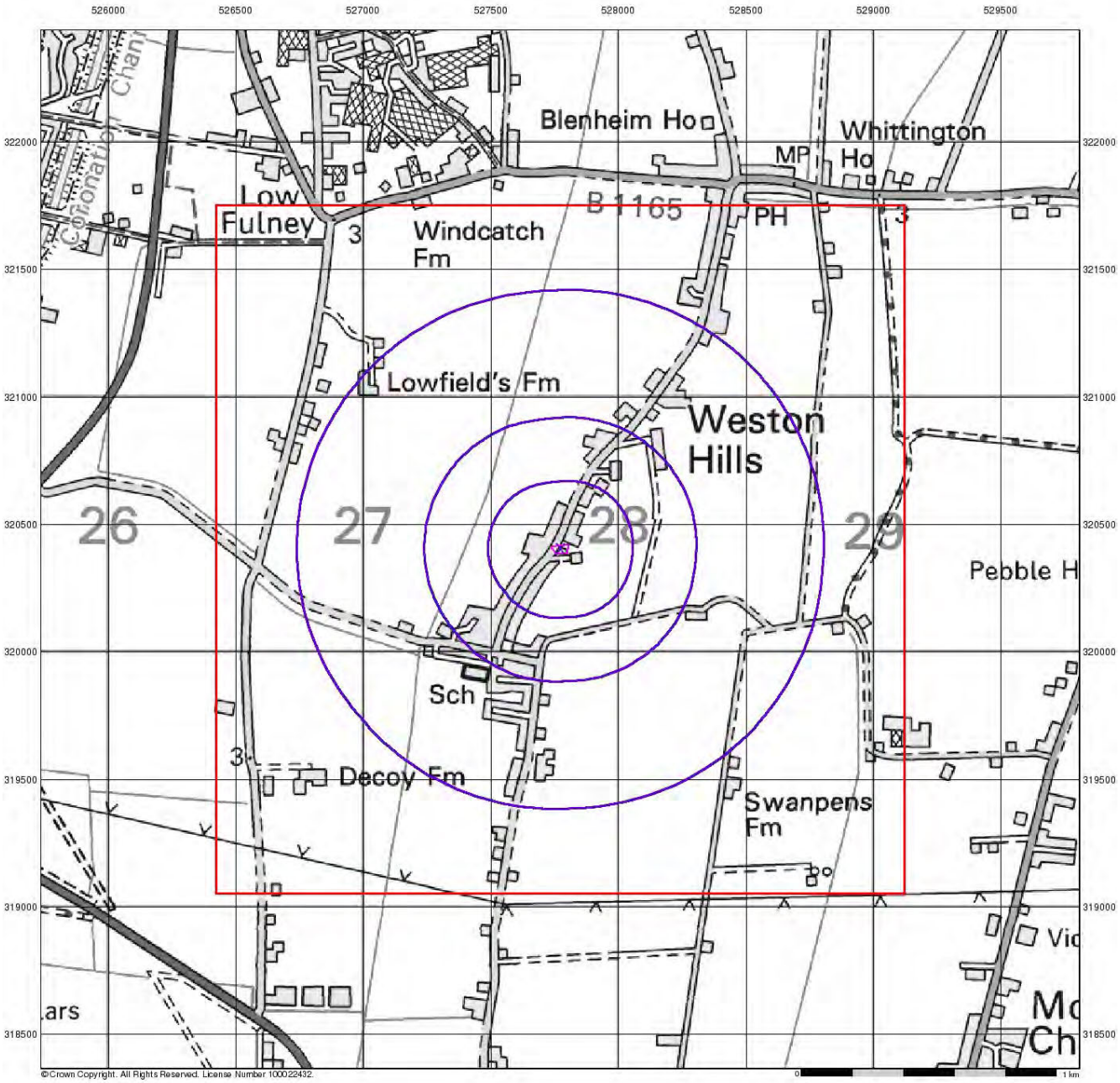
Order Details

Order Number:	316576892_1_1
Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

Site at 527780, 320410

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



Source Protection Zones

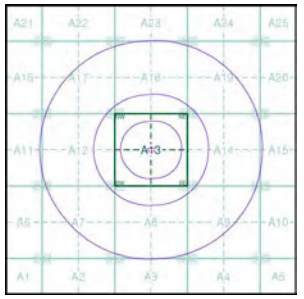
General

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)

Site Sensitivity Context Map - Slice A



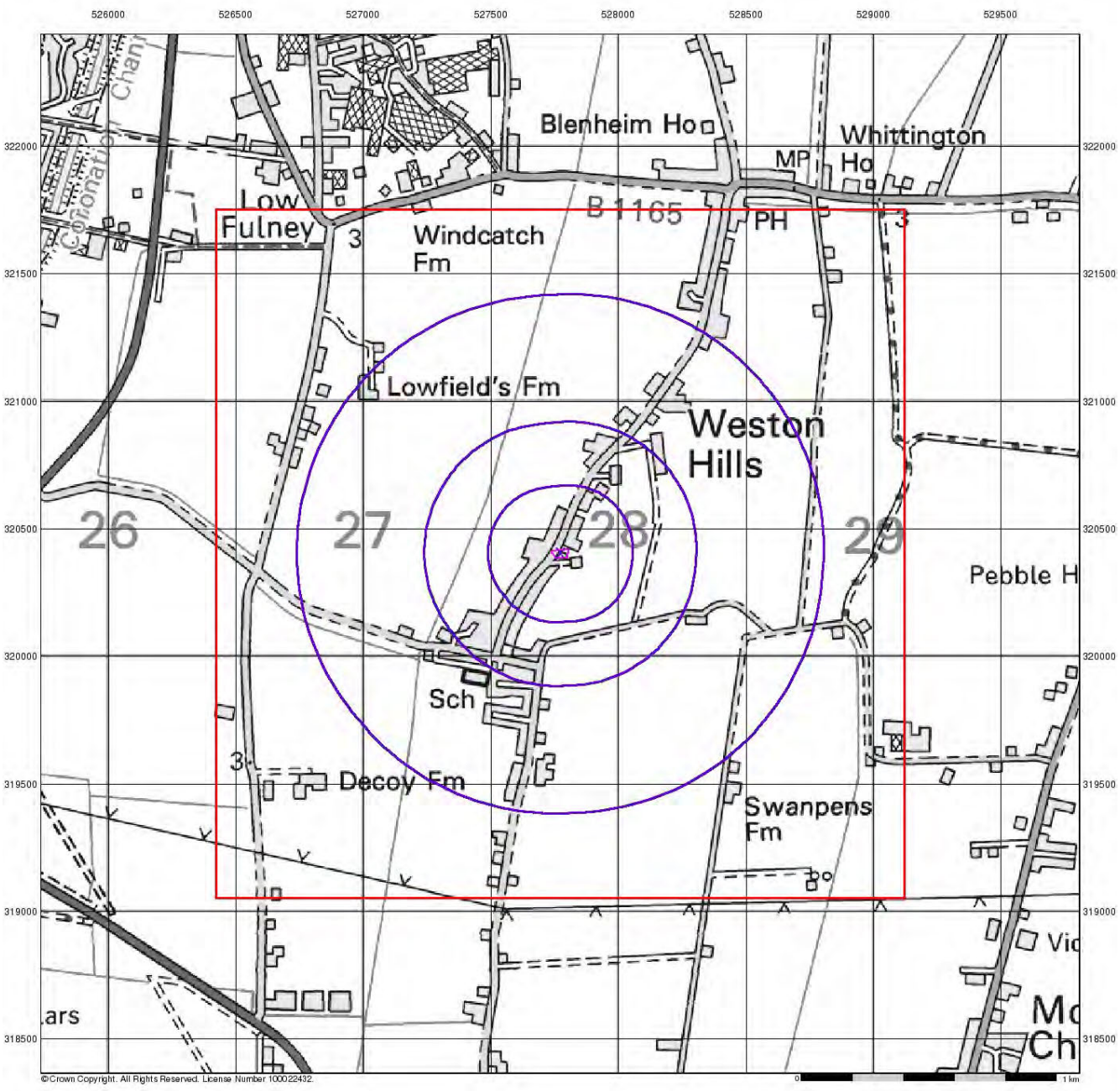
Order Details

Order Number:	316576892_1_1
Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

Site Details

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BGS Flood GFS Data

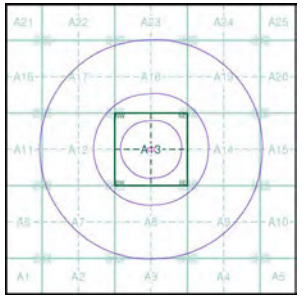
General

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



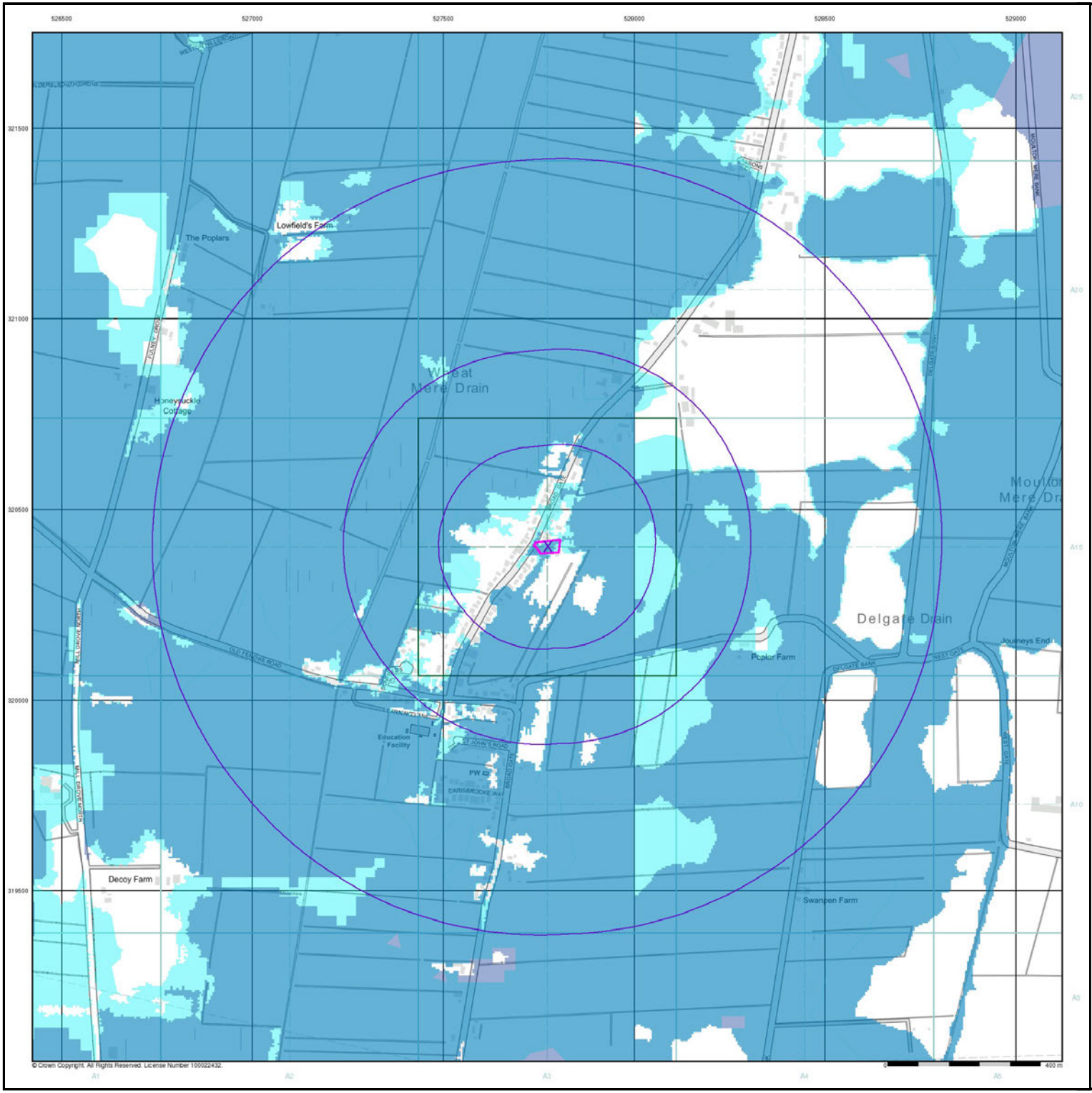
Order Details

Order Number:	316576892_1_1
Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
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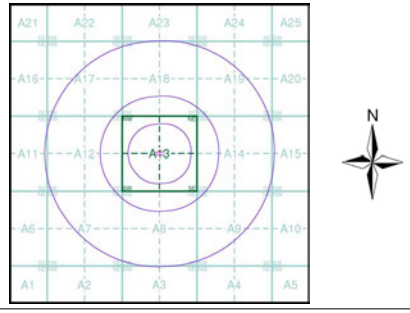
General

- 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



Order Details

Order Number:	316576892_1_1
Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	1000

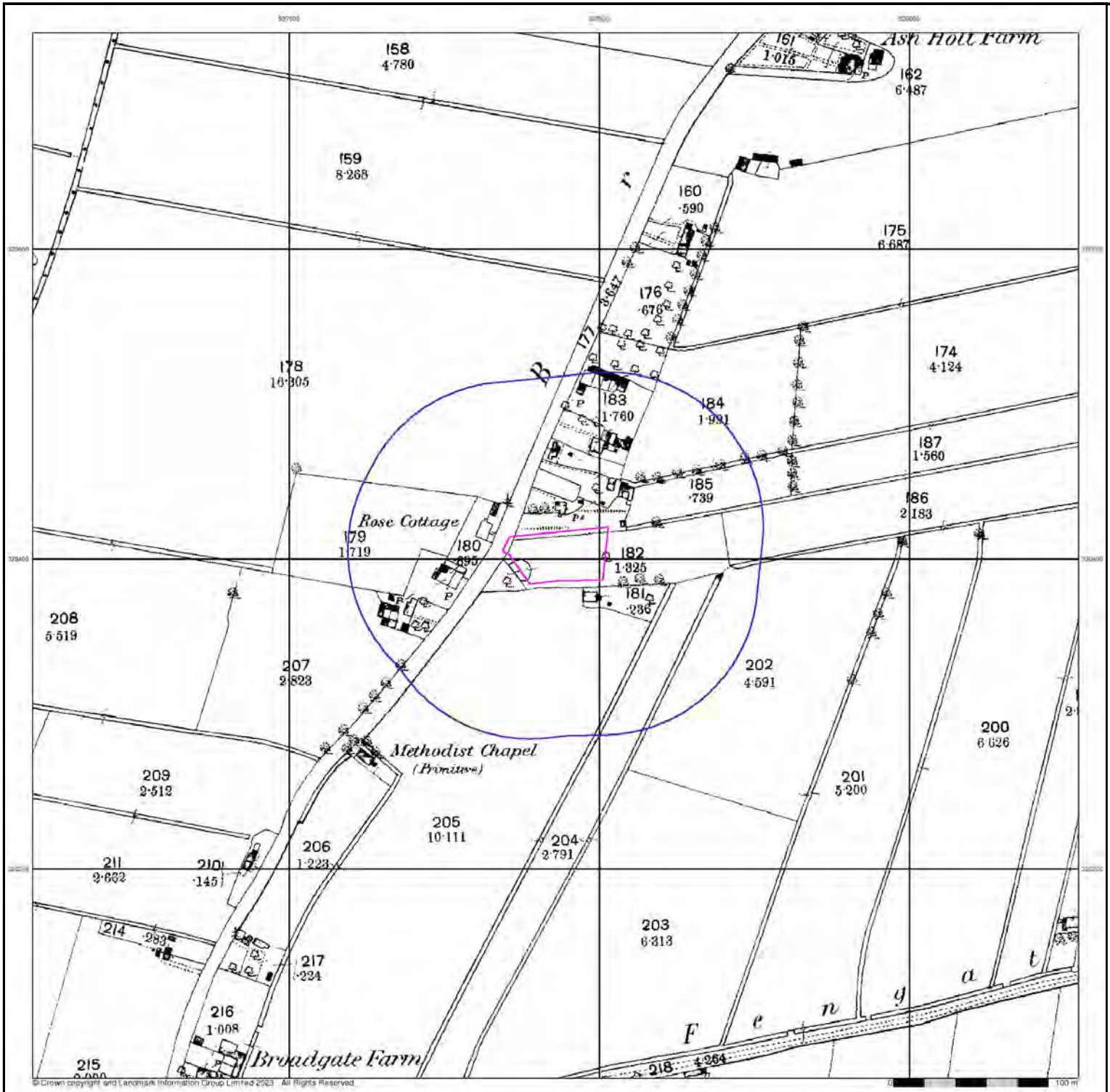
Site Details

Site at 527780, 320410

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APPENDIX F

A Selection of Historic Maps



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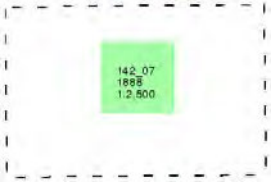
Lincolnshire

Published 1888

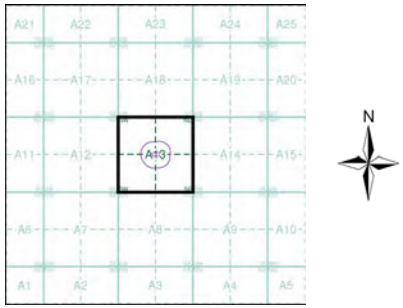
Source map scale - 1:2,500

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

Map Name(s) and Date(s)



Historical Map - Segment A13



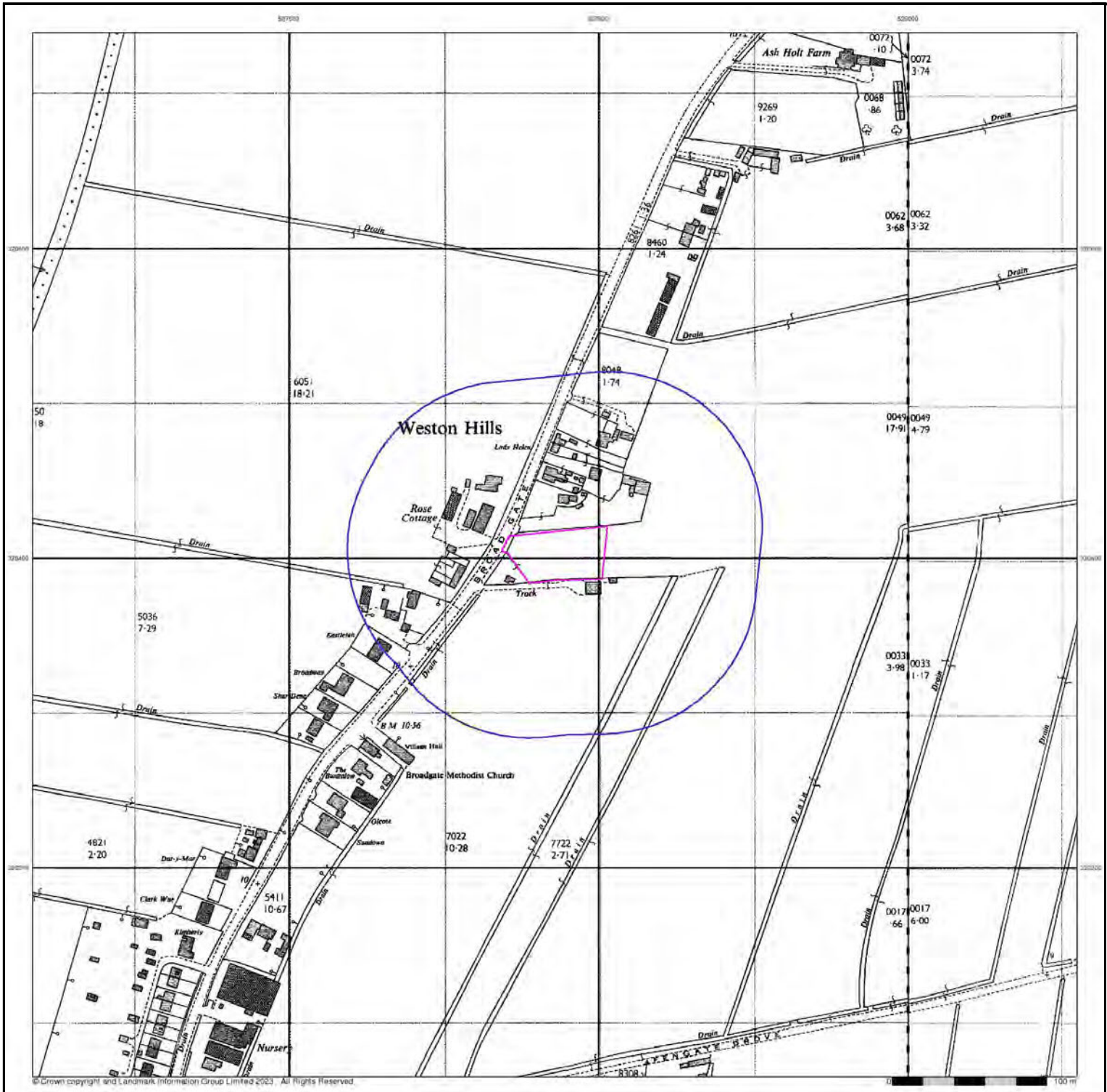
Order Details

Order Number:	316576892_1_1
Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	100

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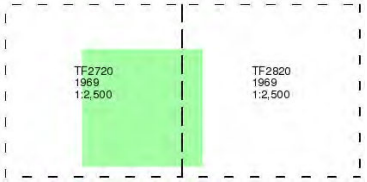
Ordnance Survey Plan

Published 1969

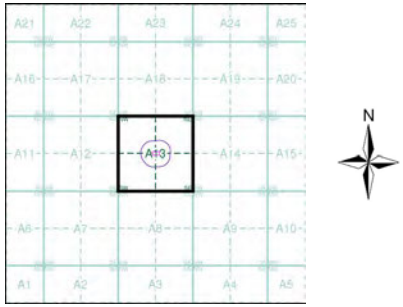
Source map scale - 1:2,500

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

Map Name(s) and Date(s)



Historical Map - Segment A13



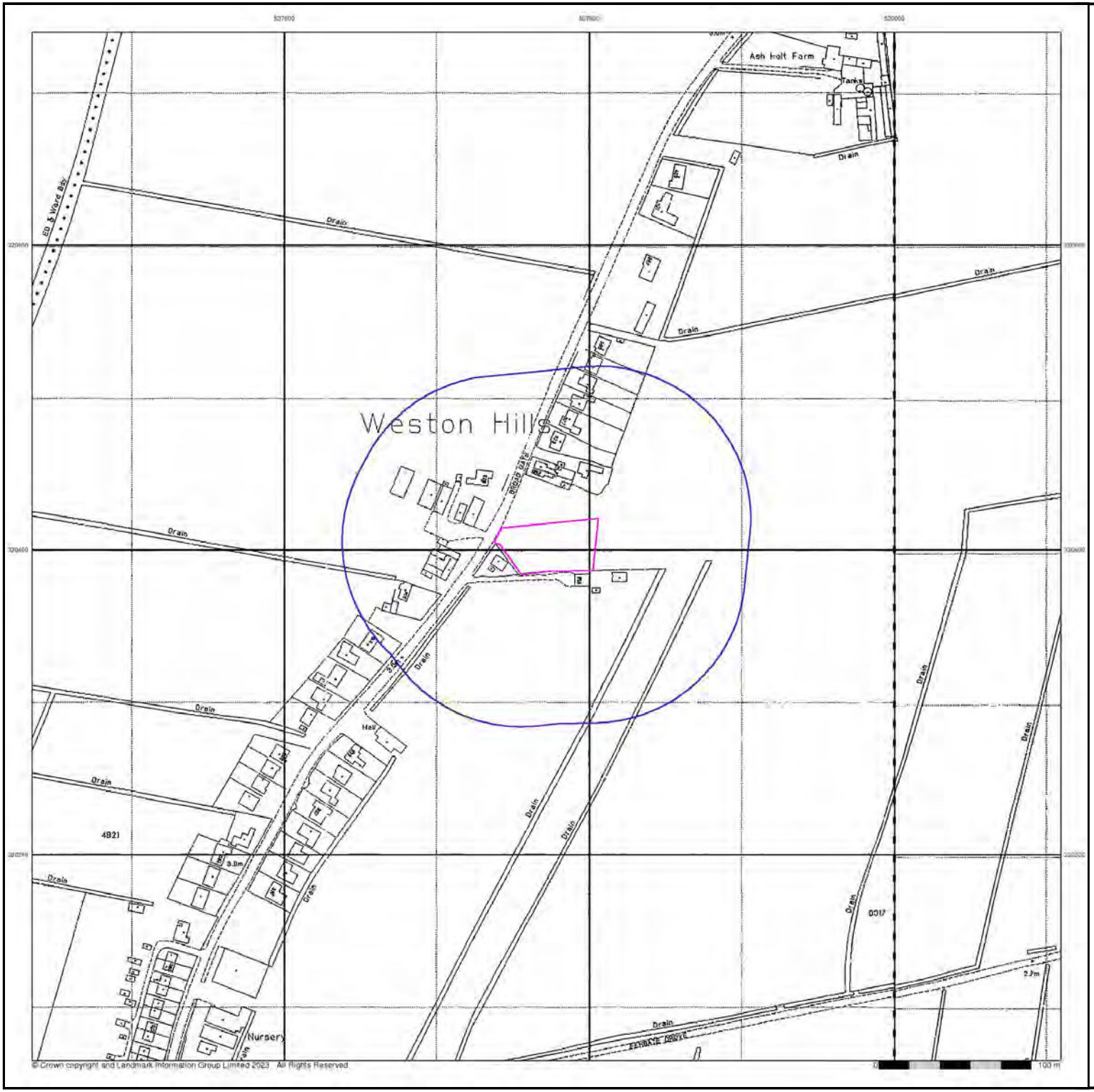
Order Details

Order Number:	316576892_1_1
Customer Ref:	UK23.6651
National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	100

Site Details

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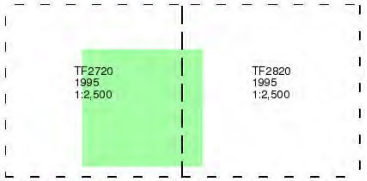
Large-Scale National Grid Data

Published 1995

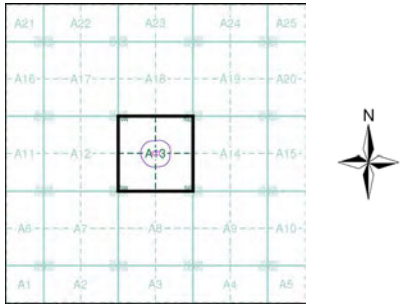
Source map scale - 1:2,500

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

Map Name(s) and Date(s)



Historical Map - Segment A13



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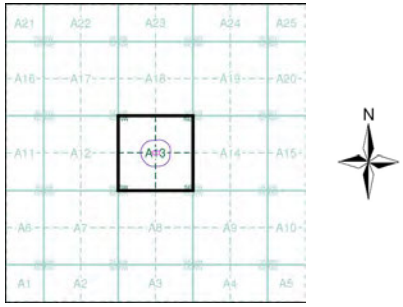


Historical Aerial Photography

Published 1999

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

Order Number:	316576892_1_1
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National Grid Reference:	527770, 320400
Slice:	A
Site Area (Ha):	0.19
Search Buffer (m):	100

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APPENDIX G

Method Statement for Encountering Unexpected Contamination

METHOD STATEMENT

ACTIONS TO BE TAKEN IN THE EVENT OF DISCOVERING UNEXPECTED CONTAMINATION DURING INTRUSIVE GROUNDWORKS

If at any point during intrusive groundworks at a site, evidence of unforeseen contamination is encountered in the form of significant noxious odours, discolouration, or instability within soils or sheen/ discolouration in groundwater, the following actions will be taken:

- Intrusive works in the immediate area of the impacted ground will be suspended and the continuation of work in other areas of the site will be considered within the context of the site specific health & safety plan.
- Environmental Protection Strategies Ltd (EPS) will be contacted and appraised of the situation so that arrangements can be made to characterise the impact and determine what action may be necessary in addition to the scheduled site works. Where possible / health & safety plan permits, digital photographs of the impacted ground will be taken and emailed to EPS at the address below to assist in the initial assessment
- It may well be necessary for EPS to attend site to undertake visual inspection and obtain samples for field and/or laboratory analysis, although the actions taken will be dependent on the nature of what is encountered
- In cases where EPS consider the unforeseen contamination likely to pose a significant risk of significant harm to adjacent site users or local environmental receptors, the local authority and the Environment Agency will be informed of the situation and the actions being taken
- Once appropriate action has been agreed and undertaken, a written summary will be produced by EPS for submission to the Local Authority, (and where relevant, the Environment Agency) in accordance with planning requirements. The submission will include details of work undertaken, analytical results of investigative and validation samples obtained and conclusions and recommendations for any further actions considered necessary
- Where regulatory bodies have been involved, site works should only recommence following their agreement and in all cases should only recommence when the site manager considers it safe to do so within the context of the site specific health & safety plan.

EPS Contact Details:

Marcus Bell	Associate Director	Tel: 0787 206 9979
Will Evans	Director	Tel: 0781 253 9655
Steve Bullock	Director	Tel: 0786 694 9221

Email: info@epstrategies.co.uk (Automatically forwarded to the above and office-based personnel)







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