



Phase I Geo-Environmental Desk Study

6 Backgate

Cowbit
Spalding
Lincolnshire
PE12 6AP

Prepared for:

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6 BACKGATE, COWBIT, SPALDING

NON-TECHNICAL CLIENT SUMMARY

This report presents the findings of a Phase I Geo-Environmental Desk Study which was carried out to identify potential contamination from previous or current uses of the site and 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 comprises a roughly 'L shaped' plot of land used as a mature garden with notable features limited to a couple of sheds/ stores, and a small brick-built outbuilding to the west. The proposed development plan is understood to include the construction of a new residential dwelling with private gardens.
- Ground conditions are indicated to comprise of superficial clays and silts, below which, mudstone bedrock of the Oxford Clay Formation is anticipated. Groundwater is not sensitive in the local area, and although a drainage channel is positioned within 10m of the eastern boundary, the site is still considered to lie within an area of low to moderate environmental sensitivity.
- Although no significant sources of contamination have been identified in the surrounding area, the site historically was occupied by a north west to south east trending railway line and some buildings and hardstanding have also been noted. Therefore, it is anticipated that some fill (made ground) may be present beneath the site, which could pose a risk to future site users and property such as new building foundations and services.
- It is recommended that the quality of shallow soils is investigated via a modest sampling exercise, to confirm ground conditions beneath the site and assess the suitability of soils present (particularly in proposed gardens), to ensure they meet modern planning standards.
- A copy of this report should be forwarded to South Holland District Council for inclusion into their land quality records and to support the existing planning application.

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:	UK21.5370	
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The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' in house 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 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, 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 April 2021, Environmental Protection Strategies Ltd (EPS) was commissioned by Raw Architecture on behalf of Ian and Sarah Howes to complete a Phase I Geo-Environmental Desk Study for land at 6 Backgate, Cowbit, Spalding, Lincolnshire, PE12 6AP ('the site'); see Figure 1.

The work was commissioned in order to fulfil initial planning requirements relating to land contamination, for the erection of a new residential dwelling and external works, under South Holland District Council Planning Reference: H01-0576-20

This report presents the findings, conclusions, and recommendations of the Phase I Desk Study undertaken for the site as instructed.

1.1 Objectives

The purpose of this desk study is to evaluate the potential contaminant linkages which may be active at the site in its current condition, or could become active in future, and to determine if any action is required to investigate them further or to break them.

This is achieved by carrying out the following activities:

- a) Examining the site history - late 1800s to present day, through collection of historical maps of the area, site records, records held by relevant local authorities, the Environment Agency and review of other information databases.
- b) Characterising the site's environmental and geological sensitivity through examination of existing geological, hydrogeological, topographical, and historical maps and aerial photographs of the area.
- c) Identifying Potential Areas of Concern (PAOCs) through a combination of historical map and data review.
- d) Consideration of any future plans for the site and the effects any proposed changes may have on contaminant linkages over time.
- e) Development of a Conceptual Site Model through a Preliminary Risk Assessment to evaluate the potential risks posed by the site and make recommendations for any further work that may be required to ensure suitability for use and safe development. In accordance with the Environment Agency's *Land Contamination: Risk Management* (2020) and the *National Planning Policy Framework*.

1.2 Project Limitations and Constraints

The purpose of this report is to present the findings of a Phase I Geo-Environmental Desk Study conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, EPS makes the following statements:

This report does not include specific investigation for the presence of either Potential Asbestos Containing Material (PACM) or Japanese Knotweed at the subject site however, if obvious evidence of either is observed during EPS site walkover, details will be provided in this report. Specialist contractors should be commissioned to make detailed assessments and recommendations if these materials are suspected.

2 SITE CHARACTERISATION

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

2.1 Site Location and Description

Detail	Description
Location	The site is located towards the north eastern corner of the village of Cowbit, approximately 3 miles south of Spalding, Lincolnshire.
National Grid Reference	526670, 317910
Topographic Elevation	The site is mostly flat and situated at approximately 3m Above Ordnance Datum (AOD).
Description of Site	A walkover survey was conducted by EPS on the 23rd April 2021, and the study area was found to comprise an 'L-shaped' plot of land covering approximately 0.11ha. The site is located to the north and east of an existing dwelling (No.6 Backgate), with access through a set of double metal gates forming the western boundary. The property stands largely as a mature garden, with well-kept lawns covering the majority of the area, with the exception of the western section which is surfaced with gravel. At the centre of the gravelled area, there is a small, single storey brick-built building, which appears as a converted outbuilding/office. Other notable features include a timber shed at the north eastern corner, which appeared to be used for general storage, with some small trailers and piping leaning against its eastern face. Along the southern perimeter, a metal storage unit was also noted, again, appearing to be used for general storage. No obvious signs of potential sources of contamination such as significant fuel or chemical storage were noted during the inspection. Furthermore, no evidence of any further (previous) structures or previous land use was identified during the visit. The site is surrounded by a combination of mature hedgerows (to the east, and also forming part of both the northern and southern perimeters), with wood panel fencing located along the sections bordering the adjacent residential properties as well as the western perimeter. Along the eastern limit, a mature deciduous tree was observed, as well as a semi-mature tree located just inside the southern boundary.
Surrounding Land Use	The site is surrounded by large open fields to the east, with residential properties in the village of Cowbit located to the north, south and west.

A plan showing the site location is provided as Figure 1, the current site layout is detailed on Figure 2 and an aerial photograph is included as Figure 3. Selected Site Photographs are included as Appendix A, an indicative proposed development plan is included as Appendix B and relevant extracts of a Landmark Envirocheck report are included as Appendix C.

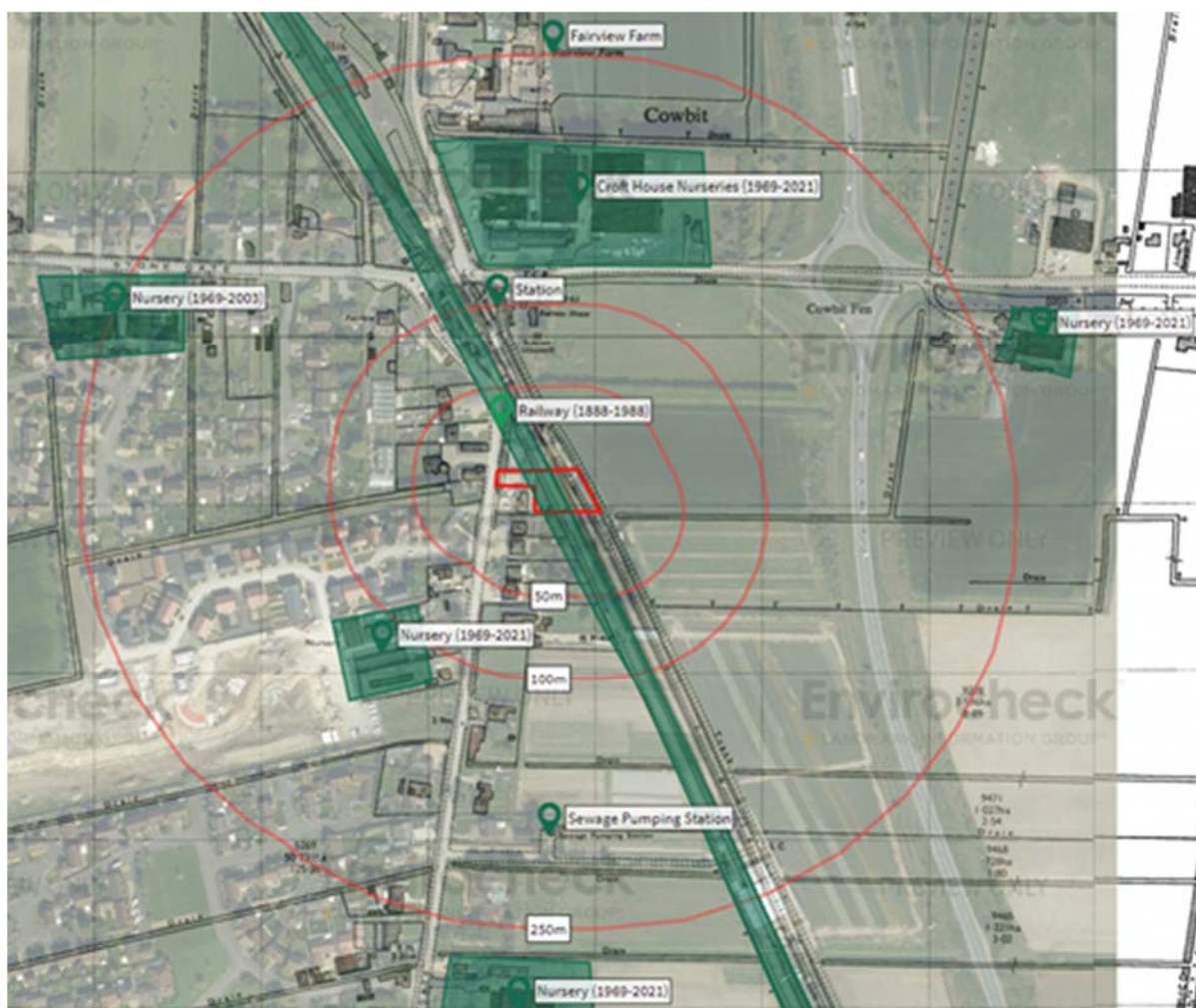
2.2 Geo-Environmental Setting

Detail	Description	
Geology	Geological maps of the area show the site to lie on superficial clays and silts of the Tidal Flat Deposits, below which is mudstone bedrock of the Oxford Clay Formation. Information on the site’s geological context is included as Appendix D.	
Geological Hazards	Hazard	On Site Risk
	Mining Activities	No Hazard
	Collapsible Ground	No Hazard
	Compressible Ground	Moderate
	Ground Dissolution	No Hazard
	Running Sand	Moderate
	Landslide	Very Low
	Shrinking / Swelling Clay	Low
	No natural or man-made cavities are recorded by the British Geological Survey (BGS) within 1km.	
Radon	The Envirocheck data report indicates that the site lies in a location where less than 1% of homes are estimated to be at or above the radon action level. Therefore, the report also states that no protective measures are required in the construction of new buildings or extensions.	
Hydrogeology	Groundwater vulnerability maps for the area show that both the underlying superficial and bedrock geology is classified as Unproductive strata. Furthermore, the site does not lie within a Source Protection Zone (SPZ) for local groundwater abstraction. There are no recorded groundwater abstractions within 1km. Groundwater vulnerability maps are included as Appendix E.	
Hydrology	The nearest surface water feature is a small east-west trending drain located around 10m to the east, which forms part of a significant and detailed network of ditches in the local area; the vast majority of which are anticipated to be associated with agricultural field boundaries. Eight surface water abstractions are listed within 1km, although only one of these remains active to present day and is registered to J W E Banks Ltd for collection of water from Wheatmere Drain for spray irrigation, at a point around 745m south east; active from February 2005. There are fourteen discharge consents within 500m, all of which fall either approximately 255m south or 440m north west, operated by Anglian Water Services Ltd at local Sewage Treatment Work sites.	
Flood Risk	Review of the EA flood zone map for the area indicates that the western section of site is located within Flood Zone 2, which is defined within Table 1 of the technical guidance to the National Planning Policy Framework (NPPF) as ‘the area with a medium probability of flooding from rivers or the sea’. It is understood that a Flood Risk Assessment has been prepared in support of the current planning application.	

Detail	Description		
Flood Risk Cont.	It should be noted that the EA maps do not take into account flooding from other potential sources of floodwater, such as from poor drainage, or groundwater. An indicative flood zone map is included as part of Appendix E.		
Known Site Drainage & Utilities	Overhead cables run from the residential property at No.6 Backgate to the small brick-built building, just inside the western edge of site. Additionally, plastic pipes were observed exiting the ground in this area.		
Landfill & Waste	The Envirocheck report indicates that no active or historical landfills are present within 1km, nor any areas of potentially infilled land (non-water). Furthermore, no licenced waste treatment, transfer or disposal sites are located within the same radius.		
Industrial Land Use	The Envirocheck report lists 4 industrial land uses within 500m, all of which are summarised below.		
	Land Use	Distance (Direction)	Status
	Crowland Pallets 2009 Ltd (Pallets, Crates & Packing Cases)	257m (N)	Active
	M & D Traction (Road Haulage Services)	368m (E)	Inactive
	Michaels Transport (Road Haulage Services)	409m (E)	Inactive
	Mark Green (Boilers- Servicing, Replacement & Repairs)	426m (SW)	Inactive
	In addition, there are two fuel stations listed within 1km, located approximately 560m south west and 830m west, both of which are now recorded as obsolete.		
Pollution Incidents	No pollution incidents to controlled waters have been recorded within 500m.		
Previous Investigation or Remediation	EPS are not aware of any previous ground investigations or remedial works undertaken at the site.		
Sensitive Land Use	There are no recorded sensitive land uses within 500m.		

2.3 Site History

A summary of historical map data from 1888 to 2021 is summarised below. Key points are highlighted, and copies of relevant historic maps and any others examined during the investigation are included in this report as Appendix F.



- Earliest mapping from the late 1880s reveals that the majority of the site was occupied by railway tracks forming part of the Great North and Great Eastern Joint Railway, which runs on a north west-south east orientation in the local area. A railway station is listed approximately 100m to the north, with most of the surrounding area large open fields, with the exception of a few residential properties opposite the station to the north west.
- There is little change on the site or immediate surrounding area until the late 1960s, when a few additional residential properties are constructed to the south and west of the property, along with several nurseries in the wider area, the most significant of which is 'Croft House'. The railway tracks still occupy most of the study area, but the station to the north is now listed as disused.
- Maps dating to 1988 list the railway track as 'dismantled' (perhaps being replaced by a farm track or similar), and around 20 years ago the outbuilding first appears in its current position. It should be noted that the eastern portion of the land appears to have been used as an informal

nursery or allotment, until 5-10 years ago when it appears to have been converted to a more conventional residential garden.

3 CONCEPTUAL MODEL & PRELIMINARY RISK ASSESSMENT

In accordance with the Environment Agency's *Land Contamination: Risk Management* (LC:RM, 2020) guidance, 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 through examination of 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	Infill material of unknown origin (made ground) used to level areas beneath the existing buildings and hardstanding.	PAH, Metals & ACM
Historic Site Use	Dismantled railway line that ran approximately north west-south east across the property from at least the late 1880s.	TPH, PAH, Metals & ACM
Current and Historical	Current and historical use of the surrounding area as nurseries/ allotments including 'Croft House Nurseries' to the north.	Metals, Herbicides and Pesticides

Potential Source	Source Description	Principal Contaminants of Concern
Surrounding Land Use	Current and former commercial land uses including a number of farm holdings (such as Fairview Farm approximately 250m north) and some local distribution and haulage firms.	TPH, PAH, Metals, SVOC, ACM

Notes: PAH Polycyclic Aromatic Hydrocarbons ACM Asbestos Containing Material
TPH Total Petroleum Hydrocarbons SVOC Semi 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 for the site includes the construction of a new residential dwelling with associated areas of soft landscaping and private gardens. This proposed land use has been considered as:

- 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 below:

Receptor	Site Specific Description
Human	Future site users, construction workers involved in the 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 superficial Tidal Flat Deposits and bedrock of the Oxford Clay Formation, both of which are defined by the EA as Unproductive strata. The site does not lie within a SPZ for nearby groundwater abstraction and no licences are held within 1km and therefore, underlying groundwater has not been considered as a potential receptor to site derived contaminants.
Surface Water	A number of surface watercourses (drainage channels) are present within the surrounding area, the closest of which located around 10m to the east. It is possible that site derived contaminants of concern may enter these watercourses by overland flow, migration through unsaturated soils or entering shallow surface drainage/ historical land drainage which discharges to these features. Therefore, surface waters must be considered as a sensitive receptor within the conceptual site model.
Flora and Fauna	The proposed development is anticipated to include 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 which could also be at risk from potential contaminants found on 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 outdoors
- Inhalation of vapours indoors

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 following:

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

Considering the site use and environmental setting, and the proposed land use, the following plausible contaminant linkages have been identified through this Phase I assessment and require further investigation.

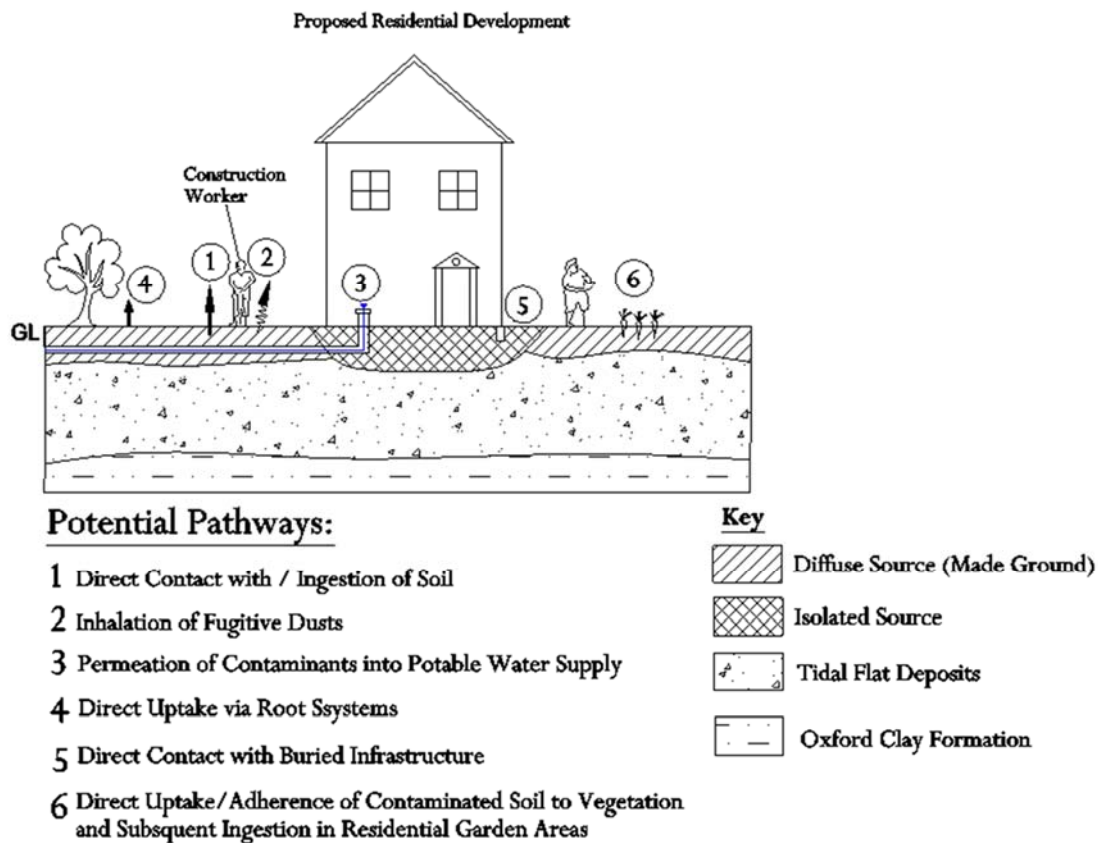
Source	Pathway	Receptor
Contaminated soil	Direct contact and inadvertent ingestion by eating or smoking with dirty hands	Construction workers during redevelopment & site users
	Inhalation of fugitive dusts	
	Direct uptake via root systems	Plants
	Direct uptake and/or adherence of contaminated soil to vegetation and subsequent ingestion.	Site users
	Ingress/diffusion through permeable potable water supply pipes	
	Direct contact	Buried infrastructure

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:

- PAHs and metals have been identified as contaminants of concern associated with the historic on-site infill, however these contaminants are considered to be relatively immobile in the environment by virtue of their very low solubility and volatility. On this basis, plausible pathways by which these potential contaminants could pose a significant risk to nearby surface watercourses are not considered to be active.
- Petroleum hydrocarbons have been identified as contaminants of concern associated with the former railway that ran across the site. However, it is not anticipated that volatile organic compounds i.e. petrol, were ever stored on site in any significant volume and any localised soil contamination from daily activities would have been relatively modest in extent. Therefore, a plausible contaminant linkage has not been identified associated with the migration of organic vapour to indoor and outdoor air, nor any risks to nearby surface watercourses from these otherwise mobile contaminants of concern. However, any isolated hydrocarbon source within the profile of the shallow fill materials (from the presence of the historic railway) would have to be considered further if encountered in relation to any future infrastructure including building foundations and/ or new service lines such as potable water supply pipework.
- Agri-chemicals utilised for surrounding historical horticultural activities (including a few small nursery sites), have been identified as potential sources of contamination. However, given the distance of these land uses and the quantities in which they are likely to have been applied, it is considered highly unlikely that significant pesticide contamination or any semi-volatile organic contaminants associated with these off-site sources would still be present in shallow soils within concentrations capable of posing a risk to future site users, particularly within the study area itself.
- A limited number of commercial land uses including farm holdings and local distribution and haulage firms are located in the surrounding area. However, given the distance (>250m), nature and status of these land uses and the anticipated presence of low permeability cohesive soils, these sources are not considered to pose a significant risk to the proposed development.

The following diagram provides an illustration of the plausible contaminant linkages that may be active at the site and which may need further investigation or control to ensure safe development:

6 Backgate, Cowbit, Spalding – Illustrative Conceptual Model



4 GEOTECHNICAL GROUND MODEL

Geological records indicate the ground conditions to comprise of superficial Tidal Flat Deposits above bedrock of the Oxford Clay Formation. Given the sites historical use, some made ground is anticipated to be present at the surface.

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	Made Ground	Allowable Bearing Pressure	Not appropriate as a bearing strata
		Settlement	High sensitivity
		Volume Change	Depends upon the soil composition
	Tidal Flat Deposits	Allowable Bearing Pressure	$< 75\text{kN/m}^2$
		Settlement	Moderate sensitivity
		Volume Change	Low to medium volume change potential
	Oxford Clay Formation	Allowable Bearing Pressure	75kN/m^2 to 150kN/m^2
		Settlement	Moderate sensitivity/ long term consolidation under loading.
		Volume Change	High volume change potential.
Drainage	Made Ground	Permeability	Not suitable for infiltration drainage
	Tidal Flat Deposits		Unlikely to be suitable for infiltration drainage
	Oxford Clay Formation		
Concrete Grade	Made Ground	Grade	Low to moderate risk of high sulphate levels
	Tidal Flat Deposits		
	Oxford Clay Formation		High risk of high sulphate levels

5 CONCLUSIONS & RECOMMENDATIONS

This Phase I Desk Study has identified that a limited number of plausible contaminant linkages have the potential to become active as a result of the sites historic use of part of a subsequently dismantled railway line.

In the context of potentially unacceptable or acceptable risks as outlined within the Environment Agency's *Land Contamination: Risk Management* guidance (LC:R, 2020), the contaminant linkages which pose potentially unacceptable risks and warrant further assessment to determine the most appropriate action are as follows:

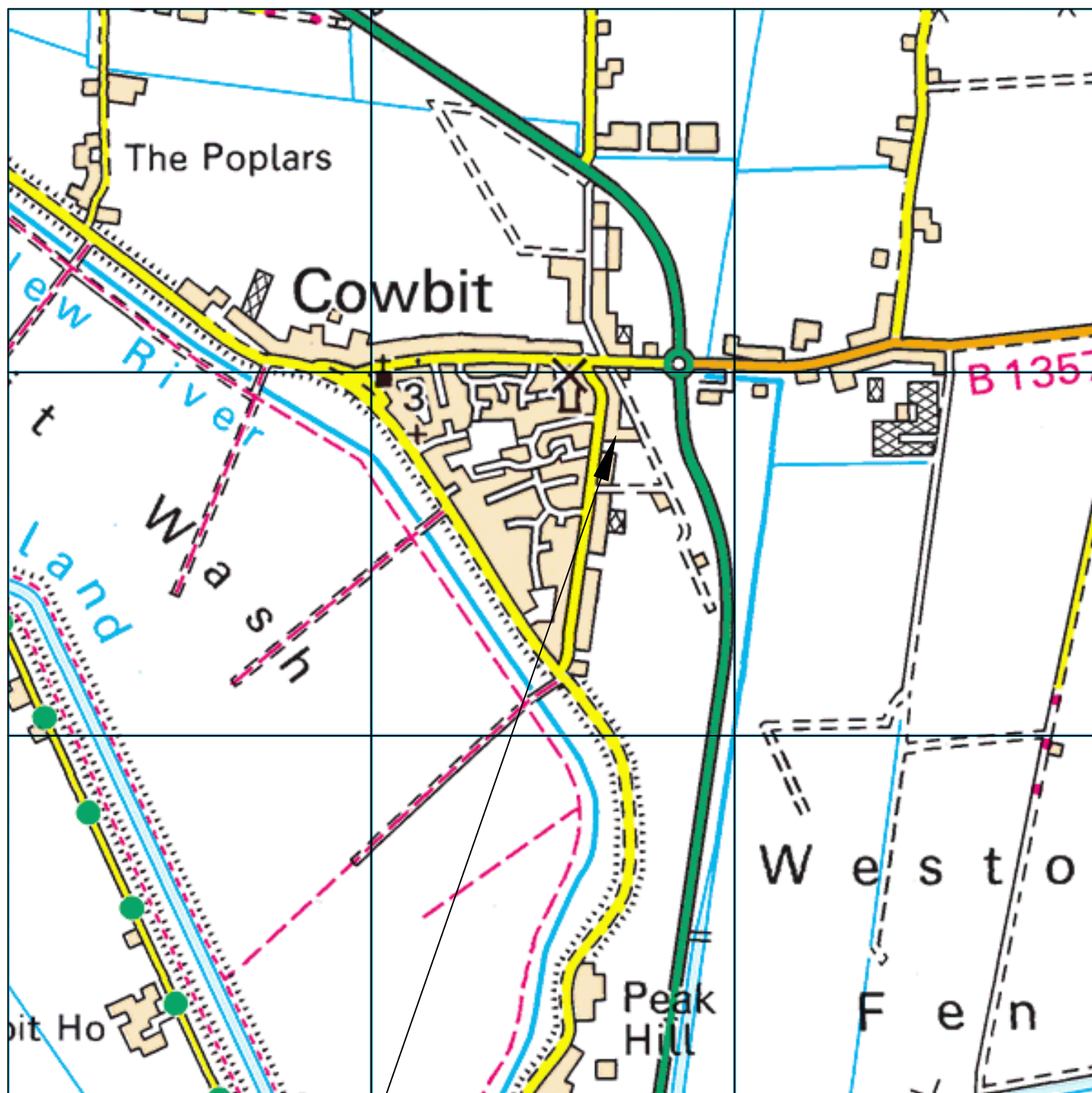
- Human health risks associated with interaction between future residents and potentially contaminated shallow soils, especially within domestic garden areas.
- Potential exposure of site workers to contaminated soils during the proposed redevelopment.
- Risks to future infrastructure such as new building foundations or newly installed potable water supply pipework.

It is therefore recommended that, initially, the identified plausible contaminant linkages should be further investigated by means of a modest intrusive investigation, which is likely to comprise the formation of a limited number of shallow boreholes to assess soil quality across the site, particularly in areas of proposed private gardens. A proposed scope and costing for this work can be provided upon request and, where appropriate discussed and agreed with the local authority prior to commencement.

Any impacts to soil quality by source contaminants which are identified by the exploratory investigation may require further targeted intrusive investigations in order to delineate the contaminants found and quantitatively evaluate the risks posed.

A copy of this report should be provided to the Environmental Health department of South Holland District Council so that the information may be used to support planning proposals for the site.

FIGURES



Approximate Site Location

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Title: Site Location Plan

Project: 6 Backgate, Cowbit, Spalding
PE12 6AP

Fig No: 1

Scale: NTS

Drawn By: MT Approved By: BV

Job No: UK21.5370

Dwg No: 6Backgate/0521/01

Date: May 2021



— Approximate Site Boundary

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Title: Current Site Layout

Project: 6 Backgate, Cowbit, Spalding
PE12 6AP

Fig No: 2

Scale: NTS

Drawn By: MT Approved By: BV

Job No: UK21.5370

Dwg No: 6Backgate/0521/02

Date: May 2021



— Approximate Site Boundary

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Title: Aerial Photograph

Project: 6 Backgate, Cowbit, Spalding
PE12 6AP

Fig No: 3

Scale: NTS

Drawn By: MT Approved By: BV

Job No: UK21.5370

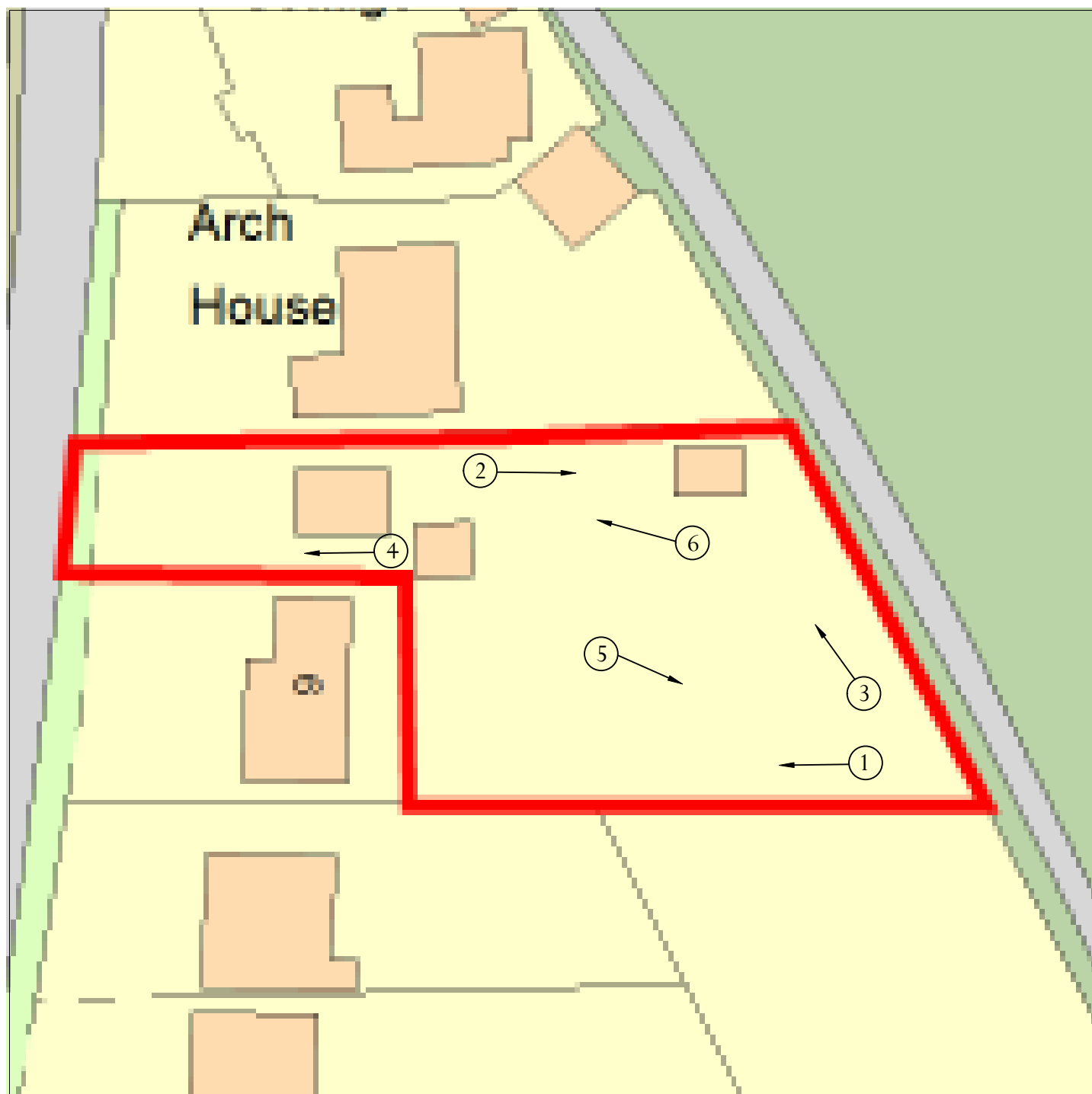
Dwg No: 6Backgate/0521/03

Date: May 2021

APPENDICES

APPENDIX A

Selected Site Photographs



— Approximate Site Boundary

① Approximate Photo Location

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Title: Photograph Location Plan

Project: 6 Backgate, Cowbit, Spalding
PE12 6AP

Fig No: A

Scale: NTS

Drawn By: MT Approved By: BV

Job No: UK21.5370

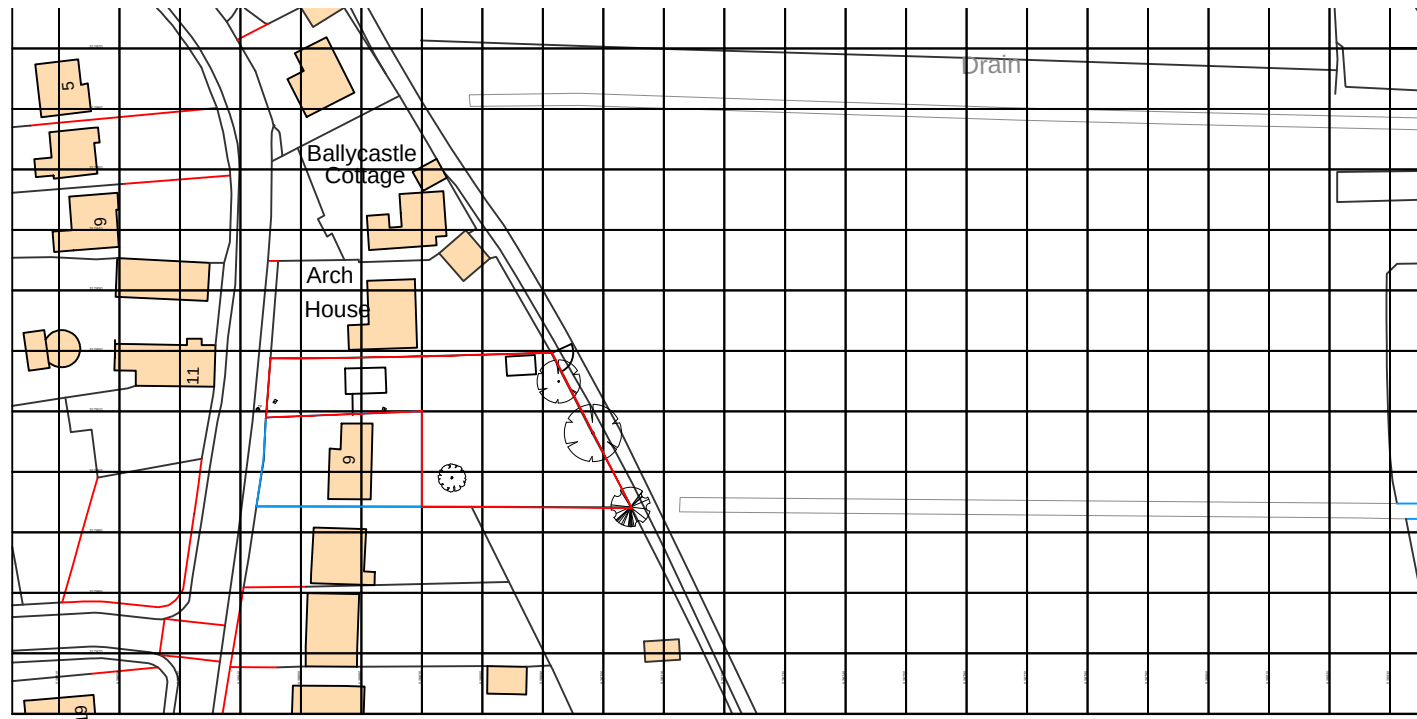
Dwg No: 6Backgate/0521/A

Date: May 2021

Photo 1: Photo looking approximately west along the southern perimeter of the site.	Photo 2: View looking approximately east showing the wooden shed in the north eastern corner.
	
Photo 3: Photo looking roughly north along the eastern perimeter.	Photo 4: Image looking approximately west, showing the gravel area and outbuilding/ office.
	
Photo 5: View looking towards the south eastern corner of the property.	Photo 6: Image looking towards the north western corner of property.
	

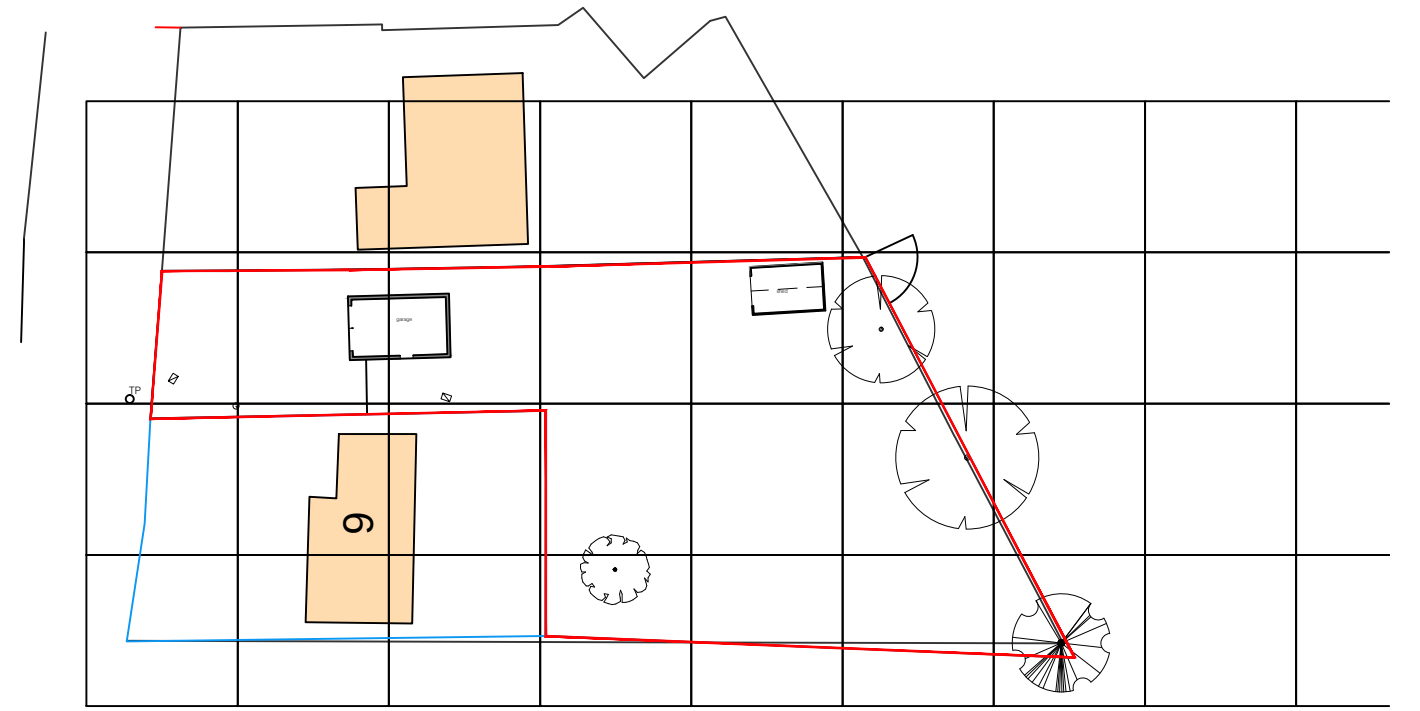
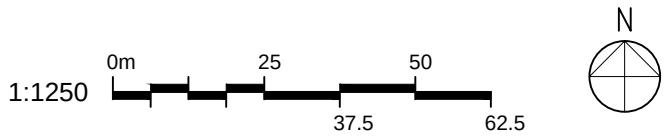
APPENDIX B

Proposed Development Plan

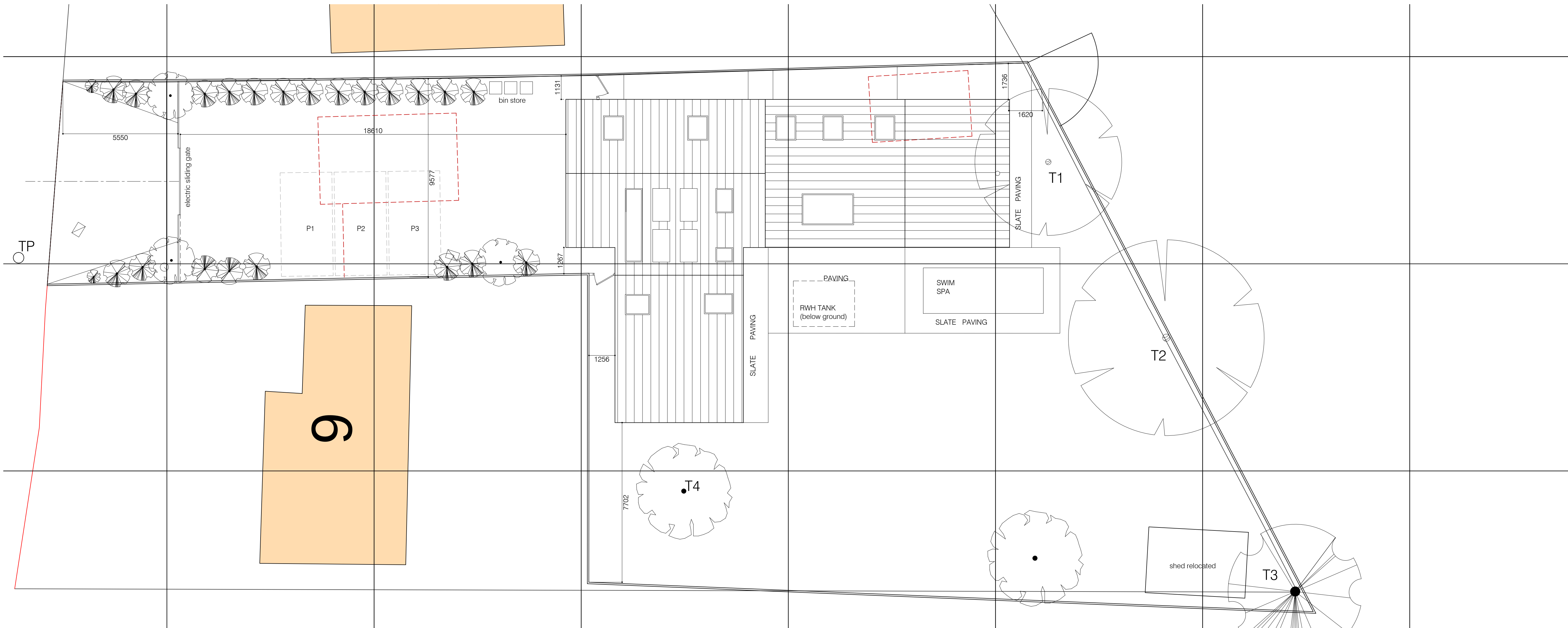
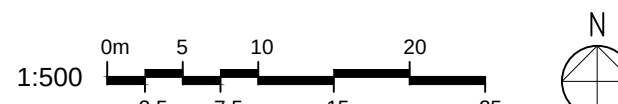


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1 SITE LOCATION PLAN



2 BLOCK PLAN (EXISTING)



3 SITE PLAN (PROPOSED)



revisions
REV A 22.08.19 - ROOFLIGHT AND RENEWABLES AMENDED
REV B 12.09.19 - BUILDING LOCATION AMENDED
REV C 12.10.19 - SHED RELOCATED
REV D 28.06.20 - ROOF FINISH AMENDED
REV E 17.07.20 - TREE REFS ADDED

key
demolition
extg / unknown
brickwork
blockwork
stud

notes

notes

This drawing is the copyright of the Architects and may not be reproduced or used except by written permission. Dimensions must not be scaled from this drawing. The Contractor is to check and verify all building and site dimensions before work is put in hand.

The Contractor is to check and verify with all the Statutory Authorities and the Employer the location and condition of any underground or overhead services or confirm that none exist prior to work commencing on site. The Contractor shall comply with enactments regulations and working rules relating to safety health and welfare of workpeople.

client

MR & MRS J. I. HOWES
6 BACKGATE
COWBIT
SPALDING

architect

RAW ARCHITECTURE
15 Warrenne Keep
Castle Dyke
Stamford

01780 480112
info@rawarchitecture.net

NEW DWELLING, 6a BACKGATE COWBIT

drawing title
SITE LOCATION & SITE PLAN

job no
0319

scale
SEE DWG

package no

drawing no / rev
A100 / E

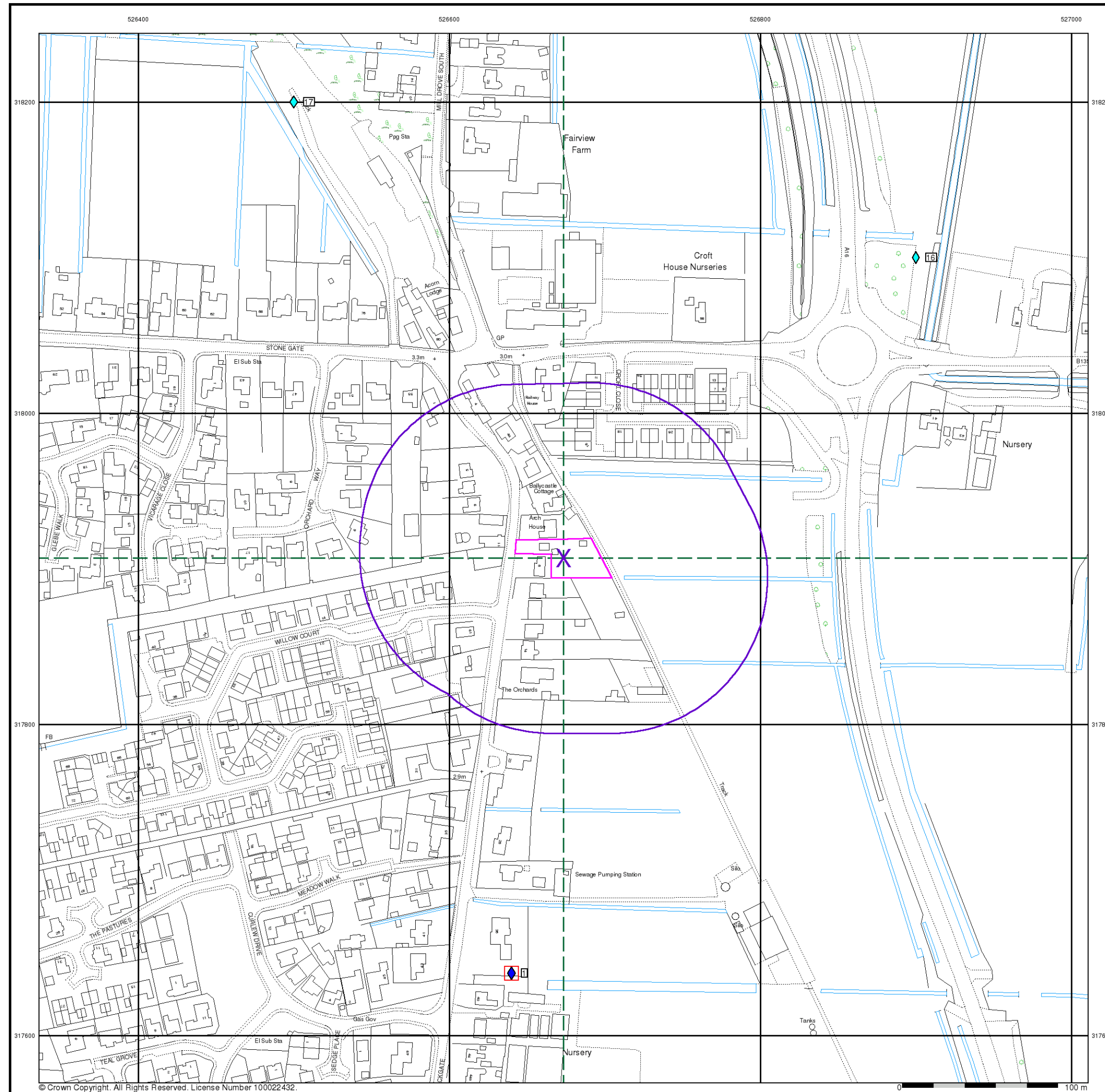
status
PLANNING

date
12.09.19

checked
HR

APPENDIX C

Surrounding Land Use



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Types at Location
- Pylon
- Overhead Transmission Line

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 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

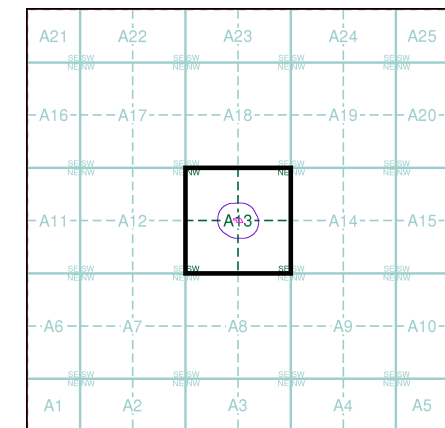
Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement
- 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 - Segment A13



Order Details

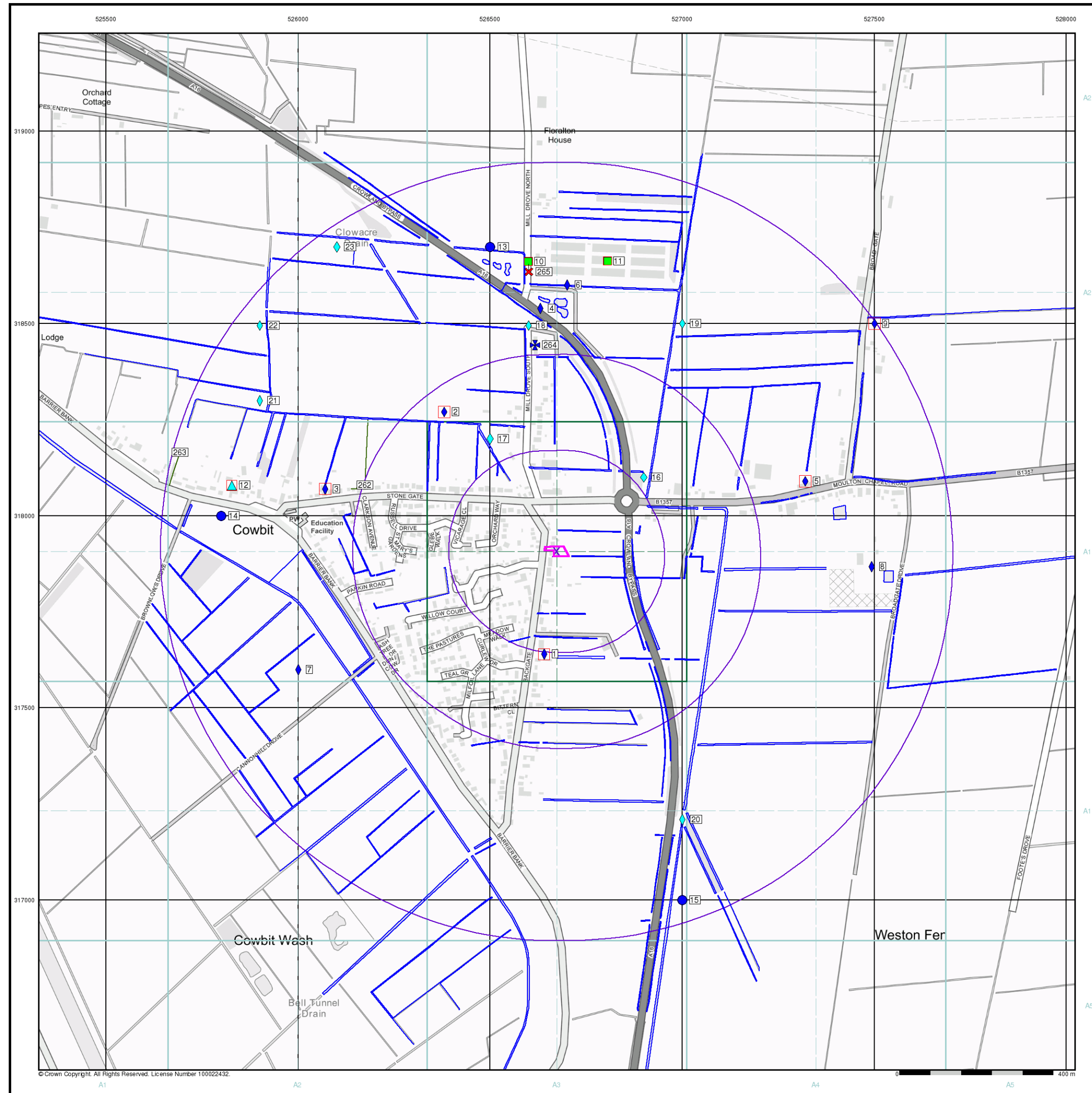
Order Number: 277161254_1_1
Customer Ref: UK21.5370
National Grid Reference: 526670, 317910
Slice: A
Site Area (Ha): 0.11
Plot Buffer (m): 100

Site Details

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- General**

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

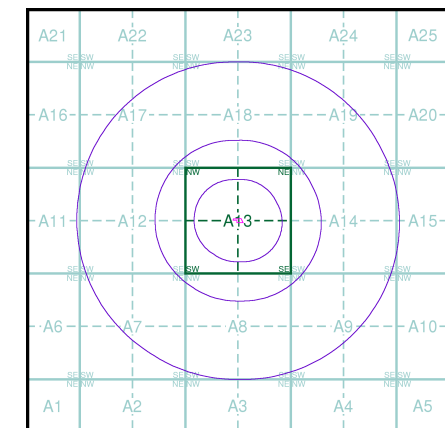
 - Contaminated Land Register Entry or Notice (Location)
 - Contaminated Land Register Entry or Notice
 - Discharge Consent
 - Enforcement or Prohibition Notice
 - Integrated Pollution Control
 - Integrated Pollution Prevention Control
 - Local Authority Integrated Pollution Prevention and Control
 - 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
- 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 (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
 - BGS Recorded Mineral Site
- Geological**

 - BGS Recorded Mineral Site

Site Sensitivity Map - Slice A



Order Details

Order Number: 277161254_1_1
Customer Ref: UK21.5370
National Grid Reference: 526670, 317910
Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 1000

Site Details

Backgate, Cowbit, Spalding, PE12 6AP

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
	ALV	Alluvium	Clay, Silt, Sand and Gravel	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

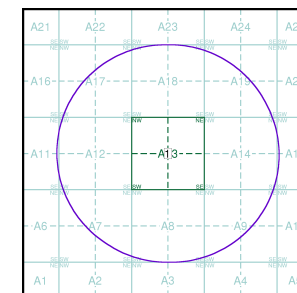
This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published 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



Order Details:

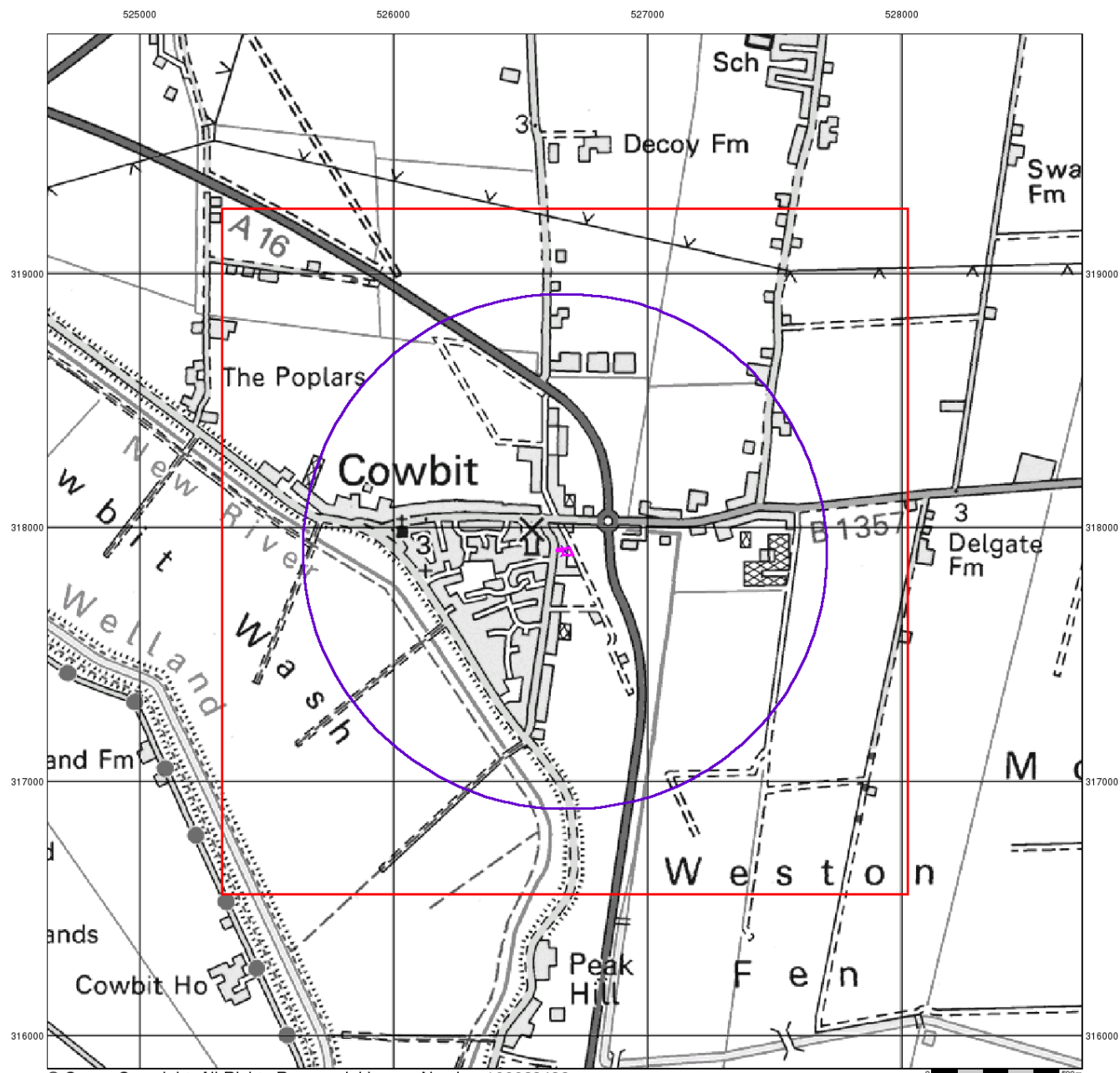
Order Number: 277161254_1_1
 Customer Reference: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details:

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Artificial Ground and Landslip

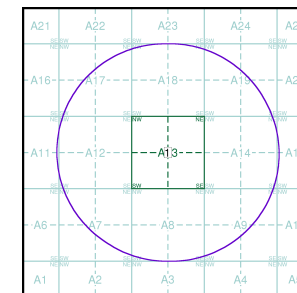
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions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



Order Details:

Order Number: 277161254_1_1
 Customer Reference: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details:

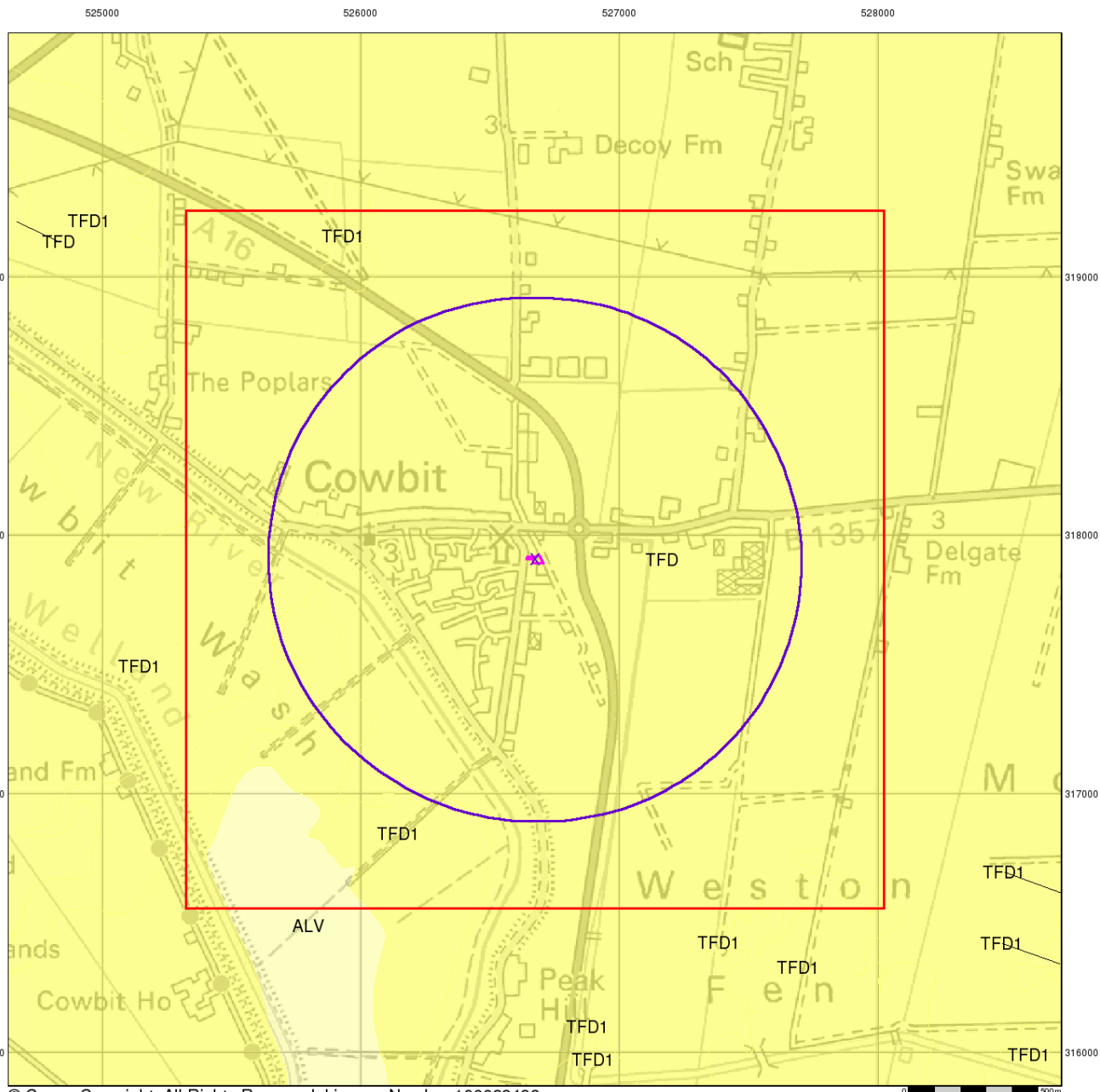
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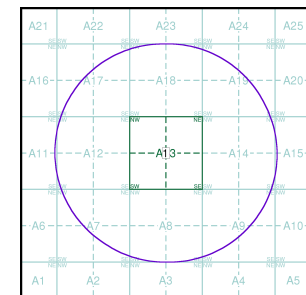
Superficial Geology

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



Order Details:

Order Number: 277161254_1_1
 Customer Reference: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details:

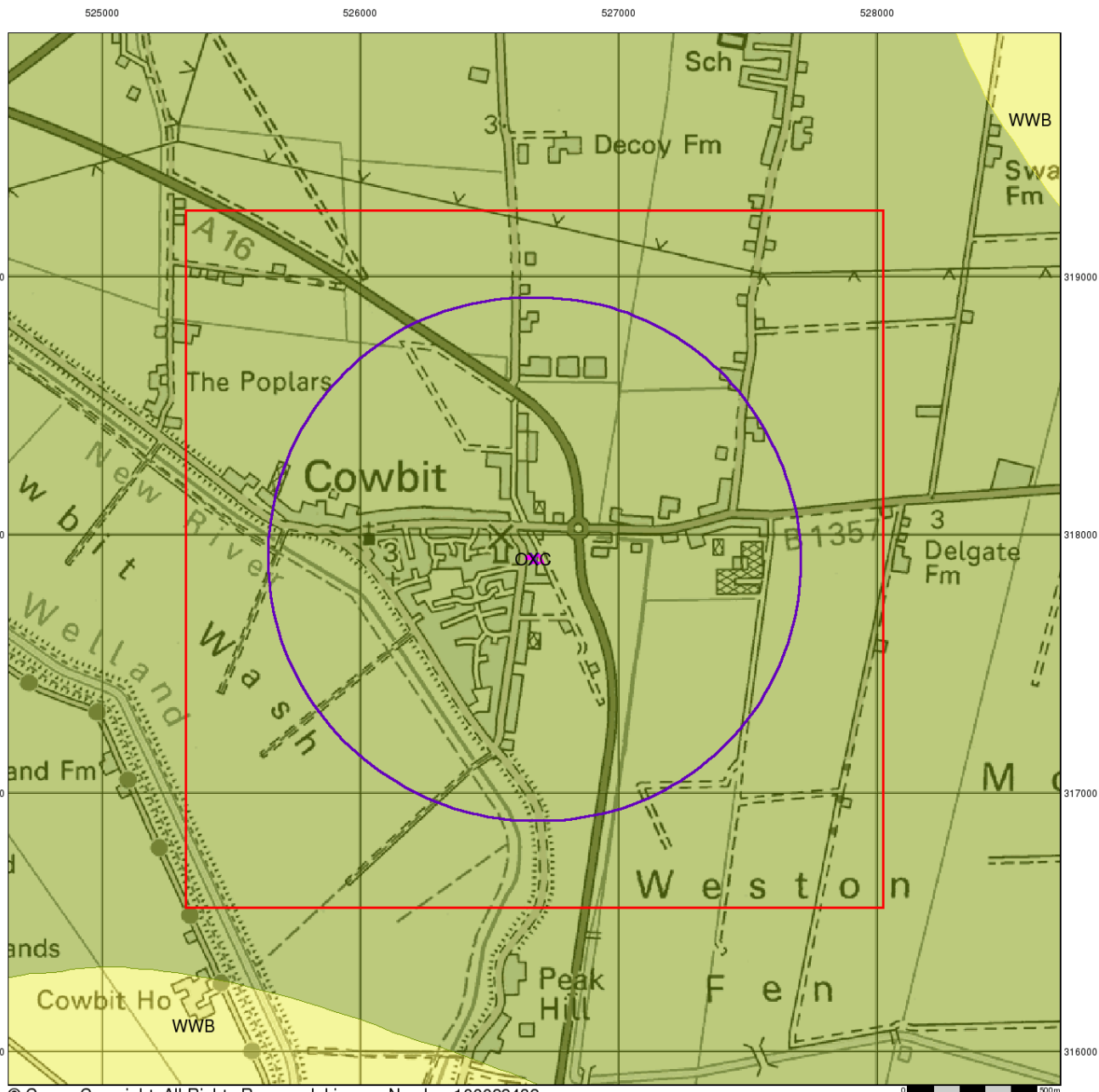
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Bedrock and Faults

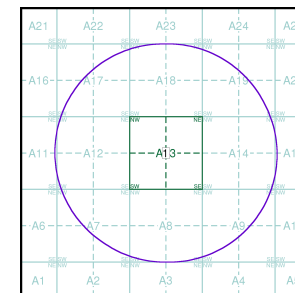
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

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



Order Details:

Order Number: 277161254_1_1
 Customer Reference: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details:

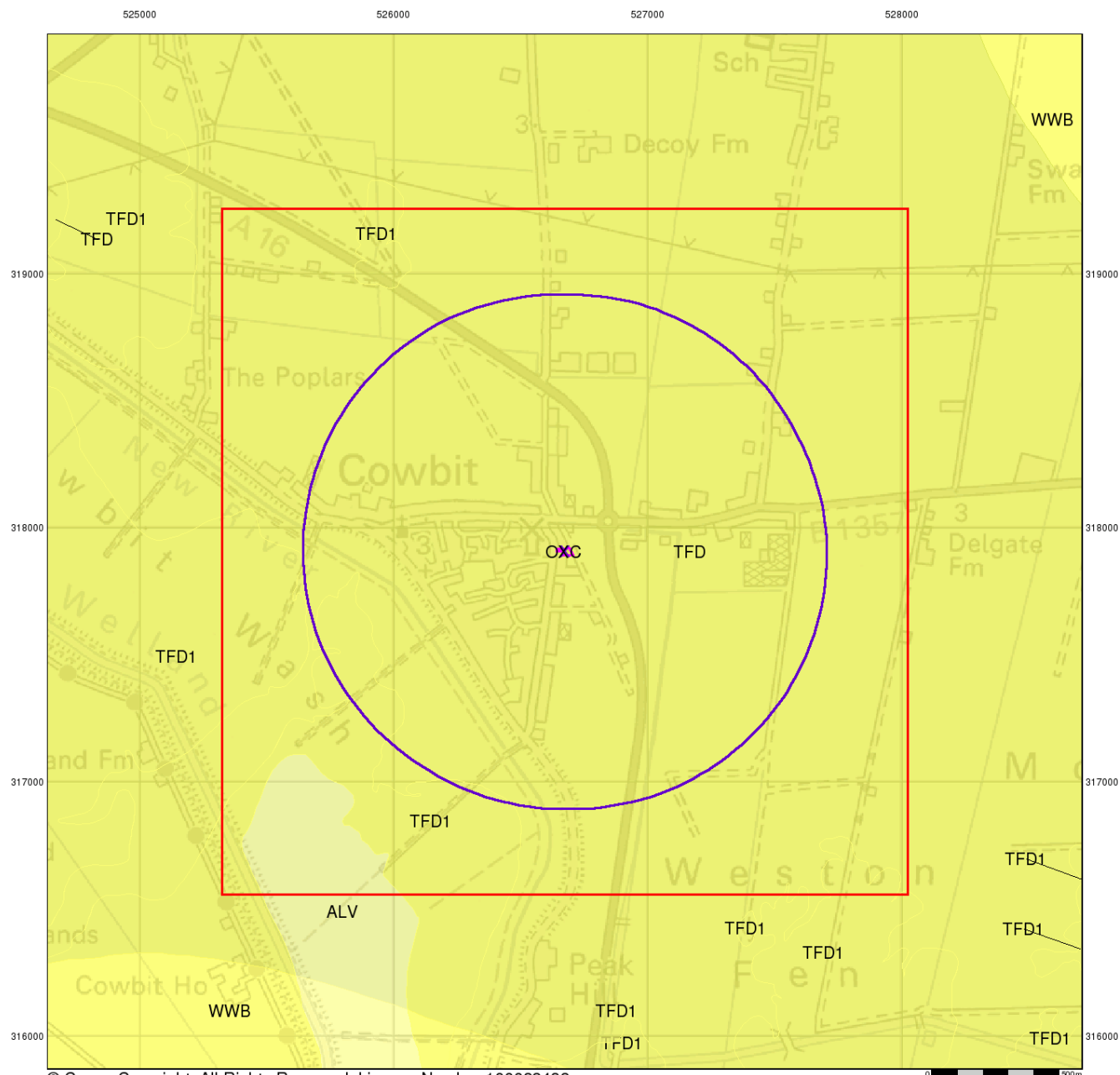
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Combined Surface Geology

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.

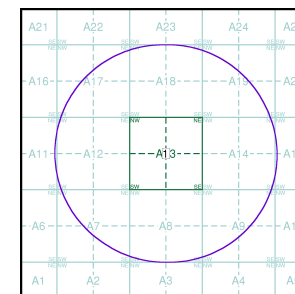
Additional Information

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: 277161254_1_1
Customer Reference: UK21.5370
National Grid Reference: 526670, 317910
Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 1000

Site Details:

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INFORMATION GROUP

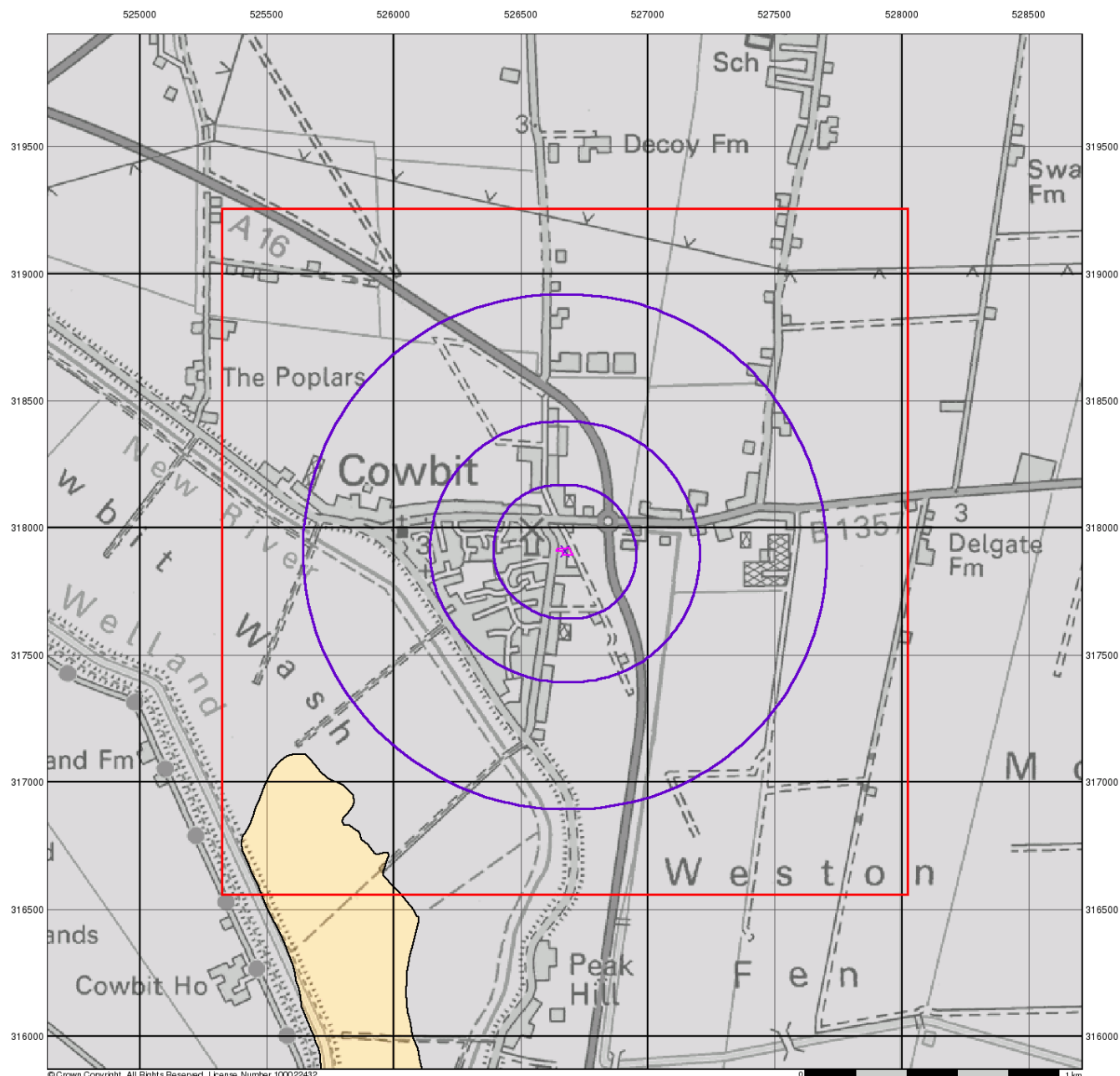
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

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APPENDIX E

Groundwater Vulnerability and Flood Maps



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Groundwater Vulnerability

General

- ✱ Specified Site ○ Specified Buffer(s) X Bearing Reference Point
- Slice 8 Map ID

Agency and Hydrological

Bedrock Aquifers

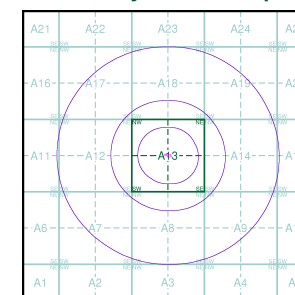
- High Vulnerability, Principal Aquifer
- High Vulnerability, Secondary Aquifer
- Medium Vulnerability, Principal Aquifer
- Medium Vulnerability, Secondary Aquifer
- Low Vulnerability, Principal Aquifer
- Low Vulnerability, Secondary Aquifer

Superficial Aquifers

- High Vulnerability, Principal Aquifer
- High Vulnerability, Secondary Aquifer
- Medium Vulnerability, Principal Aquifer
- Medium Vulnerability, Secondary Aquifer
- Low Vulnerability, Principal Aquifer
- Low Vulnerability, Secondary Aquifer

- Unproductive Aquifer
- ⋯ Soluble Rock

Site Sensitivity Context Map - Slice A



Order Details

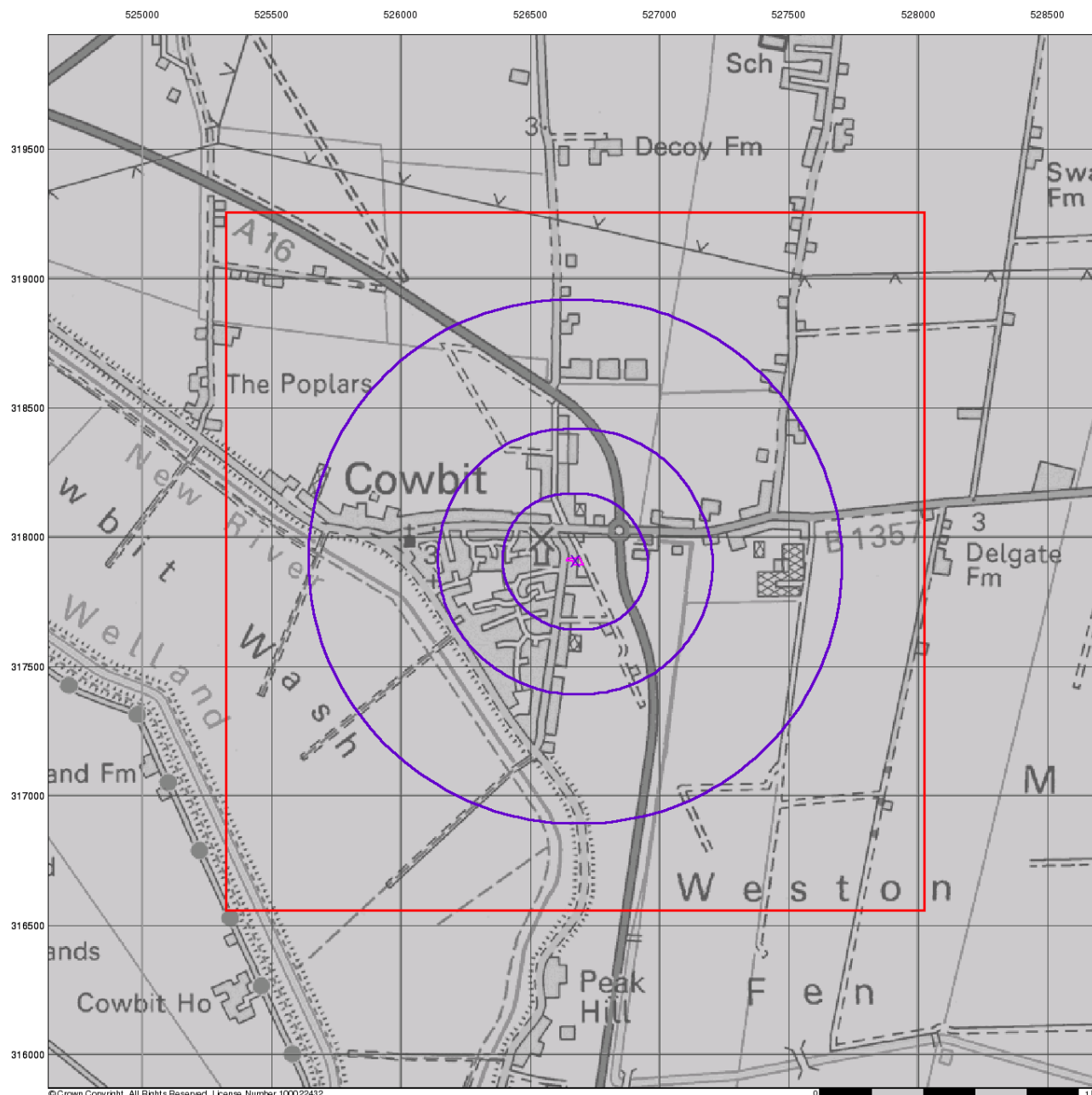
Order Number: 277161254_1_1
 Customer Ref: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

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0 1 km



Bedrock Aquifer Designation

General

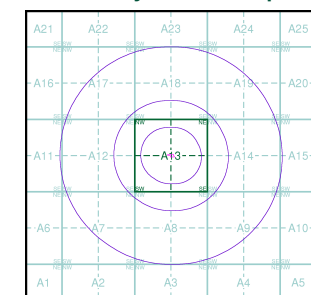
- ◇ Specified Site ○ Specified Buffer(s) X Bearing Reference Point
- Slice 8 Map ID

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

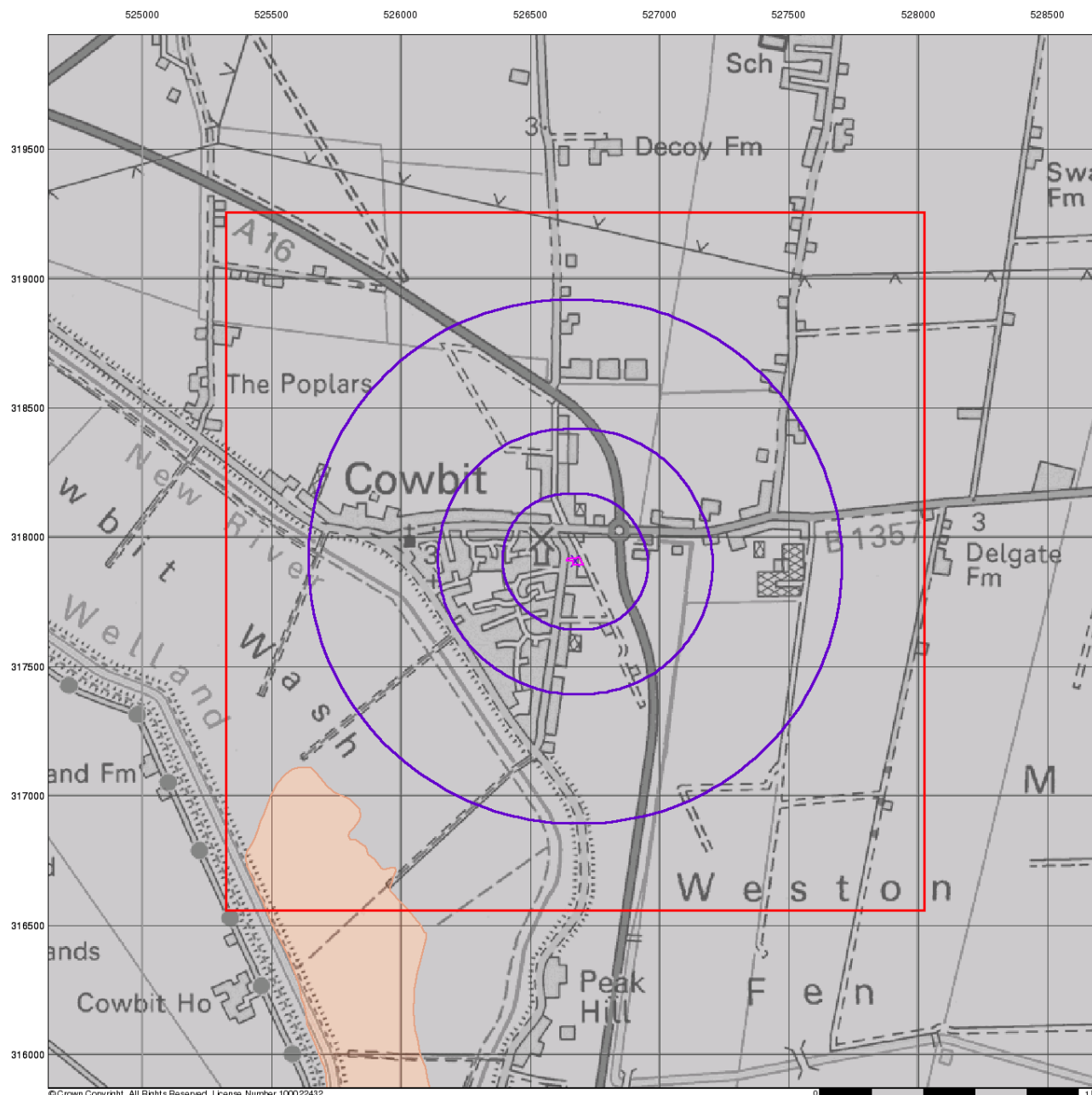
Order Number: 277161254_1_1
 Customer Ref: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

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Superficial Aquifer Designation

General

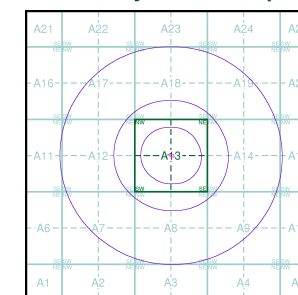
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

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

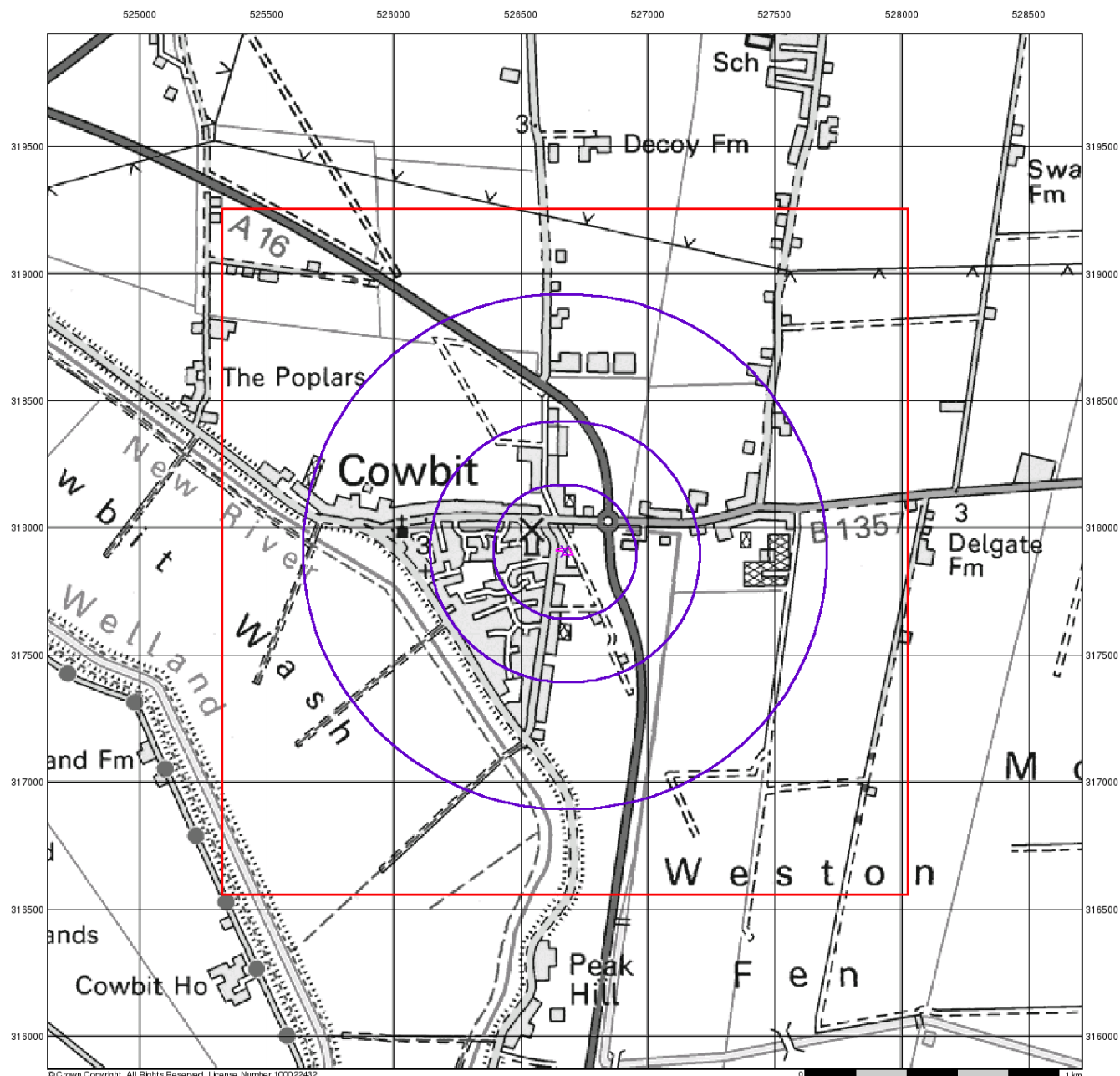
Order Number: 277161254_1_1
 Customer Ref: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

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Source Protection Zones

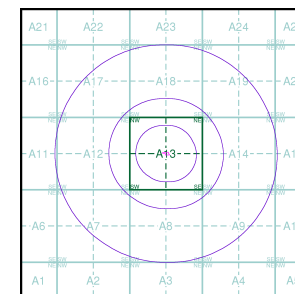
General

- 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)

Site Sensitivity Context Map - Slice A



Order Details

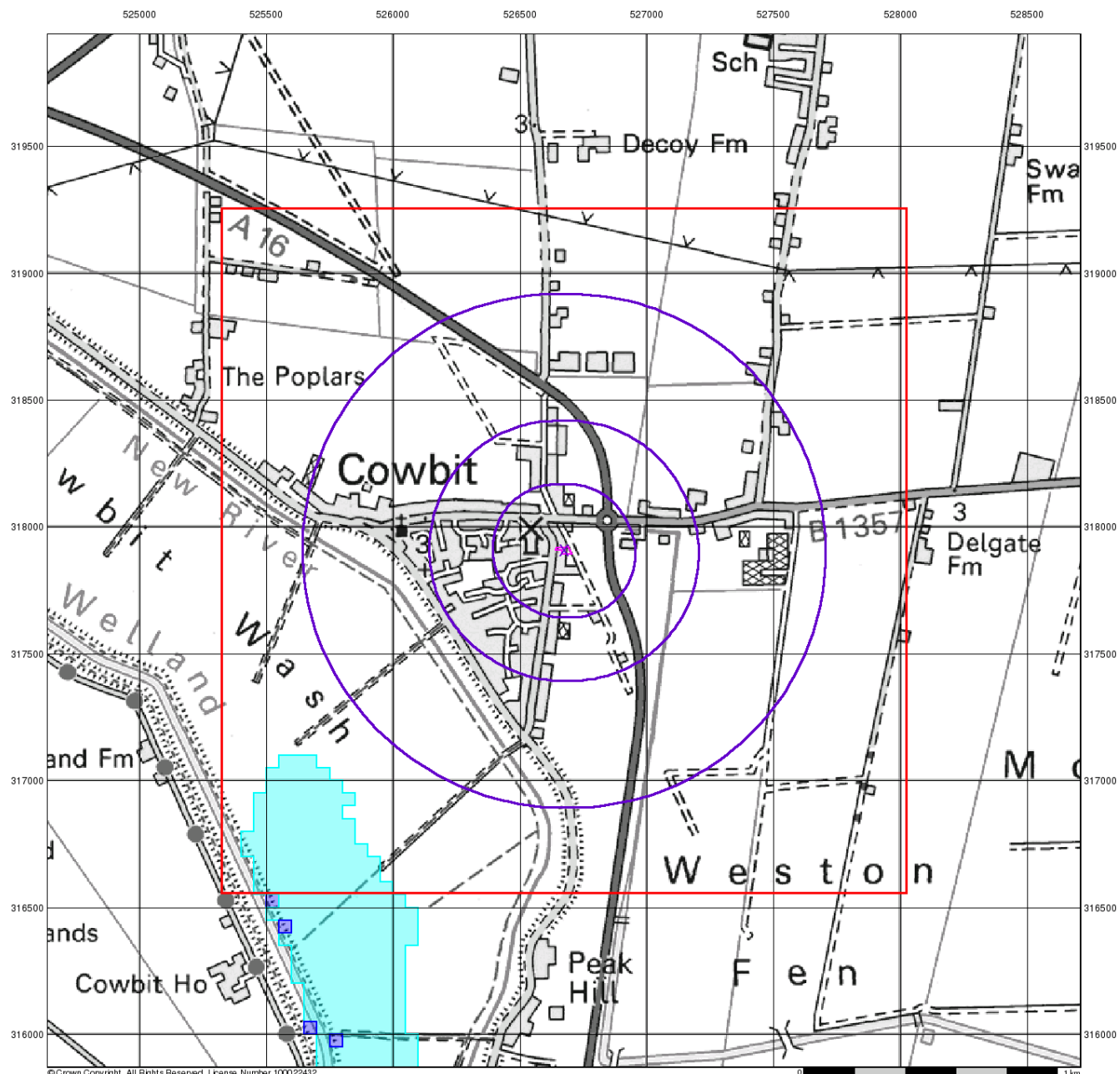
Order Number: 277161254_1_1
 Customer Ref: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

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BGS Flood GFS Data

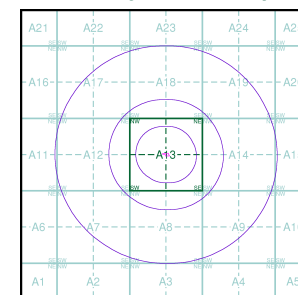
General

- 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

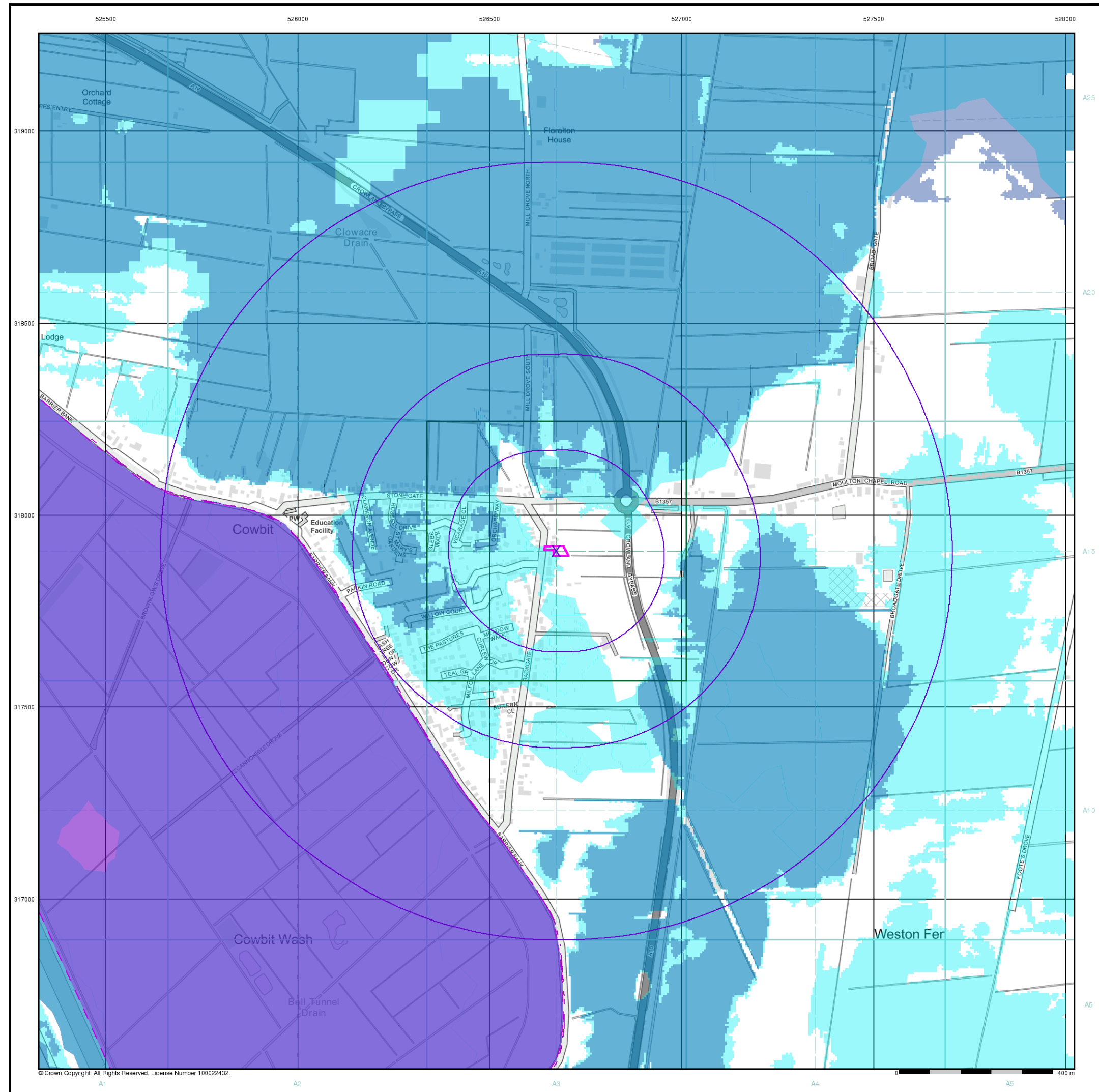
Order Number: 277161254_1_1
 Customer Ref: UK21.5370
 National Grid Reference: 526670, 317910
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

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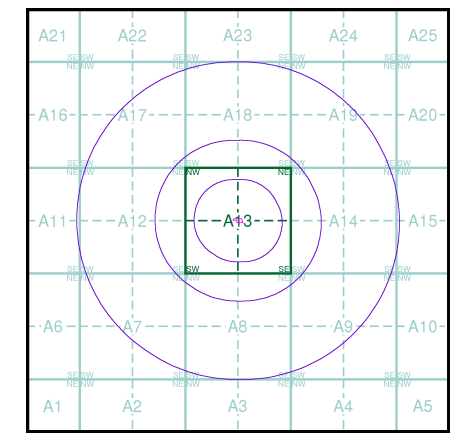
General

- 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: 277161254_1_1
Customer Ref: UK21.5370
National Grid Reference: 526670, 317910
Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 1000

Site Details

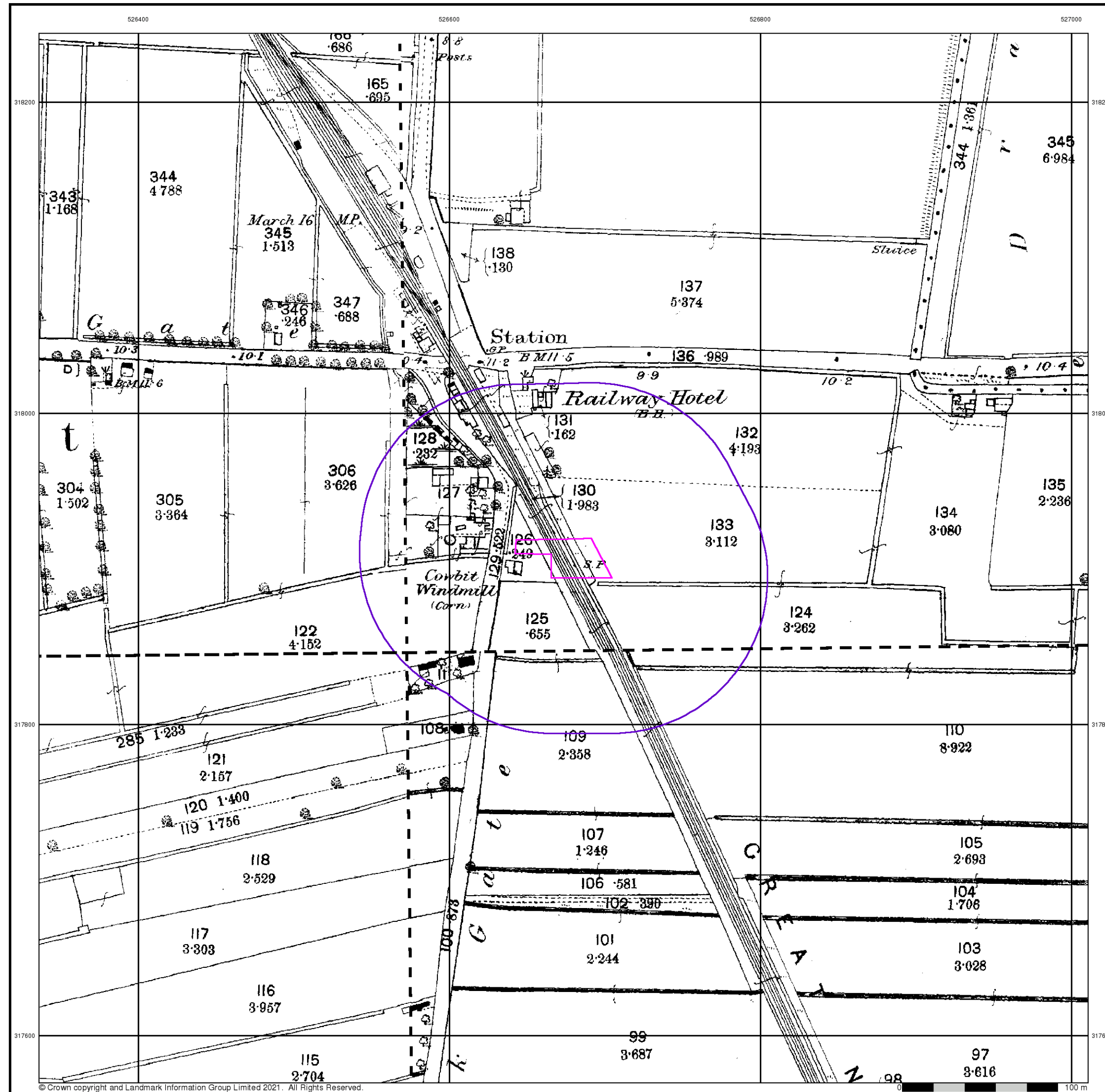
Backgate, Cowbit, Spalding, PE12 6AP



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Fax: 0844 844 9951
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APPENDIX F

A Selection of Historic Maps



Lincolnshire

Published 1888

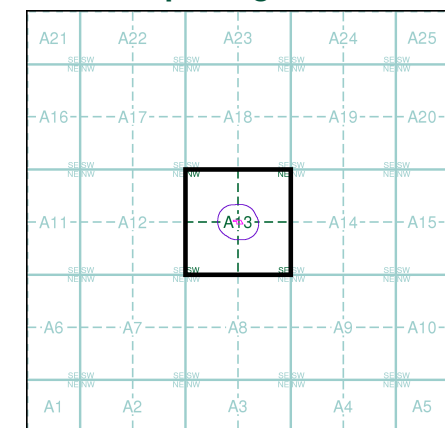
Source map scale - 1:2,500

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)

142_10 1888 1:2,500	142_11 1888 1:2,500
142_14 1888 1:2,500	142_15 1888 1:2,500

Historical Map - Segment A13



Order Details

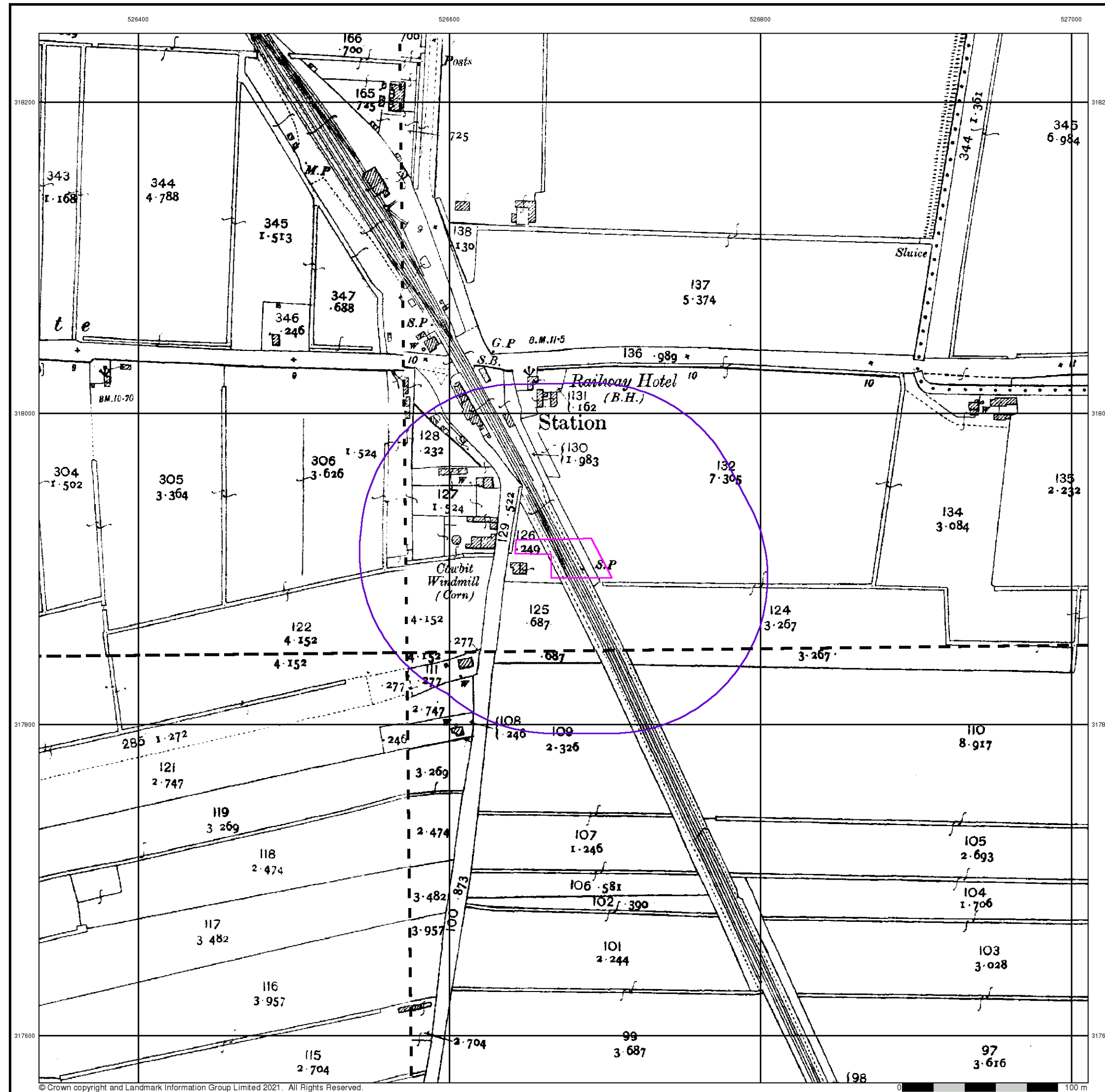
Order Number: 277161254_1_1
Customer Ref: UK21.5370
National Grid Reference: 526670, 317910
Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 100

Site Details

Backgate, Cowbit, Spalding, PE12 6AP



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Lincolnshire

Published 1904

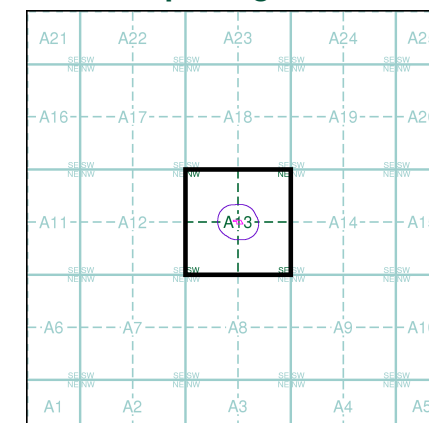
Source map scale - 1:2,500

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)

142_10 1904 1:2,500	142_11 1904 1:2,500
142_14 1904 1:2,500	142_15 1904 1:2,500

Historical Map - Segment A13



Order Details

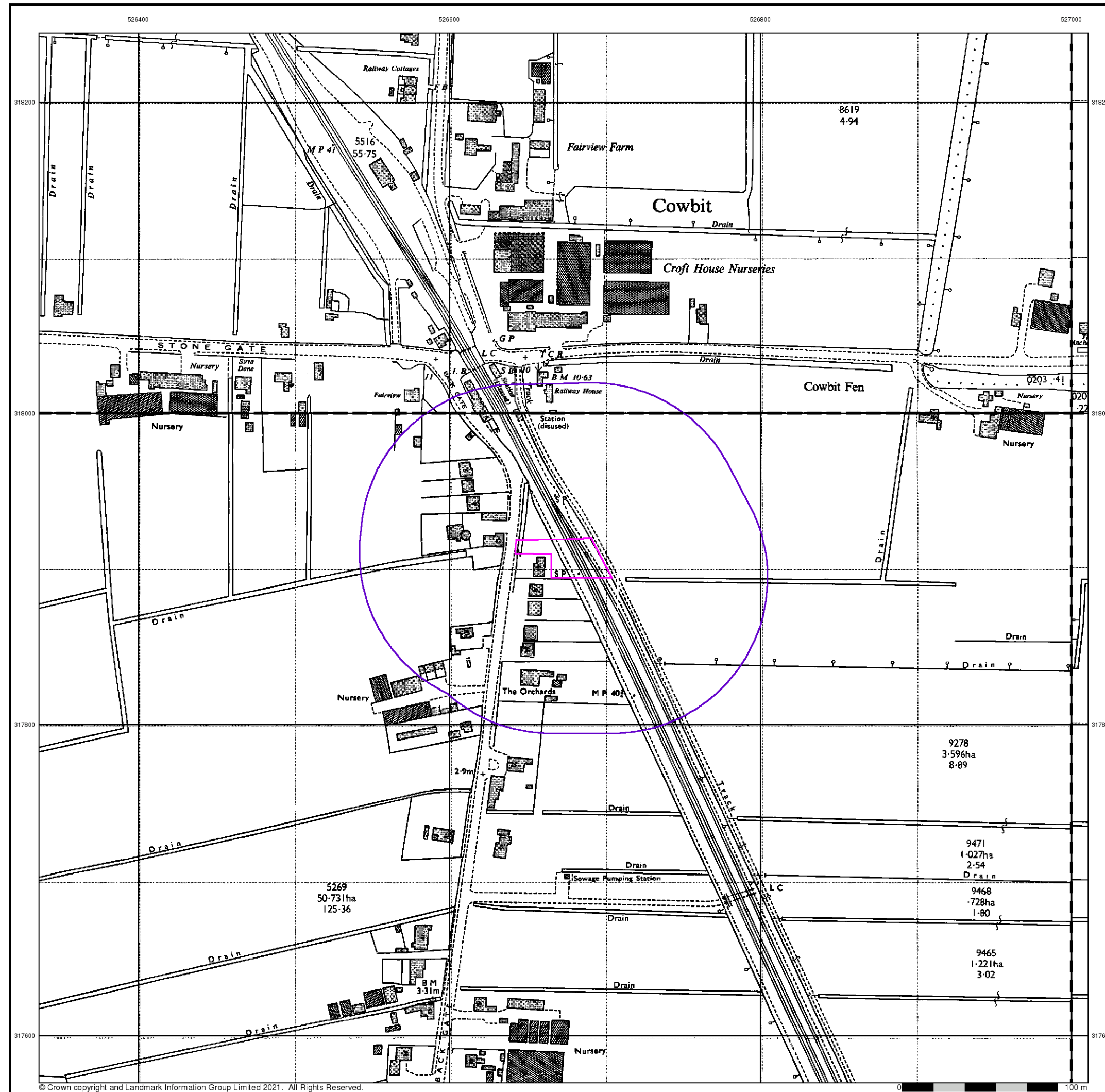
Order Number: 277161254_1_1
Customer Ref: UK21.5370
National Grid Reference: 526670, 317910
Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 100

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Ordnance Survey Plan

Published 1969 - 1976

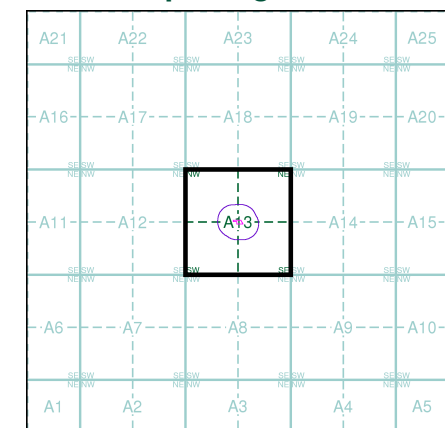
Source map scale - 1:2,500

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)

TF2618 1969 12,500	TF2718 1969 12,500
TF2617 1976 12,500	TF2717 1976 12,500

Historical Map - Segment A13



Order Details

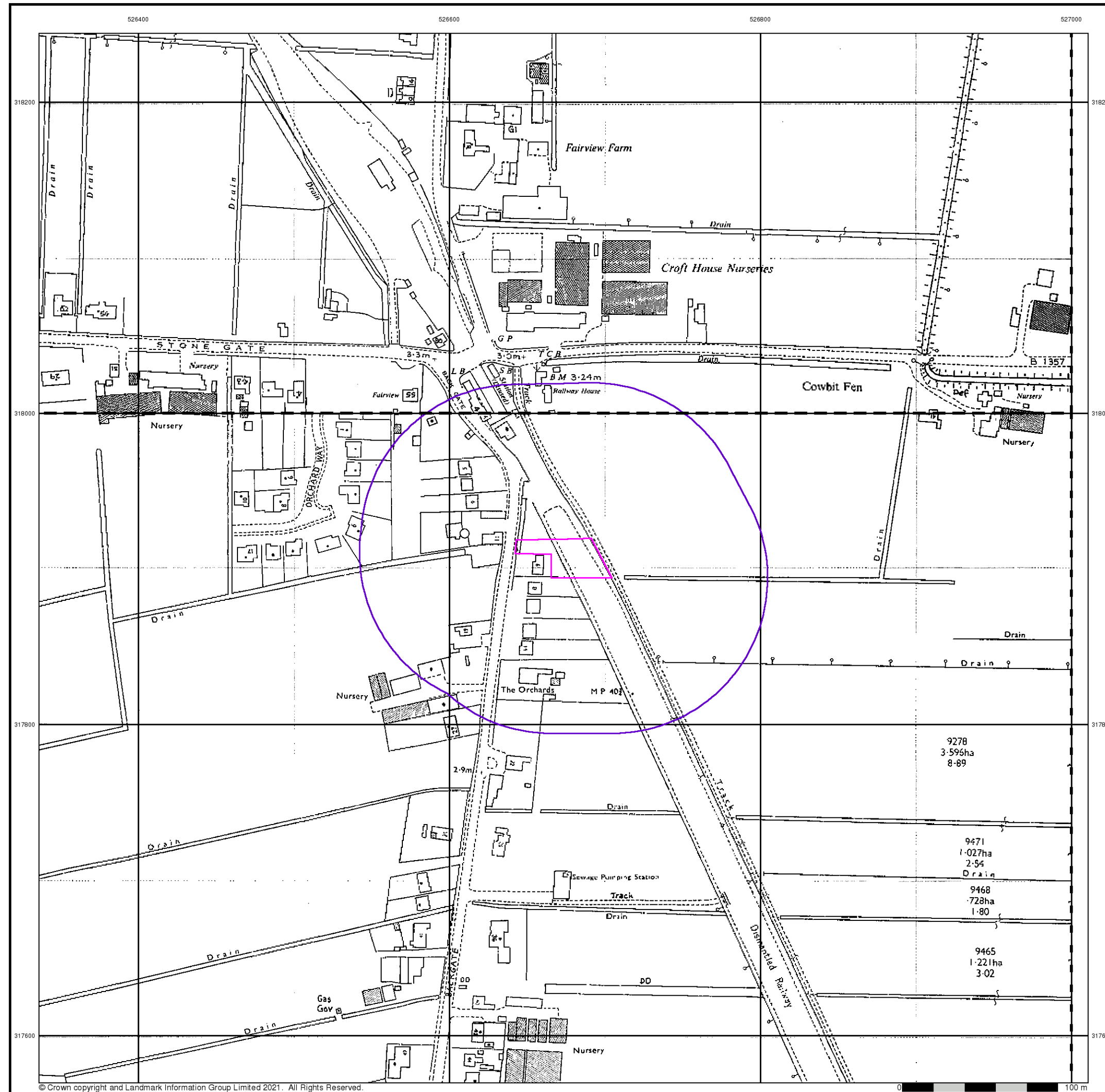
Order Number: 277161254_1_1
Customer Ref: UK21.5370
National Grid Reference: 526670, 317910
Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 100

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Additional SIMs

Published 1988 - 1992

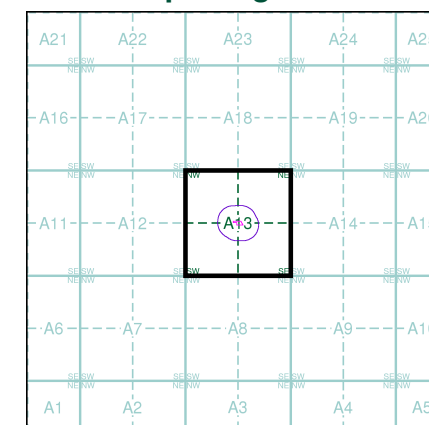
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TF2618	1988	1:2,500
TF2617	1992	1:2,500

Historical Map - Segment A13



Order Details

Order Number: 277161254_1_1
Customer Ref: UK21.5370
National Grid Reference: 526670, 317910
Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 100

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