



**PHASE 1 ENVIRONMENTAL SITE
ASSESSMENT REPORT**

**LAND ADJACENT TO 6 BENTLEY
LANE,
BURY,
BL9 6RZ**

Prepared for:

I.PLANNING SERVICES

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EnviroSolution Ltd Document Verification

Site Address	Land adjacent to 21 Shirley Avenue, Salford, Manchester, M7 3QY		
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Prepared by	Tom Craig	Signature	
Checked by	Gemma Lucas	Signature	



Executive Summary

The preliminary environmental site assessment indicates that the site can be classified as moderate risk in terms of contamination and the risks to the identified receptors (e.g. human health, controlled waters, buildings) following redevelopment is considered to be moderate.

This classification is due to the potential for Made Ground to be present on site associated with the demolition of the former houses, and the presence of several off-site land uses which have the potential to impact the site (engineering works, print works, manufacturers). Additionally, two historic quarries are located nearby which may have been in-filled with putrescible material, and therefore have the potential to generate ground gases (methane and carbon dioxide).

It is recommended a Phase 2 intrusive ground investigation is undertaken prior to site redevelopment to obtain additional information on the ground conditions and the contamination status. The investigation should be carried out by qualified and competent persons. The scope of works for the investigation will need to be submitted and approved by the local authority prior to the commencement of the Phase 2 intrusive works.

Disclaimer

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1 Introduction

1.1 Background

EnviroSolution Ltd was commissioned to undertake a Phase 1 Environmental Site Assessment at a site located at land adjacent to 6 Bentley Lane in Bury. This report was commissioned to support a planning application for residential land use at the site.

1.2 Objectives

The objective of the preliminary environmental site assessment was:

1. To provide a summary of the environmental setting and historical land use of the site and immediate surrounding area.
2. To obtain information on the ground conditions present beneath the site.
3. To develop a conceptual site model and complete a generic quantitative risk assessment to identify any environmental risks and liabilities associated with ground conditions at the site.

1.3 Scope of Work

To achieve the objectives, the following scope of work was completed:

1. A desk-based study of the site comprising a review of available environmental information for the site such as geological and hydrogeological data and historical land use information.
2. A site walkover survey.
3. Assessment of potential hazards and constraints during construction and longer term.

This work has been devised to generally comply with the relevant principles and requirements of the following legalisation and guidance:

- Part IIA of the Environmental Protection Act, 1990 and Section 57 of the Environmental Act 1995;
- Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, April 2012);
- National Planning Policy Framework (Ministry of Housing, Communities and Local Government, February 2019);
- BS10175: 2011 +A2:2017 "Investigation of Potentially Contaminated Sites- Code of Practice"; and
- DEFRA/Environment Agency (2004) Report CLR11 "Model Procedures for the Management of Land Contamination".

1.4 Information Sources

Historical Ordnance Survey maps have been obtained from historical records, ranging from 1893 to 2019. These maps provide high quality information on historical site use.

The British Geological Survey Geoindex database has been used to provide information on geo-environmental aspects of the site and the immediate surrounding area such as geological, hydrogeological and hydrological data.

The Environment Agency website (www.gov.uk/government/organisations/environment-agency) and Magic website (www.magic.gov.uk) was also used to obtain environmental information.

Industry Profiles produced by the Department of the Environment were utilised to obtain information on processes, materials and wastes associated potential contaminative land uses near the site.

Readily available information sources have been used to produce this desk based study. Additional information may be requested by the Local Planning Authority (e.g. local authority environmental information request).

2 The Site

2.1 Site Location

The site is located at land adjacent to 6 Bentley Lane, Bury, BL9 6RZ. The British National Grid Reference for the approximate site centre is GR: 380963 414166.

The site location is shown on **Figure 1** in **Appendix A**.

2.2 Site Description

The site description is aided by the completion of a site walkover survey conducted by EnviroSolution Ltd on the 25th October 2019. The site photographs are included in **Appendix B**.

The site is square in shape and has an approximate area of 430 square meters.

The site is a vacant plot of land currently used as the adjoining garden area to the neighbouring properties along Bentley Lane.

The majority of the site is covered in rough stone paving with several raised flower beds and patio area.

Several small bushes and shrubs are located within the site. There are no mature trees present.

The site boundaries consist of a 1.5m tall stone wall along the northern boundary. The site is bounded by existing residential properties along the eastern and western boundaries and open fields to the north and south.

The site is generally overgrown with grass, shrubs and young trees.

The existing site layout is shown on Figure 2 which is included in **Appendix A**.

2.3 Development Proposals

It is understood that the development plans include the construction of up to three terraced residential properties along Bentley Lane. Development plans include areas of soft landscaping to the rear of the properties and car parking to the front.

The current planning application reference number for Bury Council is: 18/71237/FUL.

The development plans are included in **Figure 3** in **Appendix A**.

2.4 Site History

The development site and surrounding area has been reviewed with reference to historical Ordnance Survey (OS) maps. The history of the site and immediate surrounding area is summarised in Table 1. Copies of the historical OS maps are included in **Appendix C**. A search buffer of 250m has been used.

Table 1 - Historic Mapping Review

Date	Scale	On Site	Off Site
1893	1:2,500	The site is developed with terraced residential housing.	Quarry 65m northwest of the site. Pump 60m east and 200m south. Air shaft 175m south of the site. Reservoir 190m south of the site. Small stream 210m east of the site which flows southwards.
1910	1:2,500	No significant change.	Quarry marked as disused.
1929	1:2,500	No significant change.	Quarry 135m south of the site. Print works 210m south fo the site.
1964	1:2,500	No significant change.	Quarry 135m south disused and now a pond. Residential development 175m southwest of the site. Works 65m northeast and 75m west of the site.
1987	1:2,500	Houses demolished on site.	M66 built 65m northeast of the site. Refuse tip marked 170m south of the site. Car care products manufacturer 130m south of the site.
2019	1:2,500	Site used as adjoining garden area but has become disused and overgrown.	No significant change.

3 Environmental Setting

3.1 Geology

Geological maps of the area indicate the site is directly underlain by diamicton superficial deposits which are of Quaternary age. Diamicton generally consists of unsorted clays, silts, sands and gravels. The site appears to be at the edge of the diamicton sheet, so the thickness is expected to be limited.

The underlying bedrock consists of the Rossendale Formation which is of Triassic age. The formation generally consists of red/brown coarse-grained cross-bedded sandstones.

No geological faults have been identified within influencing distance of the site.

A copy of the geological maps is included in **Appendix D**.

3.2 Radon

The site lies within an elevated band of radon potential where it is estimated that between 1-3% of the properties are above the action level (low probability). Radon protective measures are not deemed necessary for the development.

3.3 Coal Mining Activity

The site falls within the Lancashire coal mining area described as having minable coal deposits but does not lie within a 'Development High Risk Area' for coal mining, as defined by the Coal Authority. As such, it is considered that there are no coal mining related hazards which could affect the site. A copy of the Coal Mining Summary Map from the Coal Authority is included in **Appendix E**.

3.4 Hydrogeology

The superficial diamicton deposits are designated as a Secondary Undifferentiated Aquifer. This is defined as; cases where it had not been possible to assign category A or B to a soil type due to the inherent variability in material type.

The underlying Rossendale Formation is designated as a Secondary A Aquifer, defined as; permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The site is not located within Source Protection Zone and there are no known groundwater abstraction licences held within a 1km radius of the site.

A copy of the hydrogeological maps is included in **Appendix F**.

3.5 Hydrology

A small reservoir is located 190m south of the site and is the only surface water feature located within a 250m radius of the site.

Walmersley Brook is located 260m west of the site. Pigs Lee Brook is located 360m southeast of the site. Both brooks flow towards the south.

3.6 Flood Risk

The site lies within a Flood Zone 1, land assessed as having less than a 1 in 1,000 annual probability of river flooding (low probability).

The completion of a detailed Flood Risk Assessment is not required for this site.

3.7 Waste Management Facilities

There are 6 no. records of historic landfill sites located within a 1km radius of the site. The landfill site information is summarised below:

Table 2 – Historic Landfill Summary

Landfill Site	Operation Dates	Waste Type	Distance from Site
Gin Hall	1985 – 1992	Inter, industrial, commercial, household	300m W
Mill Road	No Information	No Information	450m S
Field North of Gin Hall	1987 – Unknown	Inert	500m NW
Whitewell Farm	1990 – 1992	Inert	800m NE
Mount Pleasant Mill	No Information	No Information	870m N
Pigsden Farm	1986 – 1989	Inert	910m S

There are no records of currently authorised landfill sites located within a 1km radius of the site. There are no records of sites in the surrounding area operating under an environmental permit for waste operations.

A copy of the Historic Landfill Map is included in **Appendix G**.

3.8 Environmental Permits, Incidents and Registers

There are several records of sites located within a 1km radius of the site operating under an environmental permit for discharges to water and groundwater. The nearest of which is held by United Utilities Water Limited approximately 350m west of the site for collection, treatment and supply.

There are no records of any pollution events having occurred within a 500m radius of the site.

3.9 Designated Environmentally Sensitive Sites

Records of designated environmentally sensitive sites located within a 1km radius of the site are summarised in Table 3 and shown on plans included in **Appendix H**.

Table 3 – Environmental Designations Summary

Features	Distance	Comments
Green Belt	On Site	The site is located within Green Belt land and would be subject to Green Belt policy.

4 Preliminary Conceptual Site Model

4.1 Introduction

In order to assess the environmental risks present, a preliminary conceptual model has been developed for the site. This model has been developed using best practice guidelines in conjunction with the current assessment framework taking into account the development proposals. This preliminary conceptual model is based on the gathered desk based information (e.g. historical OS data and data sourced from the EA, Geoindex and Magic databases).

The conceptual site model is a representation of the hypothesised relationships between sources, pathways and receptors which allows the identification of potential pollutant linkages and whether these linkages have the potential to comprise significant harm and/or pollution of controlled waters in relation to the site. This model comprises three elements:

Source – the key pollutant hazards associated with the site

Receptor – the key targets at risk from the sources

Pathway – the means by which the contaminant can cause harm to the receptor

If all three elements are present, then a potential pollutant linkage exists, and this may require further assessment.

4.2 Potential Contamination Sources

Historically, the site has been developed with residential housing until the 1980s when the on-site houses were demolished to make way into an adjoining garden to the neighbouring properties. As the houses have been demolished, there is the potential for Made Ground to be present in the shallow soils. The Made Ground could contain demolition waste and contaminants such as heavy metals and asbestos could be present.

Several off-site contamination sources have been identified in the surrounding area which could have the potential to impact the development site. The land uses and their associated contaminants are summarised below:

Table 4 – Potential Contaminants Summary

Land Use	Potential Contaminants
Engineering Works	Heavy metals, hydrocarbons, oils, lubricants
Quarry	Potential for heavy metals, acids, leachate and ground gas (methane and carbon dioxide) if in-filled.
Print Works	Heavy metals, dye, acids, solvents
Car Care Products Manufacturer	Heavy metals, oils, paints, solvents, hydrocarbons

The historic landfill search has identified several landfills in the surrounding 1km. However, all of the identified landfill sites can be discounted as a potential source of contamination to the site due to the distance from the site. (>250m).

4.3 Receptors

The potential receptors considered to be at risk from soil and groundwater contamination associated with the site are summarised in Table 5 below:

Table 5 - Receptor Description

Receptor	Details
Human (On Site)	- Construction workers - Future site users - Site visitors
Human (Off Site)	- Adjacent site users
Controlled Waters	- Secondary A Aquifer - Principal Aquifer - Reservoir - Brooks
Building/ construction materials	- Foundations and buried services
Environmental Receptors	- Green Belt

4.4 Pathways

The potential exposure pathways linking contamination with the receptors identified above are summarised in Table 6 below:

Table 6 - Exposure Pathways Summary

Receptor	Details of Exposure Pathway
Human (on-site)	- Direct ingestion of contaminated soil/groundwater - Dermal contact with soil/groundwater - Inhalation of gases and vapours
Human (off-site)	- Inhalation of fibres and particulates - Inhalation of migrating gases and vapours
Controlled waters	- Vertical and lateral migration of dissolved phase contaminants via preferential pathways to groundwater aquifers - Lateral migration and surface water run-off to water courses

Receptor	Details of Exposure Pathway
Building/construction	- Buried materials/services - Contact with contaminated soil and/or groundwater

4.5 Potential Pollution Linkages

4.5.1 Human Health

The development comprises the construction of three new residential dwellings with associated areas of soft landscaping. This is considered to be a sensitive end use.

The presence of buildings and hardstanding would eliminate the risk of exposure, via the dermal contact and ingestion pathways to future site users to any ground contamination that may remain following development.

There could be a potential risk of exposure to any ground contamination that remains following redevelopment in the proposed areas of soft landscaping (i.e. gardens), to future site users, via all possible exposure pathways.

Any ground gases (i.e. methane and carbon dioxide) and vapours that are present within the soils beneath the site could potentially ingress into the buildings through preferential pathways (e.g. service entry points). Therefore, there would be a risk of exposure via inhalation to future site users.

There is the potential for construction workers and adjacent land users to be exposed to soil and groundwater contamination during site redevelopment. However, the use of appropriate PPE and the adoption of suitable Health and Safety methods will help to reduce the risks posed to human health during this work.

4.5.2 Controlled Waters

The site is underlain by diamicton which are generally of low permeability. It is considered that the diamicton will act as an impermeable barrier between any Made Ground at the surface and the underlying sandstone aquifer.

It is considered unlikely that any potential contaminants present could migrate towards the identified surface water features via direct surface run-off due to the distance from site (>190m).

The site is not located within a Source Protection Zone and there are no groundwater abstractions located nearby. The risk to controlled waters is considered to be low.

4.5.3 Building/ Construction Materials/ Buried Services

The presence of any soil and groundwater contaminants beneath the site could potentially impact on construction materials for the new development, such as below ground structures and services. Concrete foundations are particularly sensitive to aggressive ground conditions, i.e. sulphate attack.

If ground gases and vapour are present in the soil beneath the site, then there would be the potential risk of ingress into the new properties which could present a risk of explosion.

4.6 Environmental Designations

The site lies within a Green Belt zone. This receptor is considered to be of low sensitivity.

4.7 Preliminary Hazard Assessment

A preliminary hazard assessment is presented in Table 7. The preliminary hazard assessment is a qualitative assessment of the risks posed by each potential pollutant linkage described above and is used to identify the requirement for additional work (e.g. intrusive ground investigation).

Table 7 – Preliminary Hazard Assessment

Source 1	Pathway	Receptor	Likelihood	Effect	Risk	Assessment
Contaminated soil	Ingestion (via soil dust), inhalation (via soil dust and vapours), ingestion through dirty hands, dermal contact with soil/water.	Future site users Adjacent site users Construction workers	3	3	Moderate	Source potential identified from on-site and off-site sources. Exposure pathways via dermal contact in garden areas.
Contaminated soil groundwater	Direct contact	Buildings/ services	2	3	Moderate	On-site source potential identified from Made Ground. Building foundations in direct contact with soils.
Contaminated groundwater	Downward or lateral migration	Secondary A Aquifer Principal Aquifer Reservoir	1	3	Low	No nearby surface water courses or groundwater abstractions.
Ground gas / vapours	Inhalation, ingress into buildings	Buildings / services Future site users Adjacent site users Construction workers	2	4	Moderate	Potential ground gas (methane and carbon dioxide) source identified from on-site Made Ground and possible in-filled quarries in the surrounding area.

Using Risk Matrix (Table 8) Degree of Risk (R) = Likelihood (L) x Effect (E)

Table 8 - Risk Matrix, Degree of Risk (R) = Likelihood (L) x Effect (E)

Likelihood	Description	Probability	Effect (E)	Description
5	Almost certain	>70%		
4	Probable	50-70%	4	Severe
3	Likely	30-50%	3	Medium
2	Unlikely	10-30%	2	Mild
1	Negligible	<10%	1	Minor
Risk (R)	Risk Level	Action		
1-5	Low	None required		
6-10	Moderate	Further assessment via Phase 2 intrusive ground investigation.		
>10	High	Further assessment via Phase 2 intrusive ground investigation.		

5 Conclusions and Recommendations

The preliminary environmental site assessment indicates that the site can be classified as moderate risk in terms of contamination and the risks to the identified receptors (e.g. human health, controlled waters, buildings) following redevelopment is considered to be moderate.

This classification is due to the potential for Made Ground to be present on site associated with the demolition of the former houses, and the presence of several off-site land uses which have the potential to impact the site (engineering works, print works, manufacturers). Additionally, two historic quarries are located nearby which may have been in-filled with putrescible material, and therefore have the potential to generate ground gases (methane and carbon dioxide).

It is recommended a Phase 2 intrusive ground investigation is undertaken prior to site redevelopment to obtain additional information on the ground conditions and the contamination status. The investigation should be carried out by qualified and competent persons. The scope of works for the investigation will need to be submitted and approved by the local authority prior to the commencement of the Phase 2 intrusive works.

APPENDICES

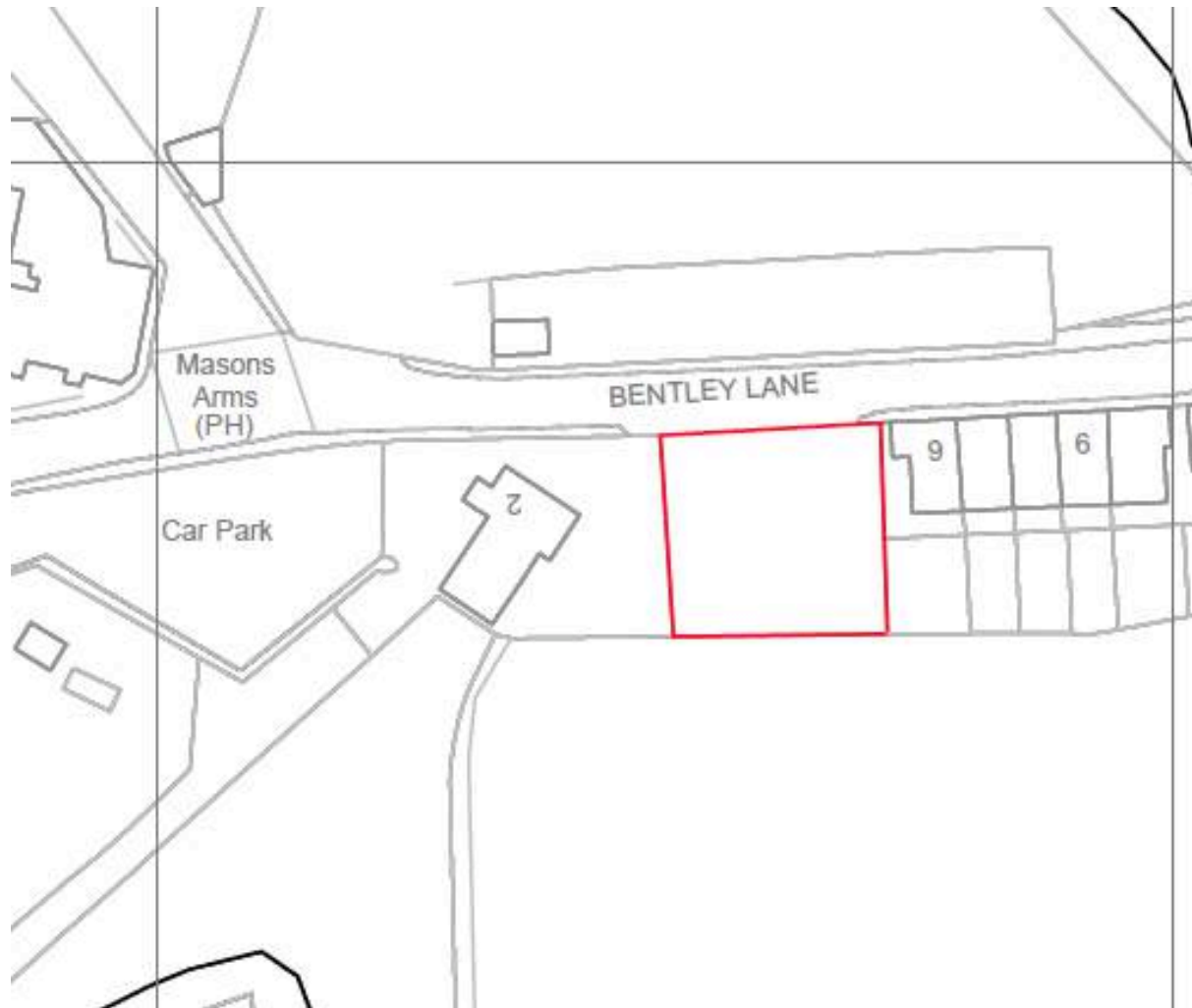
Appendix A – Site Location and Site Plan



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Site Location Map

Figure 1



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Existing Site Plan

Figure 2



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Proposed Development Plan

Figure 3

Appendix B – Site Photographs



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View looking east along Bentley Lane



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View of site from Bentley Lane



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View of the site



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View of the site



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Stone paving



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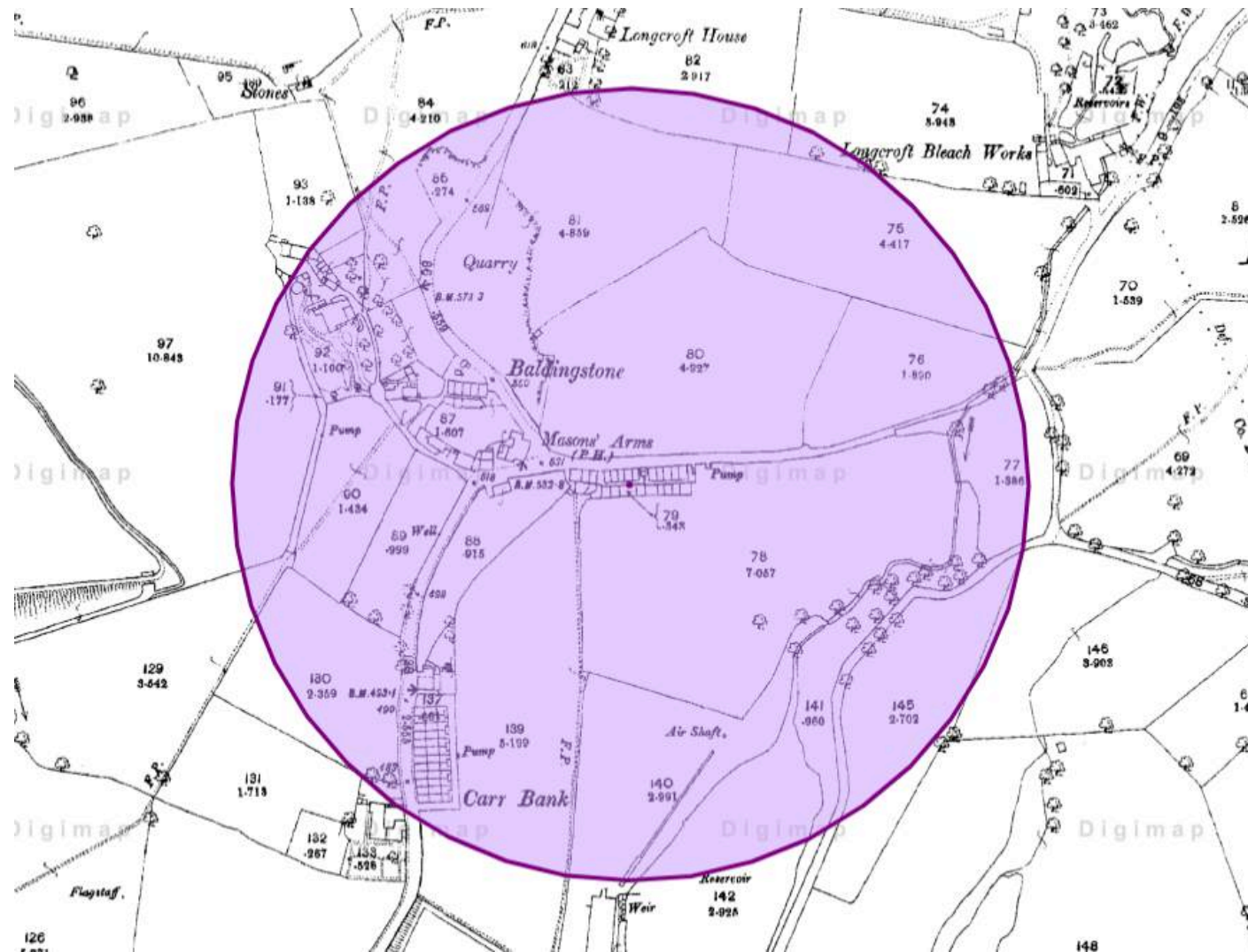
View of the site looking south showing a
rise in elevation



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Raised paving and stone wall in rear garden

Appendix C - Historical Maps

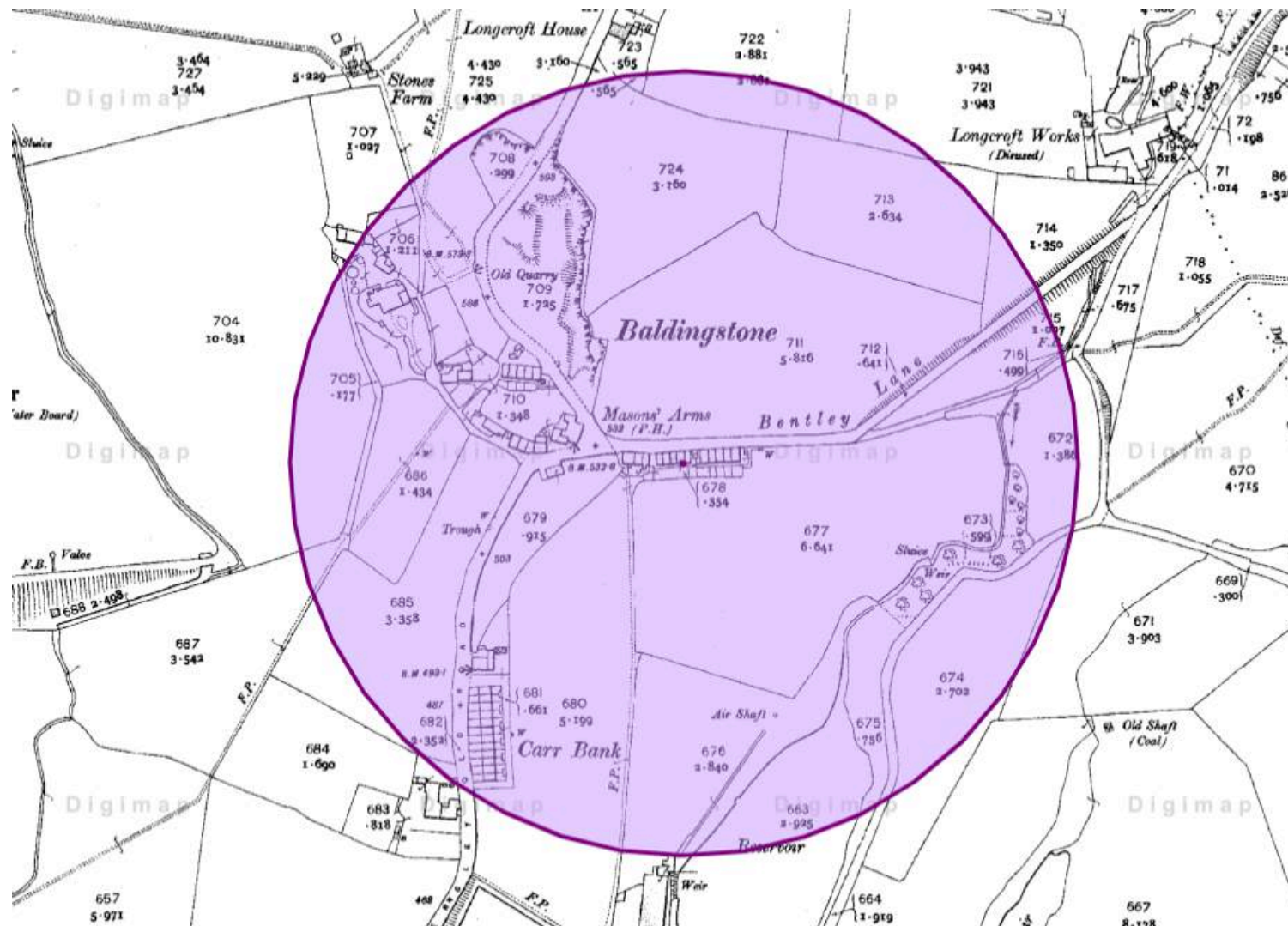


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Historic Map (250m search buffer)

Date: 1893

Scale 1:2,500

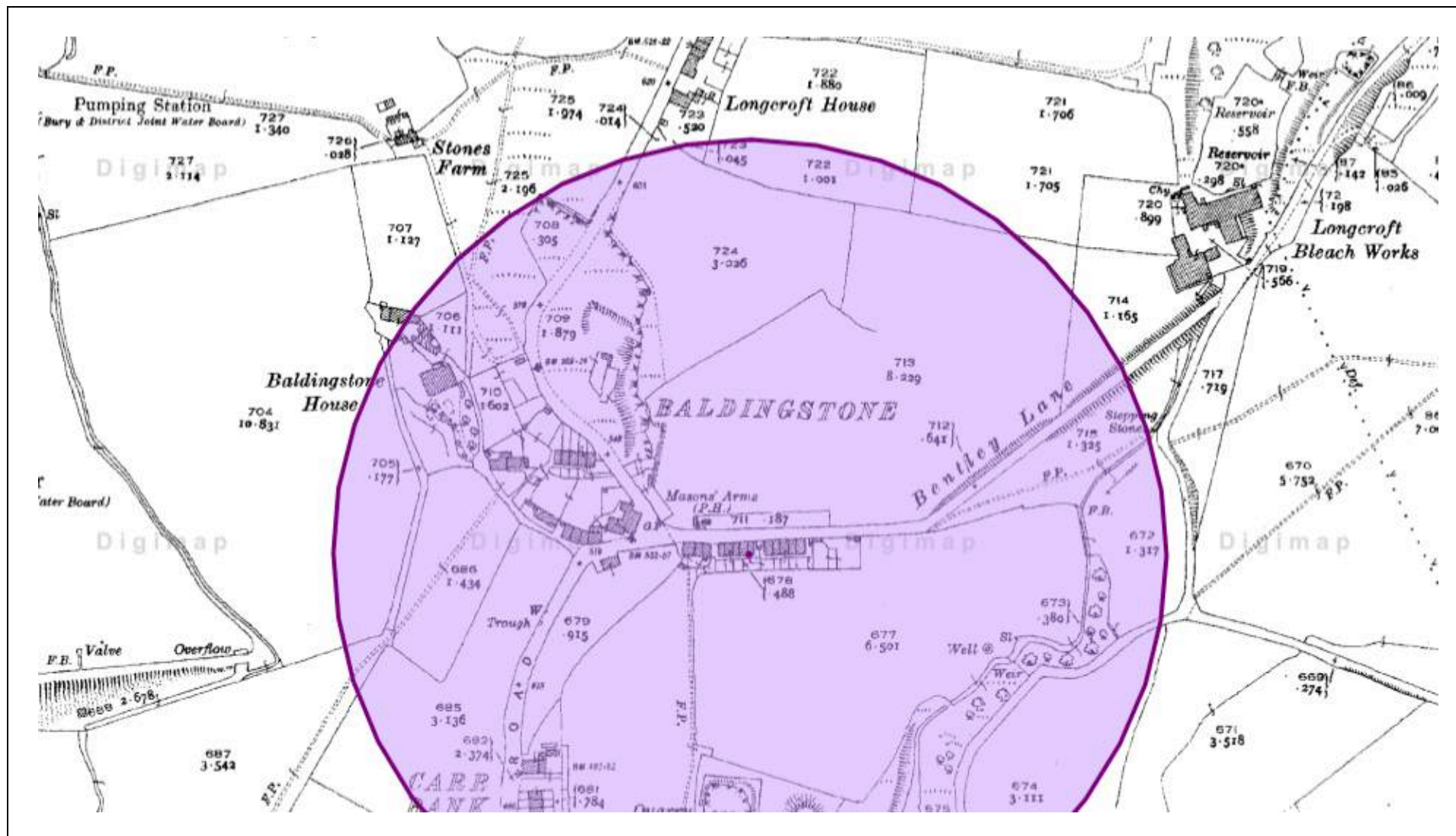


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Historic Map (250m search buffer)

Date: 1910

Scale 1:2,500

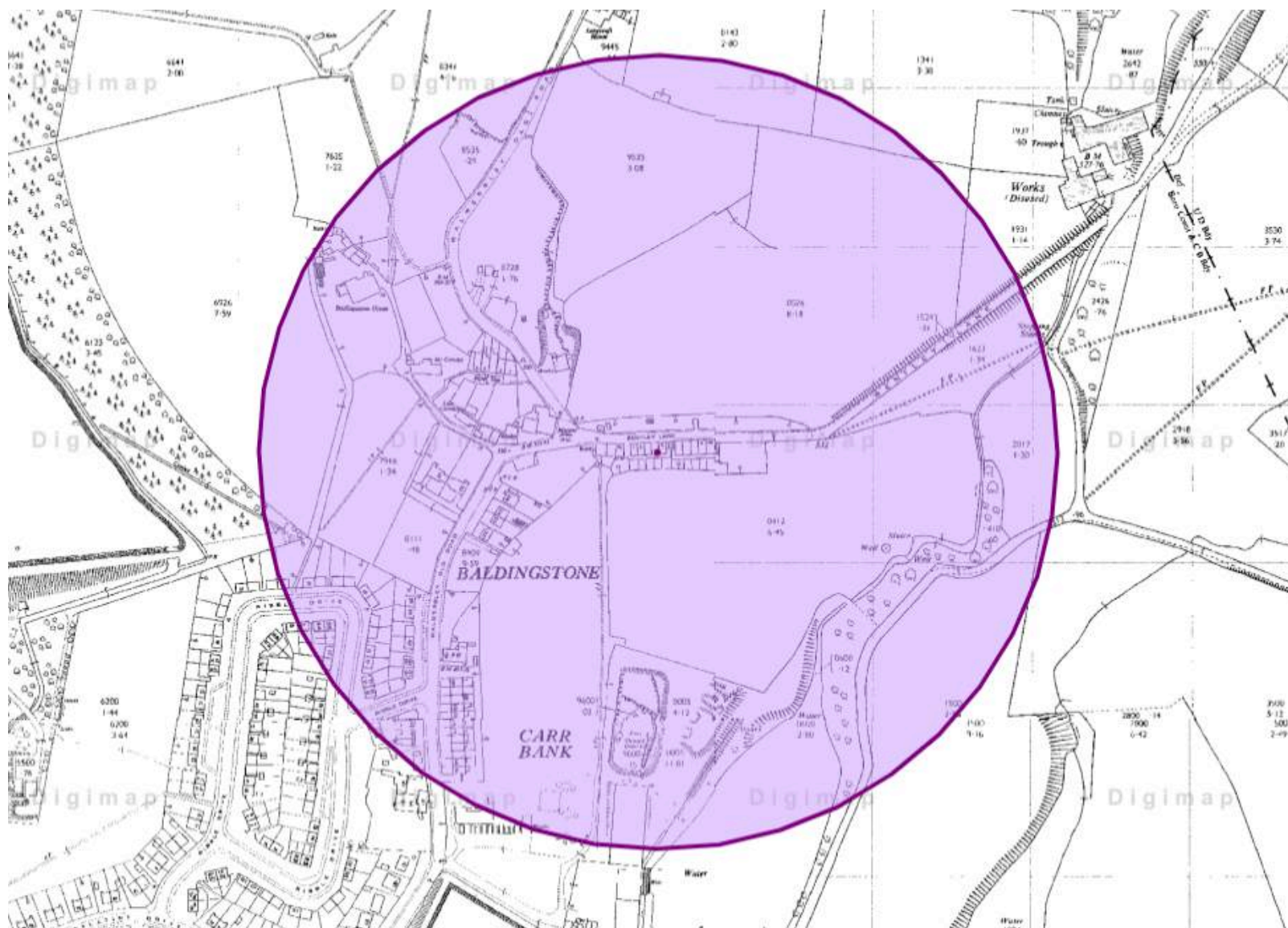


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Historic Map (250m search buffer)

Date: 1929

Scale 1:2,500



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Historic Map (250m search buffer)

Date: 1964

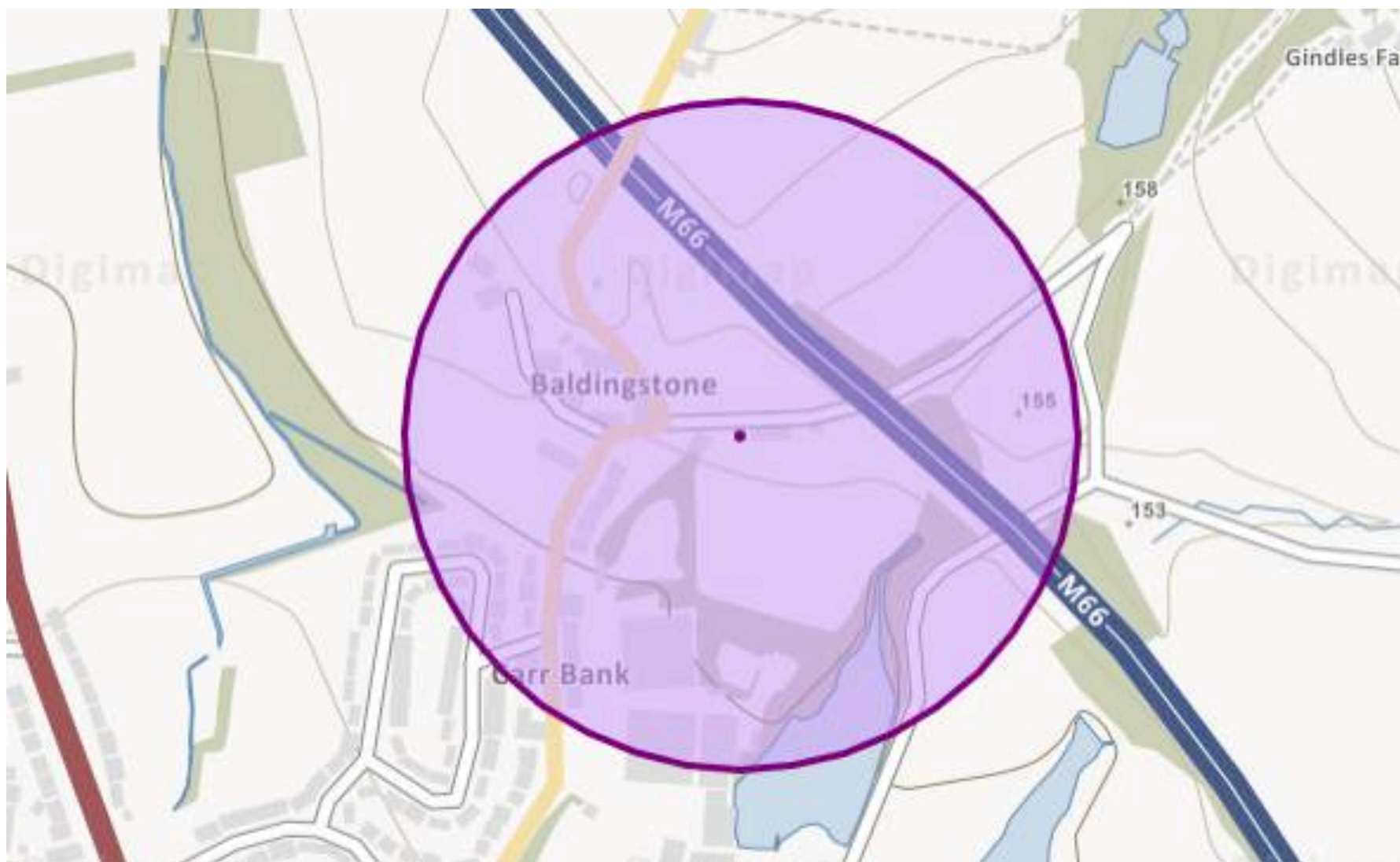
Scale 1:2,500



Historic Map (250m search buffer)


Date: 1987

Scale 1:2,500



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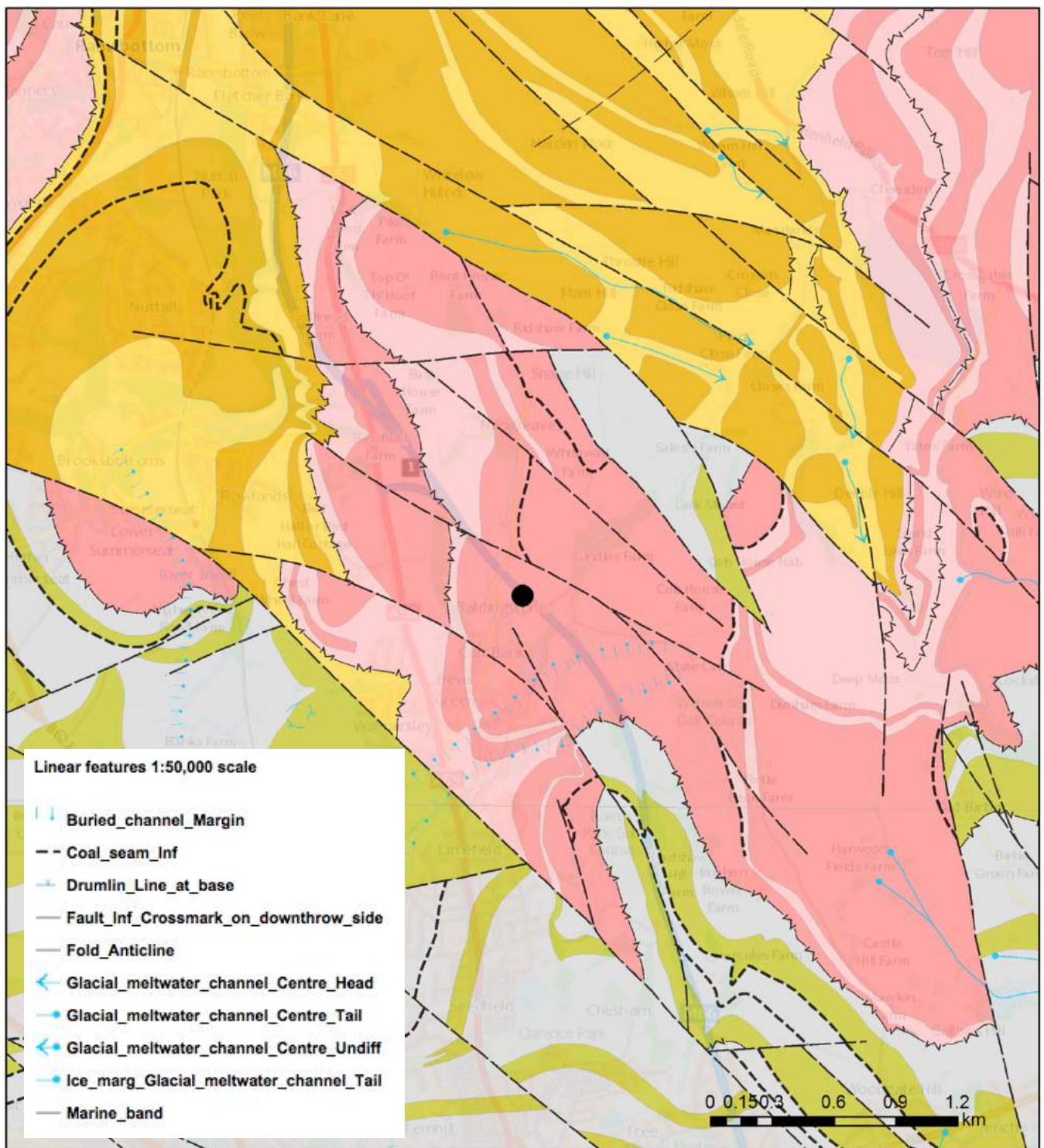
Historic Map (250m search buffer)

Date: 2019

Scale 1:2,500

Appendix D – Geological Maps

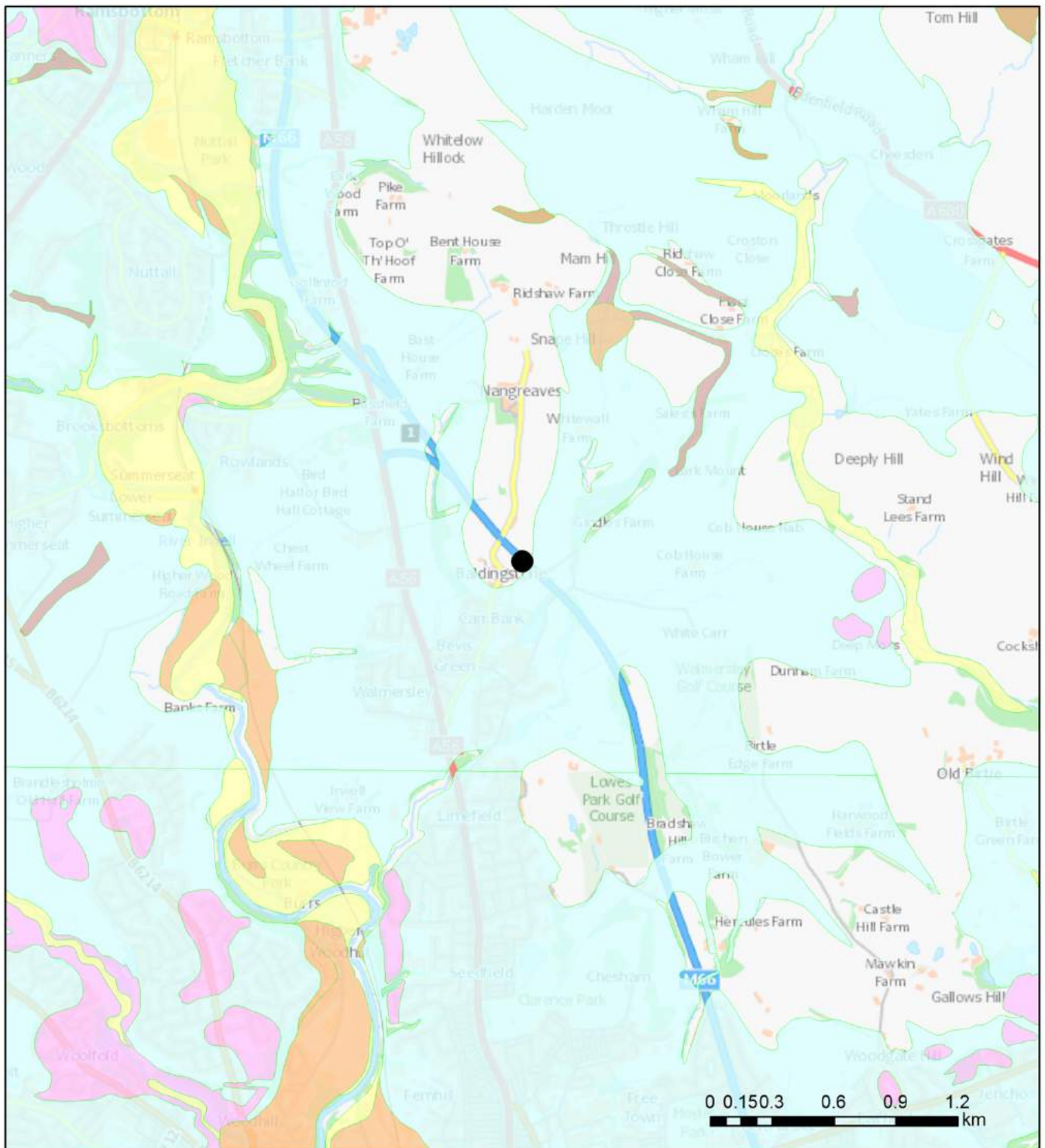
Bedrock Geology



Bedrock geology 1:50,000 scale

- PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE
- LOWER HASLINGDEN FLAGS - SANDSTONE
- MARSDEN FORMATION - MUDSTONE AND SILTSTONE
- CANNEL ROCK (SOUTH LANCASHIRE) - SANDSTONE
- BROOKSBOTTOMS GRIT - SANDSTONE

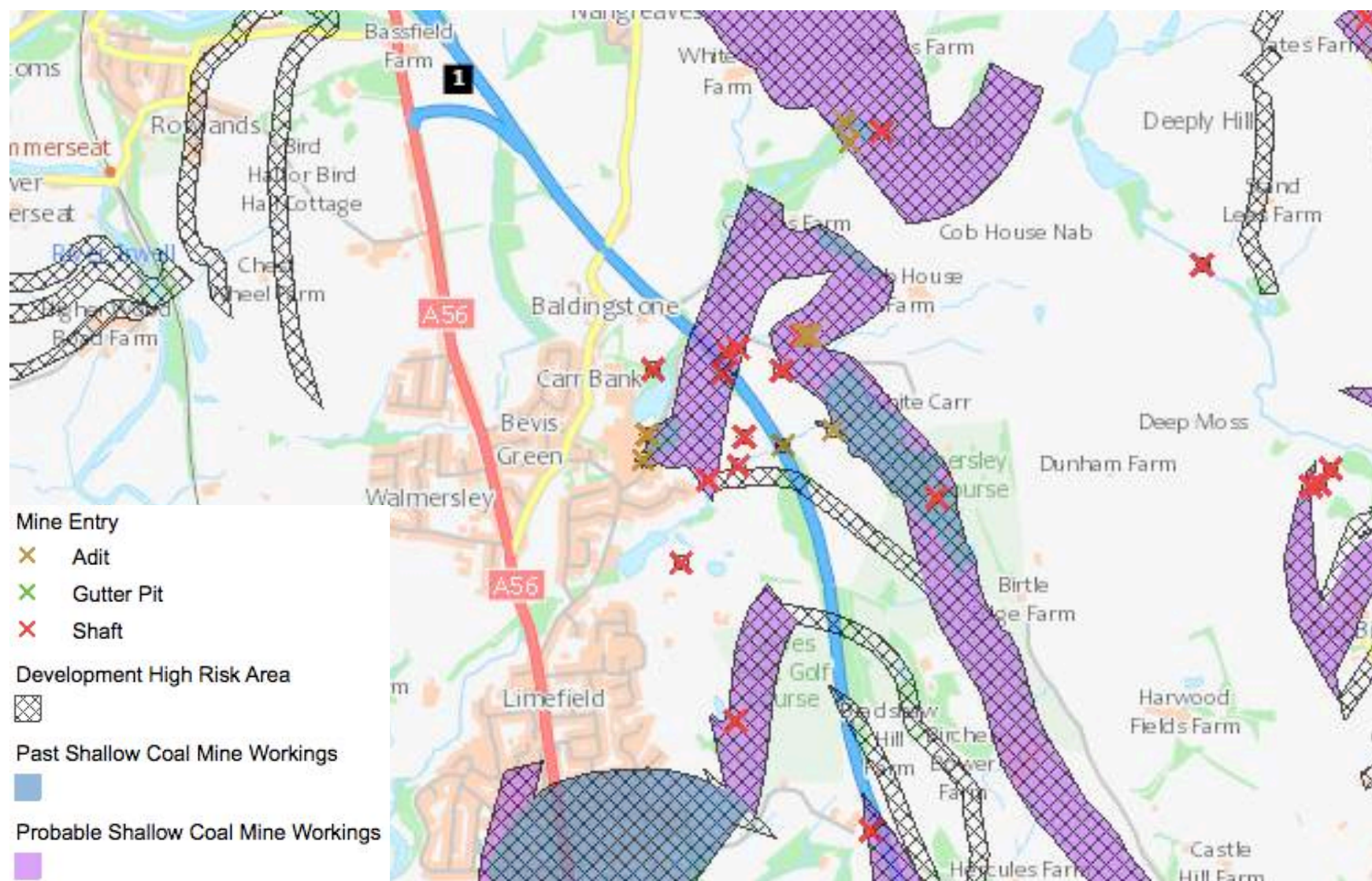
Superficial Geology



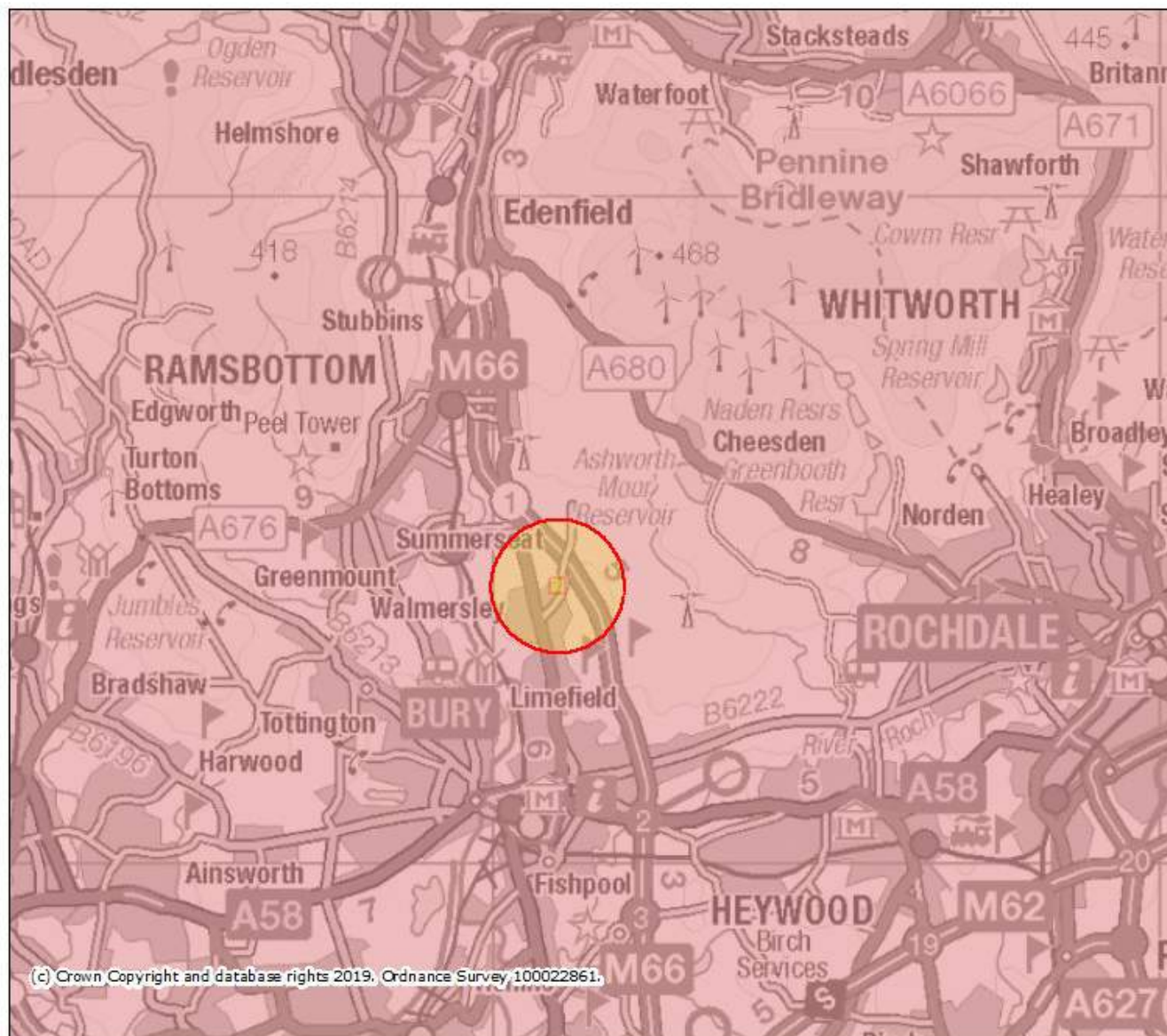
Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL
- TILL, DEVENSIAN - DIAMICTON
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- HEAD - DIAMICTON
- RIVER TERRACE DEPOSITS, 1 - SAND AND GRAVEL
- LACUSTRINE DEPOSITS - CLAY
- PEAT - PEAT

Appendix E – Coal Mining Summary Map



Bedrock Aquifer



Legend

Aquifer Designation Map (Bedrock) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unproductive

Projection = OSGB36

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ymin = 405800

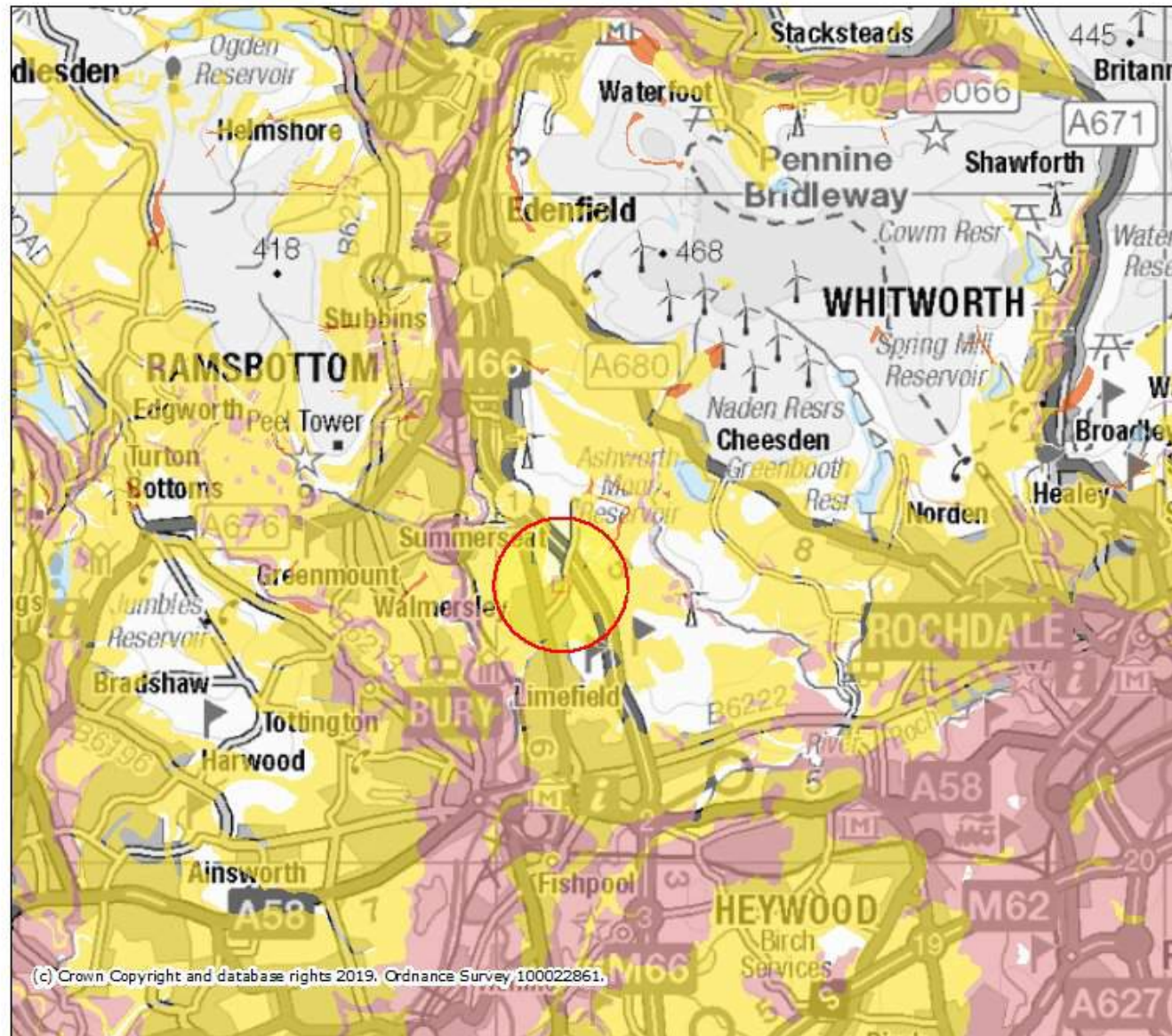
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Legend

Aquifer Designation Map (Superficial Drift) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unknown (lakes+landslip)
- Unproductive

Projection = OSGB36

xmin = 363300

ymin = 405800

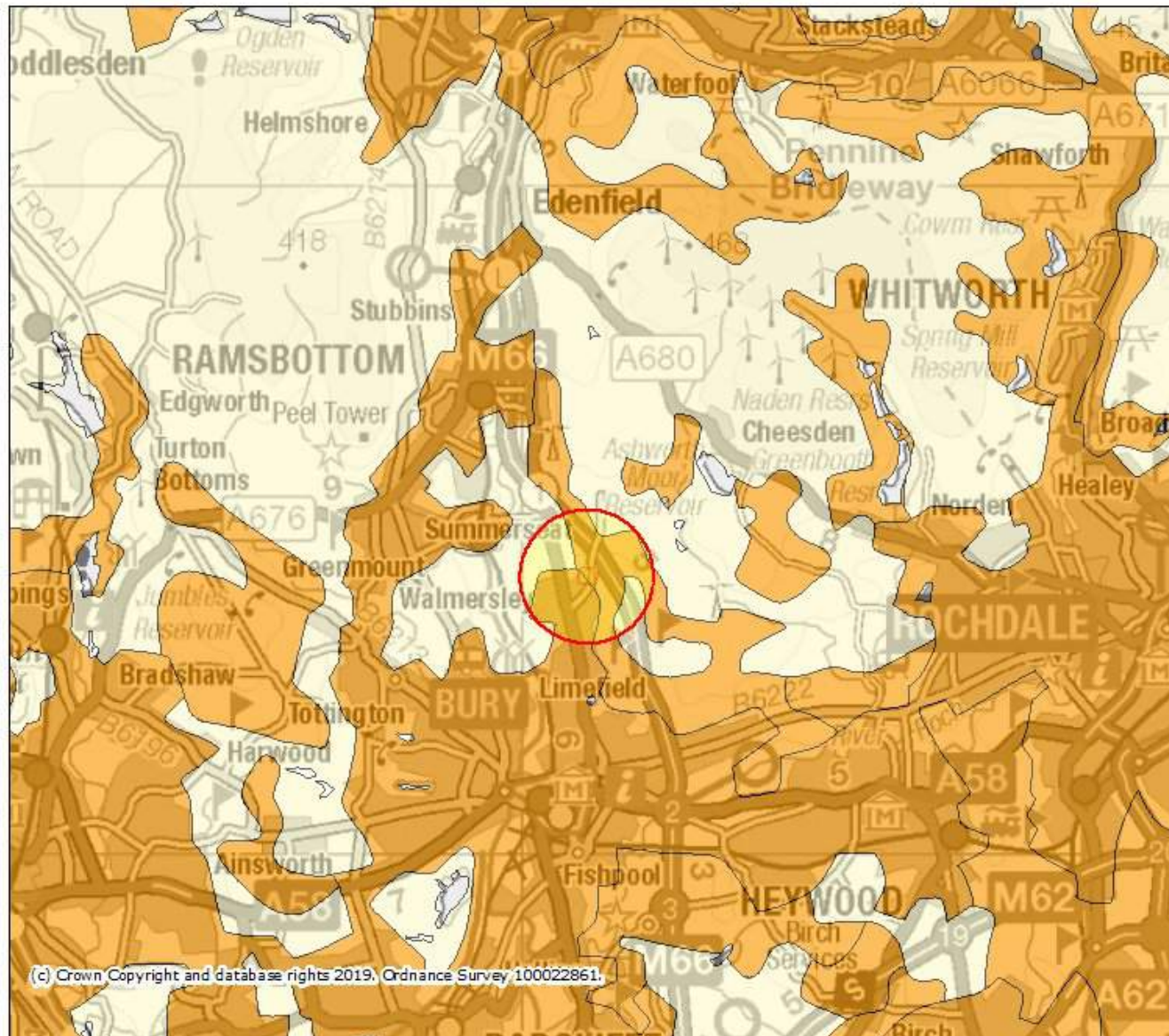
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Legend

Groundwater Vulnerability Map (England)

- Major Aquifer High
- Major Aquifer Intermediate
- Major Aquifer Low
- Minor Aquifer High
- Minor Aquifer Intermediate
- Minor Aquifer Low

Projection = OSGB36

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ymin = 405700

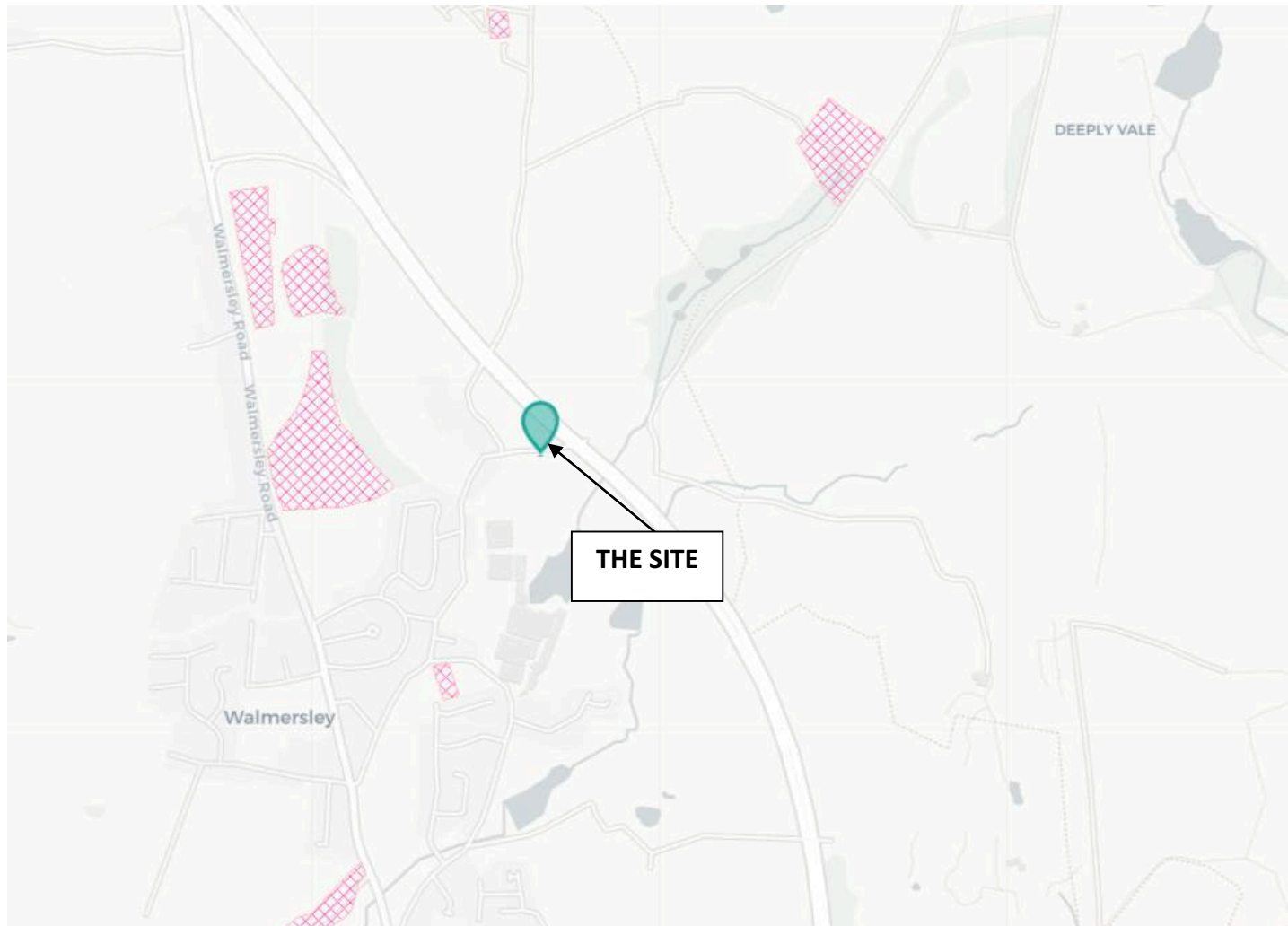
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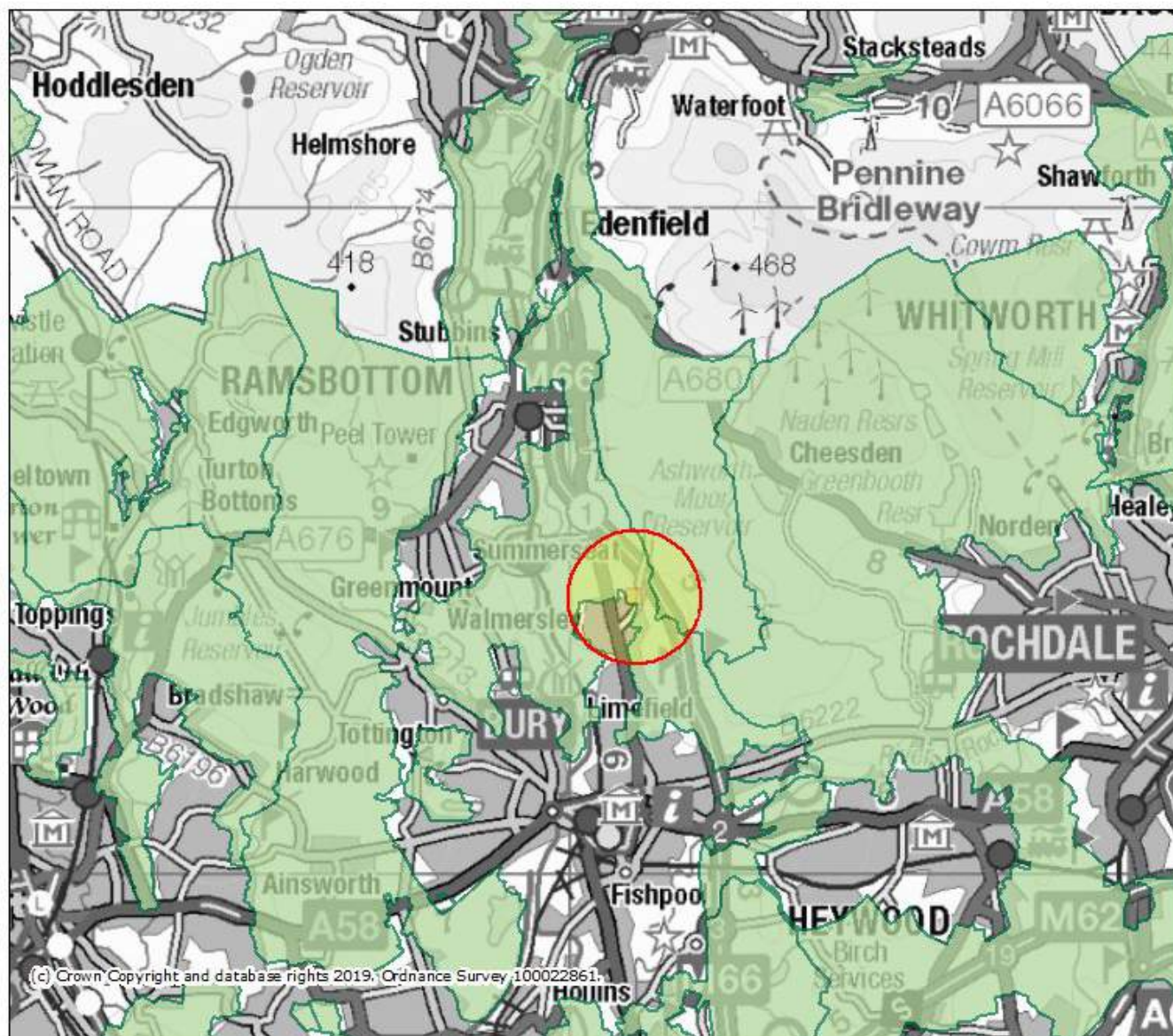
Appendix H – Landfill Map



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Landfill Map

Green Belt



Legend

Green Belt (England)

Projection = OSGB36

xmin = 362100

ymin = 406000

xmax = 398600

ymax = 424500

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