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COAL MINING RISK ASSESSMENT

7 BRIDGE PLACE,
SHOTTS,
NORTH LANARKSHIRE,
SCOTLAND,
ML7 5JE

Prepared for:

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Date:

31st July 2020

EnviroSolution Ltd
Document Verification

Site Address	7 Bridge Place, Shotts, North Lanarkshire, Scotland, ML7 5JE		
Report Title	Coal Mining Risk Assessment		
Job Number	CL101	**Document Ref.**	CL101
Date Issued	31st July 2020	**Report Version**	1
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1 Introduction

1.1 Site Location and Description

The site for the proposed small residential development is located at 7 Bridge Place, Shotts, North Lanarkshire, Scotland. The National Grid Reference for the approximate site centre is GR: 288335 659220. The site location is shown in **Appendix A**. The plot covers an area of approximately 180m^2 and lies on the eastern flank of 7 Bridge Place. The site is currently used as a garden space for 7 Bridge Place. The site is covered in grass lawn.

The site is accessed via a double gate along Bridge Place. The topography of the site is generally flat and level at an elevation of about 230m aOD.

The site is bounded by residential properties on all sides. Open agricultural fields lie further afield.

A plan showing the location of the site is shown in **Figure 1**.

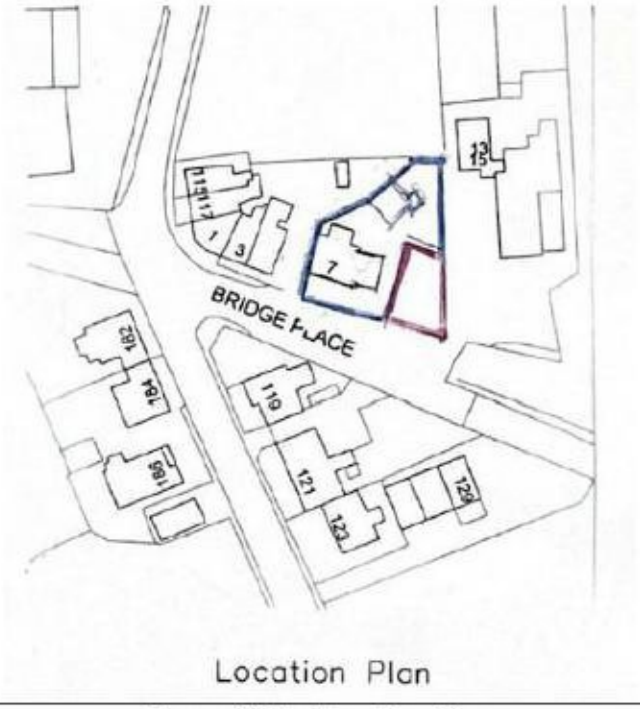

Figure 1) Site Location Map

1.2 Development Proposal

It is understood that the current development proposal includes the construction of a two-storey residential property. The current planning reference is: 20/00609/PPP.

Details of the existing and proposed site layouts are shown in **Appendix A**.

1.3 Scope of Coal Mining Risk Assessment

EnviroSolution Ltd has been commissioned to prepare a Coal Mining Risk Assessment Report (CMRA) for the proposed development site, in order to provide the Local Planning Authority with information on the coal mining legacy risk(s), an assessment of their potential impact on land stability, and provide recommendations for the need to carry out any further investigations (including intrusive boreholes) to address these risk(s).

The CMRA has been undertaken in accordance with the principles of best practice including the Coal Authority's guidance document "Risk Based Approach to Development Management - Resources for Developers Version 3" (2014) (Ref. 1), CIRIA "SP32 Construction over Abandoned Mine Workings" (2002) (Ref. 2) and CIRIA "C758D Abandoned Mine Workings Manual" (2019) (Ref. 3).

The purpose of the CMRA Report is to:

- present a desk-based review of available information on the coal mining issues that are relevant to the application site;
- use that information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact issues;
- set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development; and
- demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of National Planning Policy with regard to development on unstable land.

1.4 Sources of Information

This report is based on current information of past mining activities relevant to the site. The following information sources have been used:

- Consultants Mining Report dated 24th July 2020 (Ref: 51002282114001 **Appendix B**);
- BGS Geoindex geological map;
- BGS Geological Survey of Scotland 1:50,000 Sheet 31E Falkirk;
- Coal Authority Interactive Website;
- Historical Ordnance Survey maps.

2 Environmental Setting

2.1 Historic Coal Mining Activity

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 are summarised in Table 1. Copies of the historical OS maps are included in **Appendix C**.

Table 1 - Historic Mapping Review

Date	Scale	Historic Mining Activity
1859	1:10,560	- Sand pits 70m north and 250m west of the site. - Railway 60m east of the site. - Shotts iron works 500m north of the site.
1897	1:10,560	- Old sand pits marked 200m west and 300m northeast of the site. - Sand pits 200m northeast, 290m north and 300m west of the site.
1910	1:10,560	- Sand pits disused. - Stane Colliery (Pits No. 1 & 2) located 330m south of the site. The Colliery includes 2 no. mine shafts.

2.2 Geological Context

The BGS geological mapping (Geoindex and BGS Sheet 31E Falkirk) show that the site lies on, or close to the boundary between diamicton and glaciofluvial ice contact deposits which are of Quaternary age. Diamicton generally consists of unsorted clays, silts, sands and gravels. Glaciofluvial deposits generally consist of stratified sand and gravels, locally with lenses of silt, clay and organic material.

The underlying bedrock geology is the Scottish Lower Coal Measures Formation which is of Carboniferous age. The Scottish Lower Coal Measures Formation generally consist of interbedded grey to black mudstones and siltstones and pale grey sandstones with common coal seams. According to the BGS, the bedrock has a shallow dip of 2-4° to the northeast. **See Appendix D**.

Two BGS borehole records (Ref: NS85NE316 and NS85NE317) have been obtained from BGS online records from 10m east and 40m northeast of the site respectively. The boreholes show up to 1.50m of fill, underlain by sandy clay diamicton deposits extending to between 4.60m and 4.70m below ground level (bgl). The Scottish Lower Coal Measures were recovered as interbedded mudstones, siltstones and sandstones. Coal was encountered in NS85NE316 at a depth of 10.45m bgl. The coal has a thickness of 0.50m and a part broken recovery is noted. Coal was encountered in NS85NE317 at a depth of 20.20m bgl. The coal had a thickness of 0.50m and a 100% intact recovery was noted. The borehole locations are shown in **Figure 2**.

The nearest geological fault is located 150m north of the site and has an approximate trend of 110° (Whole Circle Bearing).

The development site lies close to an outcrop of coal shown to be the Upper Drumgray Coal (also named Carron Main), located approximately 40m northeast of the site boundary. Further coal seams have been identified to the southwest of the site. Using the regional dip of 2° and 4° to the northeast and the trigonometric relationship below, the likely depth range of the seams beneath the site can be estimated. The coal seams are shown on **Figure 2**.

Mid Drumgray Coal/ Middle Splint
Tan2° x 320m + 6m (superficial thickness) = 17.20m
Tan4° x 320m + 6m (superficial thickness) = 28.40m

Lower Drumgray Coal/ Upper Coxrod
Tan2° x 630m + 9m (elevation change) + 6m (superficial thickness) = 37.0m
Tan4° x 630m + 9m (elevation change) + 6m (superficial thickness) = 59.0m

The expected depth of the Mid Drumgray Coal can be correlated with the coal seams encountered in the boreholes in **Appendix E**.

The site is situated within a Primary Opencast Coal Resource Area (**Appendix F**), defined by the BGS as "an area which constitutes the main target for opencast coal extraction and comprises a relatively closely spaced succession of variable but generally thick coals. These coals typically occur within a certain discrete stratigraphic interval". Notwithstanding this, it is considered to be very unlikely that there will be any interest in developing open cast coal mining operations at this location in the short or medium-term.

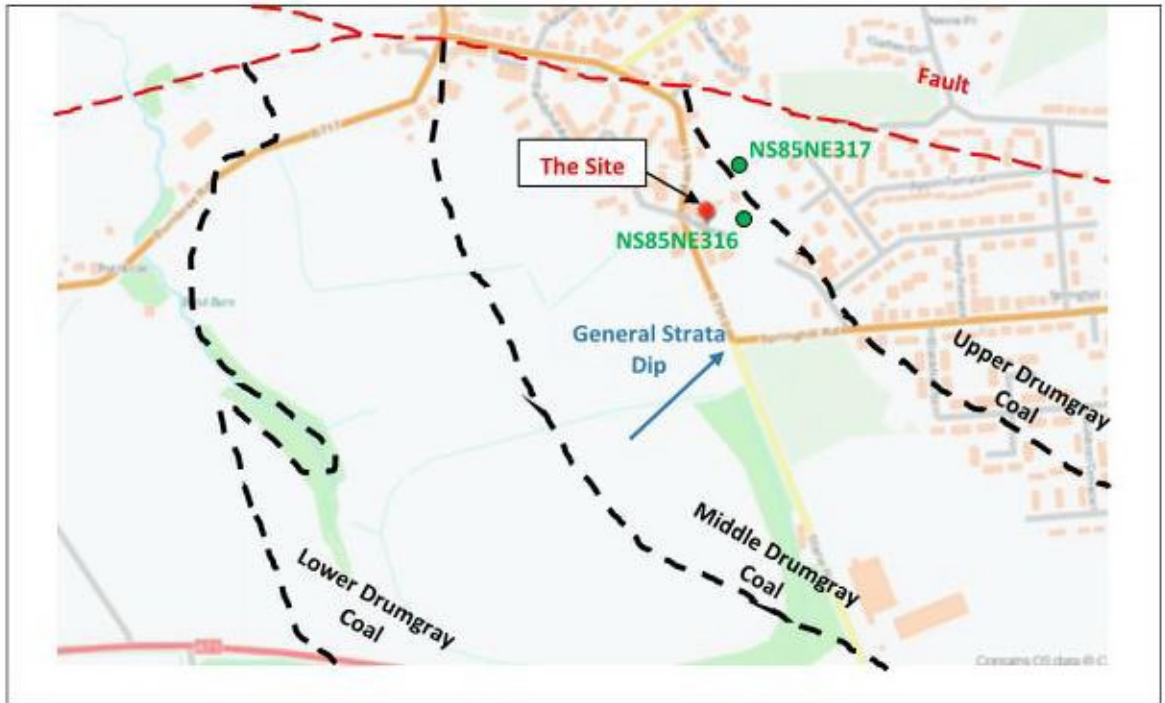

Figure 2) Coal Seam Summary Map

3 Identification and Assessment of Site-Specific Coal Mining Risks

The table below summarises the potential risks associated with coal mining legacy for the proposed development site, which have been identified from list sources of information.

Table 2 - Coal Mining Hazards Summary

Coal Mining Issues	Yes	No
Coal outcrops		X
Underground coal mining (recorded at shallow depths)	X	
Underground coal mining (probable at shallow depths)	X	
Recorded mine entries (shafts and adits)		X
Unrecorded mine entries (shafts and adits)	X	
Coal mining geology (fissures)		X
Record of past gas emissions		X
Recorded coal mining surface hazard		X
Surface mining (opencast workings)		X

The Coal Authority Interactive Map Viewer (**Appendix G**) has identified that the site lies within a Development High Risk Area associated with the potential presence of unrecorded workings at shallow depth (less than 30m bgl) beneath the site associated with several seams of coal that subcrop to the southwest.

The report obtained from the Coal Authority (Consultants Coal Mining Report, reference 51002282114001, dated 24th July 2020) revealed the property is in a surface area that is affected by recorded underground mining in 1 no. coal seam identified as the Armadale Main at a depth of 86m bgl. The mine working has a recorded extraction thickness of 0.61m and was last mined in 1911.

Using the generally accepted 'rule-of-thumb' guidance that a competent rock strata thickness equivalent to at least ten times the extraction thickness (0.61m) provides adequate protection against crown-hole development and surface instability (Refs 2 and 3), the depth and thickness of the Armadale seam, and knowledge of the local geological context, the seam can be considered to rest at such a depth that the recorded workings will not result in surface subsidence or crown-hole development.

However, the Coal Authority report states that the property is in an area where the Coal Authority believe there is coal at or close to the surface (Mid Drumgray Coal), which may have been worked in the past. The Coal Authority has drawn attention to this and has stated that the presence of unrecorded shallow coal should be considered. It is considered that if these seams have been worked in the past, they could present a risk of surface instability. Nearby deep rotary borehole logs in close proximity to the site have shown intact coal with a thickness of 0.50m at a depth which can be correlated to the expected depth of the Mid Drumgray Coal, therefore indicating that this coal seam has not been worked. The Lower Drumgray Coal is at such a depth that the potential unrecorded workings will not result in surface subsidence or crown-hole development.

The Coal Authority report states that they are not aware of any recorded mine entries within 100m of the development site boundary. Notwithstanding this, it is recognised that there may, however, be mine entries in the vicinity that have not been recorded.

The Coal Authority report states that they are no aware of any opencast coal mining sites located within 500m of the development site boundary.

4 Proposed Mitigation Strategy

With due regard to the historic mining activity, coal geology and information presented within the Coal Authority report, it is considered that further intrusive works relating to coal mine working risks beneath the site are not necessary for the proposed development.

- The possibility of unrecorded mine shafts has been highlighted in the Coal Authority report. Historical maps do not show evidence of shafts within the site boundary. The potential risk can be dealt with through vigilance during the earthworks stage of construction.

5 Conclusions

The Coal Mining Risk Assessment for the site at Bridge Place has concluded that the risk associated with coal mining related issues can be considered negligible and that the future development can be made safe if the above mitigation measures have been followed.

It is believed that any residual risk can be readily mitigated through informed vigilance during the site groundworks stage. If during these works, unexpected ground conditions are encountered, then professional advice (including the Coal Authority) should be sort.

No further intrusive investigation works are deemed necessary for the proposed development in respect of historical coal mining legacy.

6 References

1. Coal Authority, 2014, Risk Based Approach to Development Management Resources for Developers, Version 3.
2. CIRIA, 2002, SP32 Construction over Abandoned Mine Workings.
3. CIRIA, 2019, C758D Abandoned Mine Workings Manual.
4. CIRIA, Publication C665, Assessing risks posed by hazardous ground gases to buildings.

Appendix A – Site Location

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Location Plan

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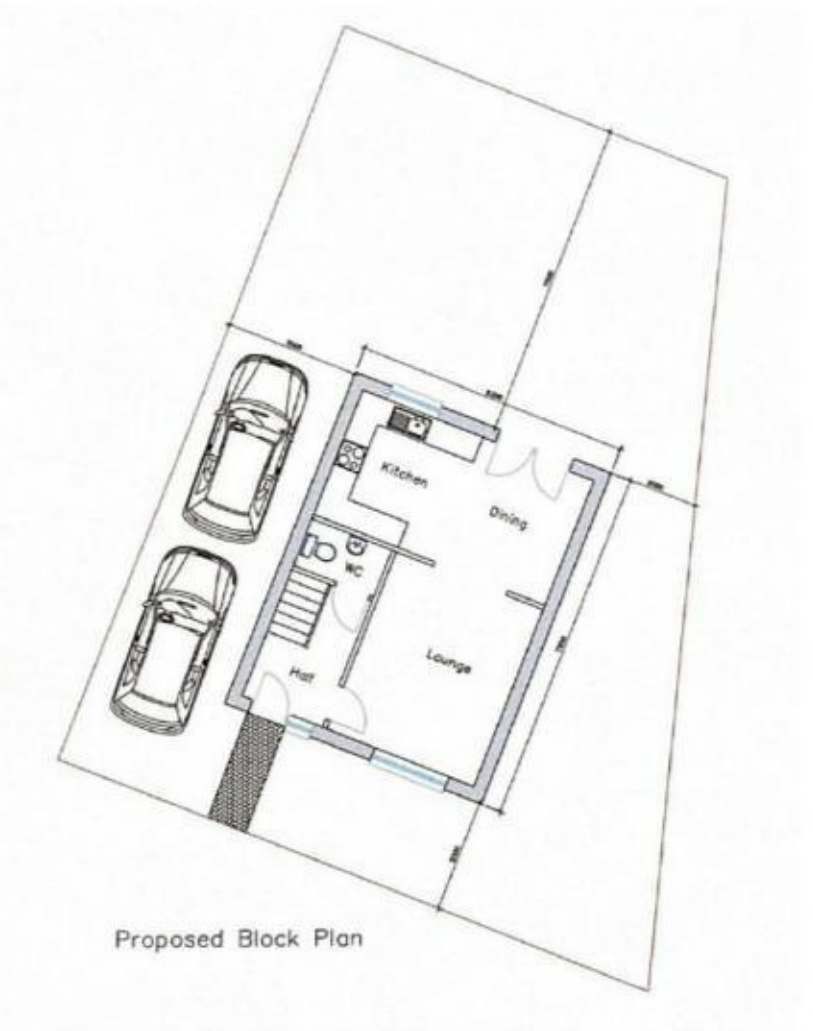
Existing Site Plan



Proposed Block Plan

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Proposed Site Plan

Appendix B – Coal Authority Report

The Coal Authority

Consultants

Coal Mining Report

7 Bridge Place
Stane
Shotts
North Lanarkshire
ML7 5JE

Date of enquiry:	24 July 2020
Date enquiry received:	24 July 2020
Issue date:	24 July 2020
Our reference:	51002282114001
Your reference:	ES240720

Consultants
Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

EnviroSolution Limited

Enquiry address

7 Bridge Place
Stane
Shotts
North Lanarkshire
ML7 5JE

Approximate position of property

Map data

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NG18 4RG

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/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
STANE	ARMADALE MAIN	Coal	6LRX	86	South	1.4	North	61	1911

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

S1099	S3526	S2576
3954	S380/1/3	S404
S3493	S380/2/3	S221

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

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Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

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Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

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Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

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Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

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Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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Appendix C – Historic Maps

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Date: 1859
Scale 1:10,560

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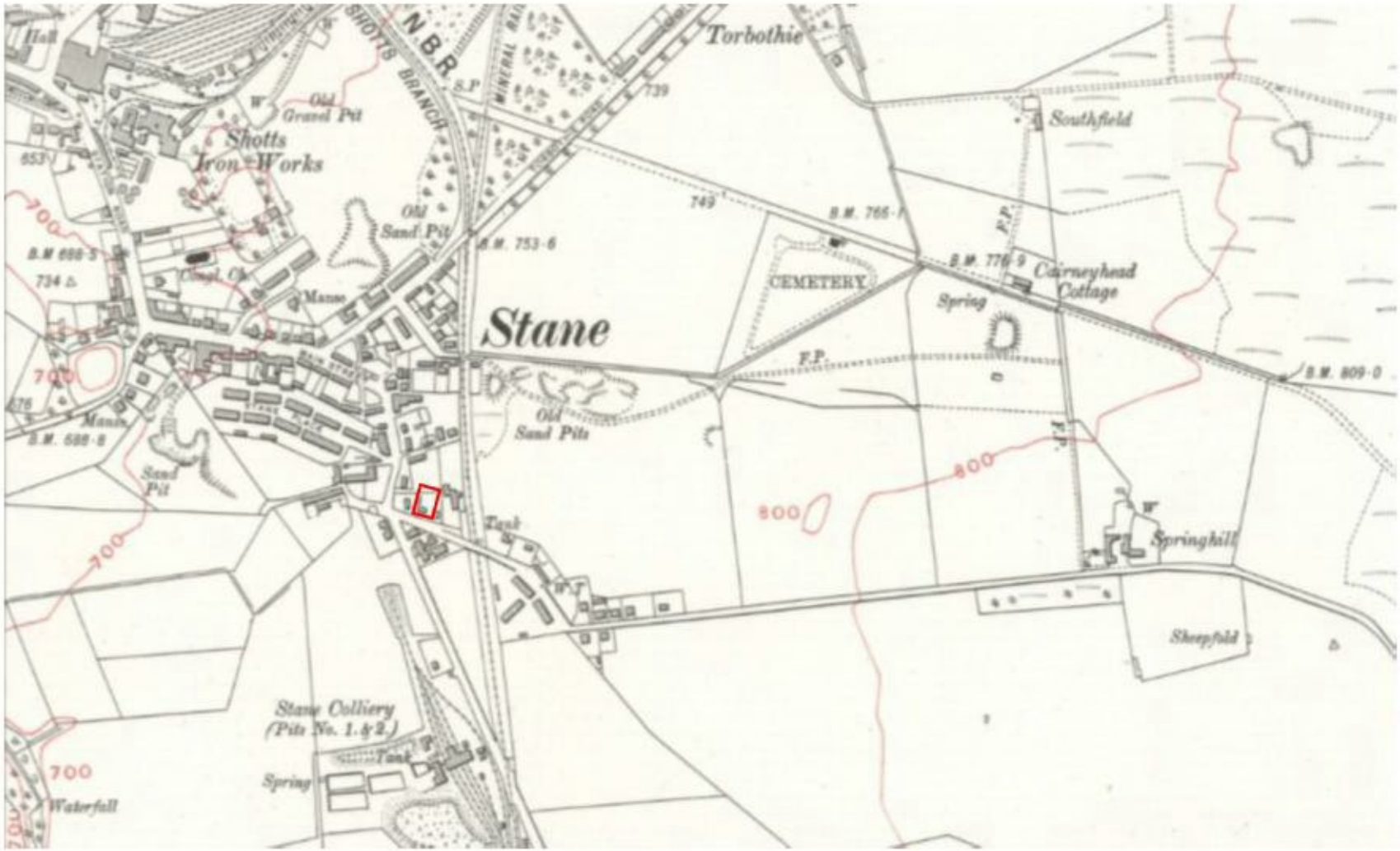
Date: 1897
Scale 1:10,560



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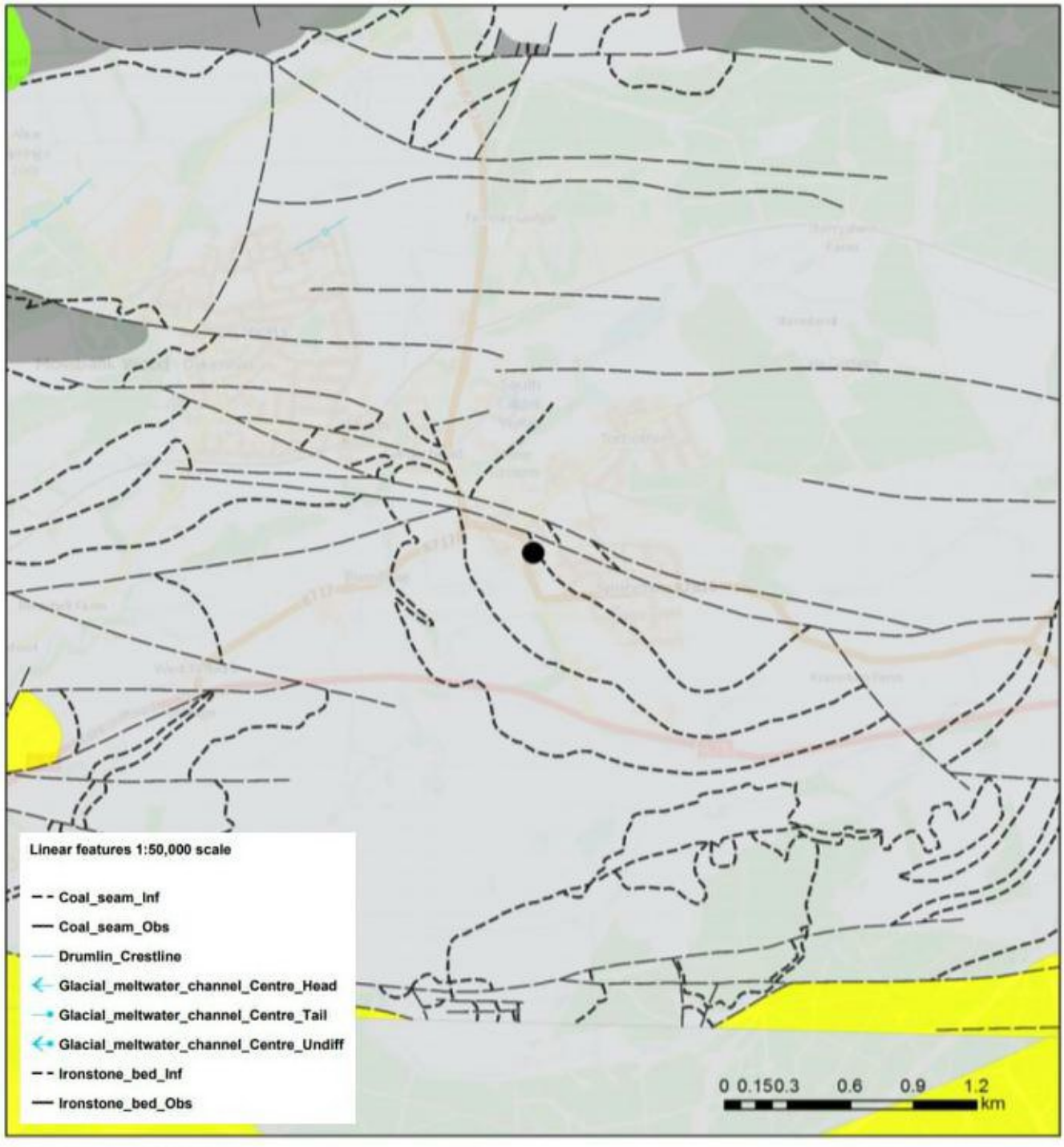
Date: 1910
Scale 1:10,560

Appendix D – Geological Maps

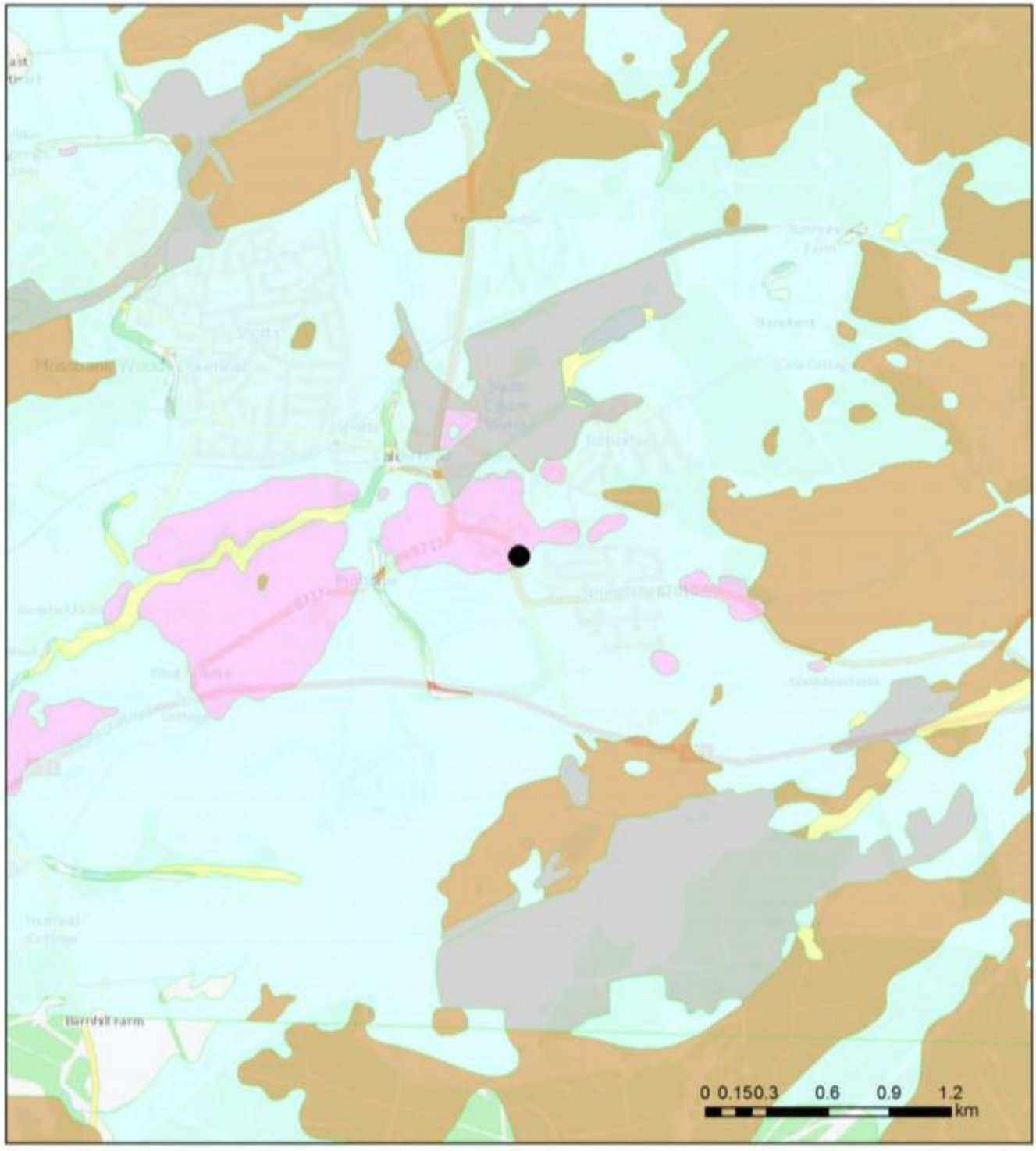
Bedrock Geology



Bedrock geology 1:50,000 scale

- UPPER LIMESTONE FORMATION - SEDIMENTARY ROCK CYCLES, CLACKMANNAN GROUP TYPE
- CALMY LIMESTONE - LIMESTONE
- SCOTTISH LOWER COAL MEASURES FORMATION - SEDIMENTARY ROCK CYCLES, COAL MEASURE TYPE
- SCOTTISH MIDDLE COAL MEASURES FORMATION - SEDIMENTARY ROCK CYCLES, COAL MEASURE TYPE
- PASSAGE FORMATION - SEDIMENTARY ROCK CYCLES, CLACKMANNAN GROUP TYPE
- NORTH BRITAIN PALAEOGENE DYKE SUITE - MAFITE
- MIDLAND VALLEY SILL-COMPLEX - QUARTZ-MICROGABBRO

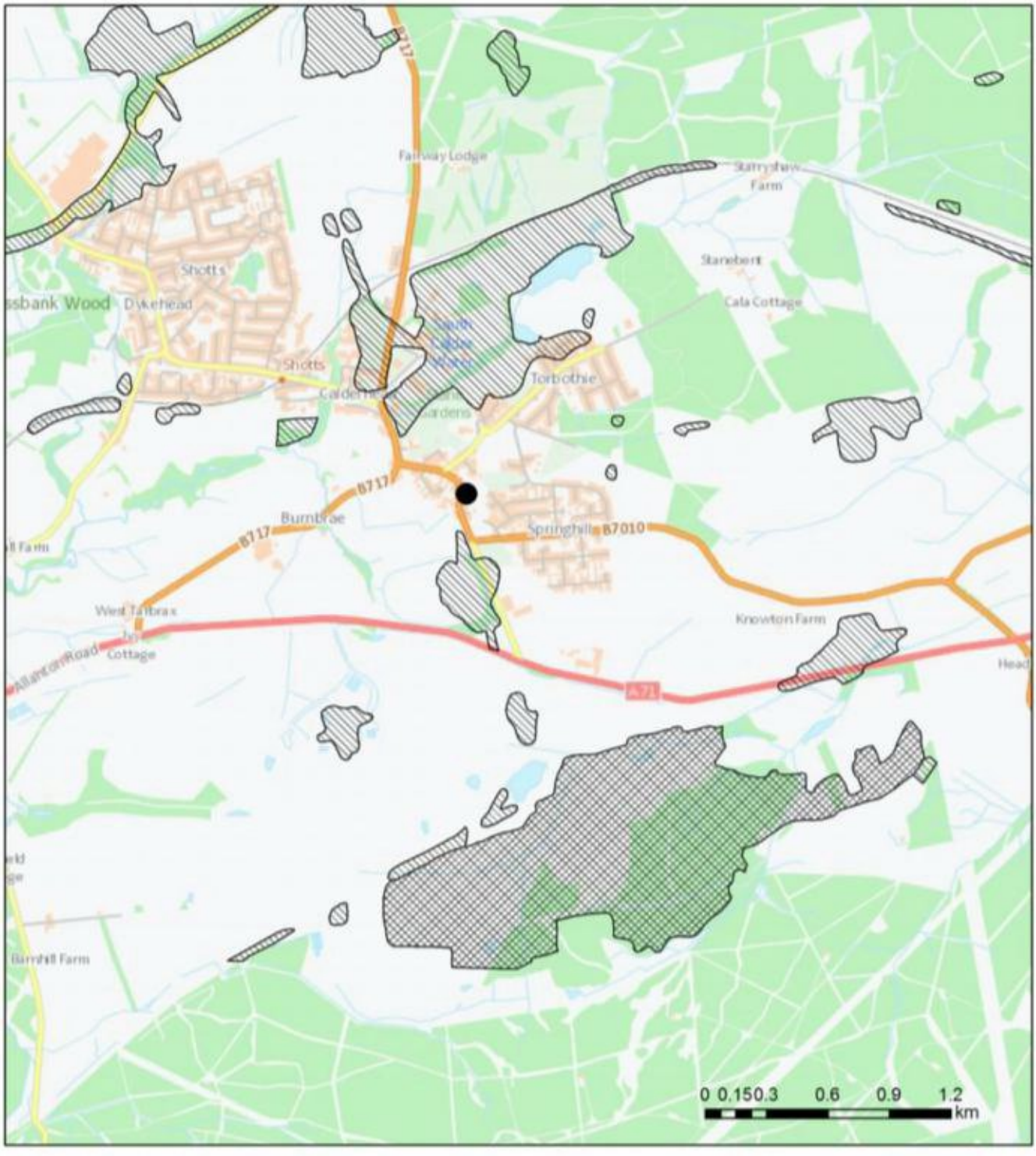
Superficial Geology



Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS - GRAVEL, SAND AND SILT
- TILL, DEVENSIAN - DIAMICTON
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- ALLUVIAL FAN DEPOSITS - GRAVEL, SAND, SILT AND CLAY
- PEAT - PEAT
- SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY] - UNKNOWN/UNCLASSIFIED ENTRY

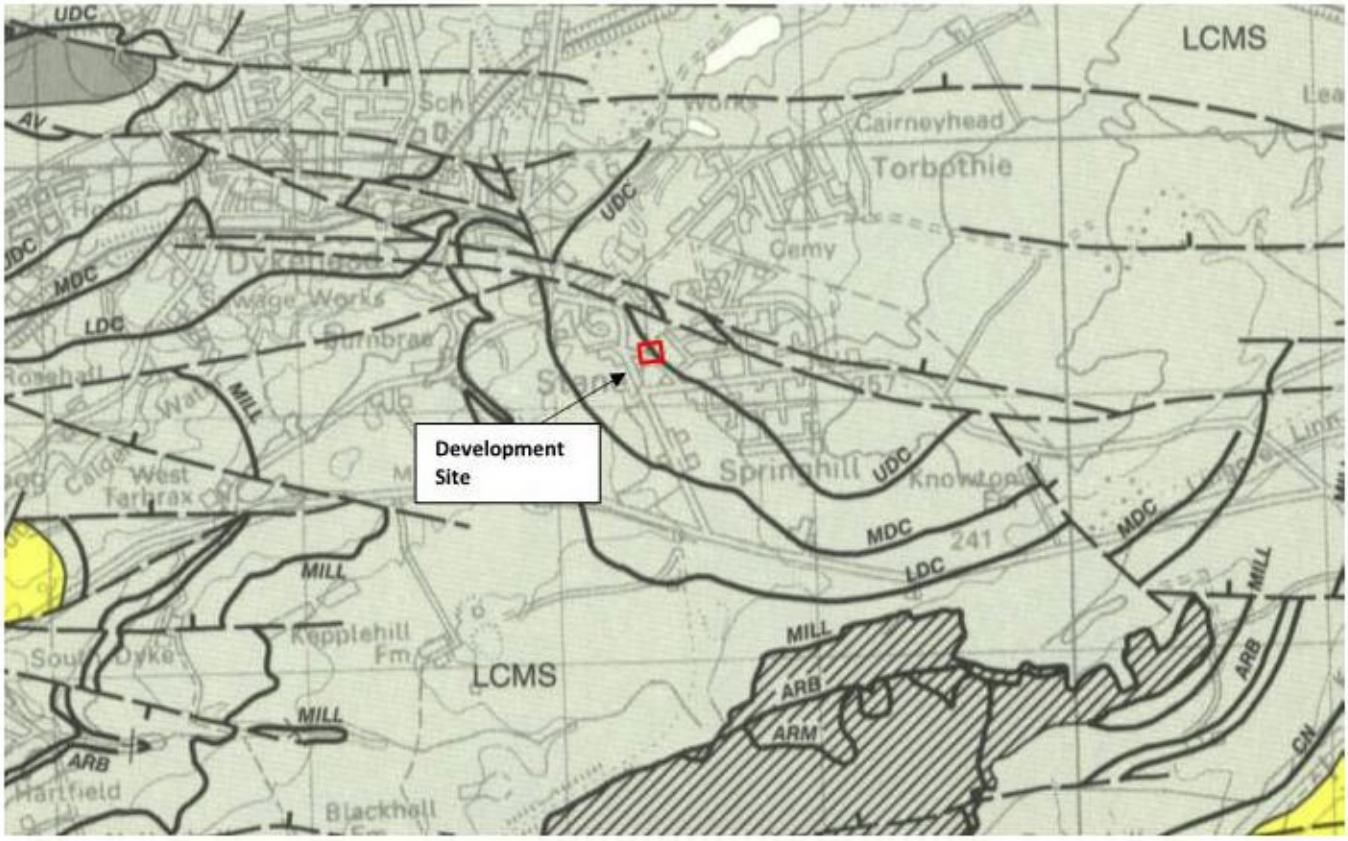
Artificial Geology

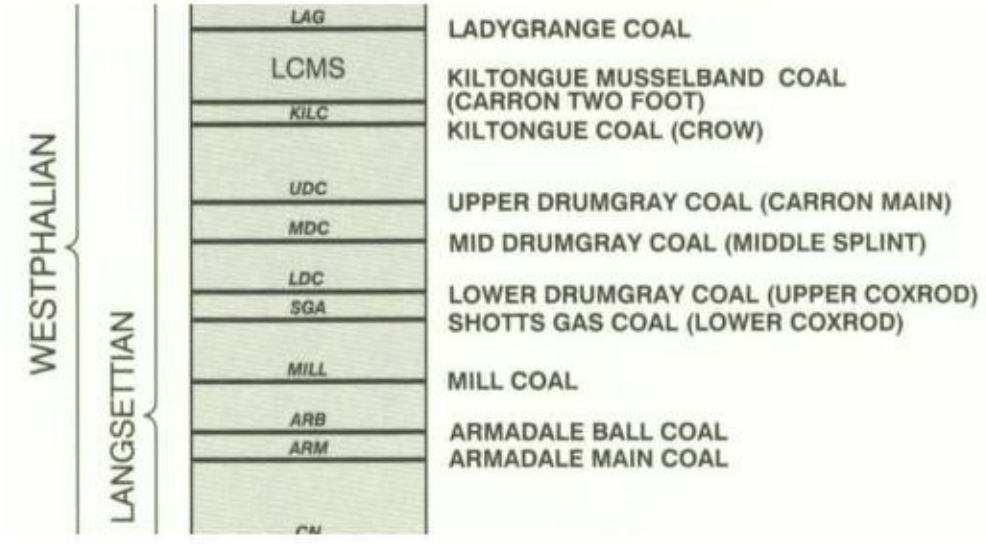


Artificial ground 1:50,000 scale

- MADE GROUND (UNDIVIDED) - ARTIFICIAL DEPOSIT
- WORKED GROUND (UNDIVIDED) - VOID
- INFILLED GROUND - ARTIFICIAL DEPOSIT

BGS Geological Survey 1:50,000 Series Scotland Sheet 31E, Falkirk





NS85NE316

SHOTTS R 101

Hydraulic (GL) 4/7/05

	M	CM
Fill	0	80
Soft sandy clay	1	80
Sandy boulder clay	4	60
Soft mudstone	6	00

Start coring at 6.00

RUNS	RECOVERY
6 00 to 7 10	90
9 10	190
10 45	120
13 45	275
15 65	220
16 85	120
19 85	290
22 85	295
25 60	275

SILTSTONE, grey, occasional rust staining near top; sandy laminae; rooty at top; some muddy bands with plant debris — 8 70

SANDSTONE, pale grey, rust stained in places; some steep + subvertical open rust stained joints fine + medium grained. — 9 80

MUDSTONE, grey, fresh, fairly well bedded iron patches; plant remains. — 10 45

COAL, fresh, mostly bright, (part broken recovery) — 0 50 — 10 95

SEAT MUDSTONE, brownish grey fresh silty below — 11 90

SILTSTONE, grey + pale grey fresh, irregular pale grey sandy bands + laminae plant debris; some pale brown iron patches. — 14 25

MUDSTONE, grey + pale grey fresh, silty in places, fairly well bedded brown iron patches, short steep jointing, plant debris — 19 00

MUDSTONE, dark grey fresh, well bedded, carbonaceous slightly cannelloid in places, fish pyritic + coaly debris. dip < 5° — 19 85

SANDSTONE pale grey + off white, fresh medium + medium to coarse grained some silty laminae; some carbonaceous clasts. — 25 00

MUDSTONE, grey fresh, fairly well bedded some iron laminae, broken + jointed; plant debris — 25 60

Examined 8/7/05 [redacted] Total 25 60

NS85NE317

SHOTTS R 102
Hydraulat Ltd. 5/7/05 (GL.)

	m	cm
Fill	1	50
Soft sandy clay Fill	3	50
Sandy boulder clay	4	70
Broken mudstone	6	50

Start coring at 650 m

RUNS		RECOVERY
50 to 9	00	100
11	20	220
14	20	300
17	20	300
20	20	265
23	20	295

RUN 650 to 900 100 rec.

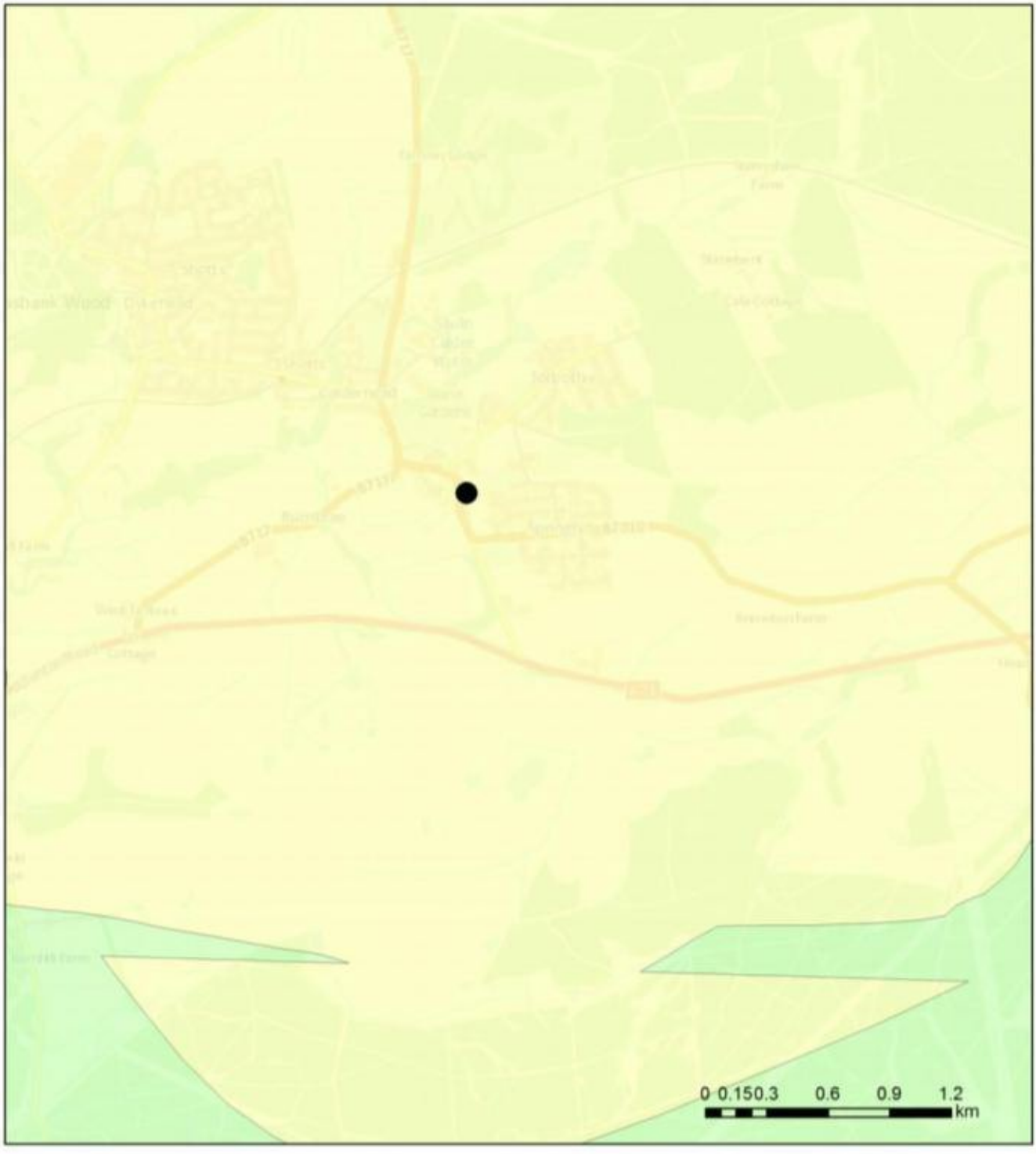
SILTSTONE, pale grey + grey mostly fresh, some slight rust staining near top, broken + jointed in top 80 cm of recovered core; plant debris	9	00	
SILTY MUDSTONE, grey + pale grey fresh, silty laminae irony pebbles, plant debris broken + crushed at base	15	20	
MUDSTONE, dark grey well bedded, mostly fresh, some faint rust staining at base carbonaceous, coaly + pyritic plant debris; rare bivalve fragment dip ∠ 5°	16	10	
SANDSTONE, pale grey + buff, mostly fresh, medium + coarse grained, rooty at top slightly kaolinitic in places, subvertical rust stained joint 17 70 to 18 10; some silty laminae to base	19	50	
MUDSTONE, grey, fresh, fairly well bedded, irony laminae; broken + jointed	20	20	
COAL fresh mostly bright (100% intact recovery)	0	50	20 70
SEAT MUDSTONE, grey + dark grey fresh, crushed, some coaly laminae	20	90	
SILTSTONE, grey fresh, some irregular sandy laminae, highly rooty at top; plants; 10 cm sandstone at base	23	20	

Total 23 20

Examined 8/7/05

[redacted]

Appendix F – Coal Resource Map



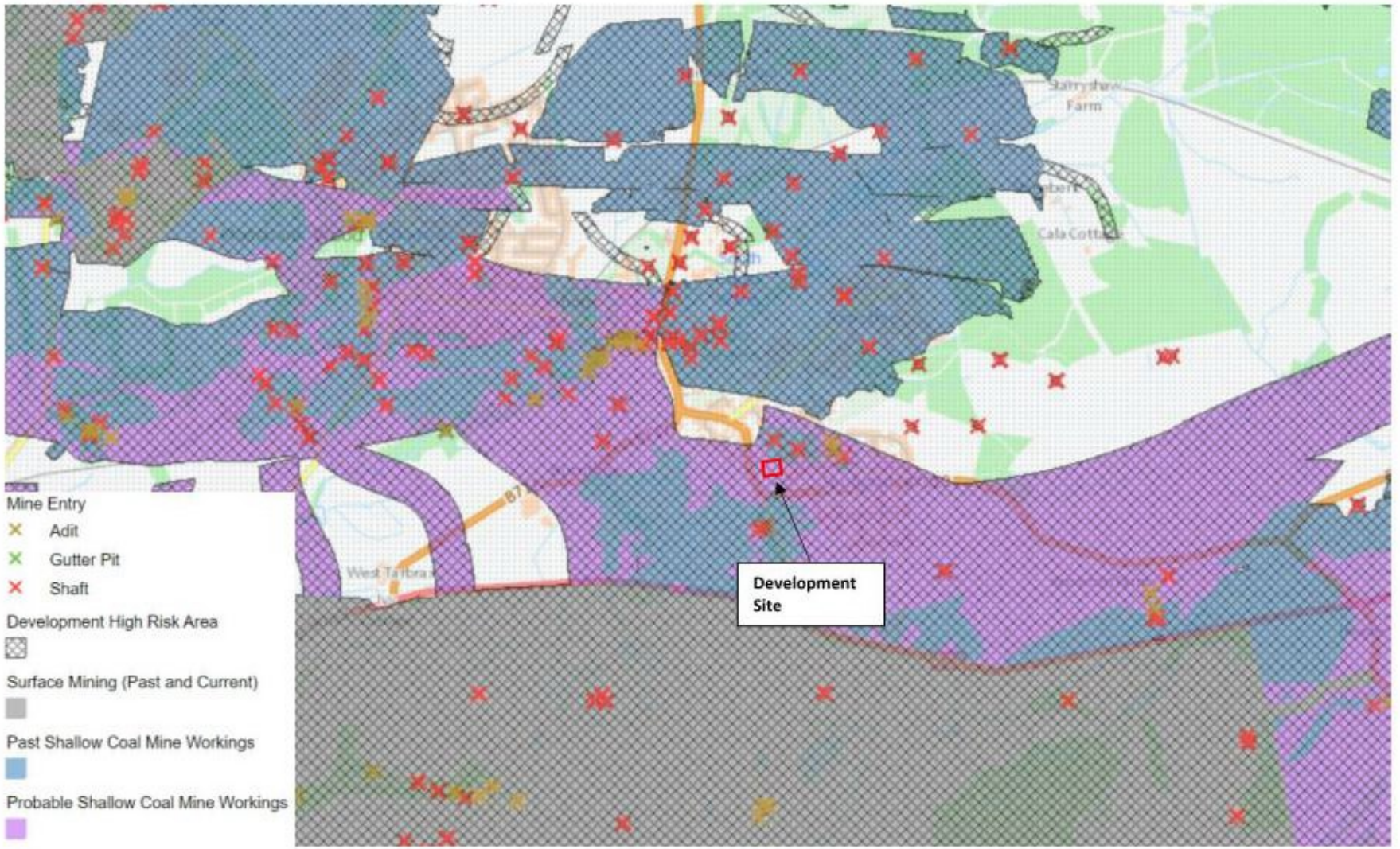
Shallow Coal

- Buried coal resource overlain by up to 50m overburden
- Primary opencast coal resource area
- Secondary opencast coal resource area
- Tertiary opencast coal resource area

Deep Coal

- Deep coal at more than 1200m
- Deep coal between 50m and 1200m

Appendix G – Coal Mining Summary Map



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Coal Mining Summary Map