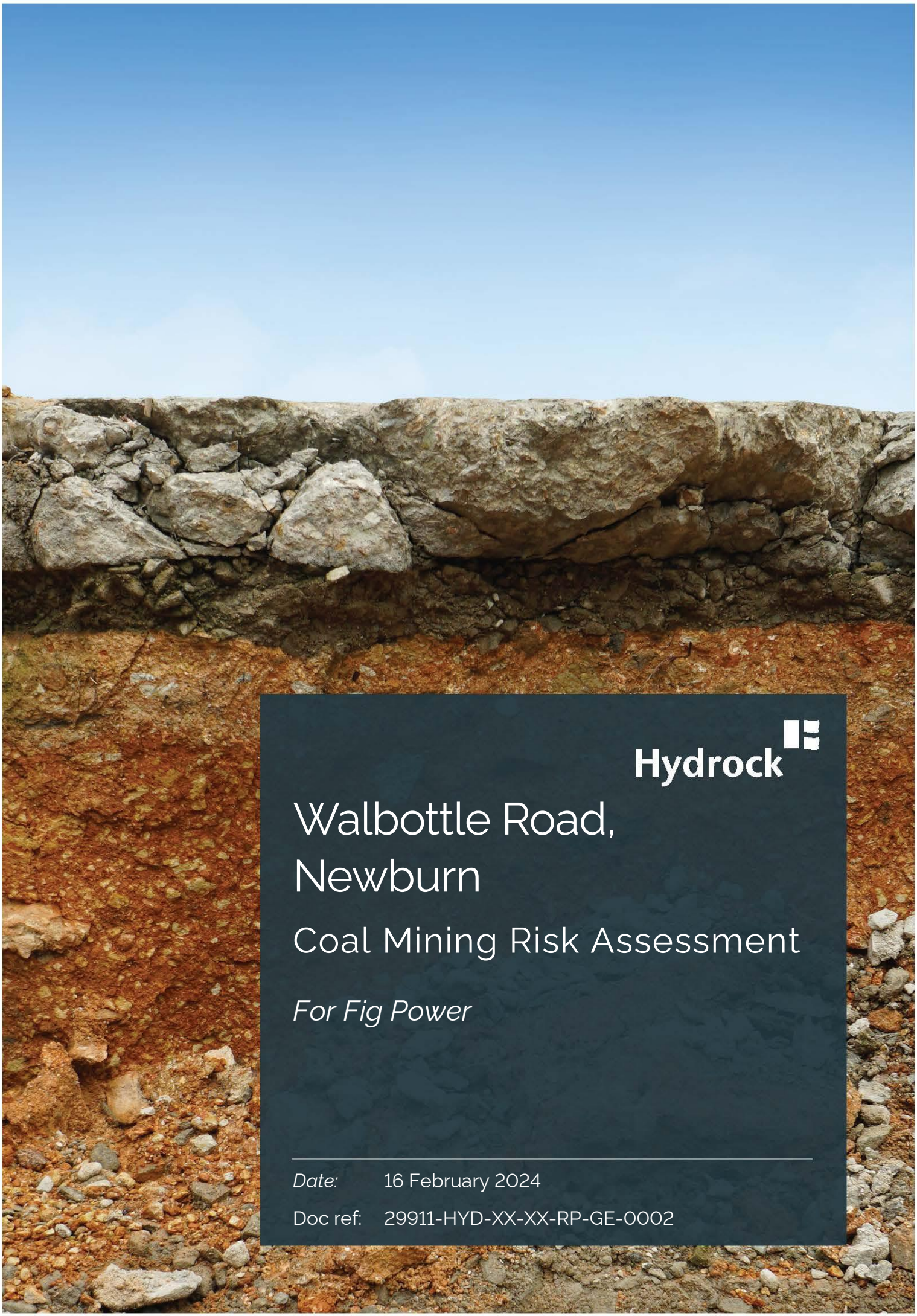

Hydrock

Walbottle Road, Newburn

Coal Mining Risk Assessment

For Fig Power

Date: 16 February 2024

Doc ref: 29911-HYD-XX-XX-RP-GE-0002

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1. INTRODUCTION

1.1 Terms of reference

In November 2023, Hydrock Consultants Limited (Hydrock) was commissioned by Fig Power (the Client) to undertake a Coal Mining Risk Assessment (CMRA) for Walbottle Road, Newburn, Newcastle Upon Tyne, NE15 8HH.

A site location plan (29911-HYD-XX-XX-DR-GE-0001) is provided in Appendix A.

The site is currently split into two sections with an adjoining access road. The northern section comprises of a car park/ storage yard with excavators and tyres. The south-eastern section of the site comprises commercial units and associated car parking.

The proposed development is to comprise a 90MW battery storage facility in the north and a substation in the south, along with associated infrastructure. A proposed development layout (Fig Power Drawing 29911-FIG-DR-0006), is presented in Appendix A.

This assessment has been undertaken in accordance with Hydrock's proposal (referenced 29911-FP-GE-0001, 14th November 2023) and the Client's instructions to proceed via email, dated 15th November 2023.

1.2 Scope

The purpose of this Coal Mining Risk Assessment is to:

- present a desk-based review of all available information on the coal mining issues which are relevant to the application site;
- to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact of 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 will influence 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.

Where the above points cannot be fully satisfied by the desk-based data obtained to date, it will be necessary to undertake further works. Such works could consist of either intrusive ground investigation works or be incorporated into the design of stabilisation measures for the site.

1.3 Available information

The following information and reports have been used in the preparation of this report:

» Hydrock. December 2023. 'Ground Conditions Desk Study Report, Walbottle Road, Newburn', Ref: 29911-HYD-XX-XX-RP-GE-0001;

» Fig Power. November 2023. 'Location Plan'. Ref: 29911-FIG-DR-0004; and

» Fig Power. January 2024. 'Site Layout For Operation'. Ref: 29911-FIG-DR-0006.

It is understood that the Client defined in Section 1.1 commissioned or has obtained assignment of the above documents and Hydrock has assumed full reliance can be placed upon their contents. Should this not be the case, Hydrock should be informed at the earliest opportunity.

2. DESK-BASED INFORMATION SOURCES

2.1 Data

The following sources of information have been consulted in the preparation of this CMRA:

- BGS Maps Portal, Geological Survey of Great Britain, Newcastle Upon Tyne 1: 50,000, 1995 (geological sheet 20, Solid);
- Third-party environmental report (Groundsure report, reference HYD-9ML-MJ2-CD8-TX8);
- BGS Onshore GeoIndex (GeoIndex - British Geological Survey (bgs.ac.uk);
- BGS borehole records (Borehole records - British Geological Survey (bgs.ac.uk);
- Historical Ordnance Survey mapping;
- BGS Archive Records;
- Coal Authority 'CON29 Consultants Coal Mining Report' (Ref: HYD-6HT-A7V-A2S-ENT);
- Coal Authority's Interactive Viewer (http://mapapps2.bgs.ac.uk/coalauthority/home.html); and
- Coal Mine Abandonment Plans (referenced 832_999999_2 of 9, 1014_999999, 12028_999999_3 of 5, 12028_999999_4 of 5, NC197_999999_Part A and NC197_999999_Part B).

The Coal Authority Consultants coal mining report and large plot drawing is included in Appendix B. The mine abandonment plans are presented in Appendix C.

2.2 Site Referencing

The site is referenced in Table 2.1 and the location is indicated in Figure 2.1 and Figure 2.2.

Table 2.1: Site referencing information

Item	Brief Description
Site name	Walbottle Road, Newburn.
Site address	Walbottle Road, Newburn, Newcastle Upon Tyne, NE15 8HH.
Site location and grid reference	The site is located between Walbottle Road to the north-east and High Street to the south-west. 1.3km south of the A69, 2.4km west of the A1 and 7.6km west of Newcastle upon Tyne city centre. The National Grid Reference of the approximate centre of the site is 217063E, 565240N. The site is approximately 0.66Ha in area.
Topography	Existing site levels are approximately 25.3m AOD and the high street to the south of the site is at circa 7.3m AOD. There is a significant gradient drop within the area with the site sloping from north to south towards the High Street.
Site boundaries	An approximately 2m high metal palisade fence, along with brick walls and chain link fences surrounds the southern and northern sections of the site. Along the eastern boundary there are a mixture of retaining walls (between 1.5m and 2.0m) and steep slopes above (between 8.0m in the north-east and 5.0m in the south east.)

Figure 2.1: Site location.
(Reproduced with permission from Groundsure).

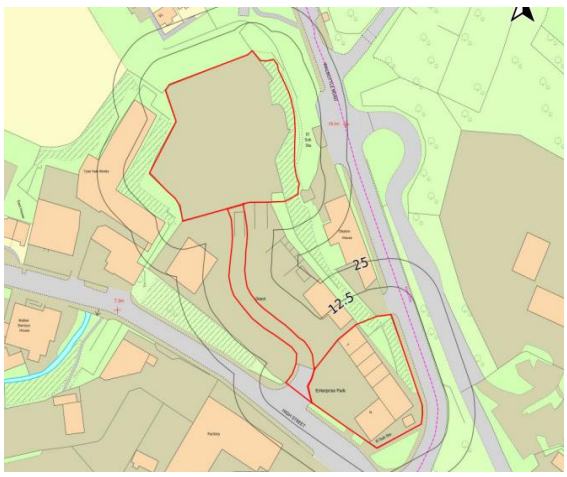

Figure 2.2: Site layout plan.
(Reproduced with permission from Groundsure).

A site location plan (Hydrock Drawing 29911-HYD-XX-XX-DR-GE-0001) is presented in Appendix A.

2.3 Site Description

The site is split primarily into two sections, north and south, with a proposed access road joining the two sections. The present land use is predominately commercial with commercial units occupying the southern section of the site and a concrete works with associated stockpiles and fuelling yard along the proposed access road. The northern section of the site is currently a parking facility for cars, storage including general waste such as pallets, tyres, machinery parts etc.

2.4 Site History

From 1856 – 1858 Earliest mapping shows the northern section of the site is undeveloped grass land sloping down from the north-east to the New Burn river to the south-west (which flows below the site). The south-eastern section of the site is part of a larger orchard.

From 1895 Newburn Steel works and associated rail infrastructure has been constructed across the site, with the New Burn river partly culverted to the west and has been presumably infilled. To accommodate the Steel works and rail infrastructure, it is inferred that earthworks have been undertaken to level the site, presumably land has been cut from the east and filled in the west, resulting in steeped slopes and retaining walls along the eastern and western boundaries. By 1936 Newburn Steel works have been demolished however rail tracks remain. A small refuse tip was recorded in the south east of the site.

During the middle 20th century and early 21st century minor changes on site occurred, with demolition and then subsequent reconstruction of various smaller buildings along with removal of rail infrastructure.

2.5 Geology

2.5.1 *Published Geology and Coal Mining*

The geology of the site area is shown on the British Geological Survey (BGS) 1:10,000 geological map of Newcastle Upon Tyne (Sheet 20) and the 1:50,000 British Geological Survey (BGS) map extract reproduced as part of the Groundsure report and is summarised below:

- Surface ground workings may encroach the north of the site associated with the extraction of the shallow Glacial Till for the former Brick Works present north and north east. Deep Made Ground may be present close to the northern site boundary,
- the site is underlain by Glacial Till comprising sandy gravelly clay (shown in Figure 2.3), which overlies solid geology of; and
- Pennine Lower Coal Measures (PUCM) Formation (shown in Figure 2.4), as Sandstone across the centre and north and as Mudstone, Siltstone and Sandstone across the south.
- The BGS modelled superficial deposits thickness mapping indicates approximately between 0.80m and 1.00m of superficials are present across the site.

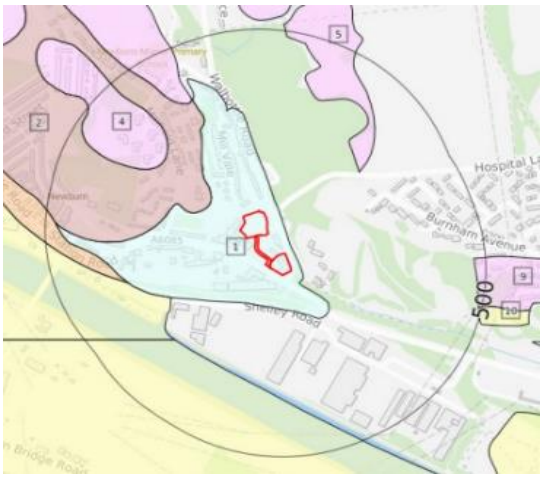

Figure 2.3: Superficial deposits (NTS)

(Reproduced with permission from Groundsure)

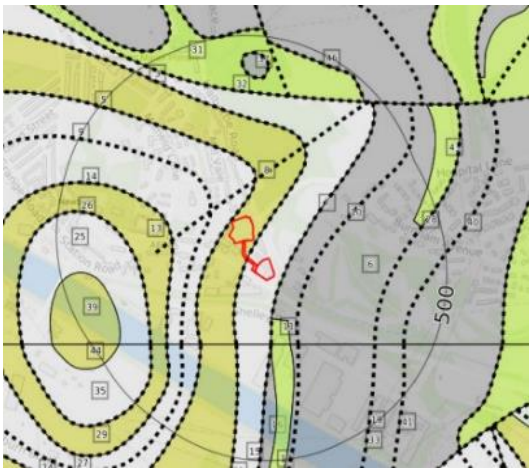

Figure 2.4: Solid geology (Scale 1:10,000)

(Reproduced with permission from Groundsure)

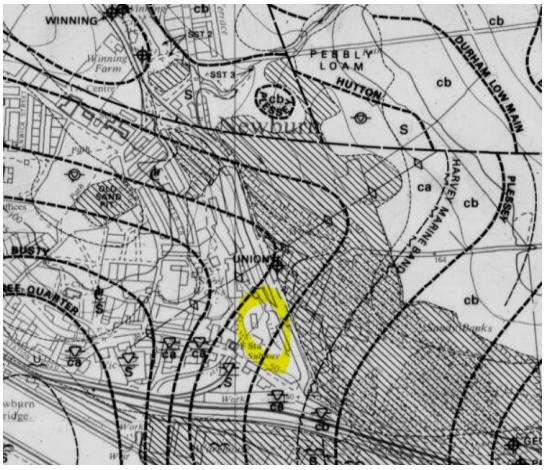

Figure 2.5: BGS Sheet 20 Newcastle Upon Tyne (Scale 1: 10, 000)

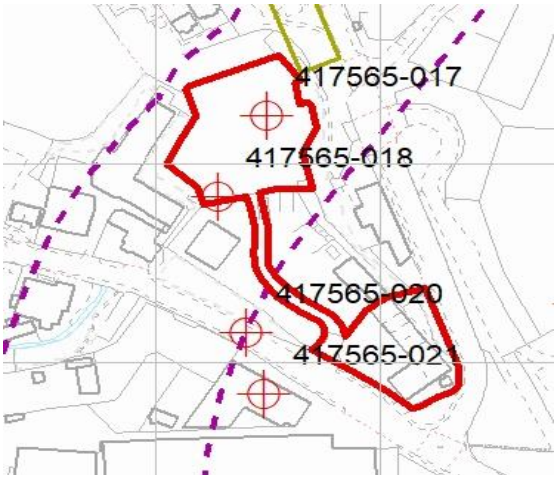

Figure 2.6: Inferred outcrops from Coal Authority Plot (Scale 1: 25,000)

As shown in Figure 2.4 and Figure 2.5 the younger Harvey (previously known as Beaumont) coal seam subcrops beneath the centre of the site orientating from north east to south west and is dipping at approximately 4.7° east/south east. The CA database records the Harvey seam at -3m AOD.

The Tilley coal seam subcrops 5 to 10m west of the northern boundary dipping at 4.1° east/south east beneath the site. The CA database records the Tilley seam at -10m AOD.

The Top Busty coal seam is present subcropping 60m north west dipping at 0.0° south east. The CA database records the Top Busty at -16m AOD.

The Bottom Busty coal seam, the oldest seam of the four, is present subcropping 190m north west dipping at 2.3° south west. The CA database records the Bottom Busty at -17m AOD.

The younger Harvey Marine Bands subcrop offsite 25m south east and, based on the dip direction of seams within the area, is unlikely to be present beneath the site.

Figure 2.6 shows mine entry 417565-017 and 417565-018 are recorded onsite and are shown on Mine Abandonment (MA) Plan referenced 832_999999_2 of 9, which is presented on the Coal Constraints Plan referenced 29911-HYD-XX-XX-DR-GE-0003 presented Appendix A.

2.6 Previous ground investigation data

A number of borehole logs from the BGS archive have been reviewed. Selected records are summarised below:

- NZ16NE619 located 1.00m north of the site, drilled to a depth of 5.00m and recorded:
  - clay with gravels of man-made constituents and cobbles between ground level and 1.55m bgl. (Made Ground);
  - Slag, clinker, ash. rubble and sand between 1.55m and 4.40m bgl (Made Ground); and
  - Dark grey shaley mudstone between 4.40m and 5.50m bgl (probable Pennine Lower Coal Measures Formation).
  - No ground water was encountered.
- NZ16NE620 located 5.00m north of the site, trial pit excavated to a depth of 4.00m and recorded:
  - dark brown clay with gravels of man-made constituents between ground level and 0.80m below ground level (bgl) (Made Ground);
  - dark reddish brown organic subsoil with gravels of man-made constituents (including asbestos containing materials (ACM), metal, slag, ash and household wastes) between 0.80m and 2.00m bgl (Made Ground); and
  - Light to medium brown silty fine grained sand between 2.00m and 4.00m bgl (probable Glacial Deposits).
  - No ground water was encountered.

Hydrock is not aware of any other previous ground investigation works having been carried out within the site boundary.

2.7 Coal Authority Interactive Viewer

The coal mining interactive viewer has been published by the Coal Authority to inform local authorities of potential hazards arising from historical coal mining. Reference to the area within the site boundary indicates the following:

- The majority site is classified as a high risk development area, due to the potential for workings associated with subcropping Harvey Coal Seam and offsite subcropping Tilley and Top Busty coal seams which are likely to be beneath the site (shown in Figure 2.7);
- The CA hold no records for probable shallow coal mine workings on the subject site;
- Mine entries 417565-017 with an 8.00m departure from its recorded location and at 2.50m in diameter and 417565-018 with an 8.00m departure from its recorded location and at 2.50m in diameter are recorded in the north of the site;
- Mine Entries 417565-020/021 are recorded towards the south, both with 8.00m departures from their recorded location and at 2.50m in diameter;
- The CA hold no records for surface mining onsite or within the immediate vicinity;
- Past shallow coal mine workings are shown to the north likely associated with the former Walbottle Colliery (MA records dated to 1877) and to the south associated with the former Isabella Colliery (MA recorded dated to 1912).
- There are no court orders or legal notices sown onsite or within the surrounding area; and
- There are no unlicensed opencasts shown onsite or within the surrounding area.

Figure 2.7: CA development high risk area (site location-red circle)

3. COAL AUTHORITY CONSULTANTS MINING REPORT

A Consultants Coal Mining Report (reference 51003390770001, dated 21st November 2023) has been obtained from the Coal Authority and is included in Appendix B. Key issues highlighted within the report include the following:

3.1 Coal Seams Subcropping the site

There is one coal seam subcropping below the centre site, known as Harvey Coal Seam (also known as Beaumont/Engine). The Tilley Coal Seam subcrops 9m north west of the site, the Coal Authority records both coal seams as workable for coal.

3.2 Past Underground Coal Workings

The Coal Authority hold records for past underground mining within the zone of influence of the site in five coals seams, some worked within different collieries. The past underground coal workings within influencing distance of the site are summarised in Table 3.1 from Oldest to Youngest.

Table 3.1: Past underground mining

Seam name	Colliery Name	Year last mined	Depth (m bgl.)	Extraction thickness (cm)	Direction to working	Dip angle and Direction
Brockwell	Percy	1931	52	117	South East	11.7 ° South East
Brockwell	Isabella	1949	62	135	Beneath	1.6° South East
Brockwell	Walbottle	1947	74	135	North	0.0° East
Bottom Busty	Unnamed	1955	53	170	North	2.3° South West
Top Busty	Throckley	1907	20	80	East	0° East
Tilley	Percy	1947	89	91	South East	4.1° South
Harvey	Walbottle	1888	21	227	North	4.7° South East

An anticline fold is present towards the north of the site. An anticline fold is an arch type fold and its presence is likely to have resulted in older coal seams like the Top Busty being exposed due to the anticline.

The Coal Authority hold records for underground workings at 62.00m in one seam beneath the site; Brockwell seam within Isabella Colliery. Workings within the Brockwell are shown in the centre and south of the site on MA plan NC197_999999_Part B (see Figure 4.4).

Due to the depth to these workings and likely extraction thickness of 1.35m, in accordance with guidance in CIRIA C758, 2019 there is considered to be sufficient coverage of bedrock over the seam, therefore the worked seam is not considered to pose a risk to the proposed development.

Furthermore, records of underground workings are held by the Coal Authority in the Tilley seam at 89m depth, to the south-east of the site. Whilst workings at such depth are not considered to pose a significant risk to the proposed development, the Tilley seam is indicated to subcrop close to the northern boundary. Therefore, there is a possibility of unrecorded workings being present across the north of the site associated with the Tilley coal seam.

The CA hold records for underground workings within the Harvey seam associated with the Walbottle Colliery at 21m depth to the north of the site. Therefore, there is a possibility of unrecorded workings being present across the site associated with the Harvey seam.

Furthermore, the CA hold records for underground workings within the Top Busty at 20m depth to the east of the site, which could also be present at shallow depth (within 30m) below the site.

3.3 Mine Entries

There are ten disused mine shafts recorded within the Consultant's report and these are summarised within Table 3.2.

Table 3.2: Mine Entries

Mine Entry	Grid Reference	Treatment	Influencing distance of site
417565-010	417012, 565441	Unknown	No, >25m not within ZOI
417565-011	417014, 565432	Unknown	No, >25m not within ZOI
417565-012	417021, 565419	Unknown	No, >25m not within ZOI
417565-013	417064, 565445	Shaft is filled, but no records	No, >25m not within ZOI
417565-014	417094, 565399	Unknown	No, >25m not within ZOI
417565-017	**417050, 565324**	**Unknown**	**Yes. Onsite (northern area)**
417565-018	**417028, 565283**	**Unknown**	**Yes Onsite (northern area)**
417565-019	417190, 565229	Unknown	No, >25m not within ZOI
417565-020	**417041, 565214**	**Unknown**	**Yes. 30m west of the site**
417565-021	**417049, 565183**	**Unknown**	**Yes. 30m south of the site**

Mineshaft 417565-020 is present 30m west and 417565-021 is shown 30m south, also recorded on MA Plan referenced 832_999999_2 of 9 (and 29911-HYD-XX-XX-DR-GE-0003). The Coal Authority hold no records for the treatment or capping for the two mine shafts on site or the two off site within 30m.

BGS archive records shown bedrock within boreholes north of the site to be circa 4.40m bgl. Assuming bedrock to the south is a worst case of 7.00m bgl either mine shaft 417565-020/021 are at the edge of the recorded departure on the MA plan at 15.00m from the site boundary. Utilising a worst case conjectured angle of 35° (CIRIA C758D 2019) from the top of the mine shaft (assumed at bedrock), and accounting for a potentially loose backfill, the no

build zone is approximately 5.00m offsite. Therefore, a void leading to subsidence in mine shaft 417565-020/021 is not considered to pose a risk to the proposed development.

Mine entries 417565-017 and 417565-018 are recorded onsite and are shown on Mine Abandonment (MA) Plan referenced 832_999999_2 of 9.

Using the coordinates within the Coal Authority report, the position of the mine shafts onsite or in close proximity, are presented on the Coal Constraints Plan referenced 29911-HYD-XX-XX-DR-GE-0003 included in Appendix A.

3.4 Unlicensed Opencast Mining Activity

The Coal Authority Report does not record any opencast mines within 500m of the site boundary.

3.5 Other Information relating to mining activity within the CA report

- There are no probable unrecorded shallow workings;
- There no spine roadways recorded at shallow depth;
- There are no Coal Authority managed tips within 500m of the site;
- The are no fissures or break-lines recorded onsite or in close proximity;
- The Coal Authority hold records for site investigations 2.60m north east of the site boundary; records of which are present in the BGS archives with chosen boreholes/trial pits summarised in Section 2.6;
- The Coal Authority has not received a damage notice or claim for the subject or property or any within 50m of the enquiry boundary, since 31 October 1994;
- There are no court orders and no Section 46 notice stating the land is at risk of subsidence,
- The Coal Authority is not aware of any requests having been made to carry out preventive works on site or within 50m of the site boundary, before coal is worked under section 33 of the Coal Mining Subsidence Act 1991;
- The property is not in an area where a notice to withdraw support has been given. The site 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.

4. MINE ADANDONMENT PLANS

Following consultation with the Coal Authority, a search of the records archive found the shallowest mine abandonment plans in the area to be for the Engine (possibly also known as Beaumont/Harvey), Tilley, Stone and Brockwell Coal Seam.

The MA plans are presented in Appendix C. Utilising QGIS software and known features, each Mine Abandonment Plan has been georeferenced and are shown in Figure 4.1 to Figure 4.4. Due to the scaling for the MA Plan from the Tilley Coal Seam (Figure 4.2) and Brockwell Coal Seam (Figure 4.4) the approximate location of the site was overlain into AutoCAD.

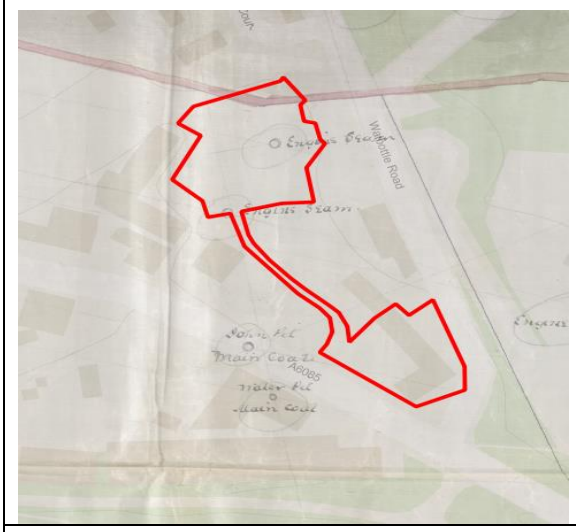

Figure 4.1 MA Plan – Walbottle Colliery 1877- Working in the Engine Seam (Harvey/Beaumont)

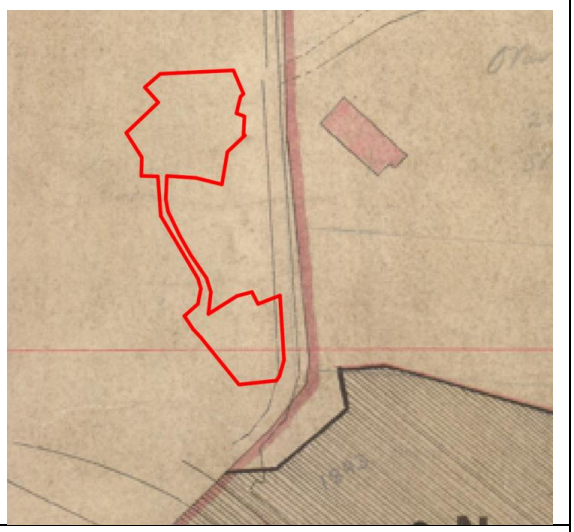

Figure 4.2 MA Plan - Walbottle Colliery 1915- Workings in the Tilley Coal Seam

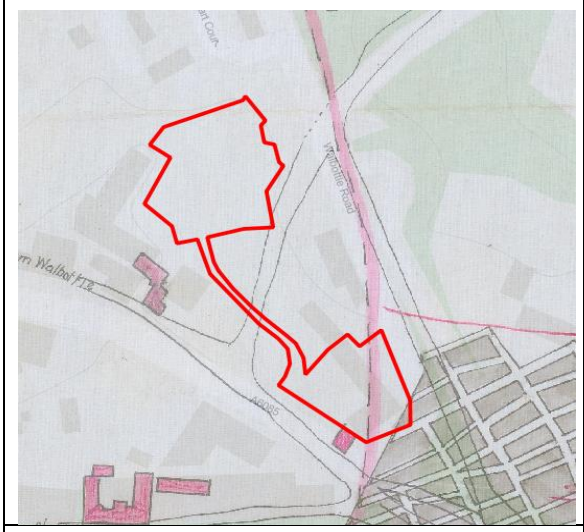

Figure 4.3 MA Plan-Walbottle Percy Colliery 1912- Workings in the Brockwell Coal Seam

Figure 4.4 Isabella Colliery 1912- Workings in the Brockwell Coal Seam

Shown on Figure 4.1 there are recorded workings below the northern section of the site within the Engine seam (also potentially known as Harvey or Beaumont). Also, shafts 417565-017/018 are recorded as Engine Seam, therefore there is the possibility of unrecorded workings in proximity of these mine shafts following the dip of the seam, potentially associated with early exploration to confirm if viable workings are present, or actual unrecorded workings.

As shown on Figure 4.1, "Old Workings" are shown to encroach the north east corner of the site, the MA plan referenced Union Pit and '*drift from Hodge Seam length* 50 *to* 60 *yards*' . The BGS mapping for Newcastle Upon Tyne (Sheet 20) 1:50,000 and 1:10,0000 referenced the Hodge Coal Seam as potentially being present above the Tilley Seam and below the Harvey Seam. The reference of 50 to 60 yards suggests that the seam could be present at 45m below ground and based on the south east/east dip of seams within the area these Old Workings are likely to be at a substantial depth which will not pose a risk to the proposed development.

Figure 4.2 shows workings within the Tilley Coal Seam associated with the Walbottle Colliery from 1915. Recorded workings within the Tilley are shown off-site to the south east of the road which runs adjacent to the east of the site.

Figure 4.3 and Figure 4.4 show workings within Brockwell Coal Seam in both Walbottle/Percy Colliery and Isabella Colliery. Roof and Pillar workings within Brockwell are shown in the centre and south of the site on MA plan NC197_999999_Part B within the Isabella Colliery. Roof and Pillar Workings are also shown on the MA Plan 10014_999999 within the Brockwell Coal Seam encroaching in the south east of the site. The Coal Authority records outlined in Table 3.1 states that workings in the Brockwell Coal Seam in Isabella are at 62m bgl and in Walbottle are 74m bgl. Both MA plan state that the average seam thickness is in the order of 0.90m to 1.20m, therefore they are unlikely to impact the proposed development,

5. COAL MINE GASES

5.1 Mine Gas

In accordance with the CL:AIRE guidance (Good practice for risk assessment for coal mine gas emissions, 2021) the risk of mine gas emissions from site has been classified as high risk due to the following reasons:

- There may be recorded workings present beneath the site associated with the Harvey, and Top Busty Coal Seams and unrecorded workings associated with the Tilley Coal Seam which may be a source of mine gas;
- The coverage of low permeability Glacial Till is unproven onsite and may be <5.00m bgl when accounting for potential construction depth including service trenches/ foundations; and
- Mine shaft 417565-017 is present onsite and 417565-018 is either onsite or within close proximity. The shafts may act as a source of mine gas, as mine fluxes travel vertically to the surface through permeable backfill and then horizontally permeable Made Ground.

There is a high risk of elevated mine gas concentrations associated with recorded workings within the Harvey and Top Busty Coal Seams and possible unrecorded workings, due to the limited knowledge of superficial thickness overlying the subcrop and the groundwater regime. Unflooded disturbed/worked coal seams pose a risk of mine gas fluxes. Furthermore, fluctuating groundwater within flooded seams can also lead to the release of mine gas.

Mine gas could utilise permeable beds in the natural Glacial Till/Weathered Bedrock or permeable Made Ground as a preferential pathway. There is also the potential for mine gas to utilise service runs, foundations or gaps in construction as a preferential pathway. Mine gas could also be sourcing through the onsite mine entry onsite or in close proximity and utilising permeable Made Ground to move vertically and horizontally,

If shallow mine workings are disproven by ground investigation the risk of mine gas may be reduced to low, if it can also be shown that the unrecorded workings are permanently flooded or a sufficient thickness of impermeable strata is confirmed. Impermeable strata including Glacial Till and/or weathered mudstones comprising clays will restrict vertical migration of mine gas. Additionally, a permanent groundwater body within the shallow workings would mitigate gas risk as static flooded workings will limit the supply of oxygen and subsequent transport of gas.

5.2 Spontaneous Combustion

In order to identify if any of the coal seams beneath the site are prone to spontaneous combustion, reference has been made to The Coal Authority's 'Coal seams with a history of spontaneous combustion' register https://www.gov.uk/government/publications/coal-seams-with-a-history-of-spontaneous-combustion.

The Harvey/Tilley or Top Busty Coal Seams are not regarded as at high risk from spontaneous combustion.

6. IDENTIFICATION AND ASSESSMENT OF SITE-SPECIFIC COAL MINING RISKS

6.1 Mining or mineral extraction

The information collected from the desk-based sources has been collated and a site-specific coal mining risk assessment has been prepared. The risk assessment is summarised in Table 6.1 below.

Table 6.1: Coal Mining Risk Assessment

Coal Mining Issue	Y/N	Risk Assessment		
		Probability	Consequence	Comments
Shallow underground coal mining including unrecorded workings (<30m deep).	Y	Medium to High	High	• The Harvey and Top Busty Coal Seams are recorded as worked seams by the CA. Consequently, shallow mining risks exist to the proposed development • There is a possibility of unrecorded workings within the Tilley Coal Seam given the seams location subcropping close to the north of the site. • The site redevelopment will include concrete plinths with heavy batteries and also a substation. To confirm the risks to the proposed development, investigations should be undertaken to assess the presence of shallow mine workings.
Other underground mining including unrecorded workings.	N	Low	Low	• The coal authority holds no records for Ironstone Workings upon the site. Therefore, workings other than coal extraction is not considered to pose a risk to the site.
Mine entries (shafts and adits).	Y	High	High	• Mine shafts 417565-017 is present onsite and 417565-018 could be present onsite. • The Coal Authority hold no records of capping or treatment for the mine entries located onsite or within potential influencing distance of the site. • The location of the mine entries will require confirmation, and treatment and capping will likely be required to allow for the proposed development to be constructed.
Coal mining geology (faults).	N	Low	Low	• The closest fault in present 340m north of the site. • The fault does not strike the Harvey, Tilley or Top Busty Coal Seam. • Displacement in this fault will not affect the coal seam subcropping beneath the site or those subcropping in the vicinity.
Mine gas emissions.	Y	High	High	• There is mine gas risk posed by the onsite mineshaft 417565-017 and close possibly encroaching by 417565-018. • Made Ground up to 2.00m likely overlies, 2.00m of Glacial Till. Mine Gas from unrecorded unflooded or partially flooded coal workings could utilise permeable bands in the Glacial Till or potentially granular Made Ground as preferential pathway,

Coal Mining Issue	Y/N	Risk Assessment		
		Probability	Consequence	Comments
				• Excavations associated with services or foundations could constitute a confined spaces. Mine gas could also use gaps in construction as a preferential pathway,
Recorded coal mining surface hazard.	N	Low	Low	• There are no records for coal mining surface hazards onsite. • The available historical mapping or MA plans do not appear to show features likely to be associated with bell pits. • The Groundsure Reports (BritPits) databased indicates that coal workings within the area were wholly underground accessed via shaft or adit.
Surface mining (opencast workings).	N	Low	Low	• There are no records for opencast mine within 500m of the site boundary.

In summary, the CA hold records for shallow workings within the Harvey and Top Busty Coal Seams which may be below the site at shallow depth. There is also the potential for unrecorded workings within the Tilley given its close proximity subcropping to the north of the site.

There is a high risk of hazardous mine gas due to the unknown depth of superficial coverage over the subcrop and the groundwater regime.

It is considered that there will be a suitable thickness of bedrock coverage above the CA recorded underground workings within the Brockwell Coal Seam likely present at 62m and 74m bgl to mitigate risk to the development.

There are no records of treatment provided for the mine entries.417565-017 (onsite) and 417565-018 (on or within close proximity). There is a high risk associated with instability or subsidence from voids or loose or uncompacted backfill in mine entries

7. PROPOSED MITIGATION STRATEGY

7.1 Mitigation Strategy

The risk assessment above in section 5 forms the basis of the proposed mitigation strategy formulated in the next section.

The coal mining risk assessment has identified a number of risks to the proposed development. The mitigation works necessary to address these risks is as follows:

- Confirmation of the locations of mine entries 417565-017 and 417565-018;
- Confirmation of the absence/presence of recorded workings in particular those associated with the Harvey and Top Busty Coal Seam where rock coverage may be insufficient; and
- Confirmation of the absence/presence of unrecorded workings in particular those associated with the Tilley Coal Seam subcropping close to the north of the site.
- If present, confirm the level of risk posed by mine gas from shallow unrecorded coal workings and from the mine entries. This should be undertaken by confirming the backfill presence/condition within the mine entries, characteristics of the ground conditions above mine entries, superficial geology thickness and groundwater regime.

7.2 Ground Investigation

To confirm the mine entry locations and the risks posed by recorded workings associated with the Harvey and Top Busty Coal Seam and possible unrecorded workings within the Tilley Coal Seam, the following ground investigation will be required:

- A series of rotary drilled boreholes across the site, with alignment of holes to investigate the presence/absence of workings and to form cross sections to assess the dip and direction of possible unrecorded seams.
- Undertake a series of trial trenches to confirm the location of the mine entries and to confirm the characteristics of the backfill above or within the entries.
- Where mine entries are not located by trial trenching it will be necessary to undertaken further investigation to confirm their location. This will likely include probe drilling on a tight grid within the departure zone and/or geophysical surveys.

To assess the risk posed by mine gas, response zones will be required to target the following:

- Gas monitoring installation should target shallow coal seams should suitable thickness of low permeability Glacial Till above the subcrop, this will allow for the assessment of mine gas risk posed by the subcropping coal seams.
- Boreholes should also be installed within the Made Ground or Glacial Till to assess the potential for horizontal mine gas fluxes.

During the investigation of possible mine workings, it should be noted that these activities could have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground investigation works.

It will be necessary to undertake any investigation works under a permit issued by the Coal Authority and subject to a fee. A permit will be issued on the condition that the works accord with the recent Coal Authority publication, “Guidance on Managing the risk of Hazardous Gases When Drilling or Piling Near Coal”.

As part of any future investigation works an allowance should be included for reinstating the rotary holes on completion with bentonite to mitigate against the creation of preferential pathways to the surface for mine gases. Guidance related to borehole decommissioning can be found in the Environment Agency, 2012, Good Practice for decommissioning redundant boreholes and wells.

7.3 Possible remedial works

Following the findings of the ground investigation, the following remedial works may be required to address the risk posed by coal mining:

- Treatment via grouting and capping of mine shafts onsite in accordance with a drilling and grouting specification. A cap should be designed by a structural engineer;
- Stabilisation of shallow mineworkings by grid drilling and grouting;
- Installation of suitable ground gas protection measures if there is a risk from elevated mine gas concentrations present; and
- Selection of appropriate foundation and ground floor slab design in view of the shallow depth of the workings that may be present.

The mitigation strategy will require agreement with the Local Authority as part of the planning process and the Coal Authority may be consulted where a significant risk is perceived or where filling and capping of abandoned mineshafts is proposed for subsequent conveyancing to the Client.

7.4 Aggressive ground conditions

Shallow coal workings have the potential for pyrite which has the potential to produce oxidisable sulphates, leading to the formation of aggressive ground conditions for concrete in certain circumstances. Buried concrete should be designed in accordance with BRE Special Digest 1 (2005) to ensure suitable protection is provided to concrete against aggressive ground conditions.

8. CONCLUSIONS

In conclusion, there is a high risk of shallow recorded coal workings in the Harvey and Top Busty coal seams and unrecorded workings within the Tilley Coal Seam. Subsidence associated with voids within partially backfilled mine entries is also considered a high risk at this stage. A summary of the main risks is presented below.

The main risks to be addressed are:

» collapse at surface/possible subsidence due to upward migration of voids in workings within recorded or unrecorded workings in shallow coal seams (Harvey, Tilley and Top Busty);

» collapse of mine entries and the potential for damage to proposed structures;

» stability risk due to existing surface hazards and unconfirmed geological conditions; and

» high risk to surface posed by displacement of mine gases within the shallow subcropping seams or partially backfilled mine entries.

The ground investigation proposed is to consist of:

- intrusive rotary open-hole drilling including rotary coring and probing to confirm conditions and determine extent of unrecorded workings requiring treatment with reference to the proposed development layout;
- installation of gas monitoring in rotary boreholes, targeting shallow seams should a suitable thickness of impermeable Glacial Till be absent;
- targeted window sample boreholes with gas monitoring installations across the site to assess potential preferential pathways for mine gas within the shallow Made Ground or Glacial Till; and
- targeted trial trenched at the CA locations and across the departures to confirm the locations of mine entries 417565-017 and 417565-018. It is recommended that a contingency is allowed for to include additional probe drilling in order to locate mine entries.

9. REFERENCES

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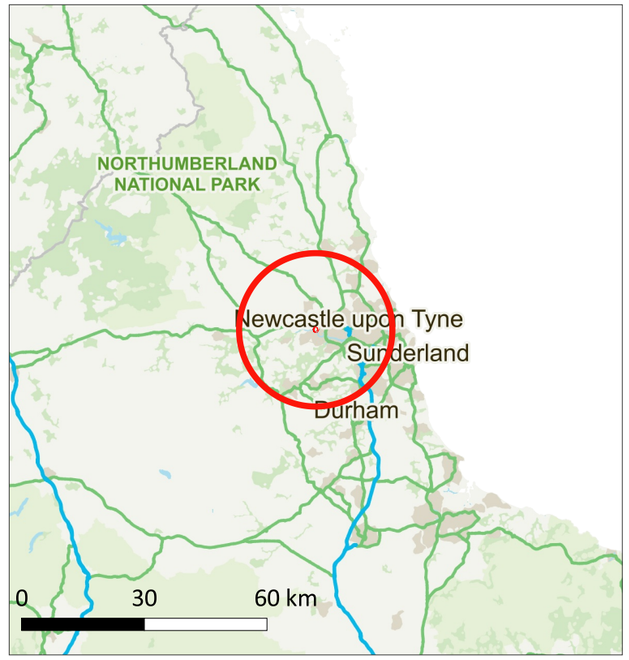
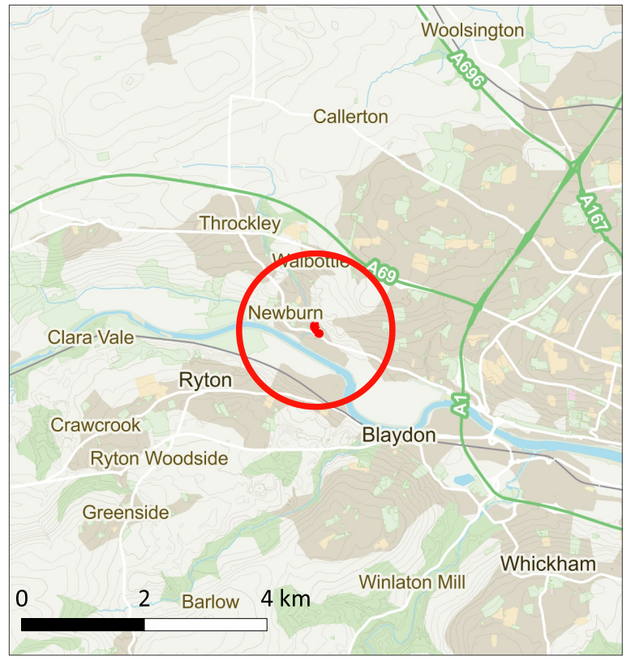
Appendix A

Drawings





KEY PLAN

Site Boundary

NOTES

1. Contains OS data © Crown copyright and database right (2022)

REVISIONS

REV.	DRAWN BY INITIALS	CHECKED BY INITIALS	DATE	REVISION NOTES/COMMENTS
P01	RS	AC	29.01.24	First issue

Hydrock

TITLE
SITE LOCATION PLAN

HYDROCK PROJECT NO.
29911

SCALE @ A3
1:1,500

CLIENT
Fig Power

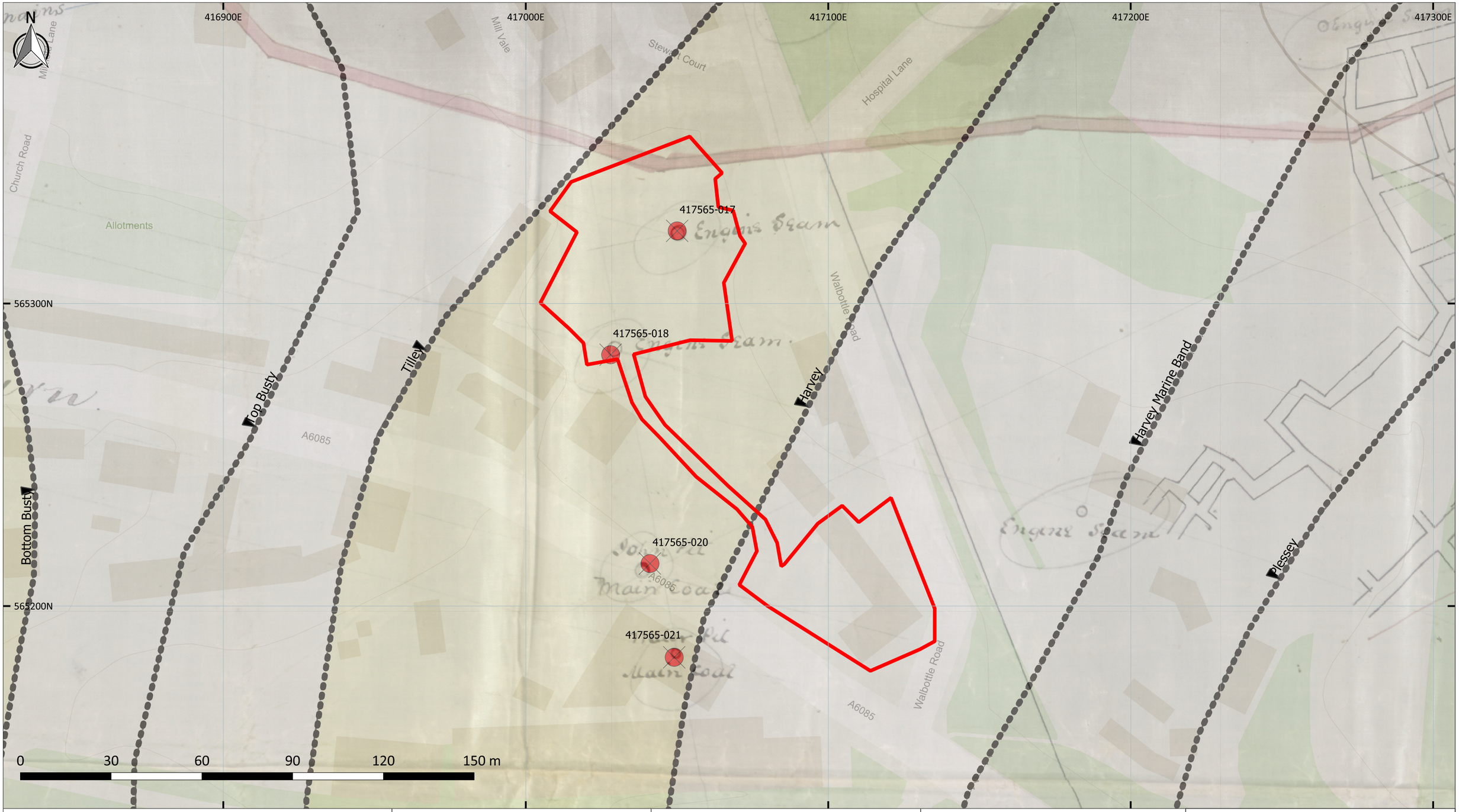
PURPOSE OF ISSUE
SUITABLE FOR INFORMATION

STATUS
S2

PROJECT
Walbottle Road, Newburn

DRAWING NO.
29911-HYD-XX-XX-DR-GE-0001

REVISION
P01



KEY PLAN

Site Boundary [1]

Proposed Locations [4]

Mine Shaft [4]

Current Site Features (Line)

Coal Seam

NOTES

1. Contains OS data © Crown copyright and database right (2022)
2. Includes the mine abandonment plan referenced MA Plan (832_999999_2 of 9) which records the onsite mine shafts.
3. Backdrop also includes the 1:50,000 scale BGS bedrock map.

REVISIONS

REV.	DRAWN BY INITIALS	CHECKED BY INITIALS	DATE	REVISION NOTES/COMMENTS
P01	RS	LM	02/02/24	First issue

Hydrock

TITLE
Coal Constraints Plan

HYDROCK PROJECT NO.
29911

SCALE @ A3
1:1,200

CLIENT
Fig Power

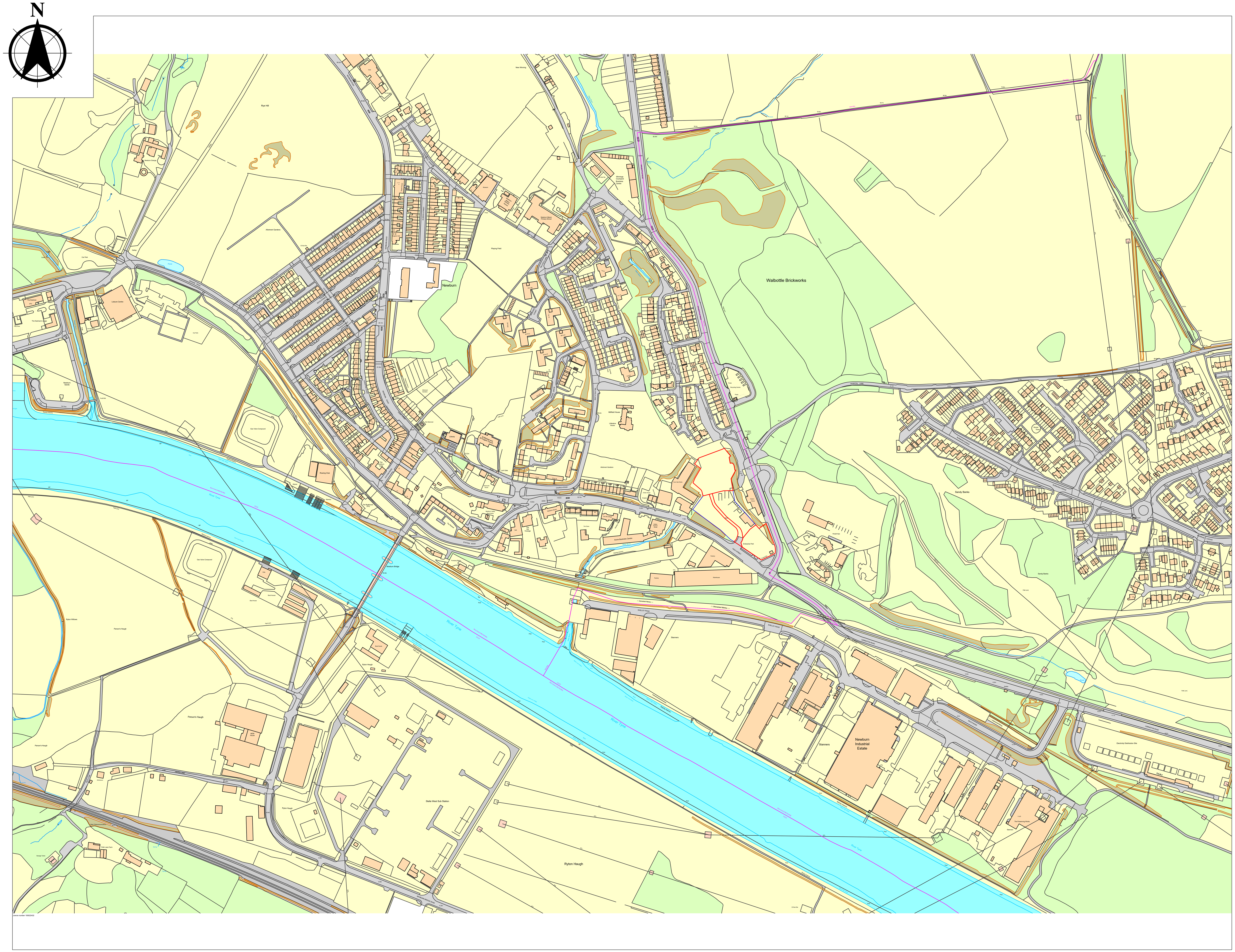
PURPOSE OF ISSUE
SUITABLE FOR INFORMATION

STATUS
S2

PROJECT
Walbottle Road, Newbuen

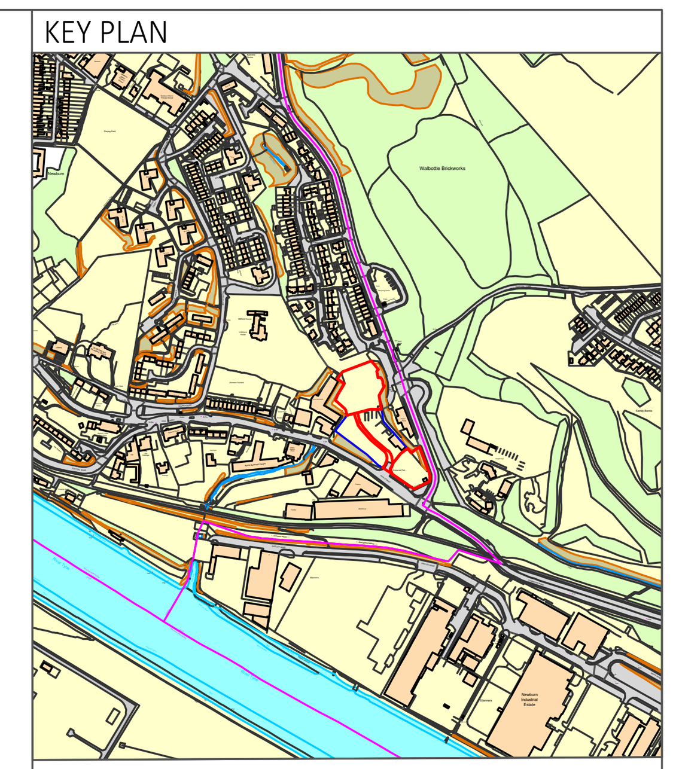
DRAWING NO.
29911-HYD-XX-XX-DR-GE-0003

REVISION
P01



1:2000 @ A1
1:4000 @ A3
0 20 40 60 80 100 120 140 160 180 200 m

KEY PLAN



NOTES

LEGEND

RED LINE BOUNDARY

LANDOWNER BOUNDARY

REVISIONS

REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P01	INITIAL VERSION					
	LGD	08/11/2023	XX	XX	XX	XX

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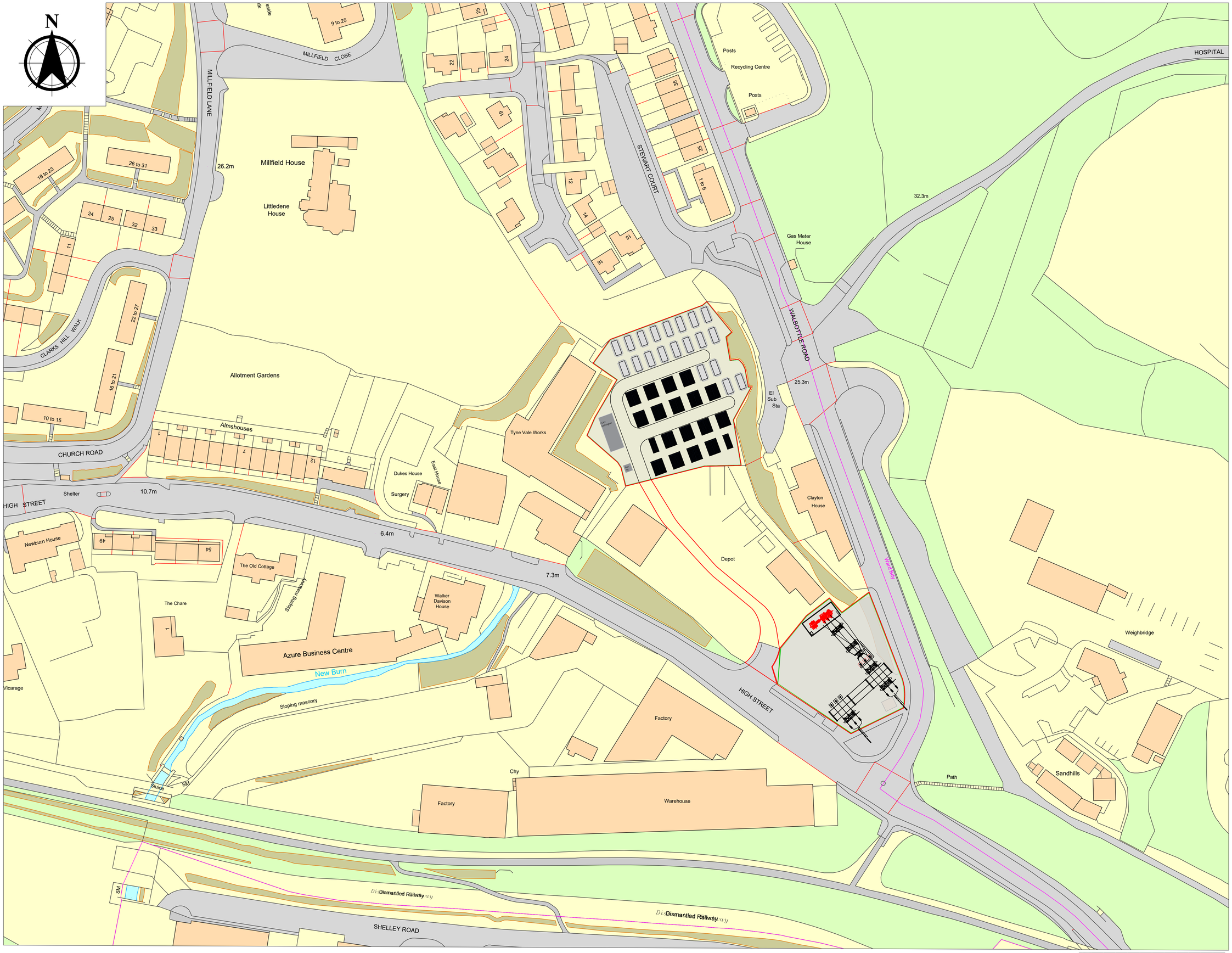
PROJECT
NEWBURN
BATTERY ENERGY STORAGE SYSTEM

TITLE
LOCATION PLAN

HYDROCK PROJECT NO.	SCALE @ A1	PAGE NO.
29911	1:2000	X:XXX

STATUS DESCRIPTION	STATUS
FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
2991-FIG-DR-0004	P01



1:500 @ A1
1:1000 @ A3
0 5 10 15 20 25 30 35 40 45 50 m

KEY PLAN

NOTES

Any equipment shown is indicative of dimensions and general appearance and may be subject to minor amendments by the manufacturer or supplier

LEGEND

- BATTERY
- PCS AND TRANSFORMER
- CONCRETE PLINTHS
- HARDSTANDING AREA
- FENCE
- GATE
- ON SITE SUBSTATION

REVISIONS

REV	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P01	INITIAL VERSION					
	CL	22/01/24	XX	XX	XX	XX

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CLIENT
FIG POWER

PROJECT
NEWBURN
BATTERY ENERGY STORAGE SYSTEM

TITLE
SITE LAYOUT
FOR OPERATION

HYDROCK PROJECT NO.	SCALE @ A1	PAGE NO.
29911	1:500	X:XXX

STATUS DESCRIPTION	STATUS
FOR INFORMATION	S2

DRAWING NO. (PROJECT-CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
2991-FIG-DR-0006	P01

Appendix B

Coal Authority Consultants Mining Report

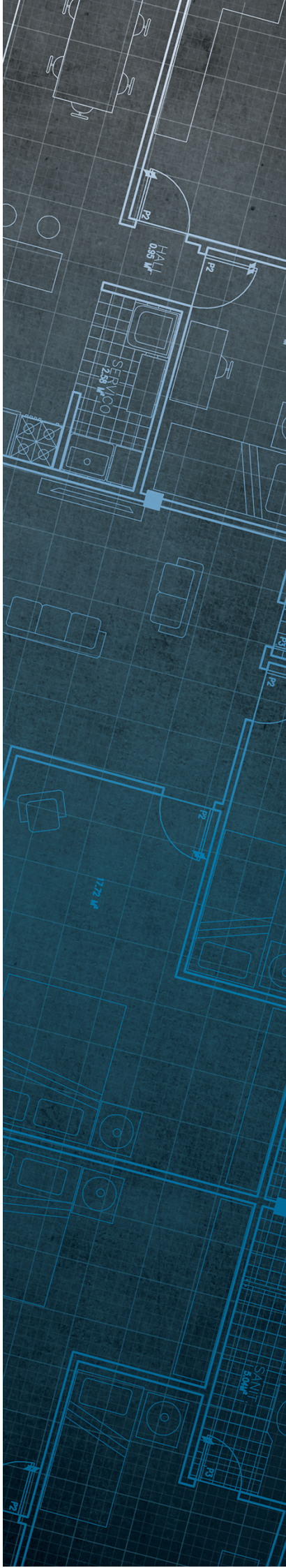
The Coal Authority

Consultants

Coal Mining Report

Walbottle Road, Newcastle Upon
Tyne
Tyne & Wear
NE15 8HH

Date of enquiry:	**21 November 2023**
Date enquiry received:	**21 November 2023**
Issue date:	**21 November 2023**
Our reference:	**51003390770001**
Your reference:	**HYD-6HT-A7V-A2S-ENT**



Consultants

Coal Mining Report

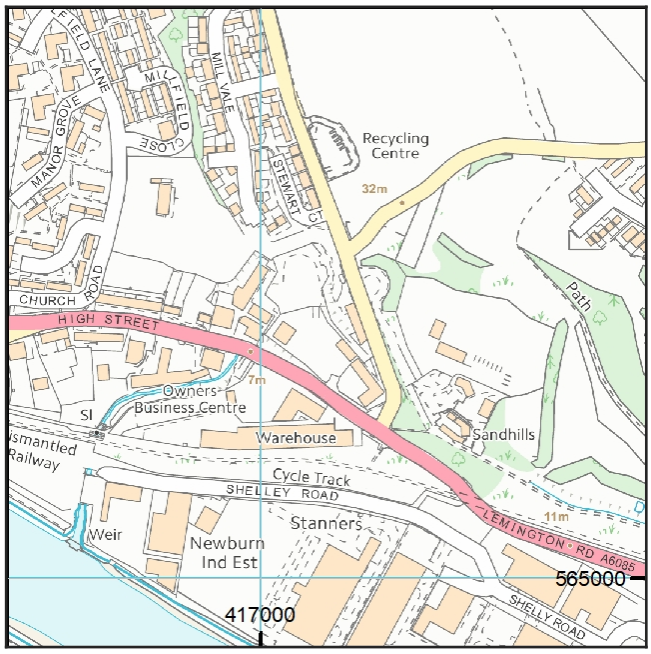
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

Walbottle Road, Newcastle Upon Tyne
Tyne & Wear
NE15 8HH



Approximate position of property

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/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
THROCKLEY	TOP BUSTY	Coal	5WVR	20	East	0.0	East	80	1907
WALBOTTLE	HARVEY	Coal	5WSU	21	North	4.7	South-East	117	1888
PERCY	BROCKWELL	Coal	5JMP	52	South-East	11.7	South-East	117	1931
unnamed	BTM. BUSTY	Coal	5FFZ	53	North	2.3	South-West	170	1955
ISABELLA	BROCKWELL	Coal	5JMV	62	Beneath Property	1.6	South-East	135	1949
WALBOTTLE	BROCKWELL	Coal	5JMX	74	North	0.0	East	135	1947
PERCY	TILLEY	Coal	5VPD	89	South-East	4.1	South	91	1947

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	417565-010	417012 565441		Coal	
Shaft	417565-011	417014 565432		Coal	
Shaft	417565-012	417021 565419		Coal	
Shaft	417565-013	417064 565445	It is believed that the shaft is filled but we have no record of any details.	Coal	
Shaft	417565-014	417094 565399		Coal	
Shaft	417565-017	417050 565324		Coal	
Shaft	417565-018	417028 565283		Coal	
Shaft	417565-019	417190 565229		Coal	
Shaft	417565-020	417041 565214		Coal	
Shaft	417565-021	417049 565183		Coal	

Abandoned mine plan catalogue numbers

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

10014	832	NC254
NC194	8920	10132
12028	NC197	R328B

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

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
HARVEY	Coal	Yes	Within	N/A	24
TILLEY	Coal	Yes	9.1	North-West	206
TILLEY	Coal	Yes	14.1	West	221

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.

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

Distance to site investigation (m)	Direction
2.6	North-East

See Section 4 for further information.

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.

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 in an area where a notice to withdraw support was given in 1945.

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.

Section 4 – Further information

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

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

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.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

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.

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. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

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.

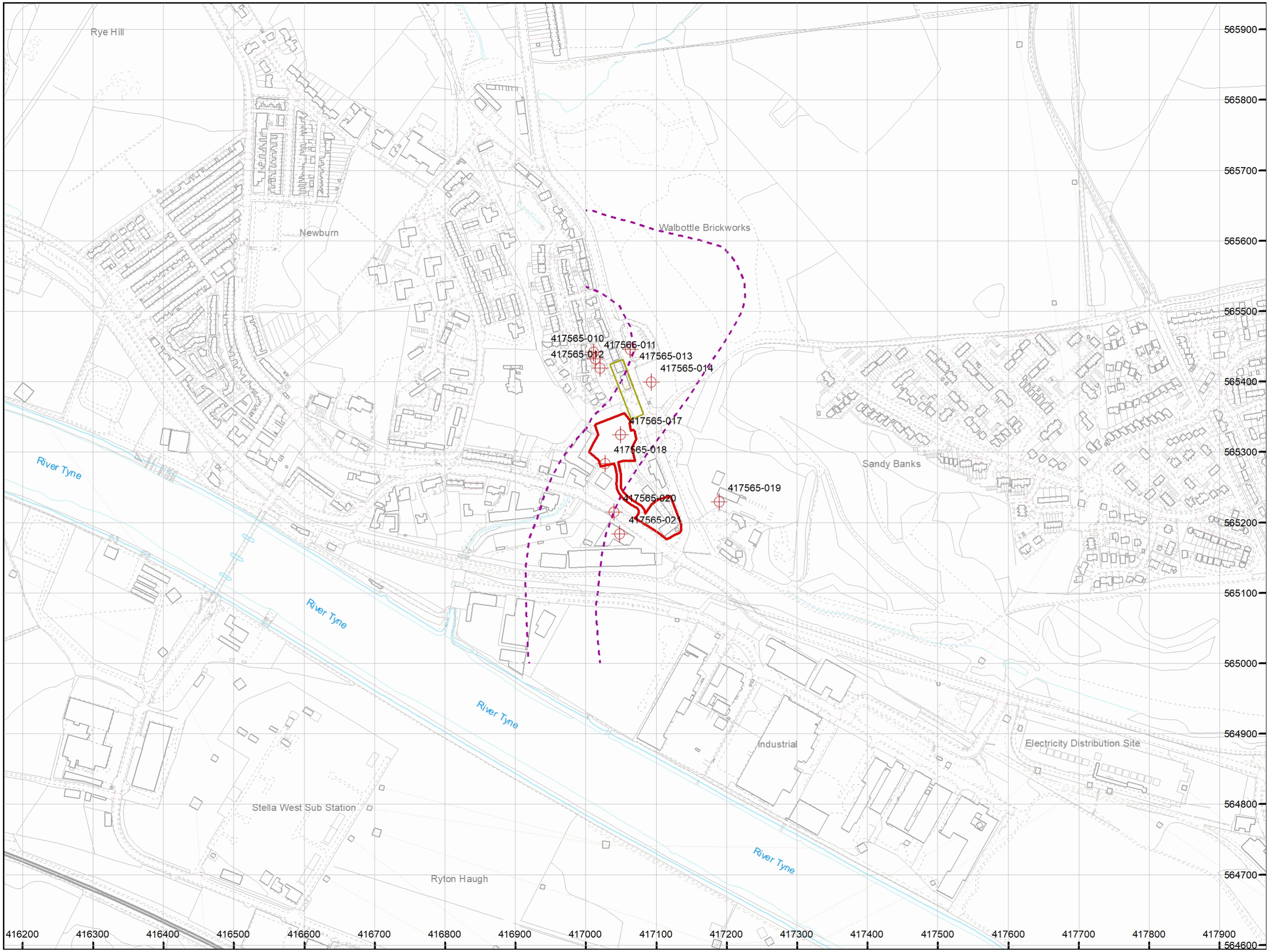
The Coal Authority

Summary of findings

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown
- Disused mine shaft
- Outcrop (Conjectured)
- Site investigations



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

Appendix C

Mine Abandonment Plans


PLAN
OF PART OF
ENGINE SEAM
WALBOTTLE COLLIERY
Engine Seam
supposed
to be
Worked

THROCKLEY "PERCY" COLLIERY FORMERLY WALBOTTLE COLLIERY

12028c

NORTHUMBERLAND

PLAN OF WORKINGS IN THE TILLEY SEAM

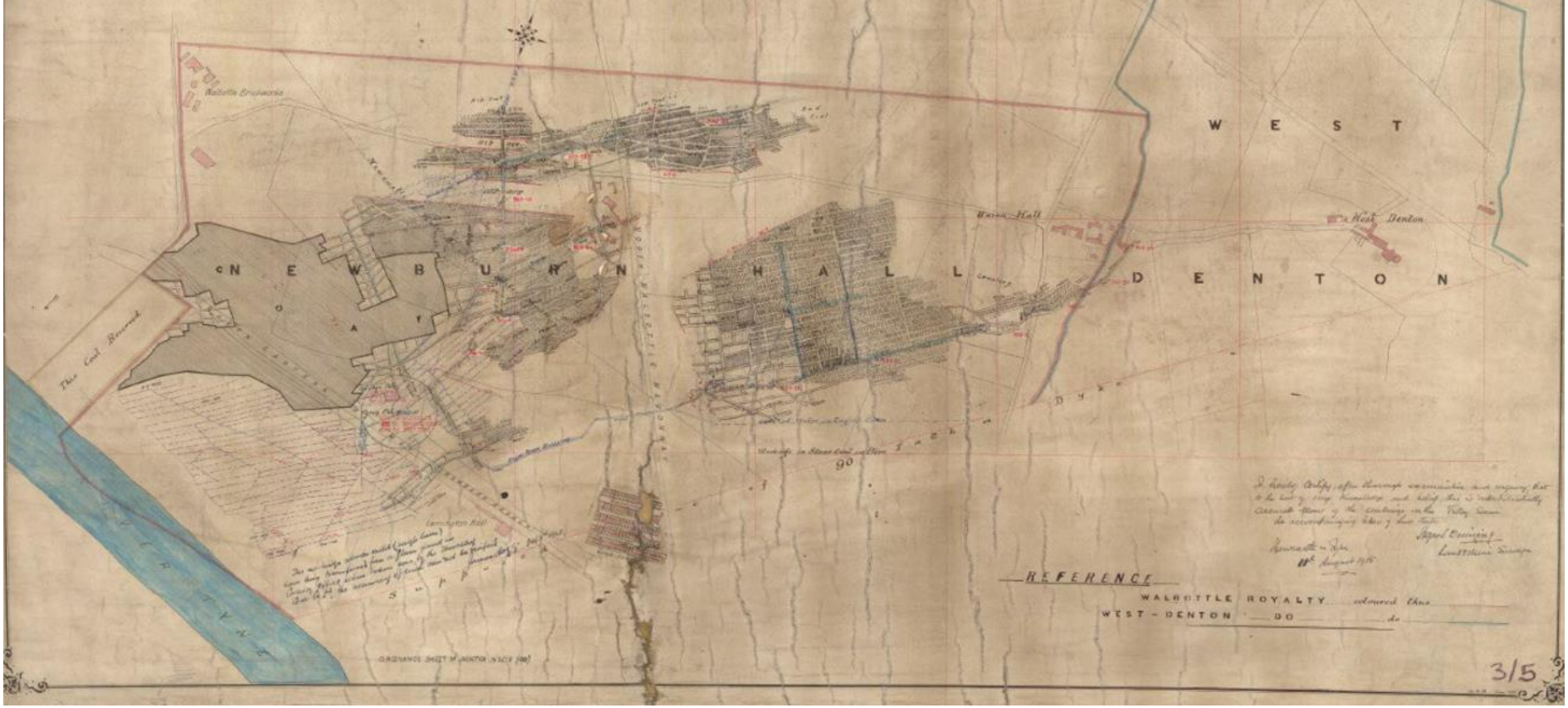
SCALE 3.160 CHAINS PER INCH

or

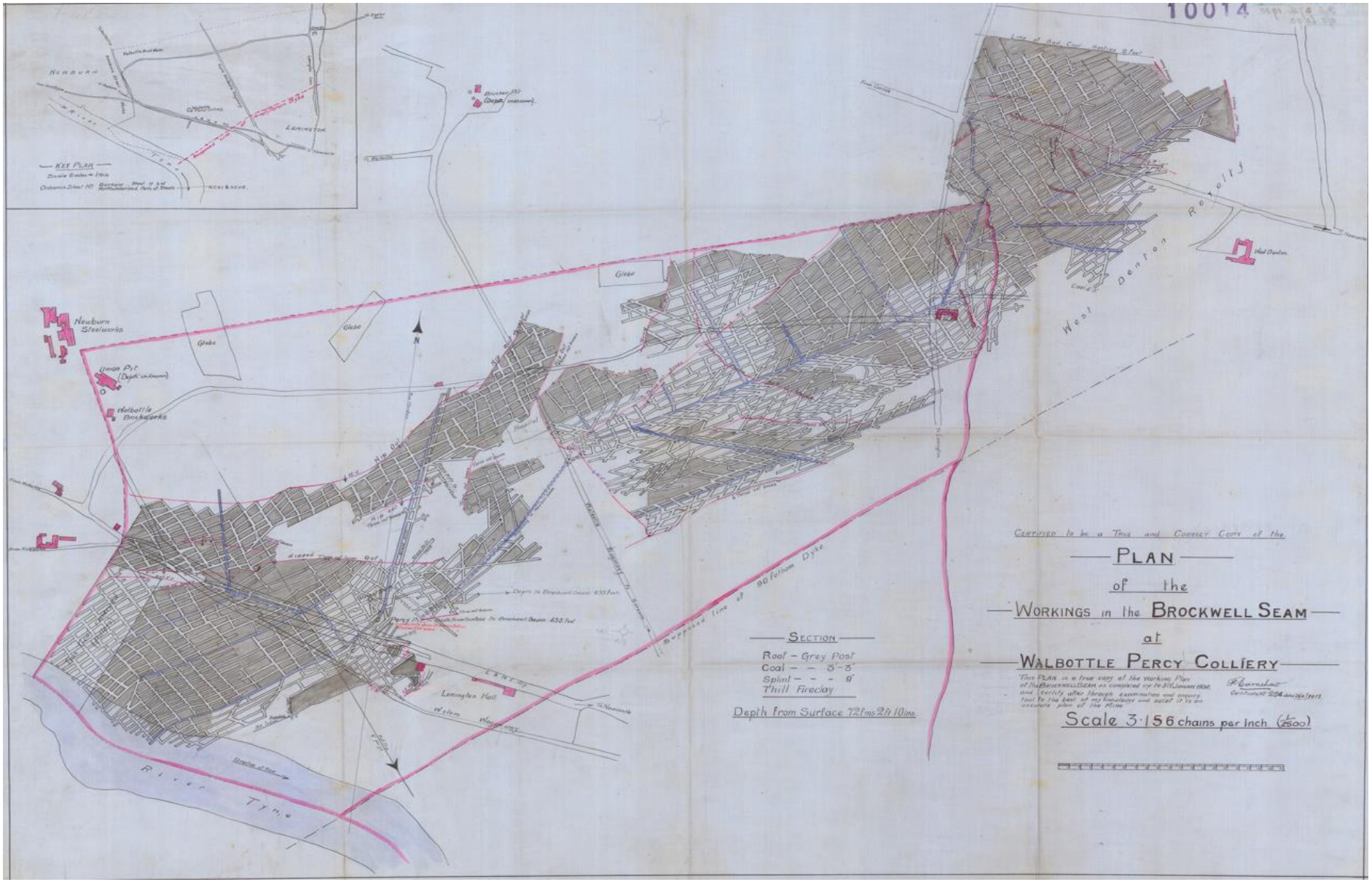
1/2600

SECTION OF SEAM

DEPTH FROM SURFACE 90.0.0



3/5


10014
Newburn
Key Plan
Newburn Steelworks
Union Pit (Depth unknown)
Holbottle Brickworks
Glebe
Lamington Hall
River Tyne
West Denton Colliery
Section
Roof – Grey Post
Coal – – 3'-3"
Splint – – 9"
Thill Fireclay
Depth from Surface 72 fms 2 ft 10 ins
Certified to be a True and Correct Copy of the
PLAN
of the
WORKINGS in the BROCKWELL SEAM
at
WALBOTTLE PERCY COLLIERY
Scale 3·156 chains per Inch. (1/2500)


NC197
NC197
THROCKLEY ISABELLA COLLIERY
PLAN OF WORKINGS IN THE
BROCKWELL SEAM
SCALE :- 1/2500