

Grimethorpe, Barnsley

Coal Mining Risk Assessment





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Coal Mining Risk Assessment

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EXECUTIVE SUMMARY

The Site	The site is located to the west of Engine Lane, Grimethorpe, Barnsley, S72 7BN approximately 10km northeast of Barnsley. It currently comprises grassland, scrubland and is an area of 12.54 ha.
Site History	The earliest map of 1854 indicates the site to be agricultural fields. From 1904 to 1955, a railway ran through the northeast corner (across access road) of the site. From 1966 to 1982, opencast workings surrounding begins and encroaches on to the site. Further expansion of colliery works onto the site from 1988 to 1992. In 2010, there are 'man-made' ponds present on the site.
Geology	<ul style="list-style-type: none"> • Made Ground comprising Made Ground (Undivided) and Infilled Ground. • Superficial strata comprising Quaternary Alluvium in the far North-East mainly over Ferry Moor Lane section of the site and to the North-West in a separate isolated section. • Bedrock Strata consisting of Pennine Middle Coal Measures. • Two Coal Seams are recorded as outcropping the superficial soils within the site boundary (Highgate Coal and Shafton Main Coal Seams). <p>Two faults are present within the site trending in a NW-SE direction, down throwing strata to north.</p> <p>No historical ground investigations have been provided to Tetra Tech.</p>
Coal Authority Search Information	<p>A Consultants Mining Report provided by the Coal Authority details:</p> <ul style="list-style-type: none"> • Highgate Coal Seam and Shafton Coal are recorded as outcropping onsite. • Opencast workings are recorded on the site, potentially undertaken in Highgate Coal Seam and Shafton Coal seam. There is a risk of excessive total settlement and differential settlement associated with backfill area. • Underground mining of 8 no. coal seam took place beneath the site at a depth from 34m to 373m. The shallow mining undertaken in Shafton Coal Seam (34m to 64m) was undertaken at a depth which is considered to potentially present a risk to site. Although more than 17m of competent bedrock overlies the seam and it may be sufficient to mitigate any collapse there is a still a risk of instability due to shallow workings within 40m of ground surface. • There are 2. no identified mine shafts within the site and one identified within 100m of the northeast site boundary. • Two recorded faults on site, which could act as a potential mine gas pathway. • No records of mine gas emissions within 500m however, combustible coal seams, Shafton Coal, Barnsley Coal, Parkgate Coal are present beneath site. • There are 5 no. Coal Mining subsidence recorded within 50m of the site boundary.
Coal Mining Risk	There is a high risk associated with the coal mining legacy onsite however, the proposed development does not include any structures and is limited to placing fill material to achieve a profile for tree planting. As such, the risk to the development posed by the coal mining legacy is low but higher in the locations of former shafts.
Recommendations	The proposed site development is understood not to include any excavation of site materials or construction of buildings but to comprise of the import and placement of soils to facilitate tree planting. As a result, the risk to construction workers and future site users is expected to be low from the chemical nature of the fill and any subsidence at the site. Planned activities in the locations of the identified mine entries should include a watching brief.

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DRAWINGS

B034815-TTE-00-XX-DR-U-0001-P01 (Site Location Plan)

B034815-TTE-00-XX-DR-U-0002-P01 (Site Boundary Plan)

THIRD PARTY DRAWINGS

Drawing No. 901.02A/ Existing Site Levels dated 14th September 2023 by Weller Designs Ltd.

Drawing No. 901.03A/Grading Plan dated 14th September 2023 by Weller Designs Ltd.

Drawing No. 901.05A/Cross sections dated 14th September 2023 by Weller Designs Ltd.

Drawing No. 901.07 Rev B/Masterplan dated 14th September 2023 by Weller Designs Ltd.

APPENDICES

APPENDIX A – REPORT CONDITIONS

APPENDIX B – COAL AUTHORITY CONSULTANTS REPORT

APPENDIX C – HISTORICAL MAPPING

1.0 INTRODUCTION

1.1 INSTRUCTION

Most of the site area is in a Development High Risk Area as designated by the Coal Authority. Tetra Tech Ltd (Tetra Tech) was commissioned by the Oakland Golf and Leisure UK Ltd (the Client), to undertake a Coal Mining Risk Assessment for the site known as Grimethorpe, Barnsley, S72 7BN (known hereafter as “the site”). The location of the site is shown on Drawing B034815-TTE-00-XX-DR-U-0001-02 (Site Location Plan).

1.2 BRIEF

The brief was to provide a Coal Mining Risk Assessment Report to determine the level of coal mining risk onsite and identify any mitigation required for the proposed development. The report will detail the coal mining legacy, ground conditions and identify any residual coal mining risk.

A desk study was also commissioned and is reported as :

- Geo-Environmental Desk Study Assessment for Grimethorpe, Barnsley prepared by Tetra Tech on behalf of Oakland Golf and Leisure UK Ltd Report Reference: B034815.DS.1 Date: October 2023

1.3 PROPOSED DEVELOPMENT

The site currently comprises grassland, scrubland and is located to the west of Cudworth to the east of Grimethorpe. It is understood that the proposed development is the landscaping of the site including the importation of 430,300m³ of soils and inert materials in order to facilitate outdoor recreational uses in a restored landscape.

1.4 REPORT SCOPE

In line with the requirements of the Coal Authority, a Coal Mining Risk Assessment is required to address the potential hazards created by the coal mining legacy.

The purpose of this risk assessment is to:

- Present a desk-based review of information on the coal mining issues which are relevant to the proposed development across the site;
- Use that information to identify and assess potential hazards arising from coal mining legacy issues, including the cumulative impact of issues;
- Set out appropriate mitigation measures to address any revealed hazards, including the need for physical site investigations and remedial works; and,
- Demonstrate to the Local Planning Authority that the site is, or can be made, safe for the intended development.

1.5 SOURCES OF INFORMATION

The sources of information detailed below have been used to inform this risk assessment. The red boundary is as detailed by Drawing No. B034815-TTE-00-XX-DR-U-0002-02 (Site Boundary Plan).

- Coal Mining Consultants Report (GS-JYS-7U8-ANB-FJA) enclosed as Appendix BB.
- Groundsure Report (report ref: GS-EQE-SP1-RZ9-BLY) incorporating historical OS mapping enclosed as Appendix C.
- British Geological Survey (BGS) Sheet No. 87 (Barnsley) Bedrock and Superficial 1:50,000 dated 2008.

- Coal Authority Interactive Mapper (The Coal Authority, 2022), accessed 05/10/2023.

1.6 LIMITATIONS

The recommendations and opinions expressed in this report are based on information obtained as part of the desk study or provided by others. Information provided from other sources is taken in good faith and Tetra Tech cannot guarantee its accuracy.

This report is subject to the report conditions presented in Appendix A.

The information contained in this report is intended for the use of Oakland Golf and Leisure UK Ltd, and Tetra Tech can take no responsibility for the use of this information by any third party or for uses other than that described in this report or detailed within the terms of our engagement.

2.0 SITE INFORMATION

2.1 LOCATION

The site is reviewed and described in detail by the Tetra Tech Desk Study B034815.DS.2 dated October 2023 and is summarised below.

The site is located to the west of Engine Lane, Grimethorpe, Barnsley, S72 7BN. (Grid reference: SE 39889 08652). The site is one area within Grimethorpe, Barnsley with a combined area of 12.54 ha, approximately 10km northeast of Barnsley. A site location plan is presented as B034815-TTE-00-XX-DR-U-0001-02 (Site Location Plan). Table 2-1 below describes the surrounding land uses.

Table 2-1 – Surrounding land uses

Direction	Description
North	Farmland and fields
East	Industrial Warehouse facilities
South	Wind Turbine and Farmland and fields
West	Farmland and fields

2.2 SITE DESCRIPTION

A review of the site has been undertaken using Google Earth imagery dated August 2022.

The site comprises an area of unused land to the west off Engine Lane, Grimethorpe, and mainly consists of grass covered areas with an abundance of trees and vegetation. There is a small network of ditches and evidence of excavations which now contain standing water on the site. The site is currently not in use, however there is a network of hardstanding footpaths/tracks across the site. The site is mainly bound by farmland and fields, however to the east, there are large industrial warehouse units present. The site boundary plan is detailed on B034815-TTE-00-XX-DR-U-0002-02 (Site Boundary Plan).

2.3 SITE HISTORY

Table 2-2 and 2-3 below provides a detailed account of the review of available OS mapping coverage and historical aerial imagery for the site and surrounding areas dating back to 1854.

Table 2-2 – Summary of Site Historical Data

Feature	Map Years	Section	Notes
Farmland	1854 – 1981	Sitewide	Farmland and associated outbuildings were present on the site from earliest mapping, until prior to development in 1981.
Dearne Valley Railway	1904 - 1955	Access road, North-East	Railway became present and ran north-south across the access road to the site from 1904.
Overhead cables	1955	North-East corner	The 1955 map shows a pylon present north of the site with cables running south across the site. The 1967 map no longer records the presence of these overhead lines.
Slurry Ponds	1966-1982	South and East	The Nearby Coal mining operation begins and encroaches on to the site from 1966 mapping.
Possible Open cast Workings	1966-1982	North and West	The Nearby Coal mining operation begins and encroaches on to the site from 1966 mapping.
Tanks, Coal conveyor belts, and associated works.	1988-1992	East side of the site	Further expansion of colliery works onto the site.
Ponds	2010	Central	'Man made' ponds visible on mapping from c.2010.

Table 2-3 – Summary of Surrounding Historical Data within 250m

Feature	Map Years	Location	Notes
Dearne Valley Railway and associated sidings	1904-1955	Running North/South from south-east to north-west of the site.	Railway became present and ran through the north east corner of the site from 1904.
Refuse Heap	1938-1967	6m South-East, 31m East, 19m North-East, 104m North-East 106m North-East	Refuse heap, assumed to be associated with the nearby colliery workings.
Unspecified Tanks	1938-1988	30m South-East, 84m South-East, 93m South-East, 113m South-East, 161m North-East, 237m North-East, 238m North-East, 242m North-East	Many unspecified tanks associated with the nearby colliery works and sewage works.
Tramway Sidings	1930—1948	90m North-East	Tramways associated with the industrial activities in the nearby area.
Pylons	1955	36m Northeast	From 1955 mapping, a pylon and overhead cables are located near the northeast boundary with cables running in a north/south direction.
Sewage Works	1981-1988	212m North-East	Sewage works present on the mapping from 1981.
Coal conveyor belts, and associated works.	1966-1992	10m-250m South-East/East	The Nearby Coal mining operation begins and becomes closer to the site from 1966 mapping.

3.0 PRELIMINARY COAL MINING RISK ASSESSMENT

3.1 INTRODUCTION

The site is located within a coal mining reporting area and the majority of the site is within a Coal Authority Development High Risk Area with respect to shallow coal and potential underlying mine workings. In line with the requirements of the Coal Authority (a statutory consultee under the planning regime), and to assess the risk to development from in-ground abnormalities, a Coal Mining Risk Assessment is required to address the potential hazards created by the coal mining undertaken in accordance with CIRIA C758D, Abandoned Mine Workings Manual dated 2019.

The sources of information reviewed as part of the Coal Mining Risk Assessment refer to the proposed development boundary shown on Drawing No. B034815-TTE-00-XX-DR-U-0002-02 (Site Boundary Plan).

3.2 PUBLISHED INFORMATION

Details of the geology underlying the site have been obtained from the following sources:

- Coal Mining Consultants Report (Reference 51003381887001) enclosed as Appendix BB.
- Coal Authority Interactive Mapper (The Coal Authority, 2022), accessed 05/10/2023.
- Geological Survey of England and Wales 1:63,360/1:50,000 geological map series, New Series: Sheet 87 – Barnsley, Bedrock and Superficial, 2008.
- BGS website (British Geological Survey, 2023), accessed October 2023.
- Groundsure Report (report ref: GS-EQE-SP1-RZ9-BLY)

3.3 GEOLOGY

3.3.1 Made Ground

The BGS mapping and Groundsure data suggests that Made Ground is present on-site. There are two varieties of Made Ground identified on this site, Made Ground (Undivided) and Infilled Ground. The Made Ground (undivided) has been identified to cover the majority of the site from the South and South-East and extending to the central and northern sections of the site. The Infilled ground mainly covers an area from the central to the north-east of the site.

3.3.2 Superficial Geology

The published geological map (Sheet 87, Barnsley, Bedrock and Superficial, 2008) and BGS GeoIndex mapping indicates that there is superficial on site, however the coverage is sparse. Quaternary Alluvium has been identified to be on site in the far North-East mainly over Ferry Moor lane section of the site and also to the North-West in a separate isolated section. Described as 'a general term for clay, silt, sand and gravel. It is the unconsolidated detrital material deposited by a river, stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta, or as a cone or fan at the base of a mountain slope'.

3.3.3 Solid Geology

The published geological map (Sheet 87, Barnsley, Bedrock and Superficial, 2008) and BGS GeoIndex mapping indicates that the site is underlain by the Pennine Middle Coal Measures Formation. The site is underlain by two different strata associated with this formation, one being Sandstone and the other Mudstone, Siltstone and Sandstone. These are both of Duckmatian Sub-age and are described as 'Interbedded grey mudstone, siltstone,

pale grey sandstone and commonly coal seams, with a bed of mudstone containing marine fossils at the base, and several such marine fossil-bearing mudstones in the upper half of the unit.' The sandstone bearing unit underlies the north-west and south-west sections of the site. Whereas the Mudstone, Siltstone and Sandstone unit underlies the central to east sections of the site.

3.3.4 Linear Features

The Coal Authority Consultant Mining Report indicates the presence of significant coal seams beneath the site. The stratigraphic column (BGS Sheet No. 87 (Barnsley) Bedrock and Superficial 1:50,000) also describes the Highgate Coal Seam and Shafton Coal Seam outcrop on site. The recorded seams as anticipated are described by Table 3.1.

Table 3-1 – Summary of Coal Seams beneath the site.

Seam Name	Thickness (m)	Seam workable	Bearing of outcrop (°)	Dipped direction
Highgate	0 – 0.7	Yes	315 – 329	Unknown
Shafton	0.2 – 2.3	Yes	210	East
Winter/Abdy	0.0 – 1.9	Yes	-	East
Low Beamshaw	0.0 – 1.2	Yes	-	East
Meltonfield	0.0 – 1.4	Yes	-	East
Barnsley	0.0 – 3.9	Yes	-	East
Top Haigh Moor	0.0 – 4.3	Yes	-	East
Fenton	0.0 – 4.1	Yes	-	East
Parkgate	0.0 – 3.9	Yes	-	East and Northeast

The Coal Authority Consultant Mining report suggests that there are opencast workings on the north of the site. And some offsite opencast workings area immediately adjacent to the site on the north, south and east.

There are two geological faults present on the 2008 BGS Bedrock and Superficial edition map. The first fault runs west of the site, trending in a northwest to southeast direction, down throwing strata to the north. The second, is a northwest to southeast trending fault is located marginally towards the south-east of the site.

3.4 HISTORICAL BOREHOLE LOGS

There are thirty three BGS borehole logs recorded onsite. Three of the boreholes are found across the length of the site, SE40NW241, SE30NE224 and SE40NW232, are described in the table 4.4 below.

Table 3-2 – Summary of Historical Borehole Records

BGS Reference Number, Depth and Date	Grid Reference, Distance and Direction	Details
SE40NW241, 7.15m, 14/03/1980	440073 408555, On Site, South	0.00-5.50m – MADE GROUND: Generally soft to firm becoming firm dark grey silty CLAY with frequent coal, mudstone and shale fragments, becoming clay bound gravel in places 5.50-7.15m – Highly weathered light grey laminated very weak silty MUDSTONE.

SE30NE224, 7.50m, 26- 27/08/1980	439947 408557, On Site, Central/South	<p>0.00-0.60m – MADE GROUND: Firm, friable, grey and brown silty CLAY with mudstone fragments.</p> <p>0.60-1.60m – MADE GROUND: Stiff brown, grey, silty, sandy, clay with sandstone gravel and occasional coal fragments.</p> <p>1.60-1.80m – Stiff, brown, silty, coaly CLAY.</p> <p>1.80-2.90m – MADE GROUND: Stiff, brown, silty CLAY with mudstone fragments</p> <p>3.80-4.10m – MADE GROUND: Stiff brown silty sandy clay.</p> <p>4.10-5.20m – MADE GROUND: Firm brown silty very sandy CLAY.</p> <p>5.20-6.30m – Very stiff brown grey silty CLAY with small mudstone fragments.</p> <p>6.30-7.50m – Very Weak highly weathered, light brown silty fine SANDSTONE</p>
SE40NW232, 48.00m, 12/05/1980	440192 408482, 33m East	<p>0.00-2.40m – MADE GROUND: firm dark grey silty clay with frequent mudstone gravel.</p> <p>2.40-3.10m – Firm to stiff brown mottled grey silty CLAY (prob. Made ground)</p> <p>3.10-3.50m – Loose black mudstone GRAVEL and coal (prob. Made ground)</p> <p>3.50-4.40m – Stiff brown mottled light grey laminated silty CLAY.</p> <p>4.40-4.45m – Highly to completely weathered grey and brown laminated very weak (stiff) silty MUDSTONE.</p> <p>4.75-6.50m Highly weathered grey laminated very weak silty MUDSTONE.</p> <p>6.50-29.00m – MUDSTONE</p> <p>29.0-29.20m – SHALE</p> <p>29.20-32.00m – MUDSTONE</p> <p>32.0-32.60m – SHALE</p> <p>32.60-32.80m – COAL</p> <p>32.80-35.00m – SHALE</p> <p>35.50-41.00m – MUDSTONE</p> <p>41.00-42.50m – COAL & SHALE</p> <p>42.50-48.00m - MUDSTONE</p>

3.5 HISTORICAL SITE INVESTIGATIONS

No historical ground investigations have been provided to Tetra Tech.

3.6 HISTORICAL MINING

Table 3-3 describes collieries and mining areas in relation to coal on and adjacent to site as described by the Consultants Mining report Appendix B and the historical OS maps in Appendix C. This data has been supplemented by a review of online sources.

Table 3-3 – Summary of Past Underground Mining

Colliery	Year Last Mined	Location	Seams Worked	Depth (m)	Dip of Seam (°)	Extraction Thickness (m)
Ferrymoor	1950	Beneath Site	Shafton	36	4.4 East	160
South Kirkby / Ferrymoor	1966	Beneath Site	Shafton	39	3.9 East	173
Ferrymoor	1949	Beneath Site	Shafton	66	4.0 East	173
Grimethorpe	1971	South-West	Meltonfield	307	4.3 East	101
Grimethorpe	1959	Beneath Site	Winter	325	3.5 East	114
Grimethorpe	1945	Beneath Site	Meltonfield	344	3.0 East	112
Grimethorpe	1956	South	Winter	348	5.6 East	84
Grimethorpe	1945	Beneath Site	Beamshaw Low	353	3.2 East	105
Grimethorpe	1943	Beneath Site	Meltonfield	358	3.3 East	112
Grimethorpe	1945	North-West	Meltonfield	358	3.5 East	112
Grimethorpe	1944	North	Meltonfield	367	3.2 East	129
Grimethorpe	1946	North-West	Meltonfield	367	7.1 East	127
Grimethorpe	1948	South-East	Meltonfield	373	3.1 East	132
Grimethorpe	1943	Beneath Site	Beamshaw Low	376	3.7 East	93
Darfield	1985	South-West	Kent Thick	382	3.6 East	105
Darfield	1982	South	Kent Thick	399	2.8 North-East	108
Grimethorpe	1937	East	Beamshaw Low	407	3.3 East	93
Darfield	1984	South	Kent Thick	413	3.9 North-East	108

Monk Bretton	1900	Beneath Site	Barnsley	449	3.7 East	213
Mitchell	1909	South	Barnsley	472	2.4 North-East	237
Monk Bretton	1942	Beneath Site	Barnsley	473	3.7 East	170
Unnamed	1900	South	Barnsley	480	4.4 North-East	222

Table 3.4 below describes the opencast workings in close proximity to the site.

Table 3-4 – Summary of Surface Ground Workings

Feature	Years Active	Location	Seams Worked
Ferry Moor Revised Reclamation Scheme (Opencast workings)	1966 - 1982	On Site	Possible Highgate Coal and Shafton Coal
		~100 north of site boundary	
		~100 south of site boundary	
		~300m southeast of site boundary	

The following mine entries were identified on site:

Table 3-5 – Mine Entries

Entry Type	Reference	Location (Grid reference)	Mineral	Notes
Shaft	439408-001	Northwest of the site boundary (439712 408712)	Coal	-
Shaft	440408-008	South area of the site (440010 408397)	Coal	Has been filled to an unknown specification
Shaft	440408-015	South area of the site (440039 408429)	Coal	-

3.7 GROUNDSURE DATA REVIEW

The Groundsure report identified Brit Pits for surface mineral working located 194m northwest and 300m east at Ferry Moor Revised Reclamation Scheme. These Brit Pits are likely associate with opencast workings identified in Coal Authority Consultant Mining Report.

3.8 ABANDONMENT PLANS

Abandonment plans have not been obtained for this study. This is because the new landform and planting will not be adversely affected should localised subsidence occur. As a result, relating workings to the development is not necessary for the development.

4.0 IDENTIFICATION AND ASSESSMENT OF SPECIFIC COAL MINING RISKS

4.1 SUMMARY OF POTENTIAL COAL MINING RISKS

The Coal Authority Consultant's Mining Report has obtained for the site which indicates the following pertinent points:

- Highgate Coal sub crops on site in the north of the proposed development area.
- Shafton Coal sub crops on site in the south of the proposed development area and dips to the east beneath the proposed development.
- Other than outcrops, six recorded coal seams underlie the site which may potentially influence land stability.
- Northwest– southeast trending fault located to the west of the proposed development area.
- Northwest– southeast trending fault located to the south of the proposed development area.
- Underground mining beneath the site.
- Opencast workings are recorded on and within 500m of the site.
- Three mine shafts are recorded on site.

4.2 PRELIMINARY RISK ASSESSMENT

Table 4-1 below presents a risk assessment for the principal coal mining issues identified.

Table 4-1 – Potential Coal Mining Legacy Risk Assessment

Coal Mining Issue	Yes	No	Preliminary Risk Assessment
Surface Mining (opencast workings)	Y		<p>The 'Summary of findings' map of Coal Authority Consultant's Mining Report indicates that the site is within the boundary of the Ferry Moor Revised Reclamation Scheme – Ferry Moor Area and Two Gates Area opencast site from which coal has been removed by opencast methods.</p> <p>Highgate Coal and Shafton Coal seam are anticipated as the potential opencast worked seam as they were at a relatively shallow depth.</p> <p>Details of extent and backfill ranges of opencast workings may be available on the Abandonment Plan for the opencast workings and obtained from the Coal Authority if required by future development. There is a risk of undue settlement for area where backfill opencast is present below the proposed imported soil. In addition, where the highwall of the opencast is present, there is a risk of excessive differential settlement.</p> <p>Given the proposed development of importing fill material and placing it onsite the opencast workings aren't likely to present a significant risk to the proposed development as there are no hard structures requiring support/foundations.</p>
Underground Coal Mining	Y		<p>The Consultants Coal Mining Report indicates that the site is in a surface area that could be affected by underground mining in 8 seams beneath the site at 34m to 737m depth, and last worked in 1981.</p> <p>The shallowest recorded underground coal workings are in the Shafton coal seam. The Consultants Coal Mining Report indicates that the coal seam was worked at a depth of 36m and had an extraction thickness of 1.73m. Table 3-2 shows the head of bedrock are generally at a relative shallow depth between 1.1m to 5.5m bgl, only one borehole recorded the</p>

			<p>deepest bedrock head was at the depth of 8.0m bgl. Therefore, based on CIRIA C758D and adopting the 10x seam thickness rule, adopting the most conservative scenario, it is anticipated that there is more than 17m of competent bedrock overlies the seam.</p> <p>The next shallowest named coal seam below the site is the Winter Coal, which has a record thickness of between 0.0m and 1.9m. The seam separation between the Shafton Coal is approximately >200m. On this basis, it is not considered that any coal seams below the Shafton will present a risk to the surface stability of the site.</p> <p>Given the proposed development of importing and placing fill material onto site, the workings recorded within 40m of the surface have either been removed by opencast mining or are unlikely to present a significant risk of instability to the proposed development as there are no hard structures requiring support/foundations.</p>
Mine Entries (Shafts or Adits)	Y		<p>There are 2 no. shafts recorded as being onsite:</p> <ul style="list-style-type: none"> • 440408-015 – south area of the site recorded as being infilled to an unknown specification. • 440408-008 – south area of the site <p>An additional shaft is shown just outside the northwestern site boundary (439408-001).</p> <p>Subject to a review of the proposed masterplan of the site, it is recommended that the shafts are located and subject to the proposed landuse of the area are treated (if located beneath car parking space etc) or fenced off with suitable fencing to prevent access in wider areas.</p>
Coal mining geology (fissures)		N	<p>There are no recorded mining induced fissures recorded onsite.</p> <p>Both BGS Sheet 87 and the Coal Authority Consultants Mining report describe two northwest-southeast trending faults, down throwing strata to the north cross the site from northwest to southeast.</p> <p>The proposed development has no hard structures requiring support/foundations therefore there will be no requirement for reinforcement to protect from fault movements.</p>
Record of past mine gas emissions		N	<p>Faults can act as pathways for mine gas. However, the Coal Authority has no record of mine gas emissions requiring action.</p> <p>Combustible coal seams are recorded beneath the site comprising Shafton Coal, Barnsley Coal and Parkgate Coal</p> <p>There are no proposed structures as part of the development therefore gas will not be able to accumulate within confined spaces.</p>
Recorded coal mining surface hazard		N	<p>There are 5 no. Coal Mining subsidence records within 50m of the boundary from 1997 to 1998. The claim areas marginally encroach the site on the southwest corner and Ferry Moor Lane.</p> <p>The site has not been subject to any emergency remedial works relating to coal mining hazards.</p> <p>As all claims were rejected it is unlikely they can be attributed to mine workings.</p>

5.0 SUMMARY OF RISK ASSESSMENT

Based on the information reviewed, the current risk from the coal mining legacy is assessed as being **High**, associated with the recorded mine workings and opencast mining having been recorded onsite. However, based on the proposed development of importing soil and laying it onsite, it is not considered likely that the development will be impacted by the coal mining legacy therefore the risk to the proposed development is considered to be **Low**, should the proposed development change and structures are added then this assessment will need to be reviewed and updated.

The coal mining legacy for the site describes:

- Surface mining (opencast working) across the majority of the site as part of the Highgate Coal Seam.
- Underground mining did take place beneath site as part of the Shafton Coal Seam approximately (1.73m thick) recorded at a depth of between 34m to 64m below the site, as referenced in the Coal Authority Consultants Mining Report. However, in accordance with CIRIA C758D and adopting 10x seam thickness rule, it is deemed that there is sufficient bedrock cover above this seam.
- There are 8.no coal seams area recorded beneath the site and are all recorded as been historically worked in the area.
- There are two mine shaft entries recorded on site, anticipated to be associated with the old Grimethorpe Colliery, which will need to be located and treated/fenced off as necessary.
- Two recorded faults on site, which could act as a potential pathway for mine gas though there are no records of mine gas emissions within 500m.
- Combustible coal seams are recorded beneath the site comprising Shafton Coal, Barnsley Coal and Parkgate Coal.
- There are 5 no. Coal Mining subsidence records within 50m of the site boundary, all of which were rejected.

6.0 HAZARD MITIGATION STRATEGY

In view of the identified potential hazards presented by the coal mining legacy to the site of the intended development should be further investigated as part of a hazard mitigation strategy with possible mitigation strategies. The below strategy describes the proposed development only, however, if this development changes to include structures this strategy will need to be reviewed and updated appropriately.

6.1 UNDERGROUND COAL WORKINGS

No mitigation regarding recorded underground coal workings are required. However, there remains a residual risk from unrecorded underground coal workings at shallow depth. The strategy should consist of the following elements:

- Employ a watching brief for land instability during placement of soils; and
- Avoid development over entries.

6.2 MINE ENTRIES

There are 2. no recorded mine entries below the site which could affect the surface stability of the future development. The strategy should consider the following elements:

- Location and assessment of the condition of the shafts to establish if they have been infilled/decommissioned as well as conduct a watching brief to located any potential unrecorded shafts;
- Review location of shafts with respect of proposed development areas and either treat or fence off the shafts as necessary.
- Construct Engineered shaft covers to minimise future settlement; and,
- Avoid development over entries.

6.3 SETTLEMENT OF OPENCAST BACKFILL BELOW THE SITE

No mitigation regarding recorded infilled opencast coal workings are required. The development can accommodate total and/or differential settlements.

6.4 GROUND GAS

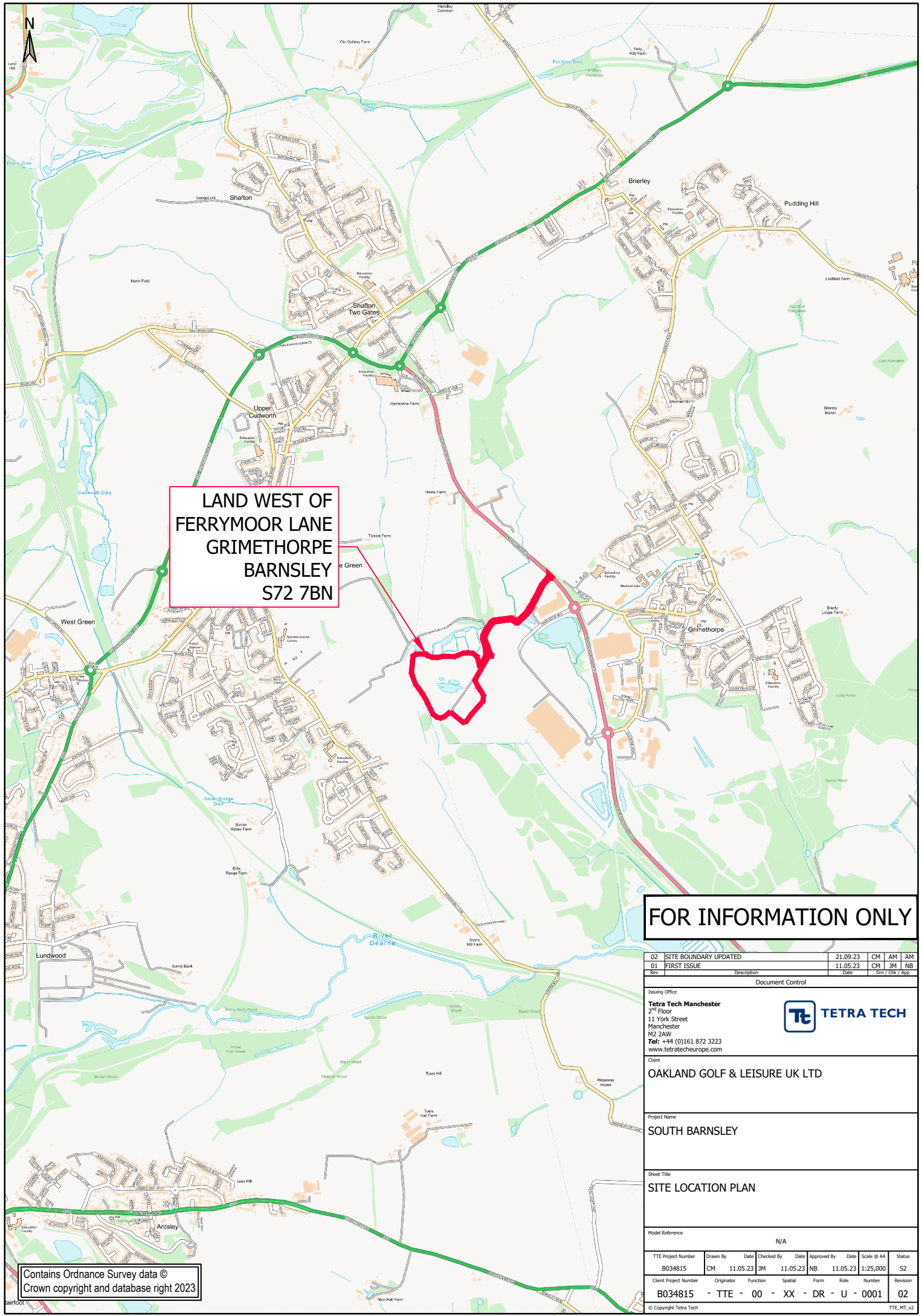
No mitigation regarding gases released from coal workings are required. The development does not introduce enclosed spaces or buildings where the collection of ground gas may present a hazard.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information consulted, it is considered that, currently, there is a **high** risk associated with the coal mining legacy onsite. However, given the proposed development of placing fill material with no structures onsite the development is unlikely to be affected by the coal mining legacy as such the risk to the development is **low**.

The placement of soils should include a Watching Brief to check for the presence of unrecorded mine entries and any induced settlements due to collapse of shallow mine workings.

DRAWINGS



**LAND WEST OF
 FERRYMOOR LANE
 GRIMETHORPE
 BARNSELEY
 S72 7BN**

FOR INFORMATION ONLY

02	SITE BOUNDARY UPDATED	21.09.23	CM	AM	AM
01	FIRST ISSUE	11.05.23	CM	JM	NB
Rev	Description	Date	Issn / Crk / App		

Document Control

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Client
OAKLAND GOLF & LEISURE UK LTD

Project Name
SOUTH BARNSELEY

Sheet Title
SITE LOCATION PLAN

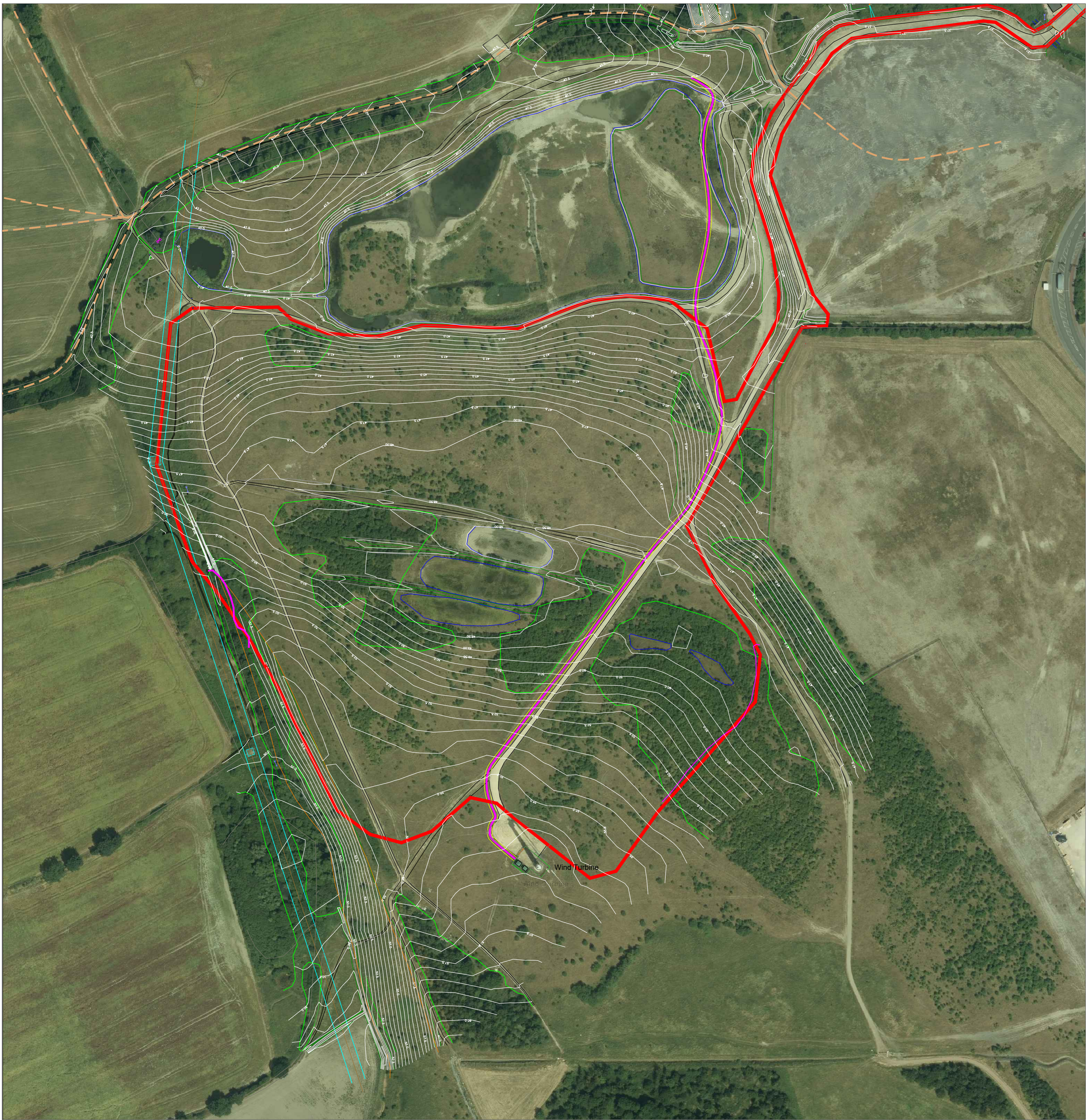
Model Reference
 N/A

TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A4	Status
B034815	CM	11.05.23	JM	11.05.23	NB	11.05.23	1:25,000	S2
Client Project Number	Originator	Function	Spatial	Form	Role	Number	Revision	
B034815	TTE	00	XX	DR	U	0001	02	

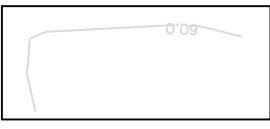

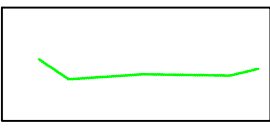

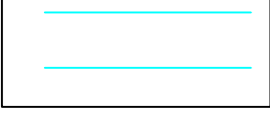
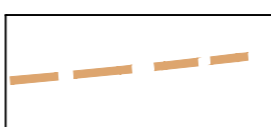

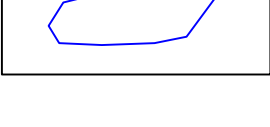
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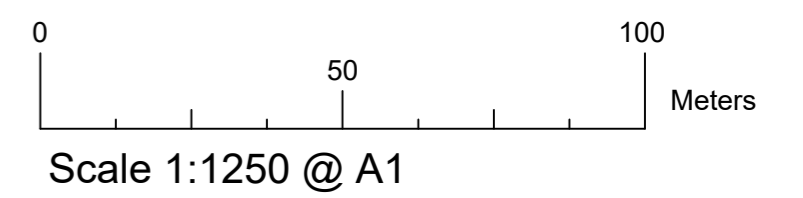
THIRD PARTY DRAWINGS

Agricultural Restoration & Landscape Enhancement Scheme



Key:

- | | | | |
|--|--|---|---|
|  | Existing Contours (1m Metre Intervals) |  | Underground Powerline plus Wayleave |
|  | Existing Scrub Vegetation |  | Application Boundary (See Also Plan 901.05) |
|  | Overhead Powerlines |  | Existing Public Rights Of Way |
|  | Existing Tracks | | |
|  | Existing Wet / Dry Areas | | |



Drawn By: GW

Revision.: A - 14/09/23 - adjustment to red line

Scale: 1: 1250 @ A1

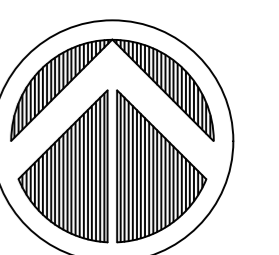
Drawing No: 901.02 Rev A

Project Name: Grimethorpe

Date: 14th September 2023

Drawing Name: Existing Site Survey

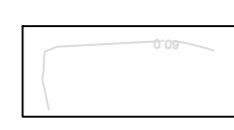
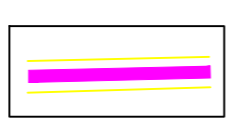
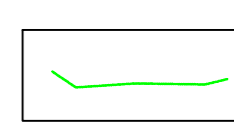
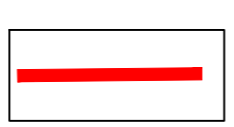
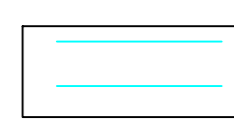
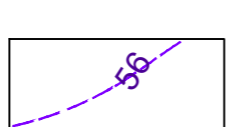
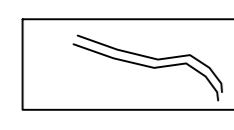

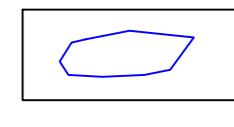
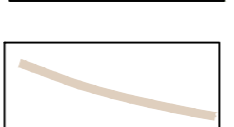

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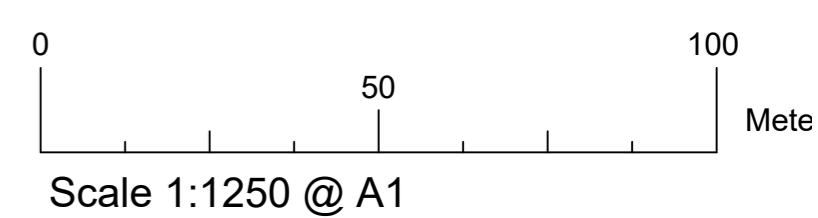
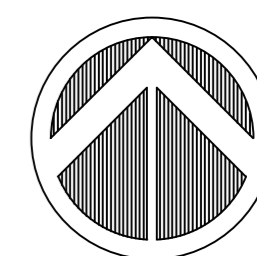


Agricultural Restoration & Landscape Enhancement Scheme



Key:

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|---|--|---|---|
|  | Existing Contours (1m Metre Intervals) |  | Underground Powerline plus Wayleave |
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|  | Overhead Powerlines |  | Proposed Contours (1m Intervals) |
|  | Existing Tracks |  | Proposed Amenity Grass |
|  | Existing Wet / Dry Areas |  | Proposed Permissive Public Access Paths |
|  | Existing Public Rights Of Way | | |



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Revision.: A - 14/09/23 - adjustment to red line

Scale: 1: 1250 @ A1

Drawing No: 901.03 Rev A

Project Name: Grimethorpe

Date: 14th September 2023

Drawing Name: Grading Plan

Checked By BW

