

**C3982
OCTOBER 2012**

PRELIMINARY APPRAISAL REPORT (DESK STUDY)

**of land off
WAKEFIELD ROAD, MAPPLEWELL, BARNSELY**

**Prepared for
PIPESTONE LTD**



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PRELIMINARY APPRAISAL REPORT (DESK STUDY)**of land off****WAKEFIELD ROAD, MAPPLEWELL, BARNSELY****Prepared for****PIPESTONE LTD****CONTENTS****EXECUTIVE SUMMARY**

1. INTRODUCTION.....	1
2. SITE DETAILS AND DESCRIPTION.....	3
3. ENVIRONMENTAL SETTING	5
3.1. Introduction.....	5
3.2. Site History	5
3.3. Published Geological Information	6
3.4. Hydrology and Hydrogeology	8
3.5. Landfilling and Waste Management	10
3.6. Radon Risk.....	10
3.7. Other	11
4. PREVIOUS INVESTIGATION FINDINGS.....	12
5. PRELIMINARY CONCEPTUAL MODEL.....	13
6. CONCLUSIONS AND RECOMMENDATIONS.....	14
6.1. General.....	14
6.2. Flood Risk	14
6.3. Geotechnical	14
6.4. Contamination Constraints	16
6.5. Invasive Plants	16
7. FURTHER INVESTIGATION	17

TABLES

Table 2.1	Current Site Overview	3
Table 3.1	Site History	5
Table 3.2	Geological Summary	7
Table 3.3	Surface Water Features	8
Table 3.4	Groundwater Occurrence and Abstraction.....	9
Table 3.5	Groundwater Vulnerability Status	9
Table 3.6	Waste Management Activities	10

APPENDICES

APPENDIX A FIGURES AND DRAWINGS

Drawing No.	Title	Scale
C3982/01	Site Location Plan	1:25,000
C3982/02	Site Features	1:1,000
C3982/03	Development Layout and Opencast Extent	1:1,000
C3982/04	Preliminary Conceptual Site Model	NTS
NE328	Abandonment Plan	1:2,500

NTS: Not to Scale

APPENDIX B ENVIROCHECK REPORT

APPENDIX C COAL AUTHORITY REPORT

EXECUTIVE SUMMARY

Introduction	<p>Sirius Geotechnical and Environmental Ltd (Sirius) were commissioned by Johnson Brook, acting on behalf of Pipestone Ltd (Pipestone), to undertake a preliminary appraisal (desk study) of land off Wakefield Road, Mapplewell, South Yorkshire.</p> <p>It is understood that Pipestone are considering developing the site for a low rise residential end use.</p>
Site Details	<p>The site forms an irregularly shaped parcel of land, approximately 9 ha in area, comprising a number of overgrown and disused fields. The fields are covered with long grasses, shrubs and adolescent to mature trees and are crossed by several informal footpaths.</p> <p>Ground levels rise from around 94m above ordnance datum (aod) in the south to 114.5m aod in the north. The rise in levels generally follows a steady gradient, but a slightly steeper banking is present in the north.</p> <p>The site is generally bounded by residential development, although the opposing side of Wakefield Road is mainly undeveloped land and a disused industrial premises further south.</p> <p>To the north of the site is Bleak House Poultry Farm, which comprises a main „L’ shaped stone built farmhouse and associated stone and timber constructed outbuildings. The farm buildings were occupied at the time of the site visit, although no farming activities appeared to be active.</p>
Site History	<p>The available historical plans indicate that the site has remained generally undeveloped since 1854. However, the Coal Authority report and abandonment plans indicate that two areas in the centre and south of the site were subject to opencast coal working. Coal was extracted between February and April 1952 and the site was restored by September 1952.</p>
Anticipated Ground Conditions	<p>The published geological information and other data gathered by this preliminary investigation indicate that the site is underlain by deep made ground in the areas of the opencast extraction. No drift deposits are anticipated.</p> <p>Solid geology comprises Middle Coal Measures strata of mudstones, siltstones and sandstones with subordinate coal, ironstone and fireclay. In the northern tip of the site the Woolley Edge rock is anticipated to be present.</p>
Mining	<p>A large proportion of the site is underlain by backfilled opencast workings in the Abdy (Winter) Coal and the Two Foot Coal. There are narrow strips of shallow coal remaining between the low wall and the conjectured outcrop of each seam that could have been historically worked.</p> <p>Unrecorded mining in the Abdy and Two Foot Coal could affect surface stability.</p> <p>The Meltonfield (Woodmoor) Coal outcrops in the north of the site. Although the Coal Authority have no records of workings in this seam, it may have been historically worked.</p> <p>The Top and Low Beamshaw Coal could be present within influencing depth of the surface beneath the southern part of the site if workings are present.</p> <p>There are no recorded mine entries beneath the site, but given the history of mining activity on site and in the region generally, unrecorded entries may be present.</p>
Foundations	<p>The nature and depth of foundations will be dependent on loadings, layout, the detailed site geology and specific results of intrusive site investigation. At this stage, the following foundation types are anticipated.</p> <ul style="list-style-type: none"> • Piled foundations within, and straddling the edge of, the backfilled opencast areas. • Shallow strip/trench foundations outside the opencast areas and deepened, if

	<p>necessary, within the zone of influence of trees.</p> <p>The presence of underground coal workings within influencing distance of the surface, would require consolidation of old workings (i.e. drilling and pressure grouting) and could, subject to depth, require alternate foundation solutions.</p>
Contamination	<p>The preliminary conceptual site model indicates that pollutant linkages are possible to a variety of receptors. Heavy metals, asbestos fibres, PAH, hydrocarbon and sulphate contaminants may pose potential risks to construction workers, site end users, the built environment and controlled waters.</p> <p>It is recommended that a targeted and non-targeted site investigation is carried out to address these matters.</p>
Gas Risk	<p>Information currently available indicates that there is potential for ground gas generation on site from open cast backfill. There is potential for mine gas migration onto site via worked coal seams. There is one registered landfill site within 250m and therefore potential for landfill gas migration onto site</p> <p>Gas risk should be assessed further via site investigation and monitoring.</p>
Further Works	<p>The following ground investigation works are recommended to allow foundation design, determination of contamination constraints and abnormal costs:</p> <ul style="list-style-type: none"> • Site specific radon report. • Trial pits to investigate near surface soil and groundwater conditions and to allow recovery of soil samples for laboratory testing. • Cable percussive boreholes to investigate deep made ground and to allow recovery of soil samples for geotechnical testing. In situ Standard Penetration Tests (SPTs) to be undertaken within boreholes in order to provide geotechnical data for the underlying made ground / soils / bedrock • Trial pits/trenches and rotary probing to investigate the edge and extent of the opencast workings. • Rotary boreholes to investigate the potential for shallow mineworkings within four seams of coal. • Installation of gas and groundwater monitoring and sampling wells in selected boreholes and subsequent monitoring and sampling. • Chemical and geotechnical laboratory testing to adequately categorise the soils and groundwater.

1. INTRODUCTION

Sirius Geotechnical and Environmental Ltd (Sirius) were commissioned by Johnson Brook, acting on behalf of Pipestone Ltd of the Isle of Man (Pipestone), to undertake a preliminary appraisal (desk study) of land off Wakefield Road, Mapplewell, Barnsley, South Yorkshire (the “site”). The site comprises one large mostly undeveloped parcel of land.

It is understood that Pipestone are considering the development of the site for low rise residential with gardens end use, with associated areas of public open space (POS), hardstanding and access roads, as shown on Drawing No. C3982/03 in Appendix A to this report.

The objectives of the preliminary appraisal were:

- To establish the historical development of the site and immediate surrounding area from a review of historical Ordnance Survey (OS) plans;
- To establish the environmental setting of the site;
- To evaluate whether past mining or other extractive industries could have an influence on the site;
- To determine if historical or current activities could give rise to significant ground contamination;
- To determine the potential risk to the development from hazardous ground gas sources including radon; and,
- To provide recommendations for intrusive works required to determine the ground conditions below the site, the contamination status of the shallow soils, and from this, foundation solutions and measures to deal with any contamination.

This desk study includes an assessment of information provided by Landmark Envirocheck (“Envirocheck”), the Coal Authority (CA) and the British Geological Survey (BGS).

A site inspection (walk over survey) was undertaken by a Sirius Geoenvironmental Engineer on 24th September 2012. This inspection included accessible external areas only, it was noted that some areas were inaccessible due to dense vegetation.

This report presents and interprets the factual information reviewed during this investigation and presents a Preliminary Conceptual Site Model (PCSM) from which ground-related hazards and risks have been assessed.

It has been assumed in the production of this report that the site is to be developed for a low rise residential end use (“residential with plant uptake”). In addition, it is assumed that ground levels will not change significantly from those described in this report. If this is not the case, amendments to the recommendations made in this report may be required.

Where the report refers to the potential presence of invasive plants (such as Japanese knotweed) or asbestos-containing materials, such observations are for information only and should be verified by a suitably qualified expert.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview

Location	The site is located to the east of Mapplewell, approximately 3.6km north of Barnsely, South Yorkshire. A site location plan is included as Drawing No. C3982/01 within Appendix A.
National Grid Reference	E 433640, N 410080.
Topography and Features	<p>The site forms one irregularly shaped parcel of land, comprising a number of overgrown and disused fields. The fields are covered with long grasses, shrubs and adolescent to mature trees and are crossed by several informal footpaths. A public footpath is present along part of the western site boundary.</p> <p>Adjacent to the south eastern boundary several of the adjoining residential properties have cultivated small parts of the site as garden „extensions’. Also, toward the south of this easternmost field is a fenced paddock; no livestock were present at the time of the site walkover.</p> <p>A Yorkshire Electricity pylon (ref: PWZ39) is present in the south of the site and carries cables at high level above the site in an approximate south west to north east direction.</p> <p>Ground levels rise from around 94m above ordnance datum (aod) in the south to 114.50 aod in the north. The rise in levels generally follows a steady gradient, but a slightly steeper banking is present.</p>
Access	<p>Pedestrian access to the majority site can be gained through informal paths and breaks in the hedgerow. Vehicular access can be gained to the westernmost field via a gate at the end of an unanmed access track off Paddock Road. No vehicular accessways were observed between any of the other fields.</p> <p>Anecdotal evidence suggests that the public footpath follows the route of historical vehicular entrance to the site off Paddock Road, but it was noted that this access is now grassed over and overgrown.</p>
Approximate Site Area	Approximately 9 hectares.
Site Boundaries	<p>Site boundaries are generally formed by overgrown hedgerows and ad hoc timber fencing.</p> <p>Immediately to the north of the site is Bleak House Poultry Farm, which comprises a main ‚L’ shaped stone built farmhouse and associated stone and timber constructed outbuildings. Stored oil/chemical drums were noted to be present within the westernmost outbuilding.</p> <p>The site is bounded to the north east by Wakefield Road, and undeveloped agricultural land is generally present beyond this. On the opposing side of Wakefield Road to the east, is Tipsey Court, which comprises a small bus depot and residential properties.</p>

	<p>Further south along Wakefield Road is a disused industrial site.</p> <p>To the south east, north (beyond the Poultry Farm) and south the site are residential properties, and further residential developments are present beyond these. To the south west the site is bounded by allotment gardens.</p> <p>To the west of the site a recreation ground is present, and beyond this Mapplewell Primary School.</p>
Current Land Use	Disused agricultural/mining land.
Invasive Plant Species	None noted, although due to limitations on access it is recommended that a survey is undertaken by an appropriately qualified specialist.
Adjacent Land Uses	Predominantly residential.

The main site features are shown on Drawing No. C3982/02 within Appendix A.

3. ENVIRONMENTAL SETTING

3.1. Introduction

Published environmental, geological and historical data relating to the site has been reviewed. A summary of relevant information is provided below and a copy of the Envirocheck report is enclosed in Appendix B. A copy of the Coal Authority Mining Report is included in Appendix C. It should be noted that the enclosed Envirocheck and Coal Authority reports show the site with an enlarged site boundary, however, the desk study is based on the boundary of the proposed development.

3.2. Site History

Table 3.1 presents a summary of the site history from 1854 to 2010. It is not the intention of this report to describe in detail all of the changes that have occurred on, or adjacent to, the site, only those pertinent to the proposed development.

Table 3.1 Site History

Map Dates	On-Site Features	Off-Site Features (only features within 500m that may affect the site are listed)
1854	The site is undeveloped fields. A spring is present adjacent to the southern site boundary and flows south to a small off site reservoir	An „L’ shaped building is present to the north of the site. Wakefield Road is present to the east of the site, but is named Tipsey Hill. A sandstone quarry is present 250m north east. Buildings are established to the north west of the site, forming Staincross. Blackerhill Quarry is present 420m south.
1893	A spring is shown in the central north east part of the site.	Sandstone quarry to the north east is now shown as disused. The Barnsley Coal Railway is developed 230m east. North Gawber Colliery developed 250m to the south west with associated shafts, reservoirs and tipped ground.
1906-1907	A well is shown adjacent to the spring in the south of the site.	No significant changes noted.
1918 - 1948	In 1918 the spring and well in the south of the site are no longer shown. The spring in the north is not labelled,	Tipped ground around North Gawber Colliery expands over this time. Miners Recreation Welfare Ground

Map Dates	On-Site Features	Off-Site Features (only features within 500m that may affect the site are listed)
	but a rectangular feature remains.	shown to west of site.
Feb 1952 to Sept 1952 (Coal Authority Records)	Two large areas are subjected to open cast coal extraction and subsequent backfilling.	
1956 - 1965	By 1965 an electric pylon is present in the south.	Blackerhill Quarry to the south is disused by 1956. By 1962 an unnamed works building is shown to the east of Wakefield Road. By 1965 reservoirs are no longer shown at the colliery, a recreation ground is recorded to the west and allotment gardens are immediately adjacent to the south west boundary.
1967	No significant changes.	The buildings to the north of the site are named as Bleak House Poultry Farm. In 1970 the works building to the east are shown as a moulded rubber works. The railway to the east is disused.
1973 - 1977	Two of the field boundaries are shown as drains.	Tips around the colliery are disused. Residential development to the north, east and south of the site. A silo is shown next to the farm buildings.
1991 - 2010	No significant changes.	By 1993 North Gawber Colliery is no longer present and a second silo is shown between the farm outbuildings.

3.3. Published Geological Information

A summary of available published geological information is provided in Table 3.2 below.

Table 3.2 Geological Summary

Sources of Information	<p>BGS 1:10,000 geological map (Sheet SE30NW) resurveyed 1978-1979.</p> <p>BGS 6 inch geological map (Sheet Yorkshire 262SE) revised 1929-1930.</p> <p>BGS lexicon of named rock units.</p> <p>BGS borehole records.</p> <p>Coal Authority Abandonment Records.</p>
Worked/ Made Ground	<p>Two strips of worked ground are shown on site; one in the south and parallel to the southern site boundary, the second toward the centre of the site and parallel to the first.</p>
Drift Geology	<p>No drift deposits are shown to underlie the site.</p>
Solid Geology	<p>The site is shown to be principally underlain by Middle Coal Measures strata (mudstones, siltstones and sandstones with subordinate coal, ironstone and fireclay).</p> <p>The northern tip of the site is shown to be underlain by the Woolley Edge Rock of the Middle Coal Measures. This is typically a coarse grained massively bedded sandstone.</p> <p>A fault, orientated south west to north east, crosses the site close to the south eastern boundary and is downthrown on its eastern side. Almost perpendicular to this fault are a pair of two parallel faults close to the north eastern site boundary. The northernmost of the pair is indicated to be present in the Barnsley Coal and downthrown 22 feet (6.7m) to the north. The southern fault of the pair is also downthrown to the north but no indication of throw is given.</p>
Mining and Quarrying	<p>Coal Seams: Geological records dated 1929-1930 show the Winter Coal (more recently known as the Abdy Coal) to outcrop along the south western site boundary, the Two Foot Coal to outcrop through the centre of the site, both orientated north west to south east, and, the Woodmoor Coal (also known as the Meltonfield Coal) to outcrop in the north of the site. More recent records show the outcrop positions of the Abdy Coal and the Two Foot Coal artificially repositioned further north indicating open cast working of these seams beneath the site.</p> <p>The next shallowest coal seam beneath the Winter Coal is the Top Beamshaw Coal recorded between 1.21m and 1.84m thick.</p> <p>Coal Mining: The Coal Authority state that <i>'the property is within the zone of likely influence from past underground workings in 8 seams of coal at 50m to 450m, last worked in 1974. In addition the property is an area where the Coal Authority believes there is coal at or close to the surface. This coal may have been worked at some time in the past'</i>.</p> <p>A damage notice or claim for alleged subsidence was made in October 2000 for 64 Paddock Road, adjacent to</p>

	<p>the northern site boundary. The claim was rejected.</p> <p>Mine Entries: The Coal Authority state that none are recorded within the site or within 20m of the boundary.</p> <p>Opencast Coal: The Coal Authority state that the site is within the boundary of an opencast site from which coal has been removed. Abandonment plans show that the site was previously referred to as Tipsey Hill Opencast Site.</p> <p>The Winter Coal (Abdy Coal) seam and the Two Foot Coal were extracted between February 1952 and April 1952 and the site backfilled by September 1952. The abandonment plan indicates the Winter Coal dips at 4.7° (1 in 12) to the north east and is 0.81m thick, and the Two Foot Coal dips at 4.1° (1 in 14) to the north east and is 0.63m thick.</p> <p>The depth of the Winter Coal opencast is recorded as between approximately 1.55m and 11.09m. The depth of the Two Foot Coal opencast is recorded as between approximately 2.26m and 8.53m. The extent of the opencast workings are shown on the Coal Authority Abandonment Plan enclosed in Appendix A, and the approximate extent of the recorded opencast workings have been overlain onto the site features drawing C3982/02 and shown in relation to the development proposals on Drawing No. C3982/03 in Appendix A.</p> <p>Quarries: None indicated on site, but historical sandstone quarries are 250m north east and 420m south. BGS mineral records show that sandstone was extracted at Tipsey Lodge 210m north east and at Blacker Hill Quarry 304m south.</p>
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3.4. Hydrology and Hydrogeology

A summary of available information pertaining to hydrology and hydrogeology is present in Tables 3.3 to 3.5 below.

Table 3.3 Surface Water Features

	Presence / location	Comments
Environment Agency (“EA”) Chemical GQA Classified Watercourses	None present within 1.5km	

	Presence / location	Comments
EA Biological GQA Classified Watercourses	None present within 1.5km.	
Unclassified Watercourses	Closest surface water course is located on site.	These appear to be drains associated with field boundaries.
Surface Water Features (Canals, Ponds, Lakes, etc.) (within 250m)	None recorded.	
Surface Water Abstractions	None recorded within 1km	
Flood Risk Status	The site is not recorded to be located within 250m of an indicative floodplain.	

Environment Agency GQA assessments: A = very good to E = poor

Table 3.4 Groundwater Occurrence and Abstraction

	Presence / location	Comments
Licensed Abstractions (within 1km)	None recorded	
Source Protection Zones (within 500m)	There are no source protection zones within 500m of the site.	
Springs / Potable Water Abstractions (within 2km)	No recorded potable water abstraction licences within 2km of the study site. Two springs and a well were historically present on site.	Springs and well are no longer shown and therefore assumed not in use.

Table 3.5 Groundwater Vulnerability Status

	Environment Agency Classification
Groundwater Classification	The solid Middle Coal Measures strata beneath the site are designated as a Secondary A Aquifer. Secondary A Aquifers are defined as “permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.”

3.5. Landfilling and Waste Management

Table 3.6 Waste Management Activities

	Presence / Location	Comments
Local Authority Recorded Landfills	Landfill site 133m east. Landfill site 370m south.	No further details on status or fill types available for either record.
BGS Recorded Landfills	None recorded.	
EA Recorded Landfills	Historic landfill site 133m east on „waste land to the rear of the Subseal Works’.	Wastes accepted include inert waste, commercial waste, industrial waste and household waste. Operated 1962 - 1994.
	Historic landfill site 370m south at Blacker Hill Quarry.	Wastes accepted include inert waste, commercial waste and industrial waste. Operated 1980 - 1984.
	Registered landfill site 228m east at Suba Seal Works.	Waste accepted include commercial, industrial, soil and subsoil. Licence lapsed in 1983.
	Registered landfill site 458m south at Blacker Hill Quarry.	Waste accepted include construction, demolition, industrial and non-hazardous wastes. Licence lapsed in 1980.
Other Licensed Waste Management Facilities within 250m	Registered waste treatment or disposal site 241m south west at Mapplewell Auto Salvage.	Operational scrapyards.
Evidence of Landfilling On or Within 250m of Site (over and above that described above)	Nature of backfill to opencast workings on site is unknown. Tipped ground developed around North Gawber Colliery when active. Historical quarries to the north and south have been backfilled over time.	
Walkover Evidence of Fly-Tipping on Site?	No evidence noted.	

3.6. Radon Risk

To determine whether the site is at risk from radon gas, the BRE Document “BRE 211 - Radon: Guidance on the protective measures for new dwellings” together with the National Radiological Protection Board (NRPB) “Radon Atlas of England and Wales” have been referenced.

These documents, together with a geological assessment contained within the Envirocheck report, which includes information obtained from the Health Protection Agency (HPA) and British Geological Survey (BGS), identifies that the site straddles the edge of where basic and no radon protection measures are required. At this stage it should be assumed that **basic radon protective measures are required for all plots**. To refine this a site specific radon report should be commissioned.

3.7. Other

Other potentially contaminative activities or environmental constraints as identified from the Envirocheck report are noted below. The entries relate to activities within approximately 250m of the site.

- Contemporary trade directory entry for rubber and plastic products manufacturers 153m south east.
- Contemporary trade directory entry for motorcycle breakers and dismantlers 240m south west.
- Category 3 minor pollution incident to controlled waters relating to diesel oil pollution to a freshwater stream 55m south.
- Land to the east of the site, beyond Wakefield Road, is designated an area of adopted green belt.

4. PREVIOUS INVESTIGATION FINDINGS

No previous desk study or site investigation reports relating to this site have been made available.

5. PRELIMINARY CONCEPTUAL MODEL

Based on the desk study information described above, a combined preliminary conceptual site model and conceptual exposure model (CSM) has been developed for the proposed future land-use (residential with gardens). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors in order to assess potential pollutant linkages. In assessing the likely contaminants present at the site, reference has been made to the Industry Profile report series issued by the Department of the Environment and other relevant supporting documentation.

A qualitative risk assessment has also been made of the likelihood of any pollutant linkage operating and its potential significance.

The preliminary conceptual model is presented in schematic form as Drawing No. C3982/04 in Appendix A.

In summary, the preliminary CSM has identified the following potential pollutant linkages which could result in an unacceptable risk to the proposed end-use, denoted as moderate or higher risk on the CSM:

- Ingestion, inhalation of dust and dermal contact with possible heavy metals, asbestos, PAHs and hydrocarbons in opencast backfill, posing a moderate to high risk to site end-users.
- Sulphate attack from sulphates/ oxidisable sulphides within opencast backfill posing a moderate risk to the built environment.
- Ingestion, inhalation of dust and dermal contact with possible heavy metals, PAHs, hydrocarbons and asbestos fibres in made ground associated with development of the farm immediately adjacent to the site posing a low to moderate risk to site end-users.
- Leaching of heavy metals, PAHs and hydrocarbons in made ground and topsoil's posing a low to moderate risk to controlled waters (on-site surface water features and underlying Secondary A Aquifer).
- Gas risk from on and off site made ground and off site landfills posing a moderate risk to site-end and adjacent site users.
- Gas risk from shallow coal seams beneath the site posing a moderate risk to site-end and adjacent site-users.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. General

It is understood that Pipestone are considering the development of land off Wakefield Road, Mapplewell (the „site’) for a low rise residential end use (“residential with plant uptake”), as shown on Drawing No. C3982/03, in Appendix A to this report.

In production of this report it has been assumed that ground levels will not change significantly from those described herein. If this is not the case, then amendments to the interpretation and conclusions in this report may be required.

6.2. Flood Risk

According to the Environment Agency the site is not located in an area vulnerable to flooding from rivers.

6.3. Geotechnical

Mining and Quarrying

The key constraints affecting this site are associated with opencast working and potentially shallow underground working of coal. Several seams are shown to outcrop beneath the site and two of these are known to have been opencast.

Abdy (Winter) Coal and Two Foot Coal

Two main areas of opencast coal extraction have been identified within the Abdy (Winter) Coal and the Two Foot Coal as shown on the enclosed drawings. A third small circular opencast area is shown in the Two Foot Coal to the east of the main area. It should be noted that the areas of the development shown to be affected on the enclosed plans represent minimum areas as there are likely to be batters or benching of the high and low walls extending beyond the limits of coal extraction shown on abandonment plans.

The abandonment plan shows that the opencast operations did not extend to the outcrop of either the Abdy (Winter) Coal or the Two Foot Coal and therefore both a high and low wall are likely to be present. This leaves a narrow strip between the outcrop and the low wall where coal is present at shallow depth. The coal may have been either historically worked at the outcrop, or from the low wall as part of the opencast operation. Furthermore, areas of the site exist where opencast extraction of the Abdy (Winter) Coal and the Two Foot Coal has not taken place, and therefore if unrecorded underground workings are present at shallow depth there is a risk of surface instability.

For typical Coal Measures bedrock, it is generally accepted that there is a risk of surface instability where the thickness of competent bedrock above the worked coal seam is less than 10x the seam thickness. Based on a recorded seam thickness of 0.81m for the Abdy (Winter) Coal and 0.63m for the Two Foot Coal, a minimum rock cover of 8.1m and 6.3m is required above the seam in order to mitigate the potential for surface subsidence.

Meltonfield (Woodmoor) Coal

The Meltonfield (Woodmoor) Coal is shown as a known outcrop position in the north of the site, approximately parallel to the Two Foot Coal outcrop. The seam is typically 0.69m to 0.89m thick

according to the BGS generalised vertical section for the area, however, a BGS borehole at Tibsey Court on the opposite side of Wakefield Road, records the Meltonfield (Woodmoor) Coal as 1.07m thick. The coal is known to have been worked by underground methods in other areas of the region. The Meltonfield (Woodmoor) Coal is likely to be present at shallow depth in the north of the site and there is potential for surface instability if underground workings are present in this seam.

Top and Low Beamshaw Coals

The Top Beamshaw Coal is the shallowest seam in the typical Middle Coal Measures succession beneath the Abdy (Winter) Coal. The Top and Low Beamshaw Coals outcrop off site to the south and dip beneath the site. The seam is typically 1.21m to 1.84m thick but the seam is recorded as being variable in thickness and often contains a dirt band, as such it has been little mined. The seam is typically 13m beneath the Abdy (Winter) Coal and as such less than 10x the maximum recorded seam thickness of competent cover exists in the area where the Abdy (Winter) Coal has been extracted. There is potential for surface instability if underground workings are present in this seam.

The underlying Low Beamshaw Coal is of better quality and has been more often mined, although is also variable in thickness between being thin and of little value and 0.91m and good quality. In some areas the Top and Low Beamshaw Coals are close together and have been mined together. There is potential for surface instability if the Top and Low Beamshaw Coals have been mined together.

Mine Entries

There are no recorded mine entries beneath the site, but given the history of mining activity on site and in the region generally, unrecorded entries may be present.

Foundations

Published geological information, and other data gathered by this preliminary investigation, indicates that the site is partially underlain by deep made ground as a result of previous opencast operations, and outside these areas residual coal measures strata are likely to be present.

The nature and depth of foundations will be dependent on loadings, layout and the detailed site geology, including:

- Thickness of made ground;
- Location and extent of any substructures / infilled basements;
- The site-specific nature and extent of underground mine workings;
- The presence of unrecorded mine entries/wells;
- Bearing capacity of the natural strata;
- Groundwater levels;
- Proximity to trees where potentially shrinkable soils are present; and
- Final development levels.

Opencast Areas

At this stage given the presence of deep made ground across significant parts of the site, piled foundations are recommended. These would be taken through the made ground, to found in the underlying Coal Measures strata. Piled foundations may be required beyond the opencast areas shown on the enclosed plans due to the presence of disturbed ground

If underground workings are present within influence of the surface, then the workings will need to be drilled and grouted and the base of piled foundations may need to be taken to below the base of treated workings.

Consideration could be given to stabilisation of the made ground by vibro techniques. However, given the depth of made ground the technical and validation requirements of the NHBC may be too onerous and render this solution uneconomic. Furthermore, piled foundations would still be required where plots straddle the high or low walls, and within the zone of differential settlement associated with the walls.

Outside Opencast Areas

Where plots lie outside the opencast areas, shallow spread foundations are likely to be suitable. If cohesive clay soils are identified beneath the site then foundations will require deepening within the zone of influence of existing or proposed trees in accordance with NHBC Standards Chapter 4.2 and heave protection measures may additionally be required. It is noted that a significant number of trees are present on site and immediately adjacent to the site. Where foundation depths due to trees are in excess of 2.5m, piled foundations may be required.

If underground workings in coal are present outside the opencast areas, the workings will need to be drilled and grouted and house foundations thickened and strengthened. Very shallow treated workings (<5x seam thickness) could necessitate raft foundations.

It is recommended that a site investigation is carried out in order to provide further information regarding these matters and to allow foundations to be designed.

6.4. Contamination Constraints

Risk Evaluation for the Proposed Land Use (Residential)

The preliminary conceptual site model indicates that pollutant linkages are possible to a variety of receptors. Potential heavy metals, asbestos fibres, organic and inorganic contaminants in made ground and shallow soils may pose a potential risk to construction workers, current and future site - users and controlled waters. Risks related to these potential linkages are currently given a qualitative assessment “low” to “high”. The precise nature of the risks should be investigated further through site investigation.

According to the BGS, basic radon protective measures are required for the site.

6.5. Invasive Plants

Invasive plant species were not observed during the site walkover, however as access was limited this should be confirmed by an appropriately qualified specialist.

7. FURTHER INVESTIGATION

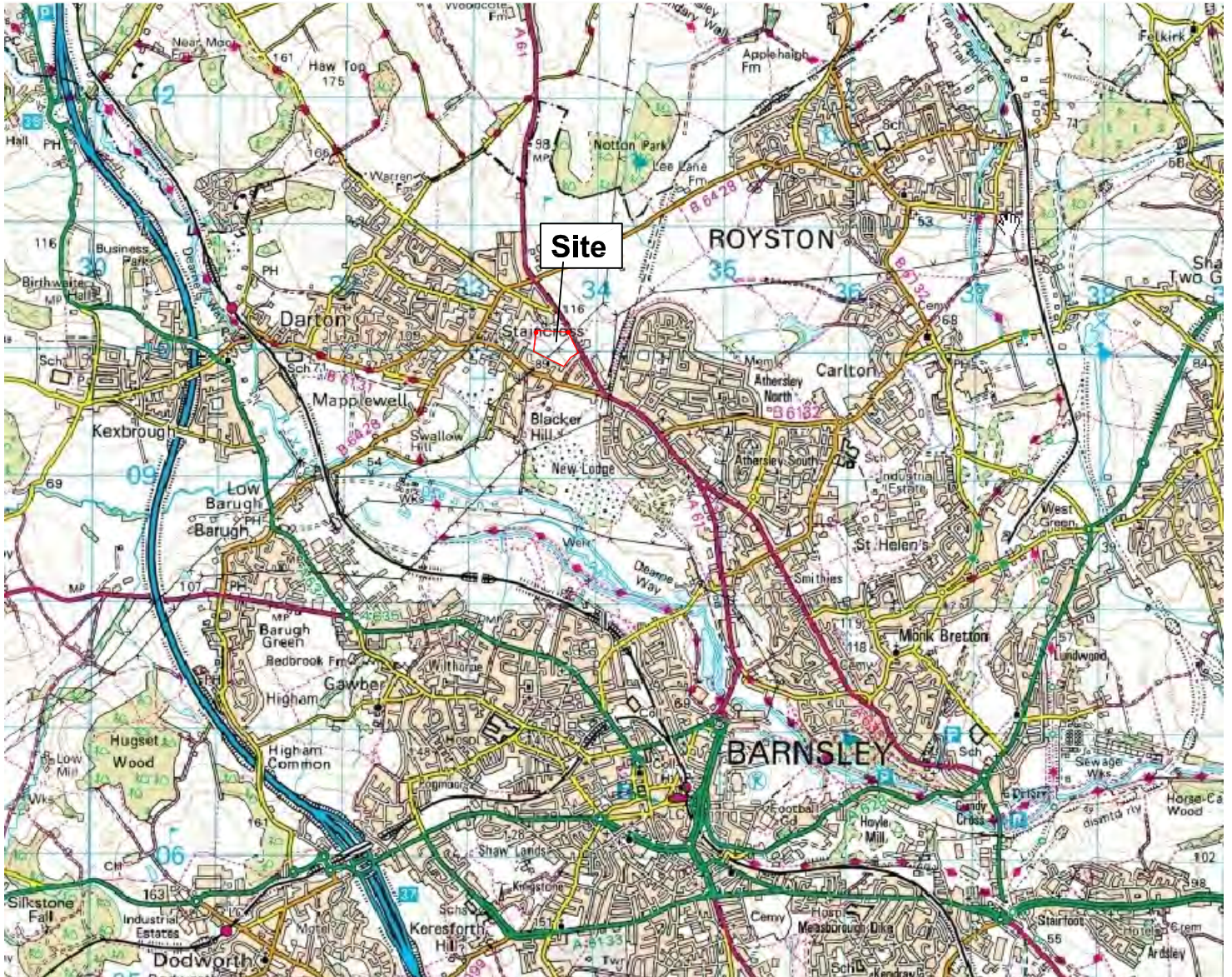
The following ground investigation works are recommended to allow foundation design, determination of contamination constraints and abnormal costs:

- Site specific radon report.
- Trial pits to investigate near surface soil and groundwater conditions and to allow recovery of soil samples for laboratory testing.
- Cable percussive boreholes to investigate deep made ground and to allow recovery of soil samples for geotechnical testing. In situ Standard Penetration Tests (SPTs) to be undertaken within boreholes in order to provide geotechnical data for the underlying made ground / soils / bedrock.
- Trial pits/trenches and rotary probing to investigate the edge and extent of the opencast workings.
- Rotary boreholes to investigate the potential for shallow mineworkings within four seams of coal.
- Installation of gas and groundwater monitoring and sampling wells in selected boreholes and subsequent monitoring and sampling.
- Chemical and geotechnical laboratory testing to adequately categorise the soils and groundwater.





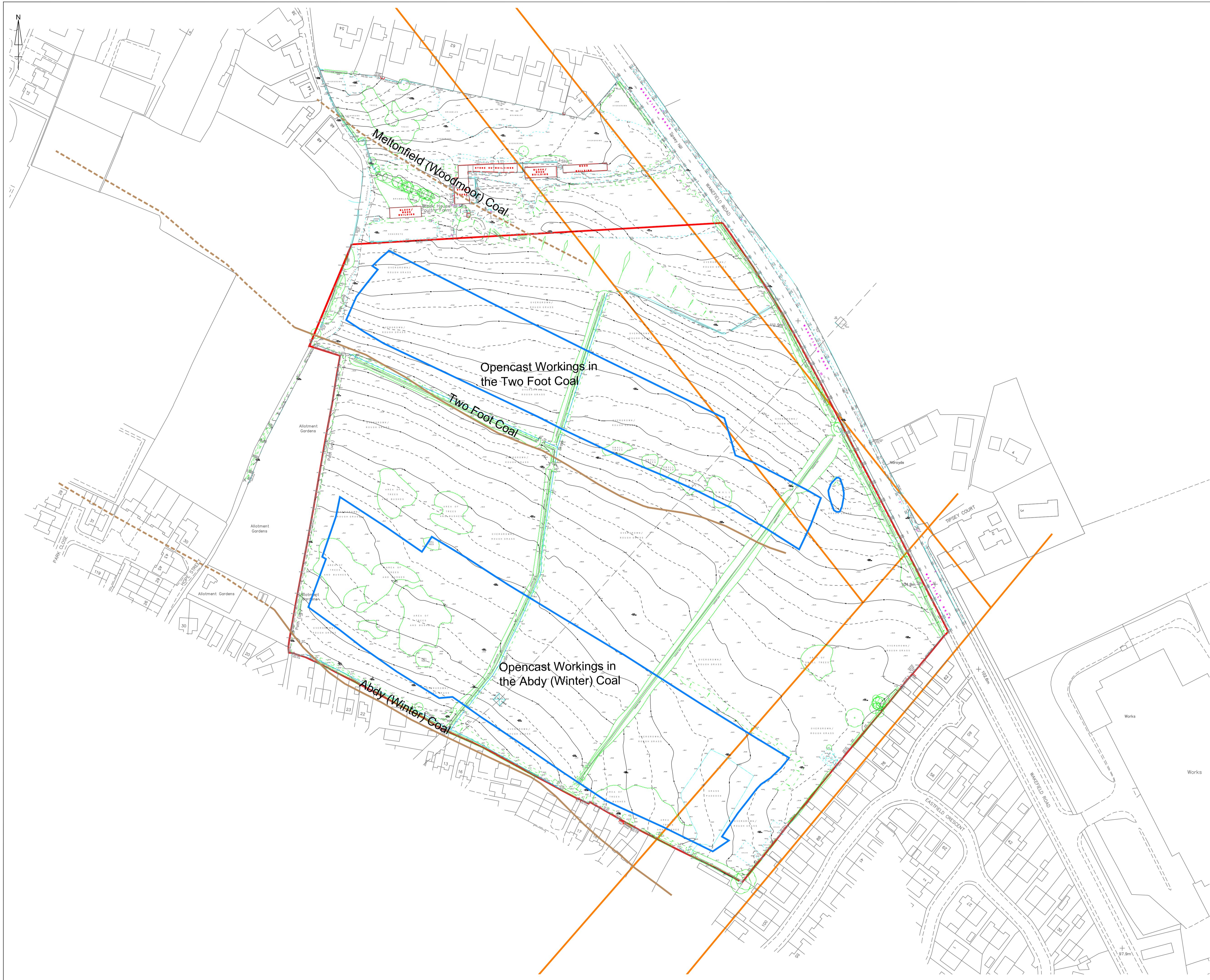
APPENDIX A

FIGURES AND DRAWINGS



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NOTES  Site Location	REVISION 0 For Information A >> B >> C >> D >>		CLIENT Pipestone Ltd	DRAWING NO. C3982/01	REVISION NO. 0	
	SIRIUS GEOTECHNICAL & ENVIRONMENTAL 4245 Park Approach, Thorpe Park, Leeds, LS15 8GB www.thesiriusgroup.com TEL: 0113 264 9960 FAX: 0113 264 9962					SITE Land off Wakefield Road, Mapplewell, Barnsley
			DRAWING TITLE Site Location Plan	DATE 08/10/12	SCALE 1:50000	A4



- NOTES**
- Site Boundary
 - Area of Opencast Workings
 - Coal seam outcrop based on Coal Authority Plans
 - Coal seam outcrop based on 1:10,560 Geological Plan
 - Location of fault based on 1:10,560 Geological Plan

This drawing is based on:

- Ellam Land Surveys Topographical Survey ref: 6523/1 dated Jan 2012.
- The Coal Authority Abandonment Plan for Tipsey Hill ref: NE328.

REVISION	
0	Information
A	>>
B	>>
C	>>
D	>>

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CLIENT

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SITE

**Land off Wakefield Road,
 Mappelow,
 Barnsley**

DRAWING TITLE

Site Features Plan

DRAWING NO. C3982/02	REVISION NO. 0
DRAWN BY MS	APPROVED BY RB
DATE 08/10/12	SCALE 1:1000
PAPER SIZE A1	



- NOTES**
- Area of Opencast (as overlain from The Coal Authority Abandonment Plan ref: NE328)
 - Coal seam outcrop based on Coal Authority Plans
 - Coal seam outcrop based on 1:10,560 Geological Plan

This drawing is based on John R Paley Associates Draft Layout ref: D09 4198 100 dated 23/03/12.

REVISION	
0	Information
A	>>
B	>>
C	>>
D	>>

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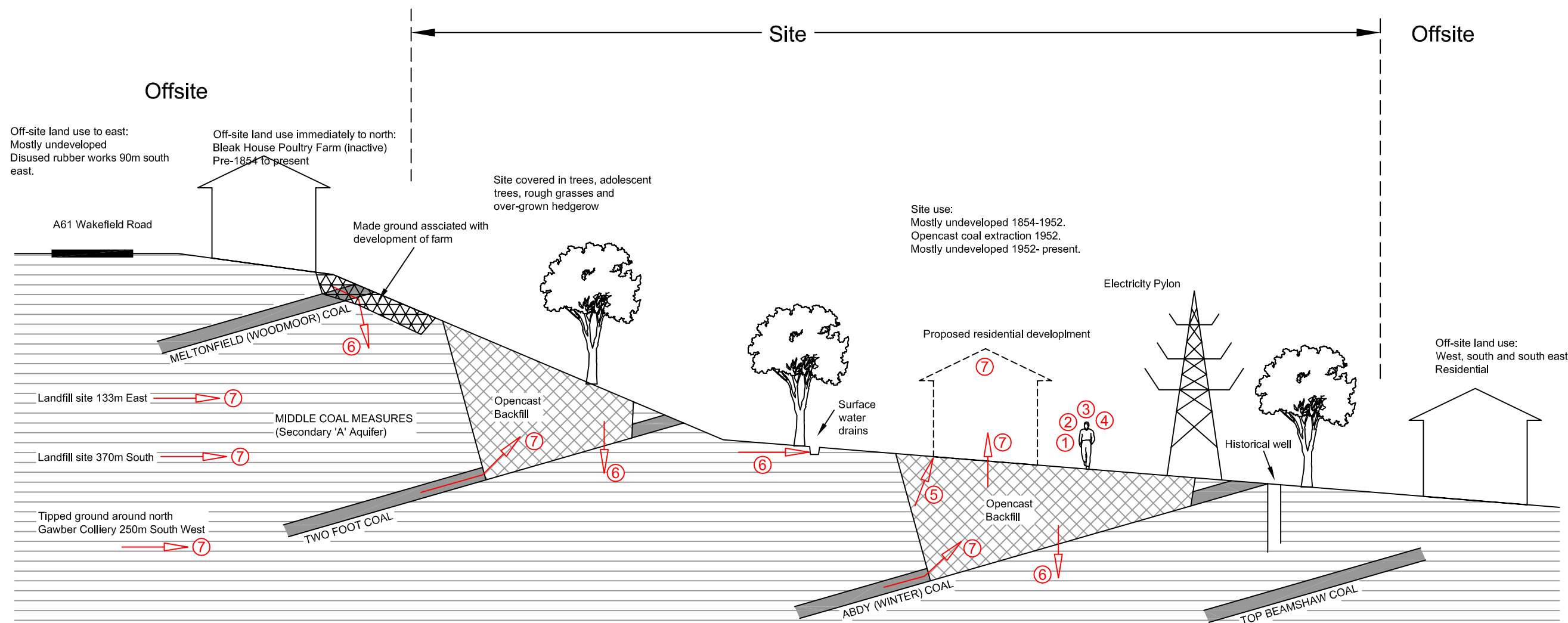
SITE

Land off Wakefield Road,
 Mapplewell,
 Barnsley

DRAWING TITLE

Development Layout
 and Opencast Extent

DRAWING NO. C3982/03		REVISION NO. 0	
DRAWN BY MS		APPROVED BY RB	
DATE 08/10/12	SCALE 1:1000	PAPER SIZE A1	



Site use:
Mostly undeveloped 1854-1952.
Opencast coal extraction 1952.
Mostly undeveloped 1952- present.

Off-site land use to east:
Mostly undeveloped
Disused rubber works 90m south east.

Off-site land use immediately to north:
Bleak House Poultry Farm (inactive)
Pre-1854 to present

Site covered in trees, adolescent trees, rough grasses and over-grown hedgerow

Off-site land use:
West, south and south east:
Residential

REVISION	
0	Information
A	>>
B	>>
C	>>
D	>>

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Contamination Sources	Contamination Pathways	Potential receptors	Likelihood of significant pollutant linkage
Heavy metals, PAHs, asbestos fibres and hydrocarbons in opencast backfill.	① Direct and indirect ingestion ② Dermal contact ③ Inhalation of dust ④ Inhalation of vapours	Construction workers/Future site users and occupants/Adjacent site users	Moderate to high
Sulphates/oxidisable sulphides within made ground and open cast backfill.	⑤ Sulphate attack	Built environment	Moderate
Leachable heavy metals, PAHs and hydrocarbons within topsoil and made ground.	⑥ Lateral and vertical migration	Secondary 'A' Aquifer/Surface water course	Low to moderate
Heavy metals, PAHs, hydrocarbons and asbestos fibres in made ground associated with development of farm immediately adjacent to the site.	① Direct and indirect ingestion ② Dermal contact ③ Inhalation of dust ④ Inhalation of vapours	Construction workers/Future site users and occupants/Adjacent site users	Low to moderate
Ground gas generation from off-site made ground and landfills, and, on-site made ground and coal seams	⑦ Migration and accumulation	Construction workers/Future site users and occupants/Adjacent site users	Moderate

CLIENT

Pipestone Ltd

SITE

Land off Wakefield Road, Mapplewell, Barnsley

DRAWING TITLE

Preliminary Conceptual Site Model

DRAWING NO. C3982/04	REVISION NO. 0
DRAWN BY MS	APPROVED BY RB
DATE 08/10/12	SCALE NTS
	PAPER SIZE A3



APPENDIX B

ENVIROCHECK REPORT



Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

41207480_1_1

Customer Reference:

C3982/RGB/7506

National Grid Reference:

433640, 410080

Slice:

A

Site Area (Ha):

13.23

Search Buffer (m):

1000

Site Details:

Proposed Development off
Wakefield Road
Mapplewell
Barnsley
South Yorkshire
S75 6LE

Client Details:

Ms D Broomfield
Sirius Geotechnical & Environmental Ltd
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	6
Hazardous Substances	-
Geological	9
Industrial Land Use	24
Sensitive Land Use	32
Data Currency	33
Data Suppliers	37
Useful Contacts	38

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Report Version v47.0



Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1				8
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 2		2	3	1
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 3	Yes			
Pollution Incidents to Controlled Waters	pg 3		1	1	3
Prosecutions Relating to Authorised Processes					
Prosecutions Relating to Controlled Waters					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register	pg 4			1	
Water Abstractions					
Water Industry Act Referrals					
Groundwater Vulnerability	pg 4	Yes	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 4	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 6		1	1	
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)	pg 6			2	
Local Authority Recorded Landfill Sites	pg 7		1	1	
Registered Landfill Sites	pg 7		1	1	
Registered Waste Transfer Sites	pg 8			1	
Registered Waste Treatment or Disposal Sites	pg 8		1		



Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 9	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 9	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 19		1	4	4
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
Brine Compensation Area			n/a	n/a	n/a
Coal Mining Affected Areas	pg 21	Yes	n/a	n/a	n/a
Mining Instability	pg 21	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 21	Yes		n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 21	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 21	Yes	Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 22	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 22	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 22	Yes	Yes	n/a	n/a
Radon Potential - Radon Affected Areas	pg 23	Yes	n/a	n/a	n/a
Radon Potential - Radon Protection Measures	pg 23	Yes	n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 24		16	50	13
Fuel Station Entries	pg 31			2	



Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Areas of Adopted Green Belt	pg 32		1		1
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves	pg 32				1
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 32	1			
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	<p>Discharge Consents</p> <p>Operator: Yorkshire Water Services Ltd Property Type: Sewerage Network - Pumping Station - Water Company Location: No Ngr On Consent-See Comment Below, See Comment Field Below, For Name Of Discharge Site, . Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: S/Cb/8 Permit Version: 1 Effective Date: 29th May 1963 Issued Date: 29th May 1963 Revocation Date: 31st March 2005 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Varies With Outlet Status: Transferred from Rivers (Prevention of Pollution) Act 1951-1961 Positional Accuracy: Located by supplier to within 10m</p>	A8NW (SE)	690	1	434344 409448
1	<p>Discharge Consents</p> <p>Operator: Yorkshire Water Services Ltd Property Type: Sewerage Network - Sewers Location: New Lodge, Wakefield Road, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Dearne Reference: S/CB/8 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: 30th June 1993 Revocation Date: Not Supplied Discharge Type: Sewage Effluent Discharge-Storm Effluent Discharge: Unknown Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m</p>	A8NW (SE)	692	1	434340 409440
2	<p>Discharge Consents</p> <p>Operator: Yorkshire Water Services Ltd Property Type: Sewerage Network - Sewers Location: Carr Green Lane, MAPPLEWELL, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Dearne Reference: S/UD/51 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: 30th June 1993 Revocation Date: Not Supplied Discharge Type: Sewage Effluent Discharge-Storm Effluent Discharge: Unknown Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m</p>	A6SW (SW)	794	1	433100 409280
2	<p>Discharge Consents</p> <p>Operator: Yorkshire Water Services Ltd Property Type: Trade (Unknown/Other) Location: Carr Green Lane, Mapplewell, Barnsley Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: C4139 Permit Version: 2 Effective Date: 31st March 2005 Issued Date: 28th February 2005 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Unnamed Trib Of River Dearne Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m</p>	A6SW (SW)	795	1	433080 409290



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	<p>Discharge Consents</p> <p>Operator: Yorkshire Water Services Ltd Property Type: Trade (Unknown/Other) Location: Carr Green Lane, Mapplewell, Barnsley Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: C4139 Permit Version: 1 Effective Date: 20th December 1985 Issued Date: 20th December 1985 Revocation Date: 30th March 2005 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Unnamed Trib Of River Dearne Status: Transferred from COPA 1974 Positional Accuracy: Located by supplier to within 100m</p>	A6SW (SW)	795	1	433080 409290
2	<p>Discharge Consents</p> <p>Operator: Yorkshire Water Services Ltd Property Type: Sewerage Network - Sewers Location: Carr Green Lane, MAPPLEWELL, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Dearne Reference: S/UD/51 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: 5th June 1963 Revocation Date: Not Supplied Discharge Type: Sewage Effluent Discharge-Storm Effluent Discharge: Unknown Environment: Receiving Water: Not Supplied Status: Not Supplied Positional Accuracy: Located by supplier to within 100m</p>	A6SW (SW)	798	1	433100 409275
3	<p>Discharge Consents</p> <p>Operator: Yorkshire Water Services Ltd Property Type: Sewerage Network - Pumping Station - Water Company Location: Staincross Sps, Staincross, Near Barnsley, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7908 Permit Version: 1 Effective Date: 6th November 2002 Issued Date: 6th November 2002 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Applehaigh Clough Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m</p>	A18SE (N)	908	1	433390 411200
4	<p>Discharge Consents</p> <p>Operator: Yorkshire Water Services Ltd Property Type: Sewerage Network - Pumping Station - Water Company Location: Staincross Sps Wakefield Road, Staincross, Barnsley, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wadc397 Permit Version: 1 Effective Date: 2nd November 1989 Issued Date: 2nd November 1989 Revocation Date: 9th November 2002 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Applehaigh Clough Status: Transferred from Water Act 1989 Positional Accuracy: Located by supplier to within 100m</p>	A18SW (N)	925	1	433300 411200
5	<p>Local Authority Pollution Prevention and Controls</p> <p>Name: William Freeman Limited Location: Wakefield Road, Staincross, Barnsley, South Yorkshire, S75 6DH Authority: Barnsley Metropolitan Borough Council, Environmental Health and Trading Standards Permit Reference: Epa102 Dated: 6th March 2000 Process Type: Local Authority Air Pollution Control Description: PG6/32 Adhesive coating Status: Site Closed Positional Accuracy: Automatically positioned to the address</p>	A11SE (SE)	153	2	434025 409913