

MINING RISK ASSESSMENT REPORT

11 Alfreds Way, Batley, West Yorkshire

Report: 487023 MRA

Date: February 2021

Client:

Z & F Properties Ltd.
The Birches, Langwith Drive,
Collingham,
Leeds
West Yorkshire,
LS22 5DJ

MINING RISK ASSESSMENT REPORT

11 Alfreds Way, Batley, West Yorkshire

DOCUMENT VERIFICATION SHEET

	Prepared By:	Checked By:
Name:	William Watkins	Richard Saville
Qualifications:	BSc MSc FGS	BSc CGeol FGS
Position:	Geotechnical Engineer	Director
Signature:	<i>Redacted</i>	

SUMMARY

Site Grid	424331E	Site Level	59	Site Area	0.11
Ref:	424303N	(m AOD):		(ha):	

Development proposals: Extension to existing building.

Past site development: High street then shopping centre open space.

Made Ground: Made ground anticipated associated with previous site use and existing building.

Anticipated Ground Conditions	Natural Soils	Residual soils anticipated.
	Bedrock:	Undifferentiated bedrock of Lower Coal Measures.
	Groundwater:	Anticipated within bedrock sequence.
	Shallow mining:	Shallow coal and iron stone workings possible.
	Foundations:	Raft foundation recommended.
	Drainage:	Soakaways are not considered suitable. Off-site drainage will need to be considered.
	Further Investigation:	Rotary open holes with water-flush.

MINING RISK ASSESSMENT REPORT
Batley Shopping Centre, Alfreds Way, Batley

TABLE OF CONTENTS

1. INTRODUCTION	1
2. OBJECTIVES	2
3. THE SITE	2
4. HISTORY	3
5. GEOLOGY	4
6. MINING RISK ASSESSMENT & QUARRYING.....	4
7. ANTICIPATED GROUND CONDITIONS.....	5
8. GEOTECHNICAL CONSIDERATIONS	6
8.1. General	6
8.2. Mining Precautions	6
8.3. Foundations	7
8.4. Floor Slabs	7
8.5. Hardstanding	7
8.6. Drainage	7
8.7. Chemical Precautions	7
9. REGULATORY APPROVAL.....	8
10. FURTHER INVESTIGATION	8

APPENDICES

APPENDIX A - SITE PLANS	A
APPENDIX B - COAL AUTHORITY CONSULTANTS REPORT	B
APPENDIX C – BGS BOREHOLE RECORDS	C

MINING RISK ASSESSMENT REPORT

Batley Shopping Centre, Alfreds Way, Batley

1. INTRODUCTION

On behalf of Z&F Properties Ltd, a Mining Risk Assessment was carried out by Abbeydale Building Environment Consultants Ltd (Abbeydale BEC) for a site at 11 Alfreds Way in Batley, West Yorkshire. The site is situated near the centre of Batley at National Grid Reference 424331E, 424303N, with a site area of around 0.11 ha. See Figure 1.

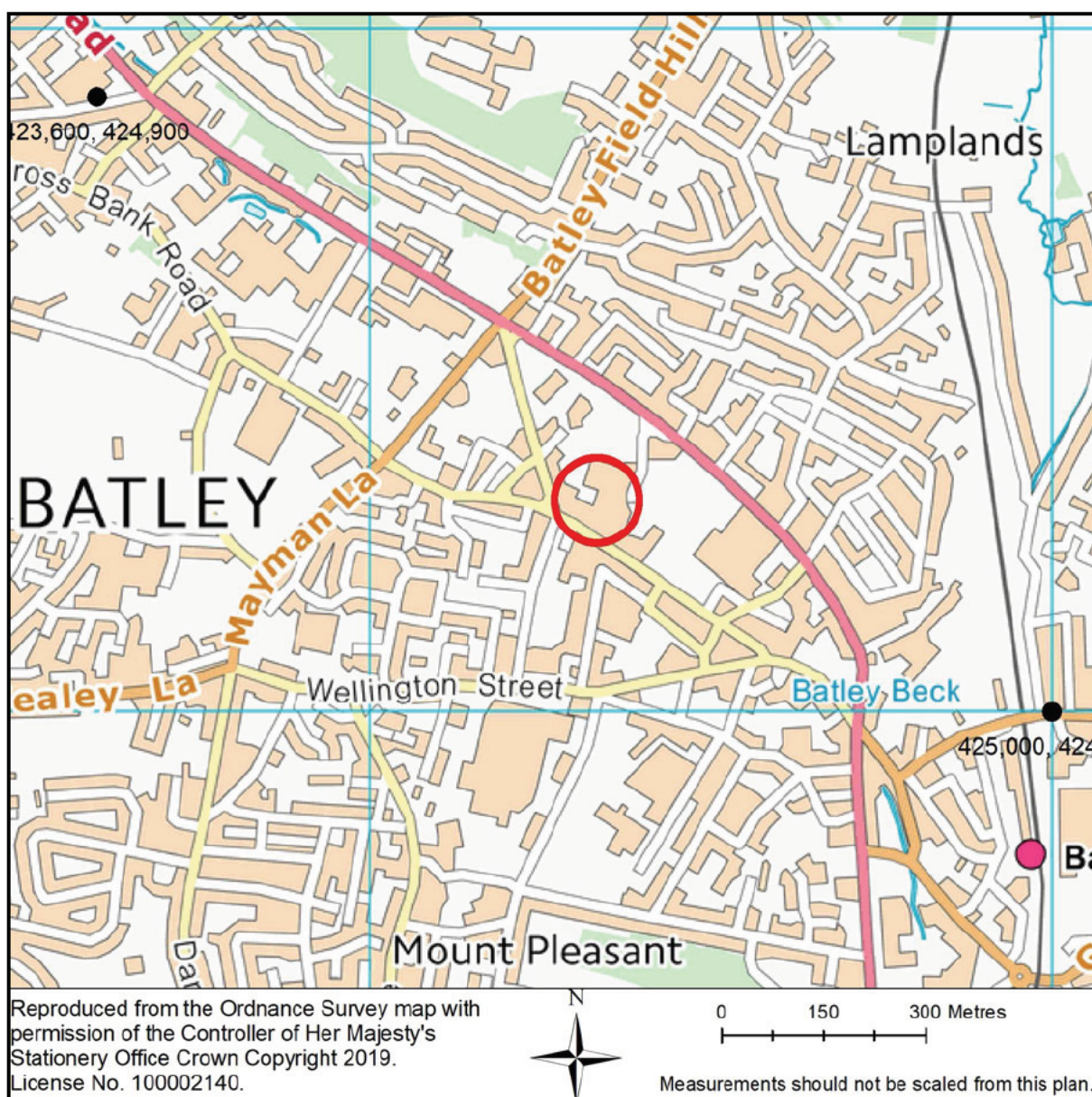


FIGURE 1 - LOCATION PLAN

This report was produced for our client, Z & F Properties Ltd, and their advisors and financiers and should not be relied upon or transferred to any other parties without the express written authorisation of Abbeydale BEC and our client. If any other unauthorised third party comes into possession of this report they rely on it at their own risk and the authors owe them no duty of care or skill.

The comments and recommendations presented in this Mining Risk Assessment report are based on the findings of a review of available information. There may be other conditions prevailing on the site which have not been recorded by the available information and therefore have not been taken into account by this report. Responsibility cannot be accepted for unrecorded information.

When writing this report the proposed development was for a new single storey takeaway retail unit. If there are changes to these proposals, then some modification to the comments and recommendations given may be required. The proposed site layout is shown on the site plan in Appendix A.

2. OBJECTIVES

This report has been undertaken to evaluate the potential risk from shallow mining beneath the footprint of the proposed development. The report evaluates the current site proposals (where known) with regard to geotechnical and engineering considerations to determine what impact the existing ground conditions will have on the integrity of the proposed building. As part of this evaluation the report gives foundation and drainage recommendations.

3. THE SITE

No site walkover has been undertaken as part of this Mining Risk Assessment; the following description is based purely on third party information.

The site is understood to be a rectangular parcel of land consisting of a tarmac area to the immediate east and north of existing retail units. Batley Methodist Church lies a short distance to the west of the site, on the opposite side of the adjacent tarmac car park. Using Google Streetview it appears as though a pair of concrete bollards are present to block vehicular access in the area where the proposed takeaway unit will be sited (image captured in July 2018).

The site is bound to the north by a neighbouring retail unit, with the units stone wall at the boundary. To the south and east are also neighbouring retail units which will adjoin the sides of the proposed development. To the west is a car park serving several retail units in the area, See Figure 2.

The proposed site layout is shown on the plans in Appendix A; it is proposed to construct a single storey extension off the western side of the building, measuring approximately 11.46m x 3.99m, which will be used as a takeaway food unit.

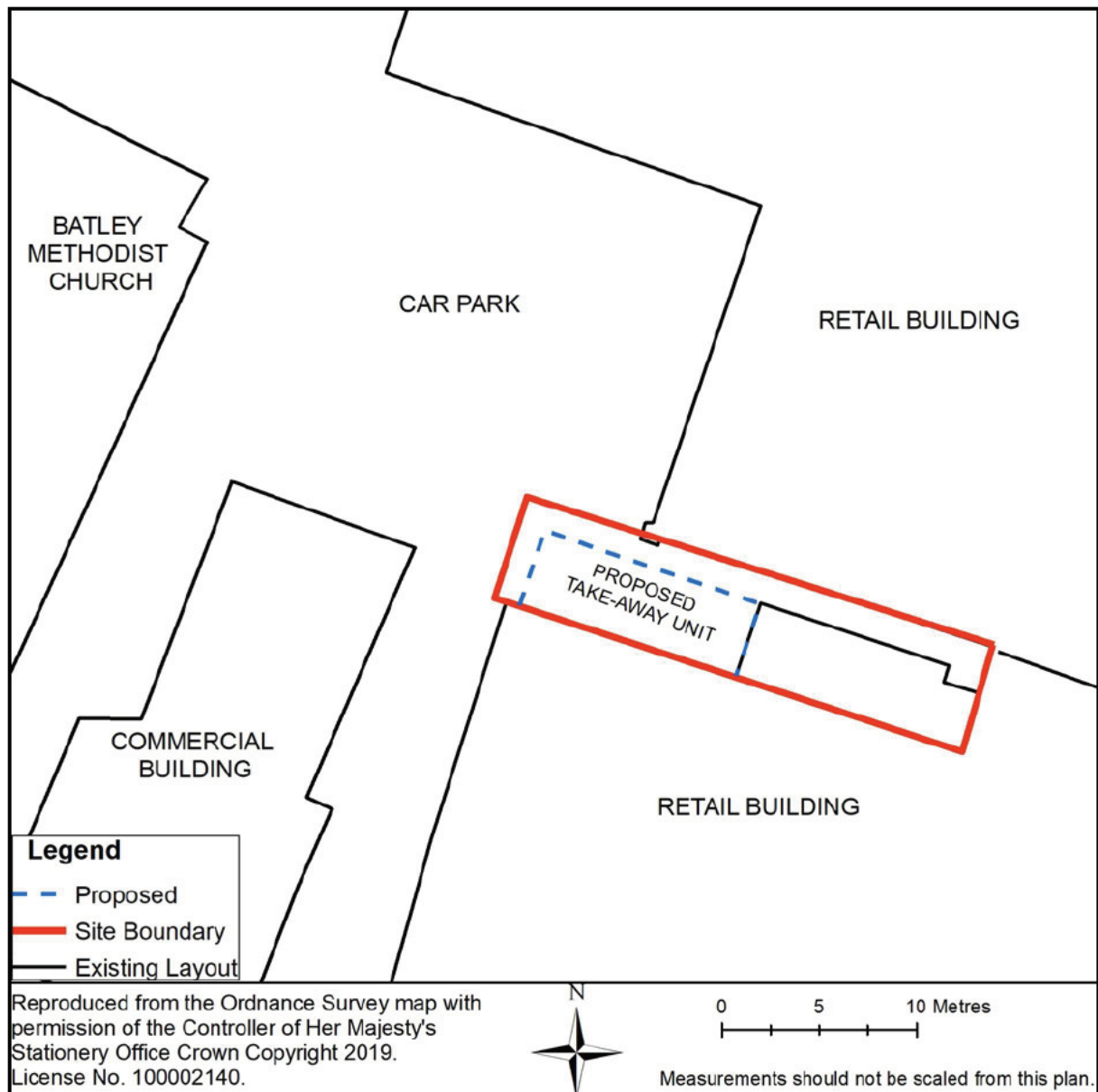


FIGURE 2 - SITE PLAN

4. HISTORY

A series of freely available online historic Ordnance Survey (OS) maps of the site and surrounding area have been assessed. All measurements stated are approximate distances from the site boundaries to the recorded features.

The earliest OS map of 1854 depicts the site within an open field, an area marked 'Batley Woollen Mill' is located 100m east of the site, later noted as 'Old Mill (Woollen)', until c.1982 when the mill was redeveloped to its present form.

The OS map of 1894 depicts the site to be occupied by Wilton Street running in a north south direction with buildings lined either side. This continues to be the case through to 1982 when the site was redeveloped to its present form.

Historical maps of the surrounding area feature a Bank Foot Brick Works ~250m North and Batley Colliery ~375m north-west of the site.

5. GEOLOGY

The geological survey maps of the area, 1:10,000 scale sheet SE22SW, 1:50,000 scale sheet 77 (Huddersfield) and Yorkshire County Series Sheet 232 SE have been examined. The site is shown to be underlain by undifferentiated strata of the Carboniferous Lower Coal Measures; dipping to the east from an assessment of outcrop patterns on the geological maps. The site is stratigraphically towards the top of the Lower Coal Measures sequence, above the Flockton Thick Coal and below the Joan Coal.

The nearest geological fault is conjectured approximately 115m to the east of the site, trending north-east - south-west and downthrowing strata to the south-west. Another fault is located ~120 north of the site, trending northwest-southeast, with strata downthrown to the south-west.

No superficial deposits are recorded to overlie the solid geology under the site; the closest being alluvium associated with Batley Beck approximately 70m north of the site. Natural soils would therefore be anticipated to be residual soils weathered down from the parent bedrock.

No artificial made ground is recorded on site, however, made ground would be anticipated from the past development in the locality of the site.

6. MINING RISK ASSESSMENT & QUARRYING

The presence of rock and mineral seams, including coal, which may have been mined or quarried in the area has been determined by the published geological maps and memoir of the area, and the appended Coal Authority (CA) Consultants report included in Appendix B.

The CA report does not indicate any recorded past mining to have occurred under the site, however it does highlight the potential for unrecorded shallow workings to be present. The geological maps show the Flockton Thick coal to outcrop to the north of the site, dipping to the south-east under the site. The seam is anticipated to be at a depth of around 12m to 15m below ground level (bgl) under the site.

Across the wider surrounding area to the west of the site the Flockton Thick coal outcrop is marked on the County Series geological map as having been worked by bell pits and adits, with the seam outcrop marked as a solid line suggested that it is known in this locality. However this annotation is not given in the vicinity of the site, where large scale urbanisation has already occurred and the outcrop is subsequently conjectured in this area. The Flockton Thick coal is said to have been worked to a large extent across the region, being of greatest value for use in the gas

lighting industry until this industry ceased. A shaft recorded on County Series geological map some

Approximately 10m to 15m below the Flockton Thick is the Flockton Thin Coal, up to 1.4m thick, known to have been worked in the Batley area. The next shallowest named coal seam, the First Brown Metal coal, lies stratigraphically around 22m to 25m below the Flockton Thin seam and would therefore be anticipated at around 42m to 45m below rockhead.

An ironstone band known as the Tankersley Ironstone is also anticipated in the strata above the Flockton Thick Coal. The geological memoir does not indicate that the ironstone was of economical importance in the area, having been worked in the region further south around the towns of Thornhill, Flockton and Emley.

Based on the above information the risk of shallow mine workings beneath the site is deemed to be **high**. Depending on the depth and thickness of any underlying shallow mine workings there is the potential for the workings to adversely affect the surface stability of the site, should collapse of any shallow mine workings occur.

No recorded mine entries have been highlighted within 100m of the site.

No recorded quarrying has been identified on or within the vicinity of the site, and the site is not directly underlain by a geological unit that was of specific economic importance. Consequently the risk of unrecorded quarrying affecting the site is deemed to be **very low**.

7. ANTICIPATED GROUND CONDITIONS

The anticipated ground conditions have been interpreted from the geological maps and available archive information, including archive BGS borehole records across the surrounding area. This includes public sector information licensed under Open Government License v 2.0, which has been used in good faith to provide an indication of the possible ground conditions beneath the site. The archive borehole logs are included in Appendix C for ease of reference. At this stage the information should be used for guidance purposes only and confirmation of the actual ground conditions should be considered if deemed critical. Using archive BGS borehole records from across the surrounding area a geological section has been compiled to summarise the anticipated ground conditions; see Figure 3.

Historical boreholes in the vicinity of the site lack ground level, hence it is tentatively assumed that ground levels at the time of drilling are similar to present ground levels.

An archive borehole recorded just north of the site (Ref: SE22SW258) identified made ground to 1.10m overlying stiff grey mottled brown clay residual soil to 3.50m, which was in turn underlain by mudstone bedrock which extended beyond the base of the borehole at 6.10m.

Deeper BGS borehole records from the area to the east generally confirm this geological sequence, with made ground overlying residual soils, followed by an upper layer of sandstone or siltstone bedrock before encountering mudstone bedrock. The nearest archive boreholes, some 50m east of the site (Ref. SE22SW266), identified made ground to 1.50m bgl, residual clay to 2.25m bgl, sandstone to 3.00m bgl, and mudstone to the base of the hole at 18.00m bgl.

The exploratory log notes dark grey to black shaly mudstone with coal and bivalves from 15.50m to 17.00m bgl, which was marked down as possible workings. Further to the east BGS borehole SE22SW267 recorded an intact coal seam from 12.50m to 13.90m depth with no signs of possible workings mentioned.

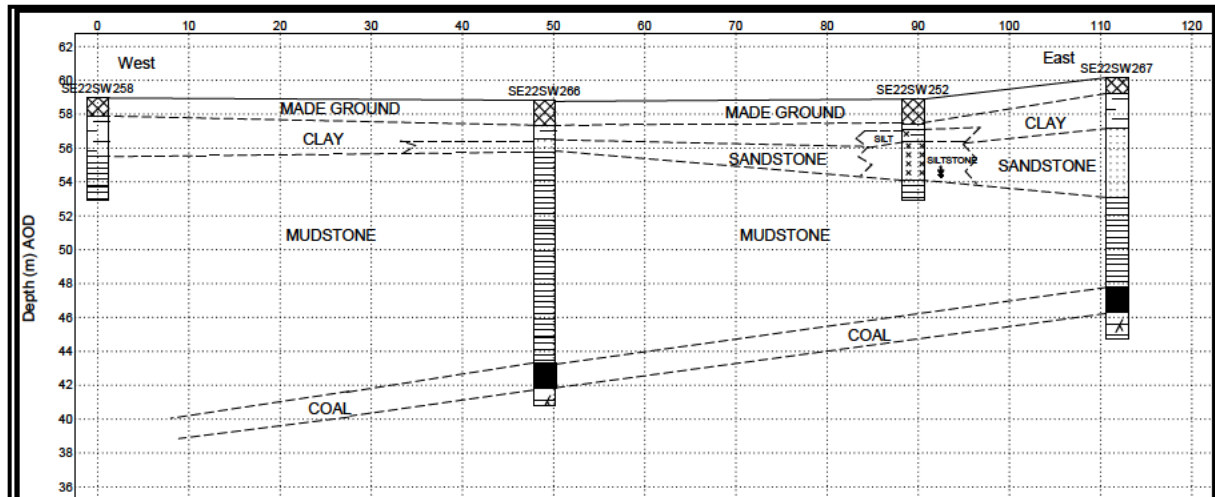


FIGURE 3 - GEOLOGICAL SECTION

Water seepages were noted to be confined within the bedrock sequence in several of the archive exploratory holes.

8. GEOTECHNICAL CONSIDERATIONS

8.1. General

An outline plan was available when completing this report. It is understood that a single storey retail unit is to be constructed as an extension to an existing building. The proposed ground loadings were not known but for the purposes of this report are assumed to be less than 75 kPa. If there are changes to these proposals, then some modification to the comments and recommendations given may be required.

8.2. Mining Precautions

Based on the above information the Flockton Thick coal is anticipated at shallow depth beneath the site, possibly with insufficient rock cover above any workings to mitigate the potential for any collapse to propagate to the surface. The resultant risk of unrecorded shallow mine workings is therefore deemed to be **high** at this stage.

Intrusive shallow mining investigation is recommended to confirm the depth and state of the Flockton Thick coal.

If mine workings are identified with insufficient rock cover then drilling and grouting may be required prior to casting any foundations to consolidate the workings and negate the potential for any collapse of the workings that may propagate to the ground surface.

If present, any mine workings in the deeper Flockton Thin coal are anticipated to be sufficiently deep so as not to affect the surface stability of the site.

8.3. Foundations

Intrusive Ground Investigation is recommended prior to foundation design to confirm the ground conditions present and determine the depth to a suitable founding stratum.

Provided that there are no signs of shallow mine workings, or any shallow workings are subsequently treated, consideration can be given to using lightly reinforced strip footings seated into very stiff residual clay or mudstone bedrock based on the anticipated geological setting of the site.

8.4. Floor Slabs

Without knowledge of the ground conditions across the site suspended floor slabs should be considered at this stage for the proposed extension.

8.5. Hardstanding

The design of any new hardstanding areas will be dependent on the ground conditions present. At this stage it should be assumed that a CBR value of less than 2.5% is available, requiring full construction thickness.

8.6. Drainage

Due to the likelihood of the bedrock beneath the site being mudstone, and the lack of available space within the site boundaries, soakaways are not suitable for draining roof water from the proposed extension.

As the site is already covered by hardstanding the proposed extension will not be increasing the impermeable areas that require drainage and draining into the existing drainage network should be feasible. All drainage measures will need to be designed in accordance with Sustainable Urban Drainage Systems (SUDS) requirements.

8.7. Chemical Precautions

Without undertaking chemical analysis of any made ground and natural soils on the site it should be assumed that sulphate resistant concrete is required at this stage. Water supply pipes should also need to be resistant to any chemical contamination.

9. REGULATORY APPROVAL

The conclusions and recommendations in this report are based on a review of available information and observations made during the site walkover survey undertaken. The conclusions cannot be guaranteed to gain regulatory approval if this report is required as part of a planning application. If it is required as such it should be passed to the relevant regulatory bodies for their comment and approval.

10. FURTHER INVESTIGATION

Based on the findings of the Mining Risk Assessment undertaken an intrusive shallow mining investigation is considered necessary to determine the depth and state of the Flockton Thick coal seam below the proposed extension.

Given the limited access to the area of the proposed extension the shallow mining investigation should consist of two rotary openhole boreholes drilled to at least 1m below the Flockton Thick coal or associated mine workings. The depth to the seam is unknown but is anticipated to be between range of 10m and 20m beneath the site, with the Flockton Thin Coal a further 10m below. At least one of the boreholes should be drilled to a depth of 30m wherever possible, to confirm the deeper geological sequence and that no other shallow mine workings are present within this depth range.

Due to the proximity to occupied buildings the rotary boreholes would need to be drilled using water flush techniques, and would require a permit to drill from the Coal Authority before undertaking the shallow mining investigation works.

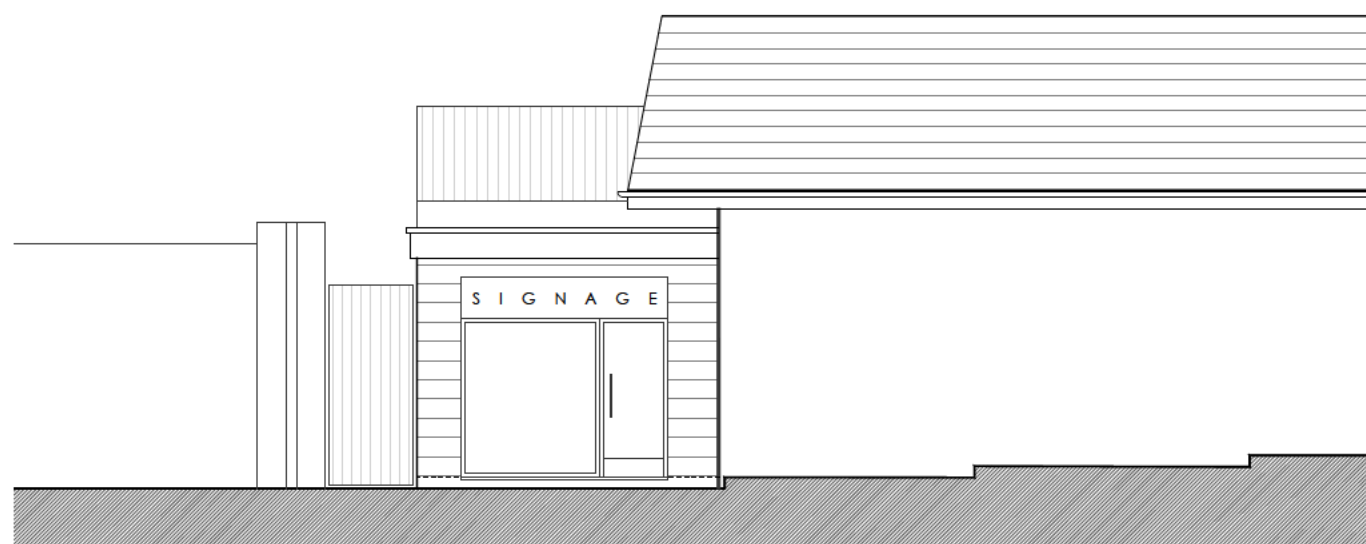
If workings are encountered then gas monitoring standpipes should be installed into at least one of the rotary openhole boreholes to facilitate post-investigation gas monitoring and determine if ground gas protection measures need to be incorporated into the extension.

Report 487023MRA | February 2021

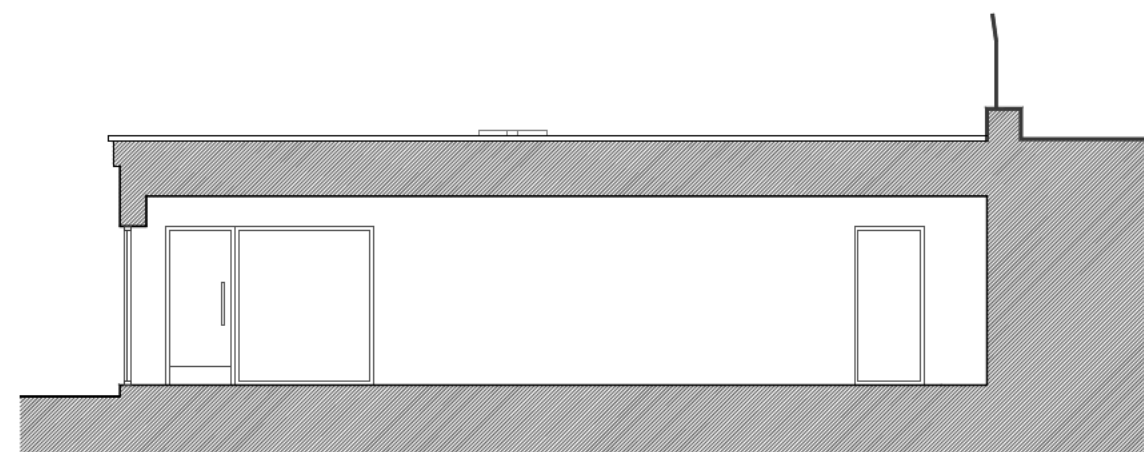
APPENDIX A - SITE PLANS



ELEVATION A



ELEVATION B



ELEVATION C

COLE GORNALL CROSS ARCHITECTS 15 WOODHALL PARK CRESENT EAST PUDSEY, LEEDS, LS28 7HG 077866 34314	PROJECT TAKE AWAY UNIT, BATLEY FOR MR ZAHID IQBAL.	TITLE	SCALE	JOB No.	DWG No.	REV.	DATE	DESC.	REV.	DATE	DESC.
		PROPOSED ELEVATIONS	1:100@A3	2049	A(SK)-06						
		STAGE	DRAWN	CHECK	DATE						
		FEASIBILITY	MC	MC	12.2020						

APPENDIX B - COAL AUTHORITY CONSULTANTS REPORT



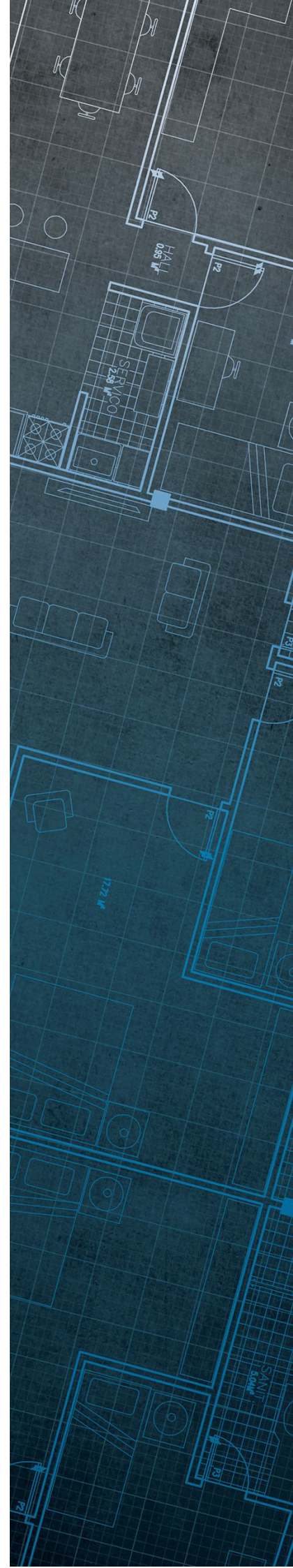
The Coal
Authority

Consultants Coal Mining Report

Batley Shopping Centre, Alfreds
Way, Batley, Wf17 5dr
West Yorkshire

Date of enquiry:	23 February 2021
Date enquiry received:	23 February 2021
Issue date:	23 February 2021

Our reference:	51002384249001
Your reference:	GS-7598001



Consultants

Coal Mining Report

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

Client name

GROUNDSURE LIMITED

Enquiry address

Batley Shopping Centre, Alfreds Way, Batley, Wf17
5dr
West Yorkshire

How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

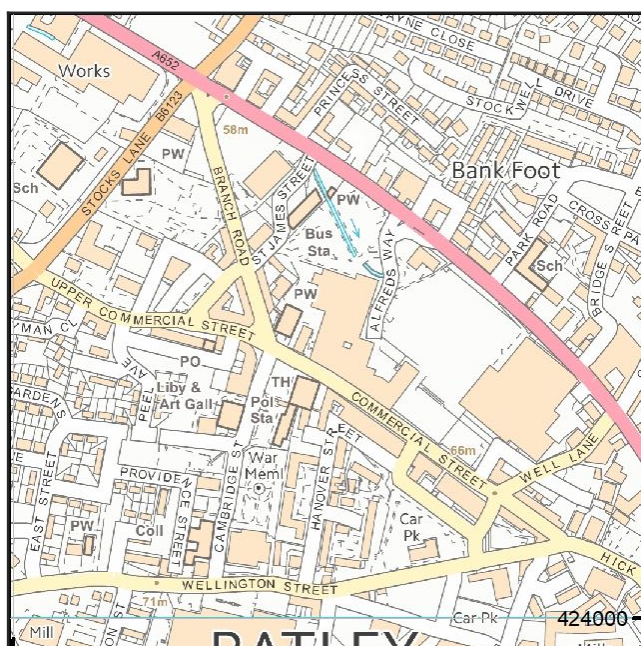
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



Reproduced by permission of
Ordnance Survey on behalf of
HMSO. © Crown copyright and
database right 2018. All rights
reserved.

Ordnance Survey Licence number: 100020315

Section 1 – Mining activity and geology

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

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

CT16	12673	8420
12676		

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

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

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

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

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

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

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

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

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

Withdrawal of support notices

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

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

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

Section 5 – Data definitions

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

Past underground coal mining

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

Probable unrecorded shallow workings

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

Spine roadways at shallow depth

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

Mine entries

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

Abandoned mine plan catalogue numbers

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

Outcrops

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

Geological faults, fissures and breaklines

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

Opencast mines

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

Coal Authority managed tips

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

Site investigations

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

Remediated sites

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

Coal mining subsidence

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

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

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

Mine gas

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

Mine water treatment schemes

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

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

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

Future underground mining

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

Coal mining licensing

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

Court orders

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

Section 46 notices

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

Withdrawal of support notices

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

Payment to owners of former copyhold land

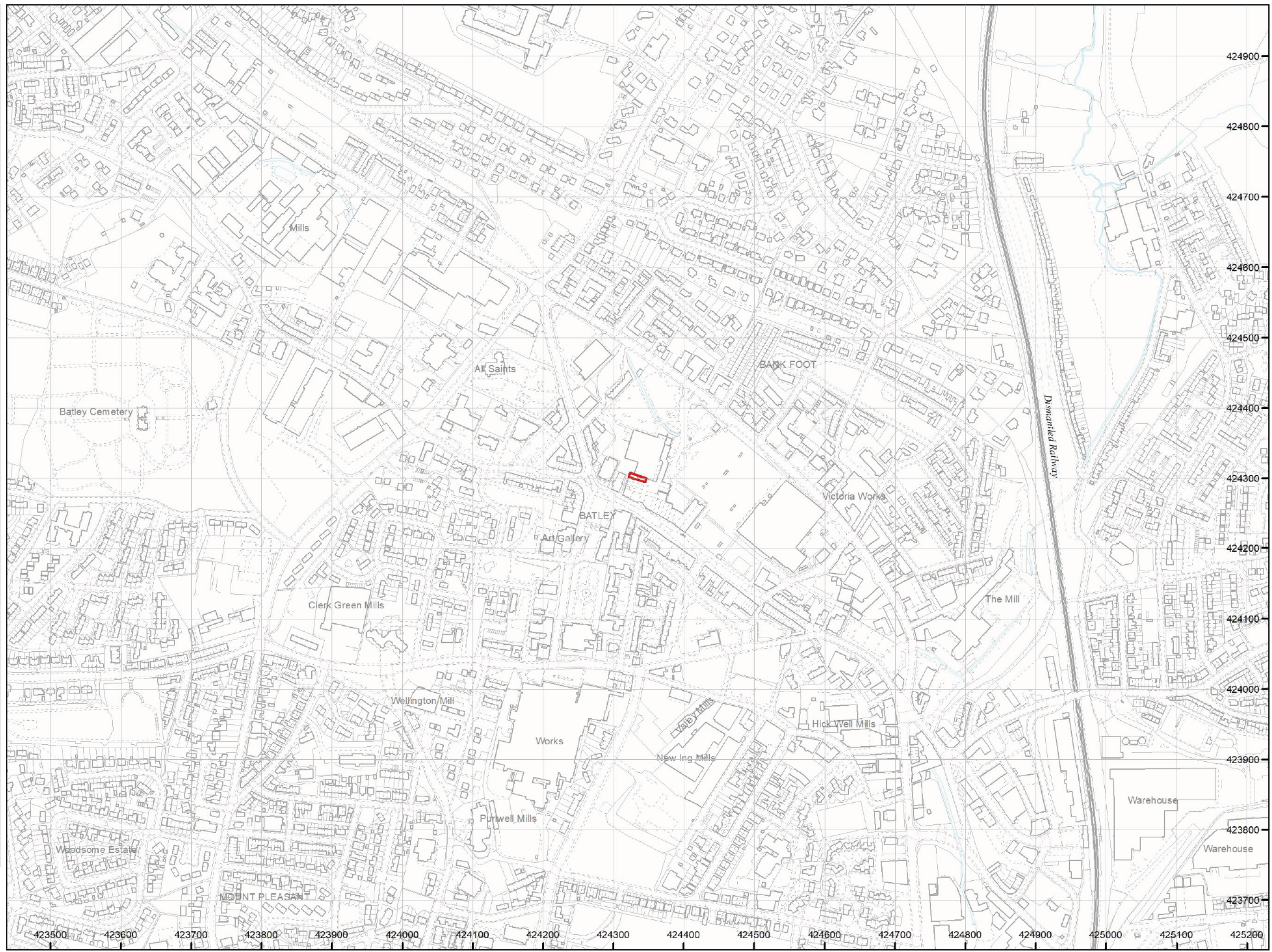
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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

Key

Approximate position of the enquiry boundary shown 

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



APPENDIX C – BGS BOREHOLE RECORDS

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG

Borehole No.

8

Contract No. F3755

Location Batley

Client Birkett, Stevens, Colman Partnership

Method of Boring Percussion

Diameter of Borehole 254mm

Sheet 1 of 1

Chainage

Ground Level

Date 8th and 9th January, 1979

SE22SW 258

Description of Strata	Legend	Depth Below G.L. (m)	Thickness of Strata (m)	Type of sample	C kN/m ²	φ deg	m.c. %	γ Mg/m ³	N
MADEGROUND : Tarmac		0.05	0.05						
MADEGROUND : Stone sets		0.20	0.15						
MADEGROUND : Ashes		0.30	0.30						
MADEGROUND : Clay, bricks ashes		1.10	0.80	1.20					
Stiff grey mottled brown very silty CLAY with occasional siltstone/sandstone fragments				2.00	98	0	23.3	1.98	
				3.05					
		3.50	2.40		83	0	20.2	2.12	
Completely weathered dark grey with brown laminated MUDSTONE				4.30					
		5.30	1.80						
Moderately weathered dark grey with brown shaly weak MUDSTONE				5.80					91 for 150mm
		6.10							

Key

- Undisturbed Sample
- Disturbed Sample
- △ Water Sample
- I Penetration Test
- φ Angle of Friction
- m.c. Moisture Content
- γ Bulk Density
- N S.P.T. Value
- C Apparent Cohesion

Remarks (Observations of Ground Water etc.)

Borehole dry

Water levels are subject to seasonal or tidal variations and should not be taken as constant

2

2441 2427.

Date.....19/10/77.....

Water levels are subject to seasonal or tidal variations and should not be taken as constant.

Holst Soil Engineering Limited

Borehole No.

2

Contract No. F3758

BOREHOLE LOG

2437 2428

Location Batley

Sheet 1 of 1

Client Birkett, Stevens, Colman Partnership

Chainage

Method of Boring Rotary coring

Ground Level m.A.O.D.

Diameter of Borehole 100 mm

SE22SW 266

Date 9-11/11/77

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D. %	Daily Progress
MADEGROUND							
Black ash clay		1.50					
Soft brown CLAY		2.25					
Highly weathered highly fractured brown SANDSTONE		3.00					
Very highly weathered very highly fractured black shaly MUDSTONE with bands of clay					5.00		
					60%		
					6.00		
					50%		
					7.00		
					30%		
		7.50					
Very highly weathered very highly fractured light grey MUDSTONE					8.50		
					66%		
					10.00		
					12.00		
					30%		
					13.50		
					30%		
		14.00					
Highly weathered highly fractured grey silty MUDSTONE					15.00		
					100%		
Highly weathered moderately fractured dark grey black shaly MUDSTONE					16.00		
Dark grey black shaly MUDSTONE with coal fragments and bivalves (possible workings)					50%		
		17.00					
Highly weathered highly fractured light grey MUDSTONE SEATEARTH					18.00		
		18.00					

Type of Sample

- Is S.P.T. ☐ Undisturbed
 Ic. C.P.T. ☒ Vane
 O Jar ☒ Water
 ● Bulk ☒ Piezometer

Remarks (Observations of Ground Water etc.)

Water seepage from 7.50 m.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Holst Soil Engineering Limited

Borehole No.

3

Contract No. F3758

BOREHOLE LOG

2443 2426

Location Batley

Sheet 1 of 1

Client Birkett, Stevens, Colman Partnership

Chainage

Method of Boring Rotary coring

Ground Level m.A.O.D.

Diameter of Borehole 100 mm

Date 11/12/11/77

SE22SW 267

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/R.Q.D.%	Daily Progress
MADEGROUND - grey brown clay		1.00					
Light brown sandy CLAY weathered siltstone		3.00			3.00		
Highly weathered, highly fractured light brown grey weak fine silty SANDSTONE		7.10			79%		
Highly weathered, highly fractured light grey silty MUDSTONE with ironstone nodules		10.75			84%		
Moderately weathered moderately fractured dark grey black shaly MUDSTONE		12.50			90%		
COAL		13.90			95%		
Slightly weathered highly fractured light grey silty MUDSTONE SEATEARTH		15.50					

Type of Sample

Is S.P.T. ☐ Undisturbed

Ic. C.P.T. ☒ Vane

O Jar ☒ Water

● Bulk ☒ Piezometer

Remarks (Observations of Ground Water etc.)

Water seepage from 6.00 m
" struck at 12.00 m

Water levels are subject to seasonal or tidal variations and should not be taken as constant