

**Quantitative Coal Mining Risk
Assessment Report**

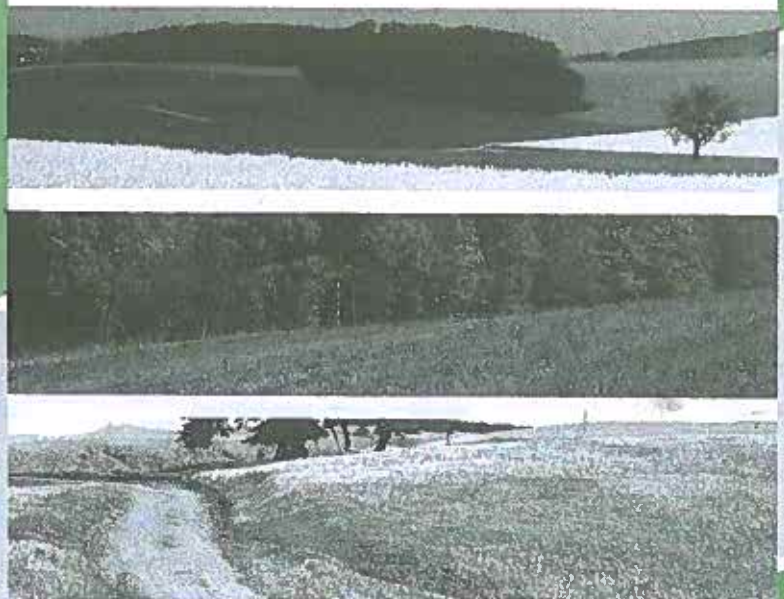
Proposed Residential Development, Builders
Yard, Elwyn Drive, Merthyr Tydfil

Prepared for:

Mr J. Cox

October 2015

Job No: 13319-2




terrafirma

Document Control

Report title	Coal Mining Risk Assessment Report: Proposed Residential Development, Builders Yard, Elwyn Drive, Merthyr Tydfil
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Authorised by	 Dr G C Lake

Executive Summary

Mr J Cox is proposing the redevelopment of a builder's yard at Elwyn Drive in Merthyr Tydfil, CF47 0NJ. The development will entail the construction of a pair of semi detached houses with associated road and driveway access and garden areas.

The site is centred at an approximate National Grid Reference of 305580, 205960 and occupies a plan area of 0.06 hectares.

The site is underlain by rocks of the South Wales Lower Coal Measures Formation, Carboniferous in age and comprising grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones.

A desk study assessment concluded that the site was potentially at risk of unrecorded abandoned mine workings associated with the Garw coal seam and the underlying Rosser Ironstone Veins.

In order to determine the level of mining related risk, an intrusive drilling exercise was undertaken on the 22nd and 23rd of October, 2015. Three rotary boreholes were installed by open hole drilling methods (water flush) using a T44 Beretta drilling rig.

The ground conditions established comprised Made Ground to 0.60/1.60m depth, underlain by Glacial Boulder Clay to 3.90/4.80m which is in turn underlain by Mudstone Coal Measures. The three rotary boreholes identified a single seam of coal, 0.60m to 0.80m thick at a depth of between 9.30m and 9.60m below ground level.

The coal was intact in all three boreholes with no evidence of workings and it was concluded that there was an insignificant risk to the development from past unrecorded shallow workings.

However, the possibility of shallow unrecorded workings having taken place within influencing distance of the proposed houses. In order to cater for such an eventuality it is recommended that a reinforced concrete raft type foundation/floor slab solution would then be suitable engineering solution for the development. The raft should be capable of spanning a crown hole of 3.0m with a cantilever effect on corners of 1.5m. The maximum load beneath the foundation should not exceed 75kN/m². Total settlement of the foundation should not exceed 30mm with angular distortions caused as a result of differential settlements should be less than 1:750.

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SECTION 1 Introduction and Proposed Development

Mr J Cox is proposing the redevelopment of a builder's yard at Elwyn Drive in Merthyr Tydfil, CF47 0NJ. The development will entail the construction of a pair of semi detached houses with associated road and driveway access and garden areas.

In August 2015, Terra Firma (Wales) Limited (TFW) was commissioned to undertake a desk study and geotechnical and geo-environmental ground investigation of the site. TFW issued their Geotechnical and Geo-environmental Report in September 2015.

TFW concluded that the site was potentially at risk unrecorded abandoned mine workings. In order to determine the level of mining related risk, an intrusive drilling exercise was recommended.

In order to achieve the above objectives, Terra Firma (Wales) Limited carried out an assessment programme including a review of existing data, followed by a rotary drilling investigation to determine the presence of, depth to and condition of shallow coal beneath the site.

1.1 Limitations and Exceptions of Investigation

The coal mining risk assessment was conducted and this report has been prepared for the sole internal reliance of Mr J Cox and his design and construction team.

This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geo-environmental and geo-technical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required. The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

SECTION 2 Review of Existing Data

2.1 Physical Setting, Current Use and Site Conditions

The site is centred at an approximate National Grid Reference of 305580, 205960 and occupies a plan area of 0.06 hectares.

The site lies within a builder's yard and is accessed at its southern point via Elwyn Drive through a locked gate. Topographically, the site slopes from the east to the west and southeast. The northern, southern and south-western site margins are marked by retaining walls and fencing. Sections of the retaining walls are in a state of disrepair. To the east of the development area are a 'lock up' and offices associated with the builder's yard business.

Prior to the site visit by a Terra Firma Engineer, a partial site strip and cut exercise had been undertaken along the northern site area, reducing the ground level in this area by between typically 0.5m and 2m. We understand that the objective of removing the soil in this area was to remove Japanese Knotweed. Colliery spoil was seen within the cut along the northern boundary of the site, with, in areas, possible naturally occurring orange grey brown Boulder Clay at the base of the cutting. Asbestos containing tile fragments were noted on top of the cutting bank. Terra Firma did not visit the site prior to the site strip/cut exercise. The soil within the cutting exhibits localised slumping due to the over steepened slope and exposure to the weather etc.

Areas of scrub vegetation exist within the site, predominantly along site margins. Within the northern, southern and western site areas, new growth of Japanese Knotweed was evident. Knotweed growth is also evident outside of the western site boundary.

Made Ground was evident at ground level across the site in the form of colliery spoil with inclusions of building materials comprising concrete fragments and bricks. In addition, there were occasional fragments of asbestos containing tile fragments across the surface of the site. In the west of the site by the site entrance the ground is surfaced with tarmac.

Within the northwest corner of the site is a single storey outhouse building of breeze block construction. Building materials including timber, bricks and concrete are found here.

The site location, existing and proposed site layouts are presented in **Drawings 01, 02 and 03.**

2.2 Geological

2.2.1 Geology

The 1:10560 scale geological map (SO 00 NE) of the area was consulted. The site is underlain by rocks of the South Wales Lower Coal Measures Formation, Carboniferous in age and comprising grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones.

Approximately 190m east of the site is the conjectured north to south crop of the Gellideg coal seam (4 to 5 feet thick). Stratigraphically beneath this coal seam is the Garw coal seam (1 foot thick) and Rosser Ironstone Veins. The coal seam stratigraphy indicates that the strata dip away from the site and therefore the Gellideg seam will not underlie the site. The crop of the Garw coal seam is not illustrated on the geological map and is therefore unknown. The seam may therefore crop within influencing distance of the site.

Superficial Deposits of Boulder Clay (Till) overlie the bedrock, which is in turn overlain by Made Ground.

2.2.2 Mining

A Coal Mining Report was procured from the Coal Authority, reference 51000967195001, see **Annex A**. The report provides the following information:

The site is not within the zone of likely influence on the surface from past underground workings. However, the site lies within an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. Referring to the coal stratigraphy described in **Section 2.5.1** (Geology), we conclude that this relates to the Garw coal seam and the underlying Rosser Ironstone Veins.

There are no known coal mine shaft entries within, or within 20 metres of, the boundary of the property. However the Coal Authority note that records may be incomplete and that there may exist in the local area mine entries of which there is no knowledge.

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

The report adds the following; In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken. Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority.

A Coal Mining Consultants Report was also procured for the site (reference 51001026888001) which confirmed that shallow unrecorded workings associated with the Garw coal seam were 'probable'. This report is also presented in **Annex A**.

SECTION 3 Field Investigation

3.1 Site Works

A rotary borehole drilling exercise was undertaken on the 22nd and 23rd of October, 2015.

Three rotary boreholes were installed by openhole drilling methods using a T44 Beretta drilling rig. Water flush was used.

The fieldworks were attended on a part time basis by a Terra Firma Wales Ltd Chartered Geologist. The borehole logs are presented in **Annex B** and field photographs are illustrated in **Annex C**. The location of the exploratory holes is given in **Drawings 02 and 03**.

3.2 Coal Authority Permit

Permissions are required for all activities that intersect, disturb or access any of the Coal Authorities interests. The Coal Authority was notified of the proposal for rotary drilling and the exercise was allowed under permit reference number 11463.

3.3 Ground Conditions

The ground conditions encountered are summarised as follows:

Table 3.1 Summary of Ground Conditions			
Depth from (m)	Depth to (m)	Thickness (m)	Stratum description
0.00	0.60 / 1.60	0.60/1.60	MADE GROUND (Driller description)
0.60 / 1.60	3.90 / 4.80	3.20 / 3.30	GLACIAL BOULDER CLAY (Driller description)
3.90 / 4.80	9.30 / 9.60	4.80 / 5.20	MUDSTONE (COAL MEASURES BEDROCK) (Driller description)
9.30 / 9.60	10.00 / 10.20	0.60 / 0.80	COAL (Driller description)
10.00 / 10.20	>34.00 / >36.00	-	MUDSTONE (COAL MEASURES BEDROCK) (Driller description)

The boreholes were drilled using water as the flushing medium and therefore it cannot be determined with certainty if groundwater was encountered.

SECTION 4 Assessment of Potential Risks from Shallow Underground Coal Mining

4.1 Shallow Coal Mining Considerations

The site is not within the zone of likely influence on the surface from past underground workings. However, as discussed in **Section 2**, the site lies within an area where the Coal Authority believe there is coal at or close to the surface; the Garw coal seam and the underlying Rosser Ironstone Veins.

The three rotary boreholes identified a single seam of coal, 0.60m to 0.80m thick at a depth of between 9.30m and 9.60m below ground level. This is thicker than the typical 0.30m (~1 foot) thickness of the Garw coal seam as indicated within the geological map vertical section.

No workings were encountered within the probeholes and it is concluded that there are no unrecorded workings beneath the proposed semi-detached houses.

However, unrecorded workings may be present within influencing distance of the site. In order to cater for such an eventuality it is recommended that a reinforced concrete raft type foundation/floor slab solution capable of spanning a crown hole of 3m with a cantilever effect on corners of 1.5m should be used for the development. The maximum load beneath the foundation should not exceed 75kN/m². Total settlement of the foundation should not exceed 30mm with angular distortions caused as a result of differential settlements should be less than 1:750.

To avoid damage from frost action, the depth to the underside of the foundation in frost susceptible ground should be at least 450mm (0.45m) below finished ground level.

Allowances should be made for the treatment of / removal of soft spots as previously described. It is recommended that a Terra Firma Engineer inspect all foundation excavations before concreted and any unusual occurrences/ground conditions should be reported immediately.

4.2 Mine Entry Considerations

The Coal Authority Mining Report does not identify any recorded mine shafts on site. However, the report states that records may be incomplete. Therefore, the possibility of unrecorded mine entries cannot be entirely discounted. During construction works, if any anomalous areas of fill, brick or stone work are identified, the occurrence should be reported immediately to Terra Firma and an appropriate investigation put in place.

4.3 Mine Gas Considerations

The Coal Authority Report confirms that there is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the study site.

ANNEX A
Coal Authority Mining Reports

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

**LANDMARK INFORMATION GROUP
LIMITED
SOWTON INDUSTRIAL ESTATE
ABBAY COURT
UNIT 5/7 EAGLE WAY
EXETER
DEVON
EX2 7HY**

Our reference: **51000967195001**
Your reference: **70905697_2|**
Date of your enquiry: **05 August 2015**
Date we received your enquiry: **05 August 2015**
Date of issue: **05 August 2015**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

SITE AT BUILDERS YARD, ELWYN DRIVE, MERTHYR TYDFIL,

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

However the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on Coal Authority Information section of the report.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

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

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

The 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

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

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

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

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

Comments on Coal Authority information

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

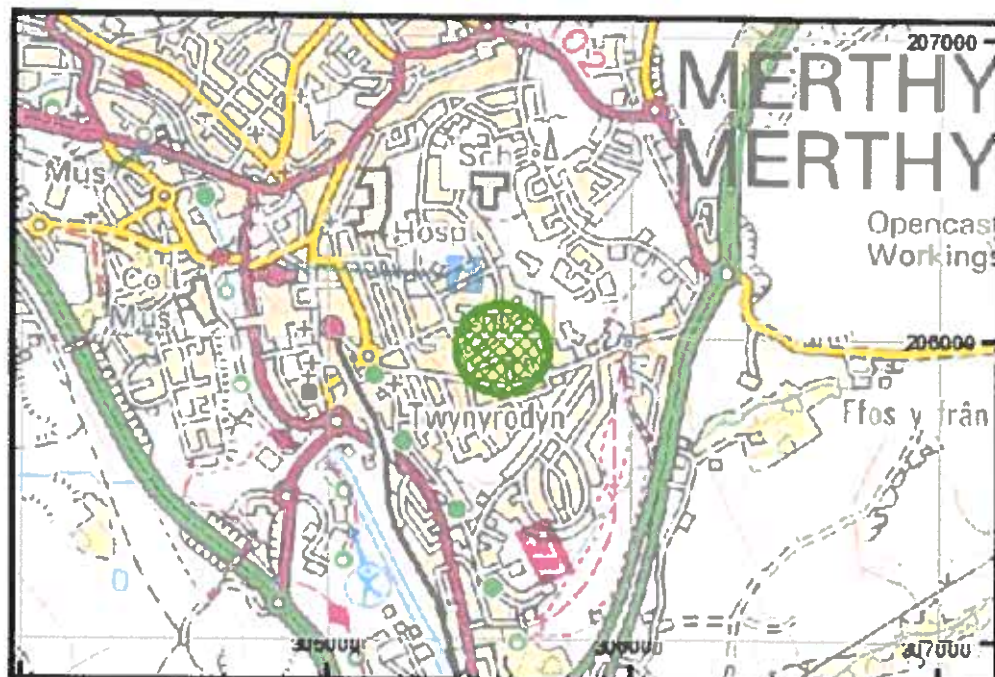
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Location map



Approximate position
of property

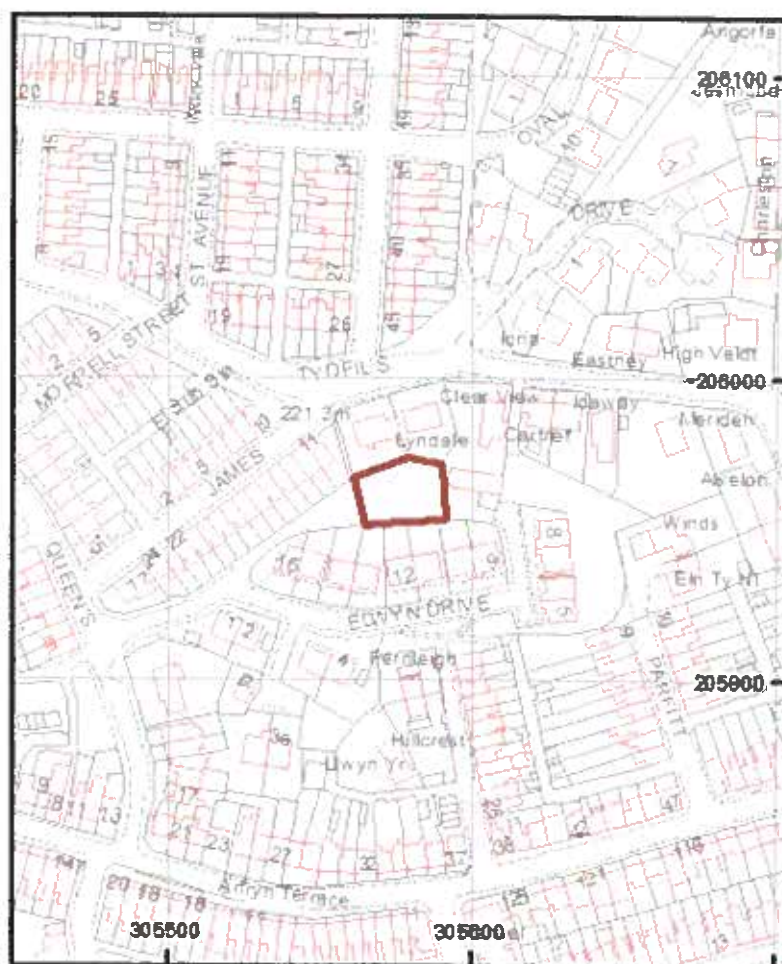


Enquiry boundary

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Key

Approximate position of enquiry
boundary shown



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The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

TERRA FIRMA (WALES) LTD
5 DERYN COURT
WHARFEDALE ROAD
PENTWYN
CARDIFF
CARDIFF
CF23 7HA

Our reference:
Your reference:
Date of your enquiry:
Date we received your enquiry:
Date of issue:
Grid Reference

51001026888001
13319
26 October 2015
26 October 2015
26 October 2015
305580 205960

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Mining Consultants Report

BUILDERS YARD, ELWYN DRIVE, MERTHYR TYDFIL, MERTHYR TYDFIL, MERTHYR TYDFIL,
CF47 0N

This report is based on and limited to the records held by the Coal Authority, at the time we answer the search.

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

Probable unrecorded coal workings at shallow depth.

Outcrops

SEAM NAME	MINERAL	THIN INDICATOR	DISTANCE TO OUTCROP (m)	DIRECTION TO OUTCROP	BEARING OF OUTCROP
GARW VEIN	Coal	False	43.9	258	162

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Future underground mining

No future mining recorded.

Licence details (AOR)

No AOR recorded.

Section 46 notices

No current notification.

Geology

No faults, fissures or breaklines recorded.

Mine entries

No mine entries recorded.

Court orders

No court orders recorded.

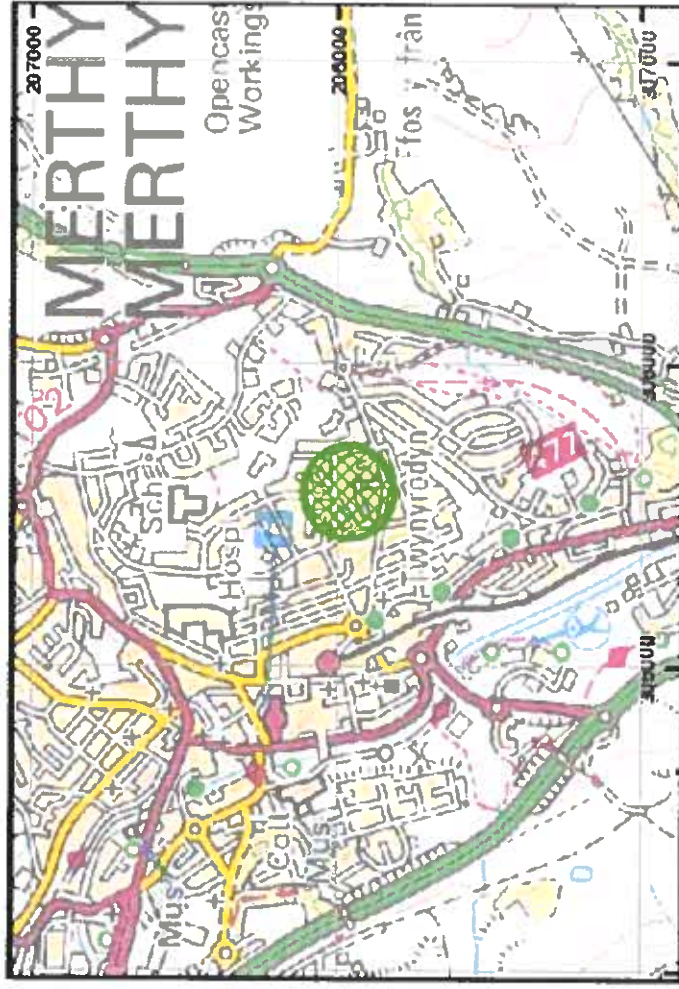
Worked out opencast sites

Worked out opencast site recorded.

Coal mining related hazards

No coal mining related hazard recorded.

Location map



Approximate position of property



Enquiry boundary



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Approximate position of enquiry boundary shown



ANNEX B
Rotary Borehole Logs

Borehole Log

Borehole No.

WS01

Sheet 1 of 1

Project Name: Elwyn Drive

Project No.
13319

Co-ords: -

Hole Type
WLS

Location: Merthyr Tydfil

Level:

Scale
1:50

Client: Mr J Cox

Dates: 14-08-2015 -

Logged By
LJD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	D					(Soft to firm) grey and grey brown slightly sandy silty CLAY with many gravels and cobbles. Gravel is fine to coarse angular/subangular. cobbles are small angular, all of shale, brick and occasional black vesicular slag. Occasional glass. Occasional fine roots. (MADE GROUND)	
		0.80	D					Ash and coal inclusions	1
		1.00		N=4 (1,1/1,1,1,1)					
		1.20	D		1.20				
					1.50			(Loose) dark/medium brown very clayey SAND / very sandy CLAY with many gravels. Gravel is fine to coarse angular/subangular of brick, shale and occasional slag. Occasional coal inclusions. Occasional fine roots. (MADE GROUND)	
		1.80	D						2
		2.00		N=8 (2.2/1,2,2,3)				(Firm) orange brown and tan brown with grey inclusions slightly sandy silty CLAY with many gravels. Gravel is fine to coarse angular/subangular/subrounded of mudstone, shale and occasional siltstone. Occasional angular/subangular cobble of mudstone/siltstone (GLACIAL TILL)	
		3.00	D					Very gravelly	3
		3.00		N=8 (2.2/2,2,2,2)				Orange fine sand inclusions	
								Coal inclusions	
		3.50		50 (11,11/12,18,20,)	3.50			End of borehole at 3.50 m	
									4
									5
									6
									7
									8
									9
									10

Remarks

Sampler refused at 3.5m. CPT refused at 3.85m. No groundwater encountered.

Borehole Log

Borehole No.

WS02

Sheet 1 of 1

Project Name: Elwyn Drive

Project No.
13319

Co-ords: -

Hole Type
WLS

Location: Merthyr Tydfil

Level:

Scale
1:50

Client: Mr J Cox

Dates: 14-08-2015 -

Logged By
LJD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	D		0.20			(Loose) dark brown slightly clayey SAND with some gravel. Gravel is fine to coarse angular of shale and occasional slag. (MADE GROUND)	
		0.75	D					(Firm becoming with depth stiff) orange tan brown with grey and rusty orange/purple inclusions, in places slightly sandy becoming sandy with depth, silty CLAY with some gravels and cobbles. Gravel is fine to medium of sandstone, mudstone and shale (discoloured orange from weathering). Cobbles are small angular of sandstone. (GLACIAL TILL)	1
		1.00		N=8 (1.1/2.4, 1.1)					
		1.50	D						
		2.00		N=13 (2.3/4.3, 3.3)					2
		3.00		N=30 (3.5/5.6, 6.13)	3.00			End of borehole at 3.00 m	3
		3.50		N=50 (11.10/10.10, 15.15)					4
									5
									6
									7
									8
									9
									10

Remarks

Sampler refused at 3m. CPT refused at 3.95m. Groundwater encountered at 2.5m.

Borehole Log

Borehole No.

WS03

Sheet 1 of 1

Project Name: Elwyn Drive

Project No.
13319

Co-ords:

Hole Type
WLS

Location: Merthyr Tydfil

Level:

Scale
1:50

Client: Mr J Cox

Dates: 14-08-2015 -

Logged By
LJD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	D		0.20			Loose) dark/medium brown very clayey SAND / very sandy CLAY with many gravels. Gravel is fine to coarse angular/subangular of brick shale and occasional slag. Occasional coal inclusions. Occasional fine roots. (MADE GROUND)	
		1.00	D	N=6 (1,1/1,1,1,3)				(Soft becoming with depth firm) orange brown and tan brown with grey inclusions slightly sandy silty CLAY with many gravels. Gravel is fine to coarse angular/subangular/subrounded of mudstone, shale and occasional siltstone. Occasional angular/subangular cobble of mudstone/siltstone. (GLACIAL TILL)	1
		2.00		N=25 (3,3/5,8,6,6)					2
		2.50	D						
		3.00		N=12 (2,2/3,3,3,3)					3
		3.50		0 (50 / ...)	3.50			End of borehole at 3.50 m	4
									5
									6
									7
									8
									9
									10

Remarks

Sampler refused at 3.5m. CPT refused at 3.575m. No groundwater encountered.

Borehole Log

Borehole No.

WS04

Sheet 1 of 1

Project Name: Elwyn Drive

Project No.
13319

Co-ords: -

Hole Type
WLS

Location: Merthyr Tydfil

Level:

Scale
1:50

Client: Mr J Cox

Dates: 14-08-2015 -

Logged By
LJD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	D		0.20			Loose) dark/medium brown very clayey SAND / very sandy CLAY with many gravels. Gravel is fine to coarse angular/subangular of shale and occasional slag. Occasional coal inclusions. Occasional brick fragment. Occasional fine roots. (MADE GROUND)	
		0.75	D					(Soft becoming with depth firm) orange brown with grey and rusty orange/purple inclusions, slightly sandy silty CLAY with some gravels and occasional cobbles. Gravel is fine to medium of sandstone, mudstone and shale (discoloured orange from weathering). Cobbles are small angular of sandstone. (GLACIAL TILL)	1
		1.00	D						
		1.00		N=7 (1,2/1,2,2,2)					
		1.75	D						
		2.00		N=10 (1,2/4,2,1,3)					2
		3.00		N=17 (4,6/5,4,4,4)					3
		3.75	D		3.70				
		4.00		N=35 (4,5/7,9,9,10)	4.00			(Stiff) dark/medium grey silty CLAY with many gravels. Gravel is fine angular/subangular of sandstone and mudstone. (GLACIAL TILL)	4
								End of borehole at 4.00 m	
		4.50		50 (13,11/13,17,20,)					5
									6
									7
									8
									9
									10

Remarks

Sampler refused at 4m. CPT refused at 4.875m. Groundwater encountered at 2.5m.

Borehole Log

Borehole No.

WS05

Sheet 1 of 1

Project Name: Elwyn Drive

Project No.
13319

Co-ords: -

Hole Type
WLS

Location: Merthyr Tydfil

Level:

Scale
1:50

Client: Mr J Cox

Dates: 14-08-2015 -

Logged By
LJD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.40			(Loose) dark brown slightly sandy fine to medium angular/subangular GRAVEL of shale/mudstone. Occasional coal inclusions. (MADE GROUND)	
		0.80	D					(Firm) orange brown with grey and rusty orange/purple inclusions, slightly sandy silty CLAY with some gravels and occasional cobbles. Gravel is fine to medium of sandstone, mudstone and shale (discoloured orange from weathering). Cobbles are small angular of sandstone. (GLACIAL TILL)	1
		1.00		N=11 (2.3/2.3.3.3)				Very gravelly	
		1.80	D		2.00				
		2.00		N=14 (2.3/3.3.4.4)				End of borehole at 2.00 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Sampler terminated at 2m. CPT terminated at 2.45m. No groundwater encountered.

ANNEX C
Site Photographs

14 August 2015































Job Number:

13319

Job Title:

Elwyn Drive, Merthyr

Drawing Title:

Site Location

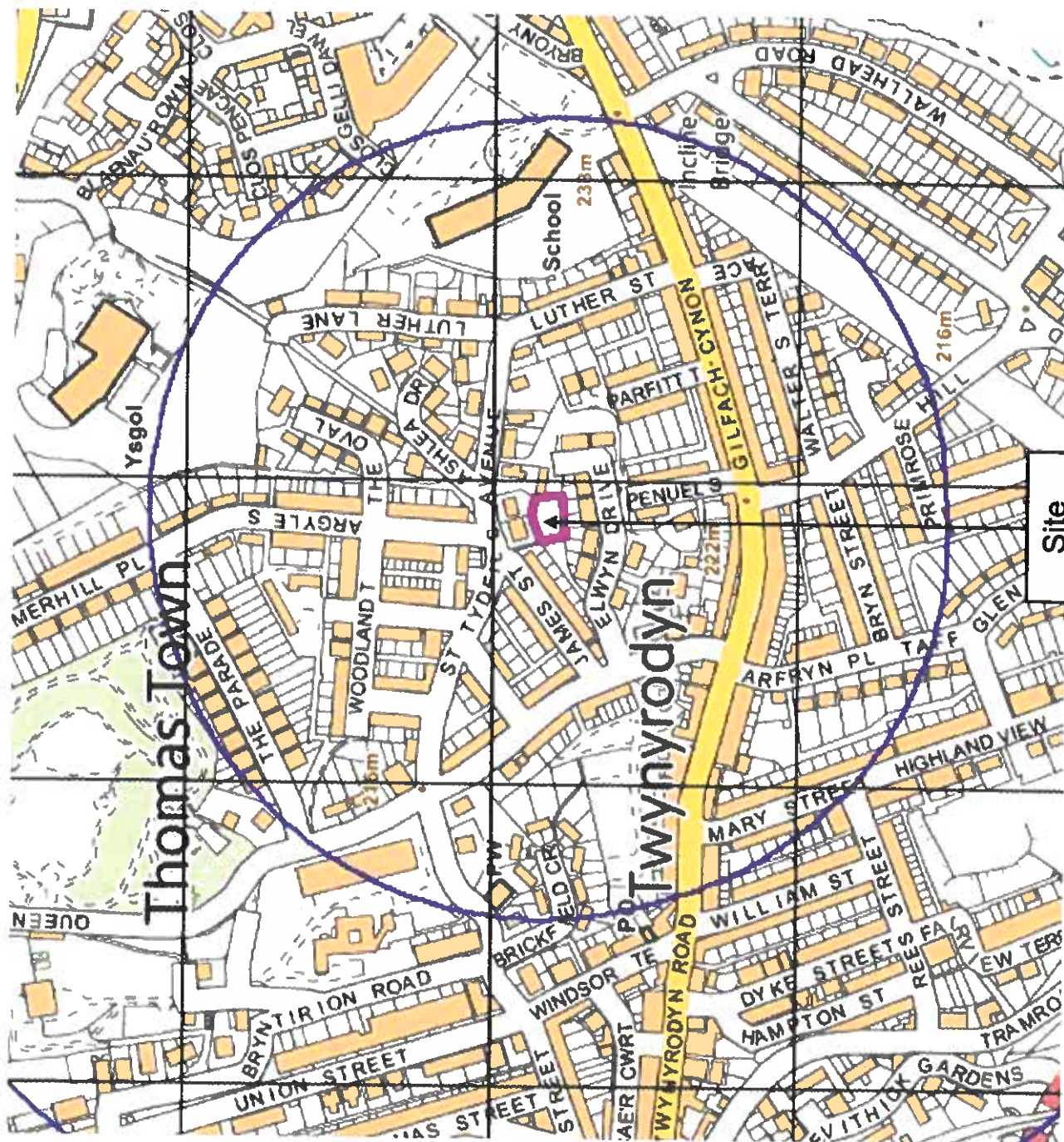
Drawing Number:

01

Scale:

Not To Scale

North



Site

Job Number:

13319

Job Title:

Elwyn Drive, Merthyr

Drawing Title:

Site Layout

Drawing Number:

02

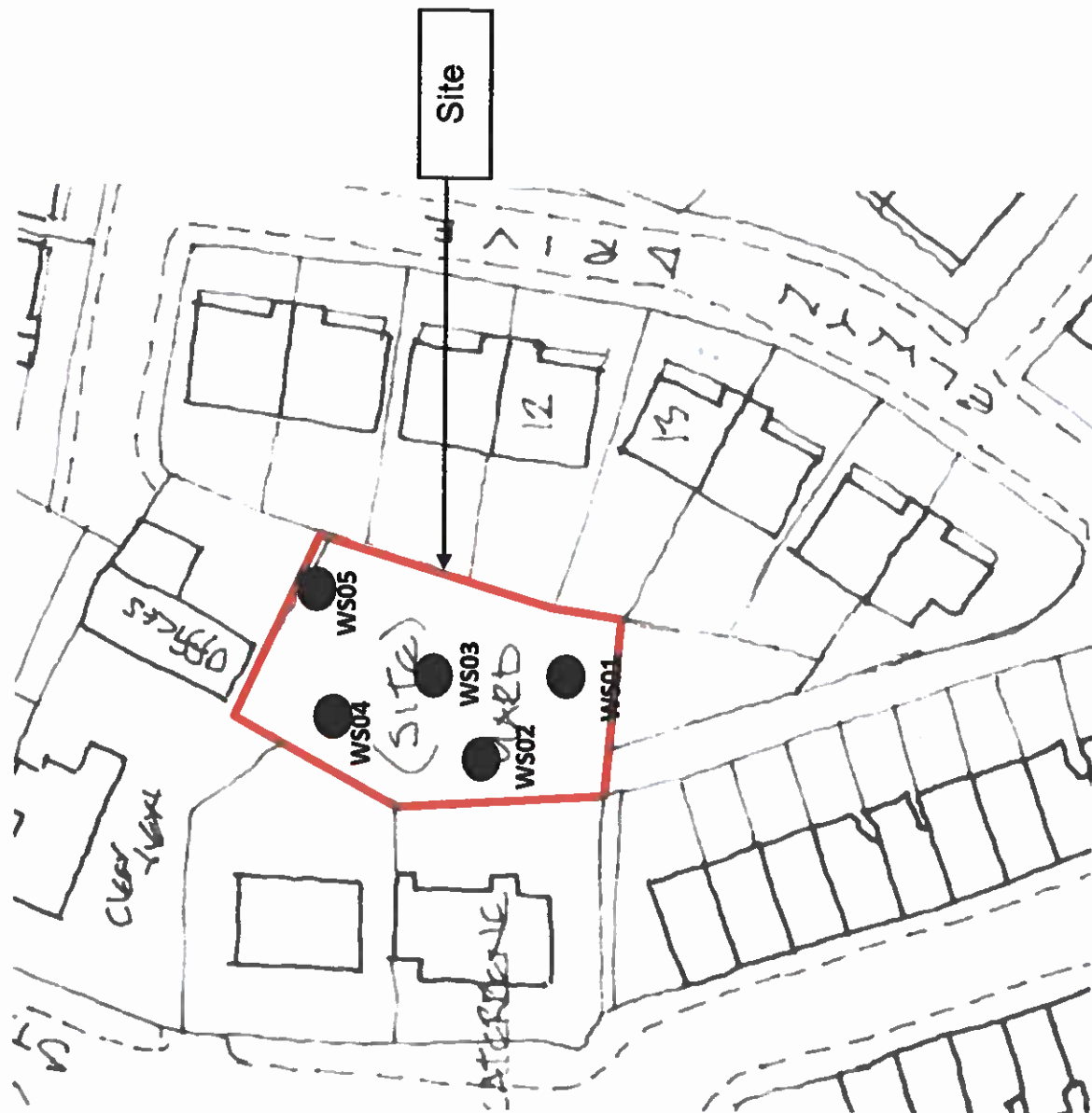
Scale:

Not To Scale

Legend:



WS01 – WS05 Location of
windowless sampling
boreholes





13319

Elwyn Drive, Merthyr

Proposed Site Layout

30

Not To Scale

WS01 – WS05 Location of windowless sampling boreholes

North

