Walters Land Limited

FORMER HOOVER CANDY SITE, MERTHYR TYDFIL

Coal Mining Risk Assessment

14275/JJ/25/CMRA

Intégral
Géotechnique

CLIENT: **Walters Land Limited**

PROJECT: **Former Hoover Candy Site, Merthyr Tydfil**

TITLE: **Coal Mining Risk Assessment**

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1.0 INTRODUCTION

1.1 GENERAL

Walters Land Limited are proposing to redevelop the former Hoover Candy factory site in Merthyr Tydfil for residential end use. The location of the site is shown in Figure 1. A site plan showing the red line planning boundary is provided in Figure 2.

Previous desk study and preliminary site investigation works have been undertaken at the site by Redstart / WSP and Quantum Geotechnic Limited, on behalf of Merthyr Tydfil County Borough Council.

Intégral Géotechnique (Wales) Limited have been commissioned by our client Walters Land Limited to carry out a review of the previous desk study and site investigation data and prepare a Coal Mining Risk Assessment (CMRA) to support an outline planning application for the proposed redevelopment of the site.

As part of the preparation of this CMRA, reference has been made to (and extracts taken from) the following available reports which have all been novated to our client (Walters Land Limited).

- Preliminary Sources (desk) Study Report prepared by Redstart / WSP of behalf of Merthyr Tydfil County Borough Council, Doc Ref: GC-4004-RED-75-XX-RP-L-001, dated March 2022
- Ground Investigation Factual Report prepared by Quantum Geotechnic Limited on behalf of Merthyr Tydfil County Borough Council, Report Ref: Q0838/FR (version 02), dated January 2023
- Ground Investigation Report (Draft) prepared by Redstart / WSP on behalf of Merthyr Tydfill Conty Borough Council, Doc Ref: GC-4005-RED-75-XX-RP-0002, Revision P01, dated November 2022.
- Ground Investigation Report (Final) prepared by Redstart / WSP on behalf of Merthyr Tydfill Conty Borough Council, Doc Ref: GC-4005-RED-75-XX-RP-0002, Revision P02, dated February 2024.

For completeness, this CMRA should be read in conjunction with the above listed previous reports.

This CMRA report (including all appendices to it and any subsequent addendums or correspondence) has been prepared for the sole benefit, use and information of Walters Land Limited and no third party is entitled or permitted to rely on it.

1.1 GENERAL (CONTINUED)

This report may not be used, reproduced or circulated (in whole or part) for any purpose without the written consent of Intégral Géotechnique (Wales) Limited. Intégral Géotechnique (Wales) Limited shall not be liable to any third party who does not have such express written permission to rely on the report for any losses they may suffer.

1.2 PROPOSED DEVELOPMENT

The site comprises three separate land parcels as follows: (1) the main former Hoover Candy factory area – to the west of Merthyr Road, (2) former car park area – to the east of Merthyr Road, and (3) former pumping station area – to the east of the Merthyr Road.

The vast majority of the site comprises the former Hoover Candy factory site area. The redevelopment proposals across this area of the site include the demolition of existing structures, site reclamation earthworks and the construction of residential housing with associated infrastructure such as access roads and car parking areas.

It is understood that future employment / commercial development is proposed on the smaller land parcels to the east of Merthyr Road.

A Development Framework Parameter Plan has been prepared by Hammond Architectural Limited, in Drawing No. DFP 01 Revision B, dated March 2025 (an extract is presented in Figure 3).

1.3 SCOPE OF WORKS

The work instructed included a review of available reports, as listed previously, followed by the preparation of a Coal Mining Risk Assessment (CMRA) to support an outline planning application for the proposed redevelopment of the site.

This report has been prepared in general accordance with the Coal Mining Risk Assessment Model Report Template and intends to demonstrate to the Local Planning Authority and the Coal Authority that the site is, or can be, made safe and stable, and to meet the requirements of the National Policy Planning Framework (NPPF).

The CMRA comprised a review of:

- The previous Redstart / WSP and Quantum Geotechnic Limited reports including applicable site investigation data

1.3 SCOPE OF WORKS (CONTINUED)

- Old Ordnance Survey maps covering the site (as presented in the Redstart / WSP Preliminary Sources (desk) Study Report
- Geological maps of the area provided by the British Geological Survey (BGS)
- A Consultants Coal Mining Report obtained from the Coal Authority
- Mine abandonment plans obtained from the Coal Authority
- A pre-application enquiry response from the Coal Authority (issued by the Coal Authority to Redstart / WSP following submittal of their Preliminary Sources desk Study Report and draft Ground Investigation Report).

1.4 LIMITATIONS

This document is intended to be a working document for further development in discussion with all concerned including the Local Planning Authority, Natural Resources Wales, the Coal Authority and the building control authority as appropriate.

The opinions and preliminary assessments presented within this report are based on desk-based research and a review of third-party information.

It should also be noted that vertical and lateral changes in ground conditions may be present between exploratory hole locations.

Access for the intrusive site investigation was limited at the time due to active and vacant buildings, areas of hardstanding and services.

2.0 THE SITE

2.1 SITE LOCATION AND DESCRIPTION

The site is located on the southern edge of Merthyr Tydfil at a National Grid Reference of 305737, 204199, see Figure 1.

The site comprises three separate land parcels as follows: (1) the main former Hoover Candy factory area – to the west of Merthyr Road, (2) former car park – to the east of Merthyr Road, and (3) former pumping station – to the east of the Merthyr Road. A site plan is presented in Figure 2.

The site is situated on ground which typically rises to the north from an approximate minimum elevation of 151m AOD in the south to an approximate maximum elevation of 162m AOD in the north.

The main site area comprises the former Hoover Candy manufacturing plant including the manufacturing plant to the south and the assembly plant to the north with an access road to separate the two plant buildings.

The southern area of the site is developed for use as a bowling green, pavilion and cricket pitch. In between the bowling green and Pentrebach station is an area of rough ground which is used for storage. Another storage area is located to the north of the bowling green at the location of former tennis courts. A burning area is located to the rear of the pavilion and a helipad is located on the northern edge of the cricket pitch.

A car park, former social club and gatehouse is located in between the cricket pitch and the Hoover manufacturing plant area. A new storage building which was formerly a polystyrene plant lies to the west of the car park and the social club.

There are access roads from the site entrance via Merthyr Road to east. The access roads follow the external areas of the plant and are typically of concrete construction and in a poor state of repair with many cracks and areas of settlement. The subsurface drainage was also considered to be potentially blocked.

To the west of the main manufacturing plant there are a number of disused buildings and tanks where chemical processes were undertaken. The plant buildings have significant asbestos sheet content such as roofing and cladding, but it is understood that most of the loose fibre material has been removed. Within the manufacturing plant several of the pits where presses and sumps were formerly present have been infilled with concrete.

2.1 SITE LOCATION AND DESCRIPTION (CONTINUED)

A Western Power Distribution (WPD) transformer station and fixed gas cylinder storage area is located to the west of the assembly plant area.

Two bridges exit the manufacturing plant to cross the River Taff. One bridge has been demolished to the east bank and these other is proposed to be removed at a later date. The bridge which joins the manufacturing and assembly plants is still in place.

The ground level increases in the southern part of the assembly plant with the southern part of the plant split level with an internal access ramp to access the plant floor.

Due to the rising ground levels, as discussed previously, a short retaining wall is present along much of the eastern boundary which increases in height to the north. A disused second exit with associated gatehouse and weighbridge is located within the north western corner of the site.

Additional smaller areas adjacent to the main site area also fall within the development boundary. A water pumping station is located to the east of the site and to the east of Merthyr Road and is linked to the former manufacturing plant by a tunnel. The ground level to the east is lower than the level along Merthyr Road. The former plant car park is located to the east of Merthyr Road and to the northeast of the site. The car park follows the gradient of Merthyr Road and rises to the north. The asphalt surfacing of the car park is deteriorated and has shrubs breaking through. An electricity pylon is located on the eastern edge of the car park and a gas pipeline marker was observed to the west of the site in line with the electricity pylon.

2.2 SITE OPERATIONS

The main site area is still occupied by the Hoover manufacturing and assembly plant buildings, but operations have ceased. The cricket ground within the southern area is also now disused.

2.3 SURROUNDING LAND USE

The surrounding areas are typically developed for commercial use with residential development to the southeast of the site and beyond the river to the southwest.

2.4 AVAILABLE SITE INVESTIGATION DATA

As part of the preparation of this CMRA, reference has been made to (and extracts taken from) the following available reports which have all been novated to our client (Walters Land Limited).

- Preliminary Sources (desk) Study Report prepared by Redstart / WSP of behalf of Merthyr Tydfil County Borough Council, Doc Ref: GC-4004-RED-75-XX-RP-L-001, dated March 2022
- Ground Investigation Factual Report prepared by Quantum Geotechnic Limited on behalf of Merthyr Tydfil County Borough Council, Report Ref: Q0838/FR (version 02), dated January 2023
- Ground Investigation Report (Draft) prepared by Redstart / WSP on behalf of Merthyr Tydfill Conty Borough Council, Doc Ref: GC-4005-RED-75-XX-RP-0002, Revision P01, dated November 2022.
- Ground Investigation Report (Final) prepared by Redstart / WSP on behalf of Merthyr Tydfill Conty Borough Council, Doc Ref: GC-4005-RED-75-XX-RP-0002, Revision P02, dated February 2024.

For completeness, this CMRA should be read in conjunction with the above listed previous reports.

2.5 CONSULTATIONS WITH REGULATORS

A pre-application enquiry was made to the Coal Authority by Redstart / WSP following submittal of their Preliminary Sources (desk) Study Report and draft Ground Investigation Report.

A copy of the pre-application enquiry response from the Coal Authority (ref: PAS00234, dated 05 May 2023) is presented in Appendix A.

Following receipt of the pre-application enquiry response and a review of the comment received therein, Redstart / WSP issued a revision to their Ground Investigation Report, as presented in Doc Ref: GC-4005-RED-75-XX-RP-0002, Revision P02**,** dated February 2024.

3.0 SITE HISTORY

The recent history of the site has been traced with the aid of a Groundsure Report, which was obtained previously as part of the Redstart / WSP Preliminary Sources (desk) Study Report. The Groundsure Report obtained by Redstart / WSP which contained historical maps of the area dated between 1875 and 2022. The full range of historical maps and discussion is presented within the Preliminary Sources (desk) Study Report Doc Ref: GC4005-RED-75-XX-RP-L-001, dated March 2022. Features such as shafts and levels, water features and buildings, and their approximate locations are discussed in the following commentary, but the maps and original desk study should be viewed to observe their more accurate locations and for more detailed context. The history of the site can be summarised as follows:

- The earliest edition of the map dated 1875 indicated that the main site area was largely undeveloped with areas of rough grass and spoil mounds. A number of tramways crossed the site particularly within the southern area which were used to deposits the spoil. A surface water feature also flowed approximately through the centre of the main site and across the southern area which separated the worked area of the site from an open green space with some trees. A sluice from an adjacent weir which flowed into Pentre-bach Dock Feeder flowed across the northern corner of the main site and then turns south to continue through the northeast additional site area. A road also crossed the additional northeast area. The tramways that cross the site connect Pentre-bach Iron Works to the southeast to Upper Abercanaid Pit to the west. They also link into the Taff Vale Railway which formed the west and southwest boundary of the site. The River Taff flows parallel to the railway. The tramways crossed the river via an existing bridge to the southwest of the main site area. Plymouth Iron Works is located approximately 250m to the north and Clyn-mil Pit is operational approximately 300m to the northeast. Residential development in the form of terraced properties are indicated to the east of the site within Upper Pentre Bach. Pentre-bach School is also located to the east. The properties are also present within the area of the additional eastern land parcel which is included as part of the site. Old shafts and levels were indicated to the north and northeast of the site. Abercanaid was well-established beyond the river to the south of the site.

3.0 SITE HISTORY (CONTINUED)

- The 1900 edition of the map indicated that the spoil mounds remained within the site but that some of the associated tramways had been removed. The surface water features remained within the site. Pentre-bach Iron Works was no longer present to the southeast but Upper Abercanaid Pit was still operation to the west. The tramways that remained across the site linked Upper Abercanaid Pit to a new Brick Works located in the vicinity of the former ironworks. A station had now been constructed at the southern corner of the main site adjacent to the railway line. Plymouth Iron Works to the north was no longer present and Clyn-mil Pit to the northeast was now disused.

- The 1919 edition of the map indicated some reprofiling of the spoil mounds within the site. There was evidence that the surface water feature which flowed through the site had been partially culverted. The two additional parcels of land to the northeast and east remained relatively unchanged. Upper Abercanaid Pit was disused by this time.

- It is understood that the first buildings were constructed with the main site area circa 1948. The 1964 edition of the map indicated two large factory buildings within the main site area and with some smaller buildings present around the main buildings. Access to the buildings was gained via Merthyr Road to the northeast. The northern area of the main site was indicated to be a slag heap. The northeast land parcel had been slightly reprofiled but remained undeveloped and the eastern land parcel was also undeveloped. The southern area of the site had been redeveloped as a sports ground which included a bowling green, a putting green and a pavilion. The former surface water features had been removed or diverted from beneath the site area. The road infrastructure had been improved as part of the redevelopment of the area which included a new roundabout adjacent to the southeast corner of the site. Development continued in the vicinity of the site including a factory beyond the road to the east. A pump house had been constructed to the northeast of the site in the area of the old shafts.

- By the 1972 edition of the map the northern assembly plant building had been constructed. New access had also been constructed into the site from the north and an improved road crossed the northeast additional site area. An overhead electricity line was indicated to cross the northern area of the site, and an electricity substation was located on the western edge. An additional small factory building had been constructed within the southern area of the site in between the sports ground and the main factory building.

3.0 SITE HISTORY (CONTINUED)

- The 1986 edition of the map indicated that the two original factory buildings had been joined to create one large building. There were two main buildings now within the main site area (the manufacturing and assembly plants) configured as they are in the present day. More factory units had been constructed beyond the river to the west of the site with a footbridge access across the river from the main site area. A new roundabout had been constructed adjacent to the northern boundary of the site. By this stage a pumping station which included a tank had been constructed within the eastern land parcel.

- The site has remained relatively unchanged between the late 1980's and the present day with the northeast land parcel utilised as a car park by the 1990's. development continued with new factory buildings constructed to the east of the site. The large factory located beyond the river to the west was demolished to slab level by 2016 and was fully cleared by 2019 in preparation for future redevelopment. The footbridge which connected into the main site area was no longer evident by the 2021 aerial photo.

4.0 SITE ENVIRONMENTAL SETTING

4.1 PHYSICAL SETTING

The site is located within a mainly commercial setting on the southern edge of Merthyr Tydfil at the head of a deep valley within the upland plateau of the South Wales Coalfield.

The site is situated on ground which typically rises to the north from an approximate minimum elevation of 150m AOD in the south to an approximate maximum elevation of 161m AOD in the north.

4.2 PUBLISHED GEOLOGY

4.2.1 BGS Mapping Records

The 1:50,000 and 1:10,560 scale (Sheet No. SO 00 SE) geological maps of the area indicate that the majority of the site is underlain by bedrock strata of the South Wales Middle Coal Measures Formation of the Carboniferous period. However, the northern area of the site is indicated to be underlain by South Wales Lower Coal Measures Formation of the Carboniferous period. These strata typically comprise grey productive coal-bearing mudstones/siltstones, with seatearths and minor sandstones.

The northwest to southeast orientated Merthyr Church Fault is located approximately 100m to the northeast of the site.

The geology maps indicate strata dips in the area to be between 4^{o} and 10^{o} to the south and southeast.

The geological maps indicated a number of coal seams to outcrop beneath the site. These range from the Two Feet Nine (in the southern area of the site) down to the Amman Marine Band (AMB) ‘on coal’ seam in the north. A summary of the coal seam stratigraphy underlying the site (in stratigraphical order), as detailed on the geological maps, is as follows:

- The conjectured outcrop of the Two Feet Nine is shown crossing the southern half of the site, in a roughly east to west orientation. The generalised vertical section (GSV) shown on the geological maps indicates this coal seam to be approximately 0.80m thick.
- The conjectured outcrop of the Four Feet coal seam is shown crossing the southern half of the site. The GSV indicates this coal seam to be approximately 1.80m thick.

4.2 PUBLISHED GEOLOGY (CONTINUED)

- The conjectured outcrop of the Upper Six Feet coal seam is shown crossing the central area of the site. The GSV indicates this coal seam to be approximately 0.90m thick.
- The conjectured outcrop of the Lower Six Feet coal seam is shown crossing the central area of the site. The GSV indicates this coal seam to be approximately 1.20m thick.
- The conjectured outcrop of the Nine Feet coal seam is shown crossing the northern area of the site. The GSV indicates this coal seam to be present as multiple leaves, with a combined thickness of approximately 3.70m.
- The conjectured outcrop of the Bute coal seam is shown crossing the northern area of the site. The GSV indicates this coal seam to be present as multiple leaves, with a combined thickness of approximately 1.20m.
- The conjectured outcrop of the Amman Marine Band (AMB) on Coal is shown crossing the northern area of the site. The GSV indicates this coal seam to be approximately 0.50m thick.

In addition to the above, the Seven Feet coal seam (approximately 1.20m thick) is indicated to outcrop approximately 250m north of the site. The GSV also indicates the presence of three unnamed thin coal seams to be present between the Lower Six Feet and the Nine Feel coal seams.

All the conjectured coal seam outcrops are indicated to terminate up against the Merthyr Church Fault to the east of the site.

Superficial deposits comprising Alluvium of the Quaternary period area indicated to overlie the bedrock strata beneath the site. Alluvium is a general term for clay, silt, sand and gravel. It is the unconsolidated detrital material deposited by a river, stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta, or as a cone or fan at the base of a mountain slope. Synonym: alluvial deposits. Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present.

A variable thickness of made ground is anticipated above the superficial deposits. These deposits are likely associated with the historical site uses and the construction of the factory buildings.

A summary of the anticipated geological succession is given below in Table 1.

4.2 PUBLISHED GEOLOGY (CONTINUED)

Table 1: Summary of Anticipated Site Geology		
Geological unit	**Horizon**	**Description**
Recent	Made ground	Various materials
Quaternary	Alluvium	Soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present
Carboniferous	South Wales Middle Coal Measures Formation and South Wales Lower Coal Measures Formation (northern area)	Grey productive coal-bearing mudstones/siltstones, with seatearths and minor sandstones.

An extract of the 1:10,560 scale geological map is presented in Figure 4.

4.2.2 Coal Authority Mapping Records

The Coal Authority Consultants Coal Mining Report (see Appendix B) highlights six coal seams outcropping beneath the site. It should be noted that nomenclature and positions of the outcropping coal seams as recorded by the Coal Authority differ from those shown on the BGS maps.

A summary of the Coal Authority listed outcrops is provided below in Table 2. An extract of the Coal Authority plan showing their assigned outcrop positions is presented in Figure 4.

Table 2: Summary of Coal Authority Listed Coal Seam Outcrops			
Seam Name	Mineral	Workable?	Bearing (degrees)
Bute	Coal	Yes	17
Lower 9Ft and Bute	Coal	Yes	198
Lower Nine Foot Top Leaf	Coal	Yes	206
Red Vein (name changed from Lower Six Feet)	Coal	Yes	255
Upper Six Feet (name changed from 6FT Bottom Leaf)	Coal	Yes	266
Upper 6Ft Rider	Coal	Yes	231

It should be noted that the Coal Authority do not list the Two Feet Nine or Four Feet coal seams to outcrop through the site. This is in contrast to the BGS maps. The Coal Authority omittance of the Two Feet Nine and Four Feet outcrops is considered erroneous.

4.3 PUBLISHED COAL MINING DATA

Several data sources have been reviewed to assess of the coal mining legacy of the site. The data sources utilised include:

- Published Geological Maps
- The previously issued Redstart / WSP and Quantum Geotechnic Limited reports
- The Coal Authority online interactive map viewer
- A Consultants Coal Mining Report and Mine Entry Data Sheets (see Appendix B)
- Georeferenced mine abandonment plans (see Appendix C)

4.3.1 Past Underground Mining / Abandonment Plans Review

The Coal Authority states that there are recorded mine workings in five seams of coal beneath the site at depths ranging between approximately 16m and 124m, and last worked in 1940. The Coal Authority list the coal seams worked beneath the site (in stratigraphical order) comprise:

- Two Feet Nine
- Four Feet
- Upper Six Feet Rider / Six Feet
- Lower Nine Feet
- Lower Seven Feet Bottom Leaf

A summary of the recorded workings beneath the site based on a review of the Consultants Coal Mining Report and the georeferenced mine abandonment plans is provided below.

Two Feet Nine

The Coal Authority record workings within the Two Feet Nine seam beneath the site at depths ranging between approximately 37m and 48m, and last worked in 1940.

Mine abandonment plans (ref: SWR3145 and SWR3186) indicate the workings in the Two Feet Nine occurred beneath the south-eastern and south-western extents of the site (see Appendix C).

The Coal Authority indicate the extraction thickness of the Two Feet Nine seam (beneath the site) ranged between 0.66m and 1.30m. The rate of dip of the workings is indicated to vary between 5.2^{o} and 6.6^{o}.

Four Feet

The Coal Authority record workings within the Four Feet seam beneath the site at depths ranging between approximately 37m and 54m, and last worked in 1891.

4.3 PUBLISHED COAL MINING DATA (CONTINUED)

Mine abandonment plans (ref: SWR3144 and SWR3621 Sheet 4 of 4) indicate the workings occurred beneath the south-eastern half of the site (see Appendix C).

The Coal Authority indicate the extraction thickness of the Four Feet seam (beneath the site) was 2.10m. The rate of dip of the workings is indicated to vary between 5.5º and 6.6º.

Upper Six Feet Rider

The shallowest recorded workings beneath the site are indicated to be within the Upper Six Feet Rider coal seam at 16m depth, and last worked in 1875.

Plans obtained from the Coal Authority (ref: 320403_SW039I and 320404_SW039I) indicate the workings occurred beneath the south-eastern half of the site. It should be noted that an annotation on plan 320404_SW039I reads 'probably worked to crop' (see Appendix C).

The Coal Authority indicate the extraction thickness of the Upper Six Feet Rider (beneath the site) was 1.70m. The rate of beneath of the workings is indicated to vary between 4.5º and 6.2º.

Abandonment plan SWR3146 shows workings in the Six Feet seam beneath the south-western area of the site (see Appendix C). The workings originated from the Gethin / Cethin Colliery (Gethin No. 2 Pit) located west of the Glamorganshire Canal, 500m south-west of the site boundary.

The workings show on abandonment plan SWR3146 mirror those show on plan 320403_SW039I (applicable to the Upper Six Feet Rider), indicating that the Six Feet and Upper Six Feet Rider are the same seam.

Lower Nine Feet

The Coal Authority record workings within the Lower Nine Feet seam beneath the site at depths ranging between approximately 49m and 91m, and last worked in 1932.

Mine abandonment plan SWR4357 sheet 7 of 7 shows workings within the Lower Nine Feet from Abercanaid Pit located to the west of the River Taff. Several roadways and galleries are recorded beneath the site (see Appendix C).

4.3 PUBLISHED COAL MINING DATA (CONTINUED)

Mine abandonment plan SWR233 sheet 4 of 5 shows proposed workings within the Lower Nine Feet seam from the Cyfarthfa Colliery (Gethin No. 2 Pit) located west of the Glamorganshire Canal. The plan shows the proposed workings to extend eastwards beneath the Afon Taff into the southern part of the site (see Appendix C).

The Coal Authority indicate the extraction thickness of the Lower Nine Feet seam beneath the site ranged between 1.45m and 2.59m. The rate of beneath of the Lower Nine Feet workings beneath the site is indicated to vary between 3.3º and 8.9º.

Lower Seven Feet Bottom Leaf

The Coal Authority record workings within the Lower Seven Feet Bottom Leaf (also known as the Standard Seven Feet) seam beneath the site at depths ranging between approximately 70m and 124m, and last worked in 1902.

Mine abandonment plan SWR1882 sheet 2 of 3 shows workings within the Lower Seven Feet Bottom Leaf from Abercanaid Pit located to the west of the River Taff. Several roadways and galleries are recorded beneath the site (see Appendix C).

The Coal Authority indicate the extraction thickness of the Lower Seven Feet Bottom Leaf (beneath the site) was 1.17m. The rate of dip of the workings is indicated to vary between 5.9º and 8.6º

Coal Seam Stratigraphy Records

Abandonment plan SWR1882 sheet 2 of 3 shows a vertical section of Abercanaid Pit No.1 at approximate National Grid reference SO (3)05400(2)04050 to the west of the site.

This shaft and its coals are summarised in Table 3.

Table 3: Coal Seam Stratigraphy in Abercanaid Pit No. 1

Description	Elevation (ft AOD)	Elevation (m AOD)	Depth (m bgl)
Top of Pit	513.31	156.46	0
Upper Two Feet Nine	469.39	143.07	13.39
Upper Four Feet	447.31	136.34	20.12
Lower Four Feet	400.23	121.99	34.47
Six Feet	385.06	117.37	39.09
Nine Feet	263.23	80.23	76.23
Seven Feet	111.65	34.04	122.39

4.3 PUBLISHED COAL MINING DATA (CONTINUED)

4.3.2 Probable Unrecorded Shallow Workings

The Coal Authority indicate the presence of 'probable unrecorded shallow workings' on site. Based on a review of the Coal Authority online interactive map viewer, the area of probable unrecorded shallow workings is indicated in the southern half of the site and is associated with the Upper Six Feet Rider seam. This listing is considered to be associated with an annotation shown on mine plan ref; 320404_SW039I which reads 'probably worked to crop' (see Appendix C).

4.3.3 Spine Roadways at Shallow Depth

The Coal Authority do not hold recorded of any no spine roadways at shallow depth beneath the site. However, the presence of unrecorded shallow roadways should not be ruled out

4.3.4 Mine Entries

The Coal Authority indicates that there are eight mine entries located within 100m of the site boundary.

A summary of the published mine entry data is presented in Table 4.

Table 4: Published Mine Entry Data

Ref:	Shaft/Adit	Approx. distance from site (m)	Assumed Diameter (depth if available) (m)	Probable Adit Azimuth (degrees)	CA Easting, Northing (Desk based)	CA Assigned Departure Distance (m)
305204-008	Shaft	Approx. 55m north	2.5m	N/A	305591 204697	5m
305204-009	Shaft	Approx. 35m north	2.5m	N/A	305600 204677	5m
305204-011	Adit	Approx. 95m northeast	3.0m	95°	305698 204719	5m
305204-012	Shaft	Approx. 12m northeast	2.5m	N/A	305711 204552	5m
305204-013	Shaft	Approx. 15m northeast	2.5m	N/A	305719 204547	5m
305204-014	Adit	Approx. 82m northeast	3.0m	97°	305784 204572	5m
305204-039	Shaft	Approx. 70m northeast	2.5m	N/A	305754 204591	10m
305204-072	Adit	Approx. 25m northeast	3.0m	59°	305719 204561	10m

4.3 PUBLISHED COAL MINING DATA (CONTINUED)

There are five historical shafts indicated to be located within 100m of the site boundary. These comprise:

- Shaft 305204-008 located approximately 55m to the north of the site
- Shaft 305204-009 located approximately 36m to the north of the site
- Shaft 305204-012 located approximately 12m to the northeast of the site
- Shaft 305204-013 located approximately 15m to the northeast of the site
- Shaft 305204-039 located approximately 70m to the northeast of the site

It should be noted that that Shafts 305204-008, 305204-009 and 305204-039 are all located a significant distance off site (greater than 35m). These shafts are not considered to be within an influencing distance of the site.

Shafts 305204-012 and 305204-013 are located approximately 12m to 15m to the northeast of the site. When considering the potential assigned departure distances these shafts would be within an influencing distance of the site.

There are three historical adits indicated to be located within 100m of the site boundary. These comprise:

- Adit 305204-011 located approximately 95m to the northeast of the site
- Adit 305204-014 located approximately 82m to the northeast of the site
- Adit 305204-072 located approximately 25m to the northeast of the site

It should be noted that all the adits are located in excess of 25m from the site boundary and are all indicated to be orientated away from site. As such the adits are not considered to be within an influencing distance of the site.

4.3.5 Geological Faults, Fissures and Breaklines

The closest BGS recorded fault is the Merthyr Church Fault indicated to between approximately 90m and 270m to the east of the site. The Coal Authority Consultants Coal Mining Report states that there are no faults, fissures or breaklines recorded beneath the site.

The above information is in contradiction to the information received from the Coal Authority in their pre-application enquiry response (ref: PAS00234, dated 05 May 2023).

4.3 PUBLISHED COAL MINING DATA (CONTINUED)

The pre-application enquiry response (see Appendix A) refers to a large northwest-southeast trending fault situated immediately to the east of the site (and approximately 100m west of the BGS recorded location) and therefore within influencing distance of the site.

4.3.6 Opencast Mines

The Coal Authority indicates that there are no unlicensed opencast sites located within 500m of the site boundary.

There are no issues regarding opencast workings within the site.

4.3.7 Coal Authority Managed Tips

The latest guidance published by the Welsh Government and its partners include a Mining and Coal Tip Safety document, published on the 14th of November 2023, which assigns an identification number (UID), a category, and the immediate status of each disused coal tip in Wales.

This document indicates the presence of a Category C tip with an assigned UID of T48065 which bounds the northeast edge of the former car park area. A Category C disused tip is defined by "a tip with the potential to impact public safety" and is "to be inspected once a year". This tip was last inspected on 25th October 2023.

A Category D tip with an assigned UID of T36885 is located further up the hillside approximately 250m to the east of the site. A Category D disused tip is defined by "a tip with the potential to impact public safety" and is "to be inspected twice a year". This tip is currently pending inspection.

4.3.8 Coal Mining Subsidence

The Coal Authority states that *"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 31st 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".

There are no recorded instances regarding subsidence.

4.3 PUBLISHED COAL MINING DATA (CONTINUED)

4.3.9 Mine Gas

The Coal Authority states that with regards to mine gas, none has been recorded within 500m of the site boundary.

Due to the presence of shallow recorded workings, gas evolution from coal seams and accumulated sources such as abandoned tunnels and workings cannot be discounted and will require further assessment, conducted in accordance with CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021.

A mine gas risk assessment should be undertaken to confirm the level of gas risk within the site (See Section 7.4).

4.3.10 Future Underground Mining and Section 46 Notices

The Coal Authority does not have any current records relating to future underground mining.

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

There are no currently understood issues regarding future workings or subsidence.

4.4 HYDROLOGY AND HYDROGEOLOGY

A network of unnamed minor drainage features and streams flow from the hillside to the east towards the River Taff which is the primary surface water feature in the area which flows in a southerly direction to the west and southwest of the site approximately following the path of the railway line.

The Natural Resources Wales groundwater vulnerability map and aquifer database classifies the bedrock beneath the site as a Secondary 'A' Aquifer. Secondary 'A' Aquifers are 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.

The Natural Resources Wales groundwater vulnerability map and aquifer database also classifies the superficial deposits beneath the site as Secondary 'A' Aquifer.

A perched water body could be encountered within the made ground. This would particularly be associated with the cohesive nature of the underlying Alluvium deposits.

5.0 GROUND INVESTIGATION RECORDS

5.1 QUANTUM GEOTECHNIC LIMITED FIELDWORKS

Intrusive site investigation works were carried out between 27th June and 28th July 2022 by Quantum Geotechnic Limited (QGL). The intrusive site investigation works included:

- 5 No. cable percussive rotary follow-on boreholes
- 6 No. internal dynamic sample rotary probe boreholes
- 6 No. cable percussive boreholes (including 3 No attempted re-drills)
- 9 No. rotary core/rotary probe openhole boreholes
- 36 No. windowless sample boreholes
- 14 No. machine excavated trial pits
- 28 No. installations of single or double gas/groundwater monitoring standpipes in selected boreholes
- Groundwater and ground gas monitoring.

The locations of the exploratory holes are shown in Figure 5a and Figure 5b.

The trial pit logs are presented in Appendix D. The windowless sample borehole logs are presented in Appendix E. The cable percussion boreholes logs are presented in Appendix F. The rotary borehole logs are presented in Appendix G. The groundwater and ground gas monitoring data is presented in Appendix H.

A summary of the boreholes drilled across the site (including locations, depths, termination stratum, and drilling method) is presented below in Table 5.

Table 5: Summary of Quantum Boreholes

Borehole Ref:	Depth (m)	Termination Stratum	Easting	Northing	Ground Level (m AOD)	Drilling Method
RBH101	45.00	Coal Measures	305961.637	203980.383	149.4	Cable Percussion, Rotary Cored, Rotary Openhole
RBH102	49.00	Coal Measures	305913.62	204047.92	149.9	Cable Percussion, Rotary Openhole
RBH103	42.00	Coal Measures	305732.038	203975.344	151.0	Cable Percussion, Rotary Openhole
RBH104	42.00	Coal Measures	305832.159	204157.051	151.0	Cable Percussion, Rotary Cored, Rotary Openhole
RBH105	30.70	Coal Measures	305892.68	204229.87	149.6	Rotary Cored, Rotary Openhole
RBH106	40.00	Coal Measures	305667.235	204070.361	151.4	Rotary Openhole
RBH107	40.00	Coal Measures	305769.03	204244.24	151.6	Rotary Openhole
RBH108	4.00	Coal Measures	305734.2	204292.11	151.6	Cable Percussion Rotary Openhole

5.1 QUANTUM GEOTECHNIC FIELDWORKS (CONTINUED)

Table 5: Summary of Quantum Boreholes

Borehole Ref:	Depth (m)	Termination Stratum	Easting	Northing	Ground Level (m AOD)	Drilling Method
RBH108A	36.50	Coal Measures	305734.2	204292.11	151.6	Cable Percussion, Rotary Cored, Rotary Openhole
RBH109	45.00	Coal Measures	305679.576	204398.934	156.4	Rotary Openhole
RBH110	30.00	Coal Measures	305757.347	204474.844	157.2	Rotary Openhole
RBH111	44.00	Coal Measures	305654.79	204446.02	157.3	Rotary Openhole
RBH112	45.00	Coal Measures	305660.771	204594.792	163.2	Cable Percussion, Rotary Cored, Rotary Openhole
RBH113	6.50	Coal Measures	305532.541	204519.788	157.1	Cable Percussion
RBH113A	47.00	Coal Measures	305533.007	204519.788	157.1	Cable Percussion, Rotary Openhole
RBH114	39.00	Coal Measures	305559.13	204604.39	161.3	Cable Percussion, Rotary Openhole
IBH102	30.00	Coal Measures	305698.557	204297.882	151.6	Dynamic Sampling, Rotary Openhole
IBH103	28.50	Coal Measures	305632.05	204236.96	151.7	Dynamic Sampling, Rotary Openhole
IBH104	27.00	Coal Measures	305785.69	204121.64	151.8	Dynamic Sampling, Rotary Openhole
IBH105	31.20	Coal Measures	305831.49	204088.05	151.8	Dynamic Sampling, Rotary Openhole
IBH106	33.00	Coal Measures	305799.99	204064.3	151.8	Dynamic Sampling, Rotary Openhole
IBH107	32.00	Coal Measures	305812.12	204073.67	151.8	Dynamic Sampling, Rotary Openhole
CP101	13.80	Alluvium	305952.611	203879.039	149.9	Cable Percussion
CP102	7.90	Alluvium	305837.706	203910.534	149.8	Cable Percussion
CP103	6.20	Alluvium	305853.802	204060.193	150.9	Cable Percussion
CP104	5.10	Alluvium	305687.254	204049.094	151.3	Cable Percussion
CP105	2.00	Made Ground	305650.55	204121.69	151.3	Cable Percussion
CP105A	3.00	Made Ground	305653.44	204118.32	151.3	Cable Percussion
CP105B	4.05	Alluvium	305647.99	204120.46	151.3	Cable Percussion
CP106	0.90	Made Ground	305619.292	204212.64	151.6	Cable Percussion
CP106A	3.80	Alluvium	305617.907	204214.442	151.6	Cable Percussion
WS101	4.50	Alluvium	305917.882	203992.548	149.6	Windowless Sampling
WS102	4.50	Alluvium	305938.182	203902.958	149.8	Windowless Sampling
WS103	4.30	Alluvium	305874.799	203949.53	149.7	Windowless Sampling
WS104	6.20	Alluvium	305817.55	203996.24	150.7	Windowless Sampling
WS105	6.20	Alluvium	305797.72	204200.51	151.2	Windowless Sampling
WS106	3.55	Alluvium	305854.656	204127.586	151.0	Windowless Sampling

5.1 QUANTUM GEOTECHNIC FIELDWORKS (CONTINUED)

Table 5: Summary of Quantum Boreholes

Borehole Ref:	Depth (m)	Termination Stratum	Easting	Northing	Ground Level (m AOD)	Drilling Method
WS107	6.00	Alluvium	305797.32	204013.27	151.0	Windowless Sampling
WS108	4.70	Alluvium	305752.512	203963.263	151.0	Windowless Sampling
WS109	5.10	Alluvium	305744.63	204008.85	151.1	Windowless Sampling
WS110	4.50	Alluvium	305705.355	204006.324	151.4	Windowless Sampling
WS111	4.65	Alluvium	305698.51	204035.9	151.3	Windowless Sampling
WS112	2.20	Made Ground	305684.62	204066.93	151.5	Windowless Sampling
WS113	3.30	Alluvium	305680.87	204133.84	150.8	Windowless Sampling
WS114	3.45	Alluvium	305643.455	204148.828	151.0	Windowless Sampling
WS116	3.70	Alluvium	305653.31	204171.16	150.8	Windowless Sampling
WS117	1.70	Made Ground	305613.7	204190.9	151.7	Windowless Sampling
WS118	1.70	Made Ground	305613.676	204190.888	151.7	Windowless Sampling
WS119	3.70	Made Ground	305623.214	204208.001	151.6	Windowless Sampling
WS120	2.40	Made Ground	305636.53	204259.49	151.8	Windowless Sampling
WS121	4.50	Alluvium	305716.72	204281.51	151.7	Windowless Sampling
WS122	2.40	Alluvium	305895.73	204244.41	150.0	Windowless Sampling
WS123	2.00	Made Ground	305909.73	204255.58	150.8	Windowless Sampling
WS124	2.40	Alluvium	305877.98	204214.5	149.4	Windowless Sampling
WS125	2.45	Alluvium	305648.51	204465.93	157.8	Windowless Sampling
WS126	6.20	Made Ground	305648.51	204465.93	157.8	Windowless Sampling
WS127	4.50	Alluvium	305701.3	204344.25	152.8	Windowless Sampling
WS128	4.54	Alluvium	305602.226	204242.38	151.7	Windowless Sampling
WS129	5.55	Alluvium	305581.874	204322.263	155.6	Windowless Sampling
WS130	4.30	Alluvium	305552.884	204472.516	156.9	Windowless Sampling
WS131	4.80	Made Ground	305565.985	204550.626	157.3	Windowless Sampling
WS132	6.20	Made Ground	305700.461	204437.821	156.5	Windowless Sampling
WS133	6.20	Made Ground	305676.399	204482.452	158.0	Windowless Sampling
WS134	6.00	Made Ground	305646.921	204546.577	160.6	Windowless Sampling
WS135	6.00	Made Ground	305623.62	204604.933	162.1	Windowless Sampling
WS136	6.00	Made Ground	305534.69	204618.684	161.0	Windowless Sampling
WS137	6.20	Alluvium	305856.882	204014.021	150.1	Windowless Sampling

5.1 QUANTUM GEOTECHNIC FIELDWORKS (CONTINUED)

A summary of the machine excavated trial pits carried out across the site (including locations, depths, and termination stratum) is presented below in Table 6.

Table 6: Summary of Quantum Trial Pits

Trial Pit Ref:	Depth (m)	Easting	Northing	Ground Level (m AOD)	Termination Stratum
TP101	4.00	305934.92	204022.256	149.4	Made Ground
TP102	4.00	305990.872	203945.211	149.0	Made Ground
TP103	4.00	305997.061	203881.518	149.9	Alluvium
TP104	4.00	305996.977	203835.083	149.9	Made Ground
TP105	4.00	305952.61	203879.04	149.9	Alluvium
TP106	4.00	305952.611	203879.039	149.9	Made Ground
TP107	4.00	305866.734	203887.106	149.7	Alluvium
TP108	3.20	305806.812	203943.362	149.9	Made Ground
TP109	0.50	305874.799	203988.352	149.6	Made Ground
TP110	4.00	305851.92	204032.732	150.2	Made Ground
TP111	1.00	305546.444	204606.429	161.0	Made Ground
TP112	3.00	305521.679	204618.004	160.2	Made Ground
TP113	3.00	305630.394	204575.629	161.7	Made Ground
TP114	2.00	305684.809	204542.092	160.7	Made Ground

A summary of the groundwater and ground gas monitoring installations is presented below in Table 7.

Table 7: Summary of Quantum Standpipe Installations

Borehole Ref:	Standpipe Ref (M=3 or more rounds of monitoring apply)	Standpipe Depth (m bgl)	Response Zone (m bgl)	
			Top	Bottom
RBH101	A (M)	9.00	5.00	9.00
RBH102	A (M)	22.00	8.50	22.00
RBH102	B (M)	8.50	5.50	8.50
RBH103	A (M)	12.00	6.00	12.00
RBH104	A (M)	36.50	34.00	36.50
RBH104	B (M)	8.00	6.00	8.00
RBH105	A (M)	15.00	13.00	15.00
RBH106	A (M)	14.10	11.10	14.10
RBH106	B (M)	7.00	4.00	7.00
RBH107	A (2 rounds only)	34.00	31.00	34.00

5.1 QUANTUM GEOTECHNIC FIELDWORKS (CONTINUED)

Table 7: Summary of Quantum Standpipe Installations

Borehole Ref:	Standpipe Ref (M=3 or more rounds of monitoring apply)	Standpipe Depth (m bgl)	Response Zone (m bgl)	
			Top	Bottom
RHB107	B (M)	6.50	5.50	6.50
RBH108	A (M)	12.00	7.00	12.00
RBH109	A (M)	25.00	24.00	25.00
RBH109	B (M)	13.00	12.00	13.00
RBH110	A (M)	25.00	23.00	25.00
RBH111	A (M)	11.00	9.00	11.00
RBH112	A (M)	38.00	37.00	38.00
RBH112	B (M)	13.00	12.00	13.00
RBH113A	A (M)	27.00	25.00	27.00
RBH113A	B (M)	11.00	9.00	11.00
RBH114	A (M)	13.00	10.00	13.00
IBH102	A (M)	26.00	23.00	26.00
IBH103	A (1 dip only)	16.00	13.00	16.00
IBH104	A (3 dips-no gas)	24.00	21.00	24.00
IBH104	B (3 dips- no gas)	8.00	5.00	8.00
IBH105	A (M)	28.00	25.00	28.00
IBH106	A (M)	30.00	27.00	30.00
IBH106	B (M)	9.00	6.00	9.00
IBH107	A (M)	28.70	25.70	28.70
IBH107	B (M)	8.00	5.00	8.00
CP101	A (M)	8.00	5.00	8.00
CP102	A (M)	7.90	4.50	7.90
CP103	A (M)	6.20	1.00	6.20
WS102	A	2.00	1.00	2.00
WS117	A	1.70	1.00	1.70
WS121	A	4.00	1.00	4.00
WS128	A	4.00	1.00	4.00
WS129	A	5.00	1.00	5.00
WS130	A	4.00	1.00	4.00
WS132	A	6.20	3.00	6.20

Following completion of the fieldworks, QGL undertook 4 No. monitoring visits to record ground gas concentrations and groundwater levels within selected borehole standpipes. Those boreholes with three or more monitoring rounds are marked with a ‘M’ in column 2 of Table 7 above.

The ground gas and groundwater level monitoring rounds were carried out on 26th July 2022, 1st August 2022, 10th August 2022, 17th August 2022, and 23rd August 2022. Not all wells were monitored at each date. Water level only gauging visits commenced earlier than the above dates with the first undertaken on 7th July 2022.

5.1 QUANTUM GEOTECHNIC FIELDWORKS (CONTINUED)

The gas monitoring comprised testing for methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide using a GA2000 calibrated gas analyser.

5.2 AVAILABLE BGS BOREHOLE RECORDS

BGS records of historical boreholes were obtained and reviewed by Redstart / WSP as part of their desk study. The BGS records were mainly utilised as a source of additional information for the mining assessment.

A total of 84 No. records were identified within 250m radius of the site.

Four of these were confidential and not obtained. A large proportion of the boreholes were unobtainable due to other reasons, including 21 No. by Wardell Armstrong, for a proposed development at Pentrebach.

A further 26 No. records were of depths less than 10m and so of little relevance to the mining assessment. Of the remaining logs, four were located on-site, and 15 No. were outside of the site. All penetrated rockhead. A summary of the pertinent BGS borehole records that have been reviewed (and are considered applicable to the site area) is presented below in Table 8.

Table 8: Summary BGS Borehole Records

Borehole Ref:	Depth (m bgl)	Easting	Northing	Ground Level (m AOD)
SO00SE261	33.50	305930	204240	150.0
SO00SE262	42.10	305700	204420	156.5
SO00SE264	40.10	305720	20500	159.0
SO00SE549	61.00	305650	204280	151.8
SO00SE260	42.30	305880	204150	152.0
SO00SE236	24.00	305950	204300	149.3
SO00SE235	36.30	305970	204210	149.8
SO00SE234	45.40	305930	204120	150.9
SO00SE259	46.70	306000	204030	148.5
SO00SE263	30.70	305820	204420	156.0
SO00SE258	41.12	306080	204020	149.0
SO00SE237	33.00	306050	204200	149.4
SO00SE233	42.30	306050	204140	150.3
SO00SE232	41.70	306100	204070	150.8

The locations of the available BGS borehole recorded are shown in Figure 5a and Figure 5b.

6.0 GROUND CONDITIONS SUMMARY

The ground conditions have been summarised using the existing intrusive site investigation data. Reference has also bee made to available borehole records provided by the British Geological Survey (BGS).

The strata encountered during the site investigation was generally found to be in accordance with the published geology for the area. The geological sequence is relatively simple and generally comprises of Made Ground over Alluvium over Coal Measures bedrock. The Alluvium can be split into a thick granular layer and a thinner layer of finer / cohesive alluvium at the top. The fine-grained alluvium is present as a lens like deposit and hence is not aways present. The fine-grained alluvium is quite variable in its clay and silt content.

6.1 HARDSTANDING, FLOORS SLABS, TOPSOIL AND MADE GROUND

Hardstanding was encountered at the majority of the exploration hole locations. Asphalt surfacing was typically approximately 0.08m thick. Concrete pavements were generally thicker at approximately 0.25m thick. The internal floor slab within the production building ranged from approximately 0.20m to 0.30m thick.

Turf and topsoil was present within one third of the exploratory holes within the southern former sports ground area. The topsoil material typically comprised black slightly gravelly silt.

Variable made ground was present across the site. However, beneath approximately two thirds of the production building footprint, the made ground comprised a consistent layer of gravel comprising slag between approximately 3.30m and 5.30m thick.

Away from the production building, the made ground was found to be granular, ranging from black silty sandy gravel (in areas very silty and containing cobbles) to a silty gravelly sand (locally very silty). Several holes also encountered reworked alluvial clays at the base of the made ground. Most of the material comprised a mix of shale and mudstone clasts and in areas with an horizon of coal dust or material rich in coal clasts which would suggest that the material is colliery spoil. The location of coal rich materials was found to be random across the site.

Thinner than average made ground was encountered within the pumping station area and intermittently outside the centre parts of the production building where the made ground was as thin as approximately 1.45m to 2.00m.

6.1 HARDSTANDING, FLOORS SLABS, TOPSOIL AND MADE GROUND (CONTINUED)

Thicker made ground was encountered within the former car park area with a thickness range of between approximately 6.00m and 9.90m. The thicker material was often grey or greyish brown with fragments of mudstone and siltstone, resembling colliery spoil.

Obstructions were encountered within the top 4.00m of the made ground. Obstructions included a rubber tyre, a concrete pipe, unknown obstructions and gas pipes. Full details of obstructions are provided within the exploratory logs.

6.2 FINE-GRAINED ALLUVIUM

Where present fine-grained alluvium lies at the top of an alluvial sequence, with a coarse-grained component beneath.

Fine-grained alluvium was present in approximately half the exploratory holes drilled or excavated across the main Hoover site area to the west of Merthyr Road, and also beneath the former car park site area.

The material varies from black to brown, soft silty clayey silt (occasionally containing wood fragments) to sandy clay (which can be gravelly).

The fine-grained alluvium deposits were noted to be absent within the exploratory holes positioned across the former pumping station site area.

6.3 COARSE-GRAINED ALLUVIUM

Coarse-grained alluvium is present across the site, and it has a substantial variation in thickness, which reflects variable depths bedrock.

The deepest areas of coarse-grained alluvium (around 21 to 24m thickness) are associated with a depression in rockhead. The depression sits beneath most of the Hoover warehouse building and passes through the centre line of the Hoover production building and out through the centre/eastern parts of the cricket pitch.

Thinner coarse alluvium is associated with the disused car park (where it is around 2.60m to 3.10m thick).

6.4 COAL MEASURES BEDROCK

Bedrock strata of the South Wales Coal Measure underlies the superficial Alluvium deposits beneath the site. The depths to bedrock vary across the site.

6.4.1 Rockhead Summary

A summary of the depths to bedrock, as proven within the on-site exploratory holes carried out by Quantum Geotechnic Limited, is presented below in Table 9.

Table 9: Depths to Rockhead (Quantum Borehole Records)

Borehole Ref:	Ground Level (m AOD)	Depth to Rockhead (m bgl)	Rockhead Elevation (m AOD)
RBH101	149.4	23.0	126.4
RBH102	149.9	25.4	124.5
RBH103	151.0	13.9	137.1
RBH104	151.0	27.6	123.4
RBH105	149.6	20.0	129.6
RBH106	151.4	14.1	137.3
RBH107	151.6	22.5	129.1
RBH108A	151.6	25.4	126.2
RBH109	156.**4**	27.2	129.2
RBH110	157.2	9.6	147.6
RBH111	157.**3**	26.1	131.2
RBH112	163.2	13.9	149.3
RBH113A	157.**1**	27.8	129.3
BH114	161.**3**	22.8	138.5
IBH102	151.6	26.1	125.5
IBH103	151.7	25.2	126.5
IBH104	151.**8**	24.0	127.8
IBH105	151.8	28.0	123.8
IBH106	151.8	30.0	121.8
IBH107	151.**8**	28.7	123.1

Borehole records found the bedrock strata to comprise competent layers of dark grey to grey siltstones, mudstones, seat-earth and black coal. Occasional pale grey sandstones strata are also present, and these vary from thin to thick beds.

Total core recovery of the holes is above 90% throughout, with the solid core and RQD values not appearing to have much of a correlation with depth.

Bedding partings (smooth planar) within recorded covered core samples of the bedrock were observed to dip in the range 5 -10 degrees, which is consistent with the dips shown on the published geological maps of the area.

6.4 COAL MEASURES BEDROCK (CONTINUED)

A summary of the depths to bedrock as detailed within the available BGS borehole records, is presented below in Table 10.

Table 10: Depths to Rockhead (BGS Borehole Records)

Borehole Ref:	Ground Level (m AOD)	Depth to Rockhead (m bgl)	Rockhead Elevation (m AOD)
SO00SE261	150.0	14.7	135.3
SO00SE262	156.5	15.8	140.7
SO00SE264	159.0	10.7	148.3
SO00SE549	151.8	30.0	121.8
SO00SE260	152.0	26.8	125.2
SO00SE236	149.3	3.9	145.4
SO00SE235	149.8	15.0	134.8
SO00SE234	150.9	25.3	125.6
SO00SE259	148.5	25.5	123.0
SO00SE263	156.0	7.9	148.1
SO00SE258	149.0	20.3	128.7
SO00SE237	149.4	7.2	142.2
SO00SE233	150.3	18.9	131.4
SO00SE232	150.8	21.4	129.4

6.4.2 Encountered Coal Seams

A number of intact coal seams were encountered within the drilled depths of the rotary boreholes. A summary of the encountered coal seams is presented below in Table 11.

Table 11: Encountered Coal Seams (Quantum Borehole Records)

Borehole Ref:	Ground Level (m AOD)	Rockhead Elevation (m AOD)	Approx. Depth to Top of Coal (m)	Elevation of Top of Coal (m AOD)	Coal Thickness (m)
RBH101	149.4	126.4	31.0	118.4	0.45
			37.9	111.5	0.60
			39.5	109.9	0.50
RBH102	149.9	124.5	29.5	120.4	0.50
			30.5	119.4	0.50
			37.6	112.3	1.20
			40.0	109.9	0.50
RBH103	151.0	137.1	19.1	131.9	0.40
			22.1	128.9	0.90
			29.1	121.9	1.10
RBH104	151.0	123.4	36.5	114.5	1.65
			39.1	111.9	0.90
RBH105	149.6	129.6	25.5	124.1	1.60
			28.2	121.4	1.40

6.4 COAL MEASURES BEDROCK (CONTINUED)

Table 11: Encountered Coal Seams (Quantum Borehole Records)

Borehole Ref:	Ground Level (m AOD)	Rockhead Elevation (m AOD)	Approx. Depth to Top of Coal (m)	Elevation of Top of Coal (m AOD)	Coal Thickness (m)
RBH106	151.4	137.3	16.4	134.9	1.20
RBH107	151.6	129.1	22.5	129.1	0.50
			26.2	125.4	1.20
			29.1	122.5	0.90
			34.1	117.5	0.90
RBH108A	151.6	126.2	28.0	123.6	0.60
RBH109	156.4	129.2	34.0	122.4	0.60
			35.2	121.2	1.20
			43.3	113.1	1.10
RBH110	157.2	147.6	21.2	136.0	1.80
			27.3	129.9	0.70
RBH111	157.3	131.2	28.1	129.2	1.30
			39.1	118.2	3.80
RBH112	163.2	149.3	19.1	144.1	0.45
			20.5	142.7	1.00
			29.3	133.9	1.80
RBH113A	157.1	129.3	30.1	127.0	1.10
			32.0	125.1	1.00
			33.4	123.7	0.70
			34.4	122.7	1.50
			44.60	112.5	0.40
RBH114	161.3	138.5	31.20	130.1	1.70
IBH102	151.6	125.5	27.40	124.2	1.20
IBH105	151.8	123.8	29.20	122.6	0.90

A summary of the coal seams as detailed within the BGS borehole records, is presented below in Table 12.

Table 12: Encountered Coal Seams (BGS Borehole Records)

Borehole Ref:	Ground Level (m AOD)	Rockhead Elevation (m AOD)	Approx. Depth to Top of Coal (m)	Elevation of Top of Coal (m AOD)	Coal Thickness (m)
SO00SE261	150.0	135.3	22.4	127.6	1.3
			25.6	124.4	1.3
			30.5	119.5	1.4
SO00SE262	156.5	140.7	40.5	116.0	0.8
SO00SE264	159.0	148.3	36.0	123.0	2.1
			38.5	120.5	0.7
SO00SE549	151.8	121.8	56.8	95.0	1.2

6.4 COAL MEASURES BEDROCK (CONTINUED)

Table 12: Encountered Coal Seams (BGS Borehole Records)

Borehole Ref:	Ground Level (m AOD)	Rockhead Elevation (m AOD)	Approx. Depth to Top of Coal (m)	Elevation of Top of Coal (m AOD)	Coal Thickness (m)
SO00SE260	152.0	125.2	35.8	116.2	1.1
			38.5	113.5	1.3
SO00SE236	149.3	145.4	14.5	134.8	1.7
			17.3	132.0	1.9
			22.4	129.9	1.2
SO00SE235	149.8	134.8	26.4	123.4	1.1
			28.9	120.9	1.3
SO00SE234	150.9	125.6	27.2	123.7	1.2
			31.3	119.6	0.4
			33.8	117.1	0.2
			44.4	106.5	0.9
SO00SE259	148.5	123.0	29.9	118.6	1.0
			37.9	110.6	1.2
			41.7	106.8	0.4
			44.1	104.4	0.4
SO00SE263	156.0	148.1	8.2	147.8	1.1
SO00SE258	149.0	128.7	22.7	126.3	0.4
			29.9	119.1	1.3
			38.6	110.4	1.1
SO00SE237	149.4	142.2	11.1	138.3	1.0
			14.4	135.0	0.4
			17.2	132.2	0.2
			26.7	122.7	1.3
			29.6	119.8	1.4
SO00SE233	150.3	131.4	23.9	126.4	1.0
			27.4	122.9	0.4
			30.0	120.3	0.3
			37.6	112.7	1.1
			40.5	109.8	1.2
SO00SE232	150.8	129.4	24.4	126.4	1.2
			32.2	118.6	1.2
			38.5	112.3	0.5
			41.2	109.6	0.2

6.4.2 Possible Mine Workings

In addition to the encountered coal seams (as detailed in Tables 9 and 10), a 3.8m high void was recorded during the drilling of rotary borehole RBH111 between depths of approximately 39.1m and 42.9m bgl. This void could be associated with historical underground mine workings, possibly targeting the Nine Feet seam.

6.5 GROUNDWATER

Given the proximity to the river and the local geology, shallow groundwater was anticipated.

Relatively shallow groundwater was encountered in cable percussive boreholes at a variety of depths ranging between approximately 6.60m and 7.80m bgl. Groundwater strikes recorded in the rotary boreholes were encountered at generally similar depths, although some were deeper.

In general, water strikes were not encountered in the 5.0m to 6.0m deep windowless sample boreholes with the exception of WS128, where a strike was recorded at a depth of approximately 4.0m bgl.

Groundwater strikes were not encountered in the 4.0 m deep trial pits, except for TP106 and TP108, where inflows were recorded at depths of approximately 3.20m bgl and 2.70m bgl respectively. Both these trial pits were located in the cricket pitch area.

Where double standpipes/piezometers were installed with one pipe in the alluvium and one pipe in the Coal Measures, such as RBH109, groundwater was slightly elevated in the Coal Measures standpipe, e.g. RBH109 had an 18cm difference in levels. In other dual pipe installations, the difference was less, around 10cm. This suggests that the Coal Measures may be fed by slightly elevated heads in the hills surrounding the site.

6.6 GROUND GASES

As detailed above in Section 5.1, ground gas monitoring was undertaken as part of the fieldworks carried out by Quantum Geotechnic Limited. During the monitoring visits, methane remained at undetectable levels and carbon dioxide remained below 5%. Gas flow rates were often recorded below the limit of detection of the equipment.

6.7 GEOLOGICAL LONG SECTION

Redstart / WSP have prepared a simplified geological long section through the site, as plotted in Drawing No. GC4005-RED-75-XX-DR-C-0011: Geological Long Section. See Figure 6.

The coal seam names are those used by the Coal Authority.

Ground investigation records as well as the Abercanaid Pit No. 1 shaft record (for determining the approximate anticipated seam separation) have been used to construct the long section.

6.6 GEOLOGICAL LONG SECTION (CONTINUED)

The seam separation is well aligned with those measured in the Abercanaid shaft record.

Several of the boreholes are offset from the line of section. The uncertainty of the long section alignment with the dip of the strata means that the named coal seams assigned on the offset boreholes appear to lie several meters above (north-east) or below (south-west) the inferred coal seam location.

Based upon the long section, the following seams are anticipated to subcrop along the line of section are as follows:

- The Two Feet Nine is inferred to sub-crop at approx. Ch. 890 m.
- The Four Feet is inferred to sub-crop at approx. Ch. 780.
- The Upper 6 Feet Rider is inferred to sub-crop at approx. Ch. 650 m.
- The Six Feet Bottom Leaf is inferred to sub-crop at approx. Ch.430 m.
- The Red Vein is inferred to sub-crop at approx. Ch.200 m.
- The Nine Feet is inferred to sub-crop approx. 80m north of the site boundary.

Note, chainages are shown on the above-mentioned drawing - Drawing No. GC4005-RED-75-XX-DR-C-0011: Geological Long Section (see Figure 6).

7.0 COAL MINING RISK ASSESSMENT

7.1 UNDERGROUND MINE WORKINGS

7.1.1 Introduction

Mine entries typically represent the highest risk mining subsidence hazard, and these are discussed in Section 8.2. This section of the report will focus on surface subsidence related to collapse of shallow mine workings.

It is considered that the most likely mechanism for potential mining related subsidence at the site will be via roof rock failure potentially resulting in crown hole formation. Larger scale areal subsidence is not considered to be of concern due to the relatively low extraction ratio revealed by the ground investigation data.

The failure of roof rock strata can result in the progressive transmission of a void, upwards through the overburden. The transmitted extent of a migrating void is influence by factors such as the strata dip, the bulking characteristics of the collapses rock or soil, the capability of arching the collapsed zone, groundwater flow, and the presence of strong and intact rock layers with the ability to span.

The limiting height on void migration, where no appreciable surface subsidence can result, is termed ‘acceptable cover’, with its determination based upon a criterion reflecting the worked thickness of the seam and the overlying rock cover.

7.1.2 Limitations

The current ground investigation must be viewed as a preliminary investigation, in which budgetary constraints and spatial restrictions, due to the existing factory buildings and infrastructure, have resulted in limited data for analysis. Nevertheless, in order to support an outline planning application, certain broad-brush assumptions may be inferred from the desk study and ground investigation information, which has allowed for an initial presentation of surface zones at risk of crown hole development across the site.

7.1.3 Quantitative Assessment of Crown Hole Development

The upper limit of rock cover permitting crown hole development has been investigated by many authors. For subsidence incidents with rock above mine workings (Arup 1991), the relative likelihood of crown hole occurrence is expressed as HT.

H / T = HT

H = Height of rock cover above a working

T = Total extraction height

7.1 UNDERGROUND MINE WORKINGS (CONTINUED)

The HT ratios can be calculated for the site based upon desk study and ground investigation data. From the geological long section (see Figure 6) the following geometries have been determined:

- We have assumed the dip of strata to be on average, 6 degrees (1V in 10H slope) in a south-south-east direction.
- Between geological long section Ch. 40 to 480 m, the reduction of rock cover is 1V in 25H.
- From Ch. 480 to 800+ m the rockhead depth appears variable but is overall does not reduce significantly across this distance and, with a conservative estimate on depth, can be assumed horizontal.

Areas at risk of crown hole development can be zoned at the grounds surface and supplemented by mine abandonment plan sources. In Arup's study, recorded crown hole developments reaching the surface were proportioned as follows:

- HT ratio >18, no crown hole occurrence was recognised at surface.
- HT ratio between 10 and 18, circa 5% of recorded crown hole developments.
- HT ratio between 2 and 10, circa 21% of recorded crown hole developments.
- At HT<2, circa 74% of recorded crown hole developments.

There are many variables to this data including the inclination of strata, overlying strata competency, groundwater depth and overburden thickness.

Literature provides evidence for lesser than 10T cover being adequate. For instance, for flat or gently inclined seams, Taylor (1975) suggested an 8T upper limit to be reasonable. Walton and Taylor (1977), based on direct observations in opencast faces, suggested the upper limit of migration may well be 7T. In a status review, Walton and Cobb (1984) concluded "it is unusual to find many collapses more than six times the room height". This was later quantified for the South Wales Coalfield, by Statham and Treharne (1991), as 90 per cent of collapses occurring at a cover ratio of less than 6T.

For the Hoover site, the Coal Authority pre-application enquiry response states that a 10T cover, to provide assurance against crown hole migration, is appropriate. This advice is in line with CIRIA guidance; Abandoned Mine Workings Manual (C758D).

7.1 UNDERGROUND MINE WORKINGS (CONTINUED)

Considering the on-site borehole information currently available is minimal, further detailed borehole information in combination with a favourable strata inclination and bulking characteristic may enable the Coal Authority to accept a reduction in the currently stipulated 10T criteria.

7.1.4 Two Feet Nine Crown Hole Risk Zone

The Coal Authority record workings within the Two Feet Nine seam beneath the site at depths ranging between approximately 37m and 48m, and last worked in 1940.

Mine abandonment plans (ref: SWR3145 and SWR3186) indicate the workings in the Two Feet Nine occurred beneath the south-eastern and south-western extents of the site.

The Coal Authority indicate the extraction thickness of the Two Feet Nine seam (beneath the site) ranged between 0.66m and 1.30m. The rate of dip of the workings is indicated to vary between 5.2^{o} and 6.6^{o}.

Redstart / WSP indicate that no boreholes within the site are interpreted to have encountered the Two Feet Nine seam. However, they note that the far southern end of the site did not contain any deep boreholes.

Abercanaid Pit shaft records suggest that only 7.0 or 8.0m separates the Two Feet Nine from the underlying Four Feet seam. If the rockhead along the geological section line is consistent, then the sub-crop is inferred to lie in the region of Ch.890 m, below the cricket pavilion. However, it is anticipated that rockhead rises significantly to the west and that the subcrop will swing in a north-westerly direction closer to the river Taff.

The maximum extraction thickness (T) = 1.30m, and at outcrop HT = 0. With a coal seam dip of 1 in 10, and an anticipated relatively level rock head, HT increases by 1, every 13m south-southeast from the inferred sub-crop.

As the inferred sub-crop and workings are so close to the site's southern extremity, the 10T crown hole risk zone (extending 130m from the outcrop), would extend well beyond the development area.

7.1.5 Four Feet Crown Hole Risk Zone

The Coal Authority record workings within the Four Feet seam beneath the site at depths ranging between approximately 37m and 54m, and last worked in 1891.

7.1 UNDERGROUND MINE WORKINGS (CONTINUED)

Mine abandonment plans (ref: SWR3144 and SWR3621 Sheet 4 of 4) indicate the workings occurred beneath the south-eastern half of the site.

The Coal Authority indicate the extraction thickness of the Four Feet seam (beneath the site) was 2.10m. The rate of dip of the workings is indicated to vary between 5.5º and 6.6º.

Redstart / WSP interpret the Four Feet seam sub-crop at Ch.780m on the geological section line.

Using the same method as described for the Two Feet Nine coal, the Four Feet workings approx. HT increases by 1 every 21m south from the inferred sub-crop, or 210m at 10T. This intersects the 10T zone of the overlying Two Feet Nine seam.

The BGS map legend suggests that a significant sandstone unit lies between the Two Feet Nine and underlying Four Feet seam, and the Abercanaid Pit record shows a sandstone roof to the seam. However, this is unproven within the current Hoover site ground investigation. If this barrier to potential crown hole migration from the Four Feet seam is absent, there would be an increased risk of interaction where the Two Feet Nine overlies the Four Feet.

7.1.6 Upper Six Feet Rider Crown Hole Risk Zone

The shallowest recorded workings beneath the site are indicated to be within the Upper Six Feet Rider coal seam at 16m depth, and last worked in 1875.

Plans obtained from the Coal Authority (ref: 320403_SW039I and 320404_SW039I) indicate the workings occurred beneath the south-eastern half of the site. It should be noted that an annotation on plan 320404_SW039I reads ‘probably worked to crop’.

The Coal Authority indicate the extraction thickness of the Upper Six Feet Rider (beneath the site) was 1.70m. The rate of beneath of the workings is indicated to vary between 4.5º and 6.2º.

Abandonment plan SWR3146 shows workings in the Six Feet seam beneath the south-western area of the site. The workings originated from the Gethin / Cethin Colliery (Gethin No. 2 Pit) located west of the Glamorganshire Canal, 500m south-west of the site boundary.

The workings show on abandonment plan SWR3146 mirror those show on plan 320403_SW039I (applicable to the Upper Six Feet Rider), indicating that the Six Feet and Upper Six Feet Rider are the same seam.

7.1 UNDERGROUND MINE WORKINGS (CONTINUED)

The sub-crop Upper Six Feet Rider is inferred to lie at Ch.620m on the Redstart / WSP geological section line (based upon IBH105).

Redstart / WSP recommend that a HT zonation is plotted with T of 1.70m, in which HT increases by 1 every 17m from inferred sub-crop position. Therefore, 10T extends 170m from the estimated line of sub-crop.

As mentioned previously, the composition of the coal roof and interburden are important factors in crown hole propagation, with the strata above the Six Feet being more competent than those above the Four Feet. RBH102R and RBH103R although not cored, provide descriptions of strata that are of predominantly lower competency material. This requires further ground investigation to confirm the anticipated strata lithologies.

7.1.7 Six Feet Bottom Leaf (aka Upper Six Feet) Crown Hole Risk Zone

No abandonment or extraction records have been obtained for the Six Feet Bottom Leaf seam. However, records indicate the seam is substantial enough to be economically viable, approximately 4ft thick on the BGS 1:10,000 map legend.

Redstart / WSP recommend a HT zonation is plotted with T of 1.5m, in which HT increases by 1 every 15m from inferred sub-crop. Therefore, 10T zone extends 150m from the estimated line of sub-crop.

The lack of competent strata overlying the Six Feet Bottom Leaf suggests that if crown holes developed in workings, these could migrate upwards and destabilise the Upper Six Feet Rider workings.

As the Coal Authority require proof of absence of workings, it should be a ground investigation requirement to locate and prove the unworked nature of the Six Feet Bottom Leaf.

7.1.8 Red Vein (aka Lower Six Feet) Crown Hole Risk Zone

No workings in the Red Vein are shown on the Coal Authority interactive viewer and no abandonment plans for the Red Vein are available from the Coal Authority. However, the presence of the Red Vein seam should be investigated, or a 10T risk zone is required to be assumed under advice from the Coal Authority.

A lack of information would require seam extraction thickness to be conservatively estimated, which would likely create an overlapping 10T zone between the Red Vein and the overlying Six Feet Bottom Leaf.

7.1 UNDERGROUND MINE WORKINGS (CONTINUED)

7.1.9 Nine Feet and Bute Crown Hole Risk Zone

Abandonment plans 4357 and SWR233 indicate that the site is underlain by workings in the Nine Feet seam apart from the far north.

The depth, thickness and location of the Nine Feet seam (and likely the closely underlying Bute seam) was determined with certainty, in the preliminary ground investigation. There is a lack of good quality ground investigation data to confidently identify the Nine Feet seam but the interpreted spacing between the Nine Feet and Lower Six Feet (34m) is close to that anticipated from the separation observed on the Abercanaid pit shaft record (37m) located to the west.

A void is recorded in RBH111 around 3.8 m thick. Redstart / WSP propose three possible explanations for this:

1. The void was formed by coal extraction within the Nine Feet Seam. The height of the void encountered is considerable and could possibly be a main roadway.
2. Fractured ground, the result of drilling into a zone of vertical crown hole migration.
3. Fractured ground due to a fault at this location; note the yellow, coloured fault zone marked close to RBH111 on Abandonment plan SWR1883

The multiple seam section in BH113AR could be the Nine Feet (and potentially Bute) seam at this location, but this would require confirmation by further drilling.

Conservatively, we would initially assign a thickness value (T) of 3.8 m to the Nine Feet seam, subject to confirmatory investigations. CA data indicates a worked thickness of 2.59m beneath the site, which may be more representative of the general extraction thickness.

Extraction thickness (T) = 2.6 m, and at outcrop HT = 0. As discussed previously, rock head appears to reduce in elevation in the same direction as the dip of strata, by approximately 2 degrees, or a 1 in 25 slope, thereby reducing the relative dip of strata to 4 degrees or a 1 in 14 slope. Therefore, HT increases by 1, every 36.4m (2.6m x 14m) south-south-east.

7.1 UNDERGROUND MINE WORKINGS (CONTINUED)

Extrapolated from the geological long section, the interpreted Nine Feet seam sub-crop lies around 80m north of the Hoover site. Consequently, we recommend that a HT zonation starting at 80m north of the site in which HT increases by 1 every 36.4m from sub-crop; giving a 364m (10T) crown hole risk zone. The crown hole risk zone lies at approximate Ch. 285 m on the line of section.

7.1.10 Yard Crown Hole Risk Zone

There is no record of this seam being worked beneath the site.

There is an anticipated separation between the Yard and the overlying Nine Feet and Bute seams of approx. 35m, as shown on the nearby Abercanaid Pit shaft records.

We have no seam thickness records, so the HT ratio cannot be established.

Further work will be necessary to prove or disprove the Yard seam location, thickness and intactness beneath the site, to see whether the 10T zone impinges upon the very northern part of the site.

However, if 10T ratios are followed the total extraction height would need to be in the region of 3.5m to trigger possible risks of multiple seam interactions with the overlying Nine Feet seam.

7.1.11 Seven Feet Crown Hole Risk Zone

With an anticipated separation between the Seven Feet and Nine Feet coals of approx. 46m, as shown on the nearby Abercanaid pit, and the Nine Feet coal outcropping to the north of the site, the Seven Feet is assumed to underlie the site at depths where the HT ratio is >10. The potential for crown hole development in the Seven Feet workings and propagating through to the overlying Nine Feet workings is considered negligible and for this reason the Seven Feet is excluded from further analysis.

7.1.12 Preliminary Crown Hole Risk Zone Plans

Following the production of the geological long section and risk zoning exercise, Redstart / WSP produced a drawing (Drawing No. GC4005-RED-75-XX-DR-C-0017: Anticipated Coal Seam Subcrop and 10T extents) showing the anticipated 10T Crown Hole At-Risk Zone for the Two Feet Nine, Four Feet, Upper Six Feet Rider, Lower Six Feet and Nine Feet & Bute coals.

Extracts of Drawing No. GC4005-RED-75-XX-DR-C-0017: Anticipated Coal Seam Subcrop and 10T extents, are presented in Figure 7a and Figure 7b

7.2 MINE ENTRIES

7.2.1 Published Mine Entry Data

The Coal Authority indicates that there are eight mine entries located within 100m of the site boundary. A summary of the published mine entry data is presented in Table 13.

Table 13: Published Mine Entry Data

Ref:	Shaft/Adit	Approx. distance from site (m)	Assumed Diameter (depth if available) (m)	Probable Adit Azimuth (degrees)	CA Easting, Northing (Desk based)	CA Assigned Departure Distance (m)
305204-008	Shaft	Approx. 55m north	2.5m	N/A	305591 204697	5m
305204-009	Shaft	Approx. 35m north	2.5m	N/A	305600 204677	5m
305204-011	Adit	Approx. 95m northeast	3.0m	95°	305698 204719	5m
305204-012	Shaft	Approx. 12m northeast	2.5m	N/A	305711 204552	5m
305204-013	Shaft	Approx. 15m northeast	2.5m	N/A	305719 204547	5m
305204-014	Adit	Approx. 82m northeast	3.0m	97°	305784 204572	5m
305204-039	Shaft	Approx. 70m northeast	2.5m	N/A	305754 204591	10m
305204-072	Adit	Approx. 25m northeast	3.0m	59°	305719 204561	10m

There are five historical shafts indicated to be located within 100m of the site boundary. These comprise:

- Shaft 305204-008 located approximately 55m to the north of the site
- Shaft 305204-009 located approximately 36m to the north of the site
- Shaft 305204-012 located approximately 12m to the northeast of the site
- Shaft 305204-013 located approximately 15m to the northeast of the site
- Shaft 305204-039 located approximately 70m to the northeast of the site

It should be noted that that Shafts 305204-008, 305204-009 and 305204-039 are all located a significant distance off site (greater than 35m). These shafts are not considered to be within an influencing distance of the site.

7.2 MINE ENTRIES (CONTINUED)

Shafts 305204-012 and 305204-013 are located approximately 12m to 15m to the northeast of the site. When considering the potential assigned departure distances these shafts would be within an influencing distance of the site.

There are three historical adits indicated to be located within 100m of the site boundary. These comprise:

- Adit 305204-011 located approximately 95m to the northeast of the site
- Adit 305204-014 located approximately 82m to the northeast of the site
- Adit 305204-072 located approximately 25m to the northeast of the site

It should be noted that all the adits are located in excess of 25m from the site boundary and are all indicated to be orientated away from site. As such the adits are not considered to be within an influencing distance of the site.

7.2.2 Risk from Shaft 305204-012 and Shaft 305204-013

There are no mine entries recorded to be on site. However, as outlined above, shaft 305204-012 and Shaft 305204-013 are indicated to be located within influencing distance of the site.

Where mine entries are proven to still be present beneath or within influencing distance of a site, there will be a potential ground subsidence risk to the proposed development. As such, in order to mitigate this risk, it is recommended that 'worst-case' building exclusion zones are applied around Shaft 305204-012 and Shaft 305204-013.

It is considered that the adoption of a worst-case building exclusion zones approach should provide sufficient confidence to the Coal Authority and the Local Planning Authority that the recorded mine entry locations and their potential lateral departure distances have been carefully considered.

In order to determine the worst-case building exclusions zones around Shaft 305204-012 and Shaft 305204-013, each of the mine entry plotting locations have been considered on an individual basis.

A 45-degree angle of 'draw' from a conservative best estimated depth to rockhead has been utilised in the determination of the worst-case building exclusion zones. The depths to rockhead are based on near-by ground investigation data. On top of this, the no build zone radii also account for conservative assumed shaft diameters of 2.5m and the Coal Authority assigned lateral departure distances of 5m.

7.2 MINE ENTRIES (CONTINUED)

Shaft 305204-012 has been georeferenced using Coal Authority source plans: OS 1:2500 Glamorgan 12/5 (1919, 1900, 1876). The best-fit plotting location for this feature is considered to be: 305711, 204552. Assuming a conservative minimum depth to bedrock of 10.7m bgl (based on the nearest borehole recorded BGS ref: SO00SE264), a conservative assumed shaft diameter of 2.5m (and radius of 1.25m), and accounting for the Coal Authority assigned 5.0m potential departure distance (from the plotted shaft location), a worst-case 16.95m radius building exclusion zone has been determined from the centre of the plotted location of Shaft 305204-012.

Shaft 305204-013 has been georeferenced using Coal Authority source plans: OS 1:2500 Glamorgan 12/5 (1919, 1900, 1876). The best-fit plotting location for this feature is considered to be: 305719, 204547. Assuming a conservative minimum depth to bedrock of 10.7m bgl (based on the nearest borehole recorded BGS ref: SO00SE264), a conservative assumed shaft diameter of 2.5m (and radius of 1.25m), and accounting for the Coal Authority assigned 5.0m potential departure distance (from the plotted shaft location), a worst-case 16.95m radius building exclusion zone has been determined from the centre of the plotted location of Shaft 305204-013.

The extents of the worst case building exclusion zones are shown in Figure 2. The worst case building exclusion zones just encroach into the eastern extents of the future employment / commercial development parcel (situated to the east of Merthyr Road).

When determining development layouts for this area of the site, it is recommended that no buildings are proposed at the defined building exclusion zones shown in Figure 2.

7.3 MINING INDUCED FAULT REACTIVATION

The closest BGS recorded fault is the Merthyr Church Fault indicated to between approximately 90m and 270m to the east of the site. The Coal Authority Consultants Coal Mining Report states that there are no faults, fissures or breaklines recorded beneath the site.

The above information is in contradiction to the information received from the Coal Authority in their pre-application enquiry response (ref: PAS00234, dated 05 May 2023).

The pre-application enquiry response (see Appendix A) refers to a large northwest-southeast trending fault situated immediately to the east of the site (and approximately 100m west of the BGS recorded location) and therefore within influencing distance of the site.

7.3 MINING INDUCED FAULT REACTIVATION (CONTINUED)

Mining-induced reactivation of a geological fault generally takes place contemporaneously with mining subsidence, however the duration of post-mining ground movements along faults are not always possible to predict accurately due to a lack of monitoring data, and in areas where there has been a cessation of large scale dewatering carried out to facilitate mining operations, subsequent mine water rebound has also been associated with the reactivation of faults.

Due the age of the last recorded mine activities beneath the site, it is considered that the risk of fault reactivation resulting from mining subsidence and mine water rebound is low.

7.4 MINE GAS

The site is located within a high-risk development area as designated by the Coal Authority and is known to be underlain by shallow underground mine workings targeting several coal seams. As such, a mine gas risk assessment has been undertaken.

There are many sources of gas in old mine workings including desorption of gas from coal and rocks, oxidation of coal, decomposition of old wood (such as pit props) and acidic mine drainage reacting with carbonate in the rocks around the seam or shaft.

All shallow mine workings have potential to generate mine gas. However, for there to be a potential risk to residential site end users, such gases would need a viable pathway to the surface (such as a mine shaft or a fault).

Figure 13.1 Decision Support Tool for Mine Gas Risk Assessment, included within CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021 includes a flow chart to aid the risk assessment process and decision making.

Based on desk-based research and existing ground investigation data, and utilising the CL:AIRE Decision Support Tool for Mine Gas Risk Assessment, the potential risk from coal mine gas emissions at the development site is considered below:

The first stage of the flow chart asks if the site is within a Coal Authority defined Coal Mining Reporting Area. Since the site is located within a Coal Authority defined Coal Mining Reporting Area, the flow chart then asks if all of the following statements are true:

- Mine entries >50m from site boundary,
- Workings >150m depth,

7.4 MINE GAS (CONTINUED)

- No faults or other potential pathways connecting surface to deeper unflooded workings,
- Outside area of past or probable shallow workings on Coal Authority viewer.

Based on the information gained from the desk-based research and ground investigation data, it is considered that the first stage statements are not all true. As such, in accordance with the flow chart a second stage of assessment is necessary.

The second stage of the flow chart asks if all of the following statements are true:

- Workings between 30m and 150m but permanently flooded or covered by 10m+ of low permeability superficial deposits,
- Mine entries >50m from site boundary.

Due to the presence of shallow underground workings recorded at depths less than 30m beneath the site and the presence of mine entries within 50m of the site boundary, the above statements are not all true and therefore, in accordance with the flow chart a third stage of assessment is necessary.

The third stage of the flow chart asks if any of the following statements are true:

- Mine entries on site or <20m from the site boundary,
- Workings below site <30m depth and unflooded or variable water level (not permanently flooded),
- Faults or other pathways connecting surface to deeper unflooded workings,
- Within area of past or probable shallow workings on Coal Authority viewer.

Our response to the third stage questions is as follows:

There are two mine shafts recorded within 20m of the site boundary. As such, the first statement is true.

There are recorded workings at less than 30m depth, but the groundwater observations made during the ground investigation would imply the workings are flooded. As such the second statement is considered to be not true.

A mine abandonment plan does indicate a fault to in close proximity to the eastern site boundary. However, any workings connected to this fault will be flooded based on groundwater observations. As such, the third statement is considered to be not true.

7.4 MINE GAS (CONTINUED)

The site is located within a Coal Authority defined area of past shallow workings. As such, the final statement is true.

As there are statements in the final stage of the flow chart that are true (i.e., not all the statements can be discounted), further consideration and assessment is required in order to determine the level of potential mine gas risk at the site.

A summary of the further considerations and the result of the further assessment is outlined below:

- Despite shallow workings being recorded beneath the site it should be noted that the workings are water filled (based on rotary drilling findings), which would displace any gas.

- Any residual gases which may still be present would need a viable pathway to the surface e.g., via faulted ground or a pathway feature such as a mine entry.

- There are two mine shafts recorded off-site (but within 20m of the site boundary). However, no buildings will be constructed over (of within the defined worst-cast exclusion zones) around these mine entries. As such, these mine entries will not form a viable pathway.

- A mine abandonment plan indicates an underground expression of fault beneath the eastern area of the site. However, the surface outcrop of this fault is recorded off-site to the east. The underground expression of the fault is considered to be connected to flooded workings. Additionally, consideration needs to be given to the in-situ superficial deposits that overlie the potentially faulted bedrock.

- The superficial deposits are significantly thick with low permeability. Considering the thickness and low permeability of the superficial deposits, it is considered that any potential pathway to the surface, via any potentially faulted ground, is broken.

Based on the above further consideration and assessment, the potential mine gas risk at the site is assessed as low.

This low-risk designation has subsequently been confirmed by the programme of gas monitoring which recorded low levels of methane, carbon dioxide and flow rates. No additional mitigation measures are considered to be required for dealing with any potential mine gases at the site.

8.0 PRELIMINARY REMEDIAL / MITIGATION RECOMMENDATIONS

Section 7.1 describes an initial assessment of risk from underground mine workings based on the available Redstart / WSP desk study information and ground investigation data (obtained by Quantum Geotechnic Limited).

Plans showing the Redstart / WSP determined preliminary 10T crown hole risk zones associated with the inferred coal seam sub-crops beneath the site are presented in Figure 7a and Figure 7b.

Based on a review of the data, Intégral Géotechnique (Wales) Limited generally concur with the Redstart / WSP determined preliminary 10T crown hole risk zones. It is also recognised that further intrusive ground investigation works will be required (following demolition and site clearance) in order to further refine the risk zones.

Redstart / WSP concluded that drilling and grouting ground stabilisation works will almost certainly be required prior to development. Intégral Géotechnique (Wales) Limited concur with this conclusion.

Following demolition and site clearance and once proposed development layouts and levels have been confirmed, it is recommended that a comprehensive rotary proof drilling exercise is undertaken across the site area to accurately confirm the currently inferred coal seam sub-crop positions and associated crown hole risk zones.

The proof drilling exercise will accurately inform the extents of required drilling and grouting stabilisation works.

Drilling and grouting ground stabilisation will be required beneath proposed building footprints (and other settlement sensitive structures such as retaining walls and critical drainage infrastructure) where there is determined to be insufficient acceptable rock cover thickness above any encountered shallow underground mine workings.

For proposed building footprints where there is considered to be acceptable rock cover thicknesses above any encountered shallow underground mine workings (or where no evidence of shallow underground mine workings is identified), drilling and grouting ground stabilisation works would not be required. In this instance, mitigation in the form of utilising shallow reinforced concrete building foundations (such as rafts or beam grillage foundations) designed with a 3m lack of support criteria would suffice.

8.0 PRELIMINARY REMEDIAL / MITIGATION RECOMMENDATIONS (CONTINUED)

With regards to less settlement sensitive infrastructure such as proposed roads, car parking areas, service runs etc, subject the findings of the recommended proof drilling exercise, it is considered that that any potential ground subsidence risk associated with shallow underground mine workings could be adequately mitigated with the introduction of geogrid reinforcement without the requirement for drilling and grouting ground stabilisation.

It should also be noted that in order to provide a suitable plateau for the proposed residential development, site reclamation earthworks are proposed. The site reclamation will be achieved through an 'excavation-and-recompaction' earthworks exercise undertaken and validated in accordance with an agreed Earthworks Specification. These works will ultimately result in re-engineering of the made ground beneath the site and an improvement in soil properties which will in-turn act as an additional form of mitigation against potential future crown hole formation.

With regards to mine entries, the worst case building exclusion zones (as described in Section 7.2 and shown in Figure 2) must be applied around the Coal Authority plotting locations of Shaft 305204-012 and Shaft 305204-013.

The worst case building exclusion zones just encroach into the eastern extents of the future employment / commercial development parcel (situated to the east of Merthyr Road). When determining development layouts for this area of the site, it is recommended that no buildings are proposed at the defined building exclusion zones.

It is also recommended that all site operatives are made aware of the potential risk of encountering unrecorded mine entries and that a system is established where during site preparation and construction works, any suspected anomalous ground conditions that could be indicative of unrecorded mine entries are rapidly reported to a geotechnical engineer, so that appropriate action can be undertaken.

9.0 ADDITIONAL GROUND INVESTIGATION RECOMMENDATIONS

The data obtained through the Redstart / WSP desk study, ground investigation and correspondence with the Coal Authority has been utilised to undertake an initial Coal Mining Risk Assessment in support of a proposed outline planning application for the proposed redevelopment of the site.

However, it should be appreciated that due to access constraints posed by the existing Hoover Candy factory buildings, the current ground investigation data has its limitations when attempting to accurately define the extent of potential crown hole risk zones. Consequently, following demolition and site clearance, it will be necessary to undertake the following in advance of submitting a detailed remedial scheme for the site:

- Additional drilling works to prove: (1) the location of the Bottom Six Feet and Red Vein coal seams, and (2) whether they are worked. Should these two seams be proven as unworked, and consequently free from the risk of crown holes, then the central part of the site is more likely to be developed without the need for remedial or preventative engineering solutions.

- Additional drilling works to prove: (1) the location of the Six Feet Rider sub-crop, and (2) the ground where probable workings are identified by the Coal Authority. This could potentially increase the area that does not require remediation further south of the Coal Authority identified area of probable workings.

- Additional drilling works in the north of the site to prove: (1) the location of the Nine Feet and Bute seams, as the Redstart / WSP presumed sub-crop differs significantly from the Coal Authority and BGS indicated subcrop position, and (2) the extent of workings in the Nine Feet and Bute seams is as shown on the abandonment plans.

- We would also advise on incorporating deeper drilling to locate and prove the unworked nature of the Yard seam, which could potentially remove the need for remedial or preventative engineering solutions in the far northern part of the site.

- Locating with confidence the Upper Six Feet Rider, Four Feet and Two Feet Nine seams.

- Determining of the quality of interburden between the Upper Six Feet Rider, Four Feet and Two Feet Nine seam. This is important to assess the interaction between overlapping workings.

9.0 ADDITIONAL GROUND INVESTIGATION RECOMMENDATIONS (CONTINUED)

- Additional drilling to determine the depth of superficial soil and rockhead along the western edge of the site, as it is thought to increase in elevation significantly.

- Additional drilling to determine the cause of the void described in RBH111 drilling records.

- Install monitoring wells to assess groundwater pressures and mine gas generation in workings and undertake a quantitative risk assessment based upon the data obtained.

- Provide a refined ground model to the Coal Authority with a view to reducing the 10T risk zones. This should include queries on the advantageous effects of any proven competent interburden and the thick superficial soil cover beneath much of the site.

APPENDIX A

PRE-APPLICATION PLANNING RESPONSE FROM THE COAL AUTHORITY

The Coal Authority

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

T: 01623 637 119 (Planning Enquiries)

E: planningadvice@coal.gov.uk

W: www.gov.uk/coalauthority

For the attention of: Mr Neil Greenwood
WSP

By email: neil.greenwood@wsp.com

Copy to: Anouska.Beaumont@merthyr.gov.uk

5th May 2023

Dear Neil,

Pre-application Enquiry: PAS00234

Advice regarding implications of coal mining legacy on proposed redevelopment of site for residential use – Hoover Factory, Merthyr Road, Pentrebach

Thank you for your instruction received in in respect of the above. Please accept my apologies for the delay in providing you with this written advice.

The Coal Authority records indicate that the site is in an area of recorded and probable coal mine workings at shallow depth. The information we hold also records two mine entries within 20m of the site boundary as identified on the plan provided within your Technical Note. These recorded features may pose a potential risk to surface stability and public safety.

You have provided the following information to support your enquiry, and the content of your email dated 10th February 2023:

- Technical Note: Mining Appraisal, dated 10 February 2023 and prepared by WSP,
- Coal Workings Plan, dated 21/11/2022 and prepared by Redstart,
- Underground Working Two Feet Nine plan, dated 21/11/2022 and prepared by Redstart,
- Underground Working Four Feet plan, dated 21/11/2022 and prepared by Redstart,
- Underground Working Six Feet plan, dated 21/11/2022 and prepared by Redstart,
- Underground Working Nine Feet plan, dated 21/11/2022 and prepared by Redstart,

- Geological Long Section and Borehole Location Plan, dated 10/10/2022 and prepared by Redstart.

We have also reviewed the Hoover Strategic Regeneration Area Framework Masterplan Documents, dated June 2018.

In your initial enquiry email dated 10th February 2023 you asked the following questions:

1. Implications of coal mining features (this breaks down into 4 separate queries as provided in text box below)
2. Advising on site layouts that either eliminate or minimise the risks posed by recorded coal mining features (as per section 7.17 in attached technical note)
3. Appraising proposed remedial measures and initial design solutions (as per section 7.17 in attached technical note)

In a sub point to question 1 you made the following request:

> We request advice as to resolving confusion as to seam code SW018l as it is repeated at four locations in CA interactive viewer, at depths that would indicate a steep asymmetrical anticlinal structure that has not been recorded by the geological map or abandonment plans or by our drilling. We are thinking that a portion of depth points might relate to be Upper Six Foot Rider and a portion the Four Feet -would this be correct ? and if so which is which ?. If this is not the case what is the seam code for the Upper Six feet Rider?. From our drilling we have coal spacing variation with closeby Abercanaid Pit records for the Lower Six Feet and Nine Feet, in that where a 37.0 m spacing is shown on old shaft records we have 26.0 m in our drill records. Does the CA think this is plausible or does this need a fresh seam naming? . Lastly at one drill location -targeting the 9ft seam , found a seam at appropriate depth split into 4 fingers over a 5.8m deep section and across dip we found a 3.8m deep void. We are wondering if there is history of working the multiple fingers at Abercanaid Pit and could this explain the void height or is partial roof collapse and drilling through a fissure a more likely explanation?

We have sought technical advice from colleagues in respect of your questions, as set out in the text box above, which relate to our Mining Information. Please see responses set out below.

<u>Accuracy of the Lower Seven Feet Bottom Leaf (SW018I)</u>

From review of the Rationalised Plan for this seam for this area, and the data used to inform it then there is very little real data which has been used (mainly because other than the depths provided for the Abercanaid shaft in plan SWR1882 there are no further depth figures from the abandonment plans to add). This means all the depth figures that are used to calculate the depth of the workings in this seam are estimated levels. We agree with WSP's interpretation that the strata is not subject to steep sided asymmetrical folding but that the data attempts to reflect the presence of a large fault in the area.

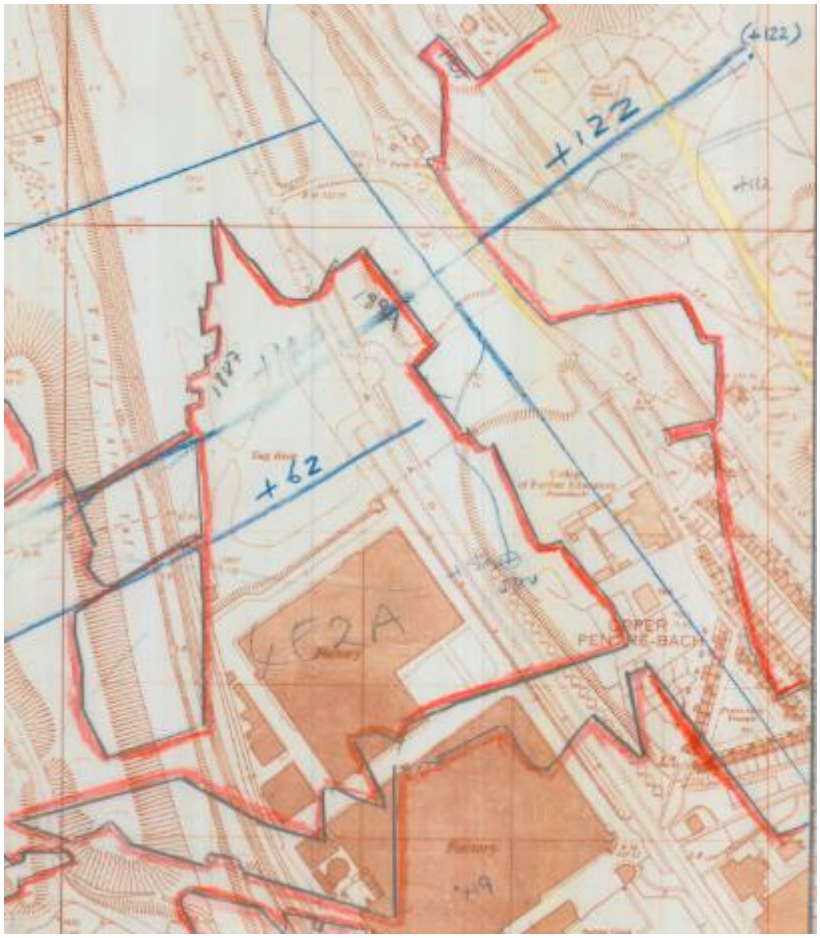


Fig 3. Extract From the Rationalised Plan 320404_SW018I showing position of the NW-SE fault and the displacement.

It would seem that the coal extraction of the SW018I coal seam, as recorded in SWR1882 was mined up to this large NW-SE trending fault to the east of the site boundary. There is an estimated ~50m displacement upwards on this fault, with the workings in SW018I to the east of the fault (the up throw side) recorded at shallower depths (from plan SWR3192). This fault is picked up on in the Technical Note but the Coal Authority records place the location of it approx. 100m to the west of where BGS indicate (see fig 4) and therefore within influence of the site.

Fig 4. BGS position of the fault

Nationally there are many discrepancies between BGS and CA/National Coal Board (NCB) data, especially with outcrops and faults. The difference in ~100m in the position of the fault is probably a combination of the difficulty in accuracy with the BGS 1:50,000 scaling and that the BGS is probably the surface location of the fault, with the Coal Authority ones derive from the position in which the fault was encountered within the sub-surface. Ultimately on either side of the fault, they likely mined until the coal disappeared, with the NCB then putting the location of the fault arbitrarily in the middle.

The estimated depth of Lower Seven Feet Bottom Leaf indicated at+82m AOD at OS grid reference 306064E, 204004N lies to the east of the fault and hopefully this information will help to inform your assessment of the implications of this feature to the development.

Seam Code for Upper Six Feet Rider

For clarity the seam code for the Upper Six Feet Rider is SW039I.

Spacing differences between the Abercanaid Pit Lower Six and Nine Feet Seams (37m apart) vs Driling (26m)

In regards to identifying coal seams, unless a seam has been worked then there would be no requirement or need to give it a name or a code. Without knowing how far the borehole was from the Abercanaid Pit it is open to interpretation whether the borehole encountered the same two seams. We note there are other un-named coal seams recorded as present between the two seams as seen in the shaft schematic on plan SWR1882.

Nine Feet Seam Split vs Roof Collapse

We can only report on and interpret the information we hold. We have no confirmation of any exceptions as to how the Nine Feet was mined in the area. We have no confirmation of this particular seam being mined in leaves in this part of South Wales. The conservative approach in the absence of sufficient proven data is to assume that all the coal would have been mined in its greater thickness.

Based on the above, the shallowness of productive seams (the 4 ft, Upper and Lower 6 ft) as interpreted in the cross sections may represent probable shallow coal workings, reflecting our Development High Risk Area categorisation. We would expect this to be thoroughly investigated. Similarly if the Nine Feet Seam is mined, and it occurs in leaves, a greater thickness of extraction is likely which consequently may explain the greater than >3.8m void encountered. This will need to form part of your assessment and risk categorisation.

Further comments

Please be aware that the Interactive Viewer is hosted on the BGS server and is only updated biannually. Consequently the Interactive Viewer does not reflect updates to our data in real

time, however as of this time there have not been any edits to the mining data in this area recently to account for any recognised data ambiguity.

Where there are productive coal seams below a site then these have potential to be worked and should be assessed accordingly. The recorded workings for the SW039I Upper Six Feet Rider Seam in this area are taken from a Coal Commission Plan, a plan which we no longer hold. Evident on the Interactive Viewer are recorded workings terminating at gridlines in this seam, indicative of missing data. An improved interpretation of workings is provided by our reference to the probable shallow workings data layer in conjunction with the recorded workings layer. This helps overcome issues arising from missing data. As a result of the geological cross-section provided we are currently reviewing the completeness of our probable shallow workings data layer in this area.

In respect of development layout our records do not indicate the presence of any recorded features at surface which would need to inform the development layout, such as mine entries or surface mining highwalls. However, we do hold records for off-site mine entries and we would expect consideration to be given to the potential relationship between these features and their zones of influence and any development proposals, and any risks these may pose. It should be noted that we hold no treatment details for these features and therefore their recorded positions may be subject to significant departure from their actual location. This may mean that the mine entries and their zones of influence are closer to the site than current records indicate.

The Coal Authority is of the opinion that building over the top of, or in close proximity to, mine entries should be avoided wherever possible, even after they have been capped, in line with our adopted policy:
https://www.gov.uk/government/publications/building-on-or-within-the-influencing-distance-of-mine-entries

It is noted that the proposed remedial measures and initial design solutions are directly informed by the risk categorisation identified within the plans provided and described within Section 7.15 onwards. We have the following comments to make on the content of the information provided and approach adopted within those sections.

- C758D is the authoritative document which should be referred to in any assessment. This guidance considers the references that have been directly referred to in the technical note.
- There is no recognised distinction that cover ratios should be assessed differently in Wales to elsewhere and C758D reflects that.
- T is the total extraction height and should not be termed as the void remaining after extraction (Section 7.15.2). The derivation of T has to consider operational height not just seam height and the issue of workings in leaves already identified above.
- The Redstart defined risk zones presented are not supported by reference to C758D (by example, we would not agree that a cover ration of between 6 and 10 being

described as low risk) and as a consequence we would likely object to this categorisation and its implications within the remedial strategy.

- The focus of the risk zone assessment and the boundaries defined are based on a crown hole as the causal mechanism and it's unclear as to why other mechanisms have been discounted. Influences over the risk posed by the site-specific characteristics should be examined within the context of Table 5.1, C758D.

A point of note is that crown holes or other subsidence mechanisms do not have to be recognisable at the surface before they produce subsidence and subsidence that could of concern to a structure.

The technical note leaves us uncertain as to the following;

- If or how multiple seam interactions have been considered or eliminated as a risk. The risk zones sections are seam specific and there does not appear to be an overall assessment and statement made relating to interaction.

The technical note in assessing the risks posed contains apparent ambiguity. By example we refer to Section 7.15.7 it is confirmed that relevant abandonment plans have not been obtained and there is confusion as to whether two named seams (the Upper Six Foot Rider and Four Feet Seams) are in fact the same (There is no evidence from the Coal Authority's seam listings that this is the case Since we have separate seam codes for both seams without corresponding alternatives). Table 7.9, Interburden Strata Composition concludes that the interburden between these same two seams is particularly competent.

We have identified the following significant areas of concern, which may result in potential objections to the proposed mitigation should a formal application be made.

In Section 7.17 indication is that that medium risk zones (presumably the same as the moderate risk category) and higher will be grouted this would equate to 6T and lower with structural precautions being suggested above this. This is contrary to CIRIA C758D without appropriate justification. There appears to be no apparent consideration given to mine gas risk to inform categorisation given the foundation proposals.

The suggestion that car parks and utilities can be left to accommodate settlement by relevelling and maintenance is not acceptable and contrary to ensuring 'safe and stable' development having unacceptable liability implications for the Coal Authority. As part of the planning application process the Coal Authority would expect any formal submission for development on this site to be supported by a robust assessment of the risks posed by past coal mining activity. We would also expect the information provided to set out the measures necessary to ensure that any issues arising in respect of land instability due to past coal mining activity are properly addressed across the development as a whole.

The report does not present a clear understanding of cover ratios proven across the site, proven or suspected workings and, what further investigation is necessary to confirm or

disprove whether they pose a risk. With the identification of likely missing data a clear strategy as to how any unrecorded mine entries might be identified is also not apparent.

If you would like to discuss this matter further, please do not hesitate to contact me.

Yours sincerely

Leigh Sharpe

Licensing & Permitting Manager

General information

Under the Coal Industry Act 1994 any intrusive activities, including initial site investigation boreholes, and/or any subsequent treatment of coal mine workings/coal mine entries for ground stability purposes require the prior written permission of The Coal Authority, since such activities can have serious public health and safety implications. Failure to obtain permission will result in trespass, with the potential for court action. In the event that you are proposing to undertake such work in the Forest of Dean local authority area our permission may not be required; it is recommended that you check with us prior to commencing any works. Application forms for Coal Authority permission and further guidance can be obtained from The Coal Authority's website at:www.gov.uk/get-a-permit-to-deal-with-a-coal-mine-on-your-property

Disclaimer

Whilst we have made every attempt to ensure that the information contained in this response is based on our records, The Coal Authority is not responsible for any errors or omissions, or for the results obtained from the use of this information. All information is provided 'as is', with no guarantee of completeness, accuracy, timeliness or of the results obtained from the use of this information, and without warranty of any kind, express or implied, including, but not limited to warranties of performance, merchantability and fitness for a particular purpose. In no event will the Coal Authority, be liable to you or anyone else for any decision made or action taken in reliance on the information in this Site or for any consequential, special or similar damages, even if advised of the possibility of such damages

APPENDIX B

CONSULTANTS COAL MINING REPORT AND MINE ENTRY DATA SHEETS

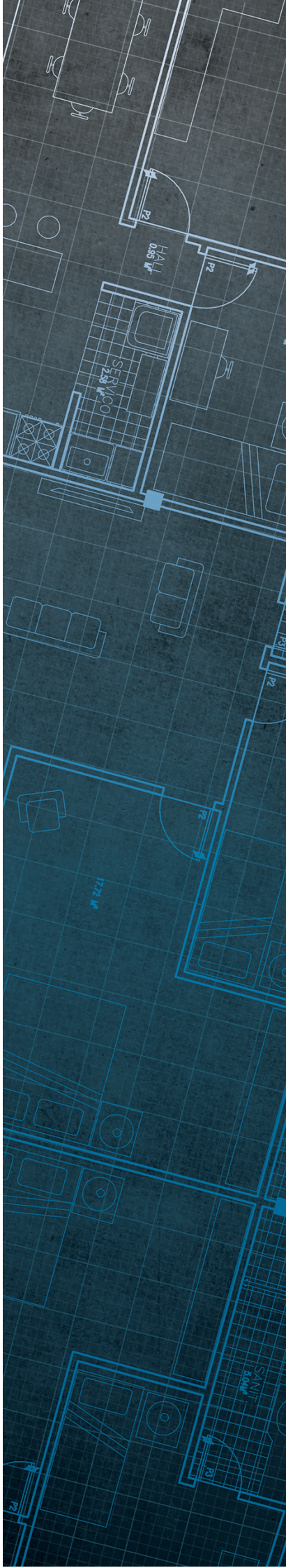
The Coal Authority

Consultants

Coal Mining Report

Hoover Candy Site
Pentrebach
Merthyr Tydfil
Merthyr Tydfil
CF48 4TQ

Date of enquiry:	**10 October 2024**
Date enquiry received:	**10 October 2024**
Issue date:	**10 October 2024**
Our reference:	**51003455639001**
Your reference:	**14275/LP**



Consultants

Coal Mining Report

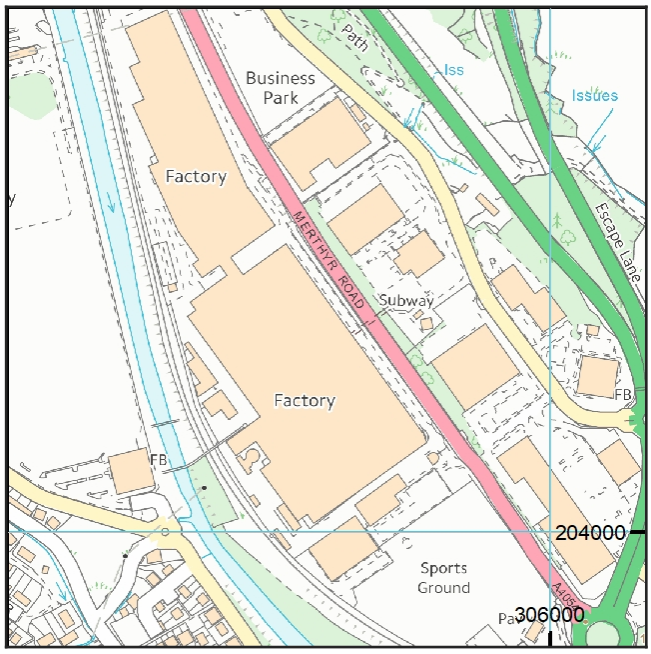
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

INTEGRAL GEOTECHNIQUE (WALES) LTD.

Enquiry address

Hoover Candy Site
Pentrebach
Merthyr Tydfil
Merthyr Tydfil
CF48 4TQ



Approximate position of property

How to contact us

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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	UPPER 6FT RIDER	Coal	4WJU	16	Beneath Property	6.2	South	170	1875
unnamed	UPPER 6FT RIDER	Coal	4WJS	24	Beneath Property	4.5	South	170	1875
unnamed	LOWER 7FT BOTTOM LEAF	Coal	4E29	35	North-East	7.7	South-East	114	1907
unnamed	TWO FOOT NINE	Coal	4WLA	37	Beneath Property	6.6	South-East	66	1940
unnamed	FOUR FOOT	Coal	4WIG	37	Beneath Property	5.5	South	210	1854
unnamed	TWO FOOT NINE	Coal	4WJ0	48	Beneath Property	5.2	South	130	1862
unnamed	LOWER NINE FOOT	Coal	49AZ	49	Beneath Property	8.9	South	259	1885
unnamed	UPPER 6FT (T.L.)	Coal	4WIL	52	South-West	3.9	South-East	120	1891
unnamed	FOUR FOOT	Coal	4WL6	54	Beneath Property	6.6	South	210	1891
unnamed	FOUR FOOT	Coal	4WL5	61	South	8.4	South-East	210	1891
unnamed	UPPER 6FT RIDER	Coal	4WMI	64	East	6.9	South-East	170	1900
unnamed	LOWER 7FT BOTTOM LEAF	Coal	4BDV	65	North-East	6.5	South-East	117	1902
unnamed	LOWER 7FT BOTTOM LEAF	Coal	4E2A	70	Beneath Property	8.6	South-East	117	1889
unnamed	LOWER NINE FOOT	Coal	4WJD	83	Beneath Property	6.6	South-East	145	1868
unnamed	LOWER NINE FOOT	Coal	4WJK	85	Beneath Property	3.3	South-East	145	1932
unnamed	LOWER NINE FOOT	Coal	4BDK	89	North-East	0.0	East	183	1909
unnamed	LOWER NINE FOOT	Coal	4WJN	91	Beneath Property	7.1	South-East	145	1932
unnamed	LOWER NINE FOOT	Coal	4WLG	98	North-East	6.9	South	183	1935
unnamed	LOWER 7FT BOTTOM LEAF	Coal	4WK1	117	Beneath Property	7.5	South-East	117	1899
unnamed	LOWER 7FT BOTTOM LEAF	Coal	4WK2	124	Beneath Property	5.9	South	117	1899

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	BOTTOM VEIN IRONSTONE	Ironstone	499Y	137	North-East	16.4	South	100	1855
unnamed	LOWER 7FT BOTTOM LEAF	Coal	4WLQ	147	North-East	6.1	South-East	117	1902
unnamed	GARW NO.1 IRONSTONE	Ironstone	499V	156	North	16.0	South-East	100	1855

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	305204-008	305591 204697		Coal	
Shaft	305204-009	305600 204677		Coal	
Adit	305204-011	305698 204719		Coal	
Shaft	305204-012	305711 204552		Coal	
Shaft	305204-013	305719 204547		Coal	
Adit	305204-014	305784 204572		Coal	
Shaft	305204-039	305754 204591		Coal	
Adit	305204-072	305719 204561		Coal	

Abandoned mine plan catalogue numbers

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

SWR233	SWR3143	8695
SWR3150	PO0	SWR1878
SWR3146	SWR3187	SWR3141

Our records show we have more plans than those shown above which could affect the enquiry boundary.

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

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
BUTE	Coal	Yes	Within	N/A	17
LOWER 9FT AND BUTE	Coal	Yes	Within	N/A	198
LOWER NINE FOOT TOP LEAF	Coal	Yes	Within	N/A	206
LOWER SIX FEET	Coal	Yes	Within	N/A	255
UPPER 6FT RIDER	Coal	Yes	Within	N/A	231
UPPER SIX FEET	Coal	Yes	Within	N/A	266

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

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

Future development

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

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

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

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

Past underground coal mining

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

Probable unrecorded shallow workings

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

Spine roadways at shallow depth

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

Mine entries

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

Abandoned mine plan catalogue numbers

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

Outcrops

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

Geological faults, fissures and breaklines

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

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

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

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

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

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

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

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

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

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

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

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

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

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

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

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

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

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

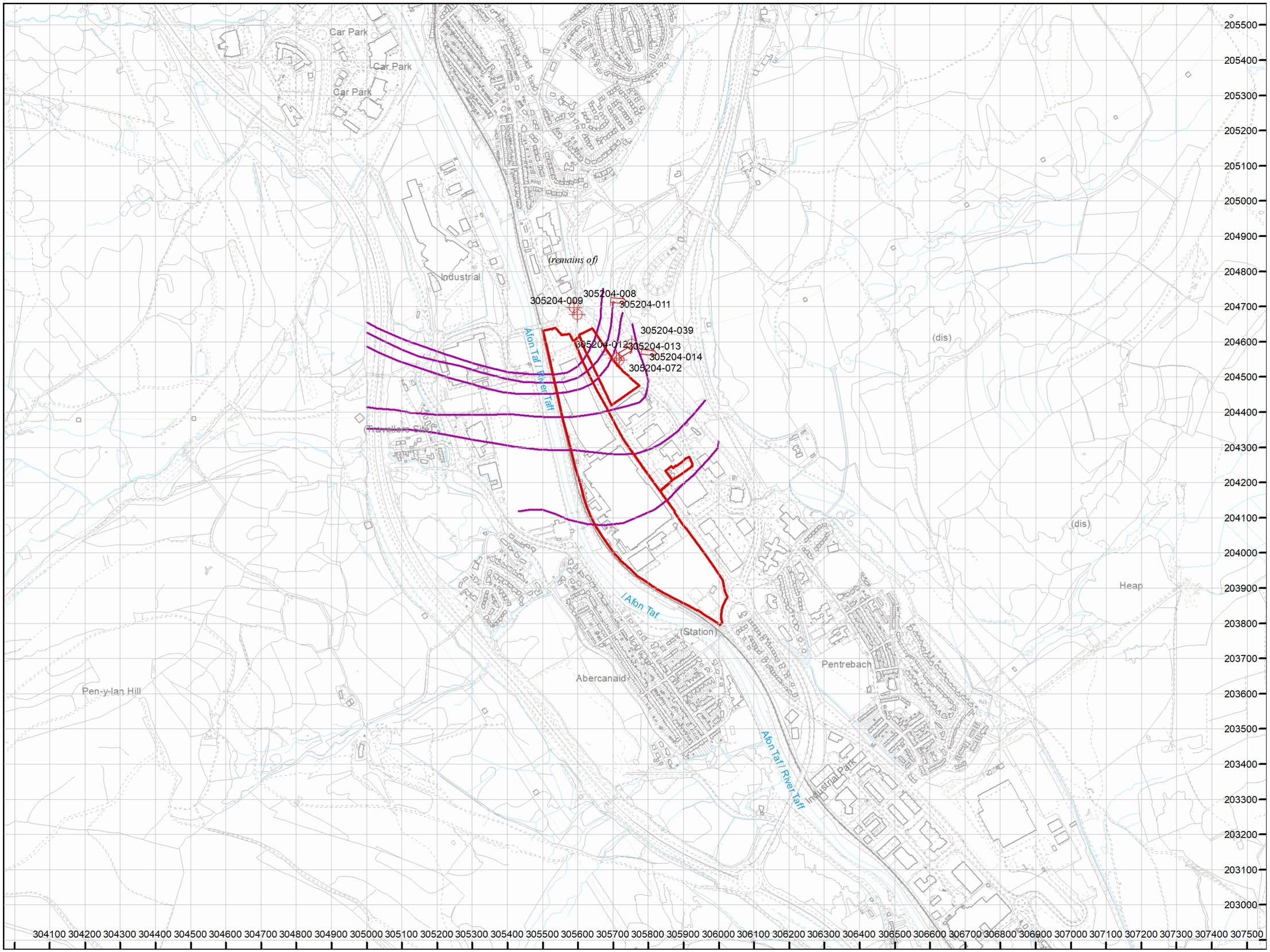
The Coal Authority

Summary of findings

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

Key

- Approximate position of the enquiry boundary shown
- Disused mine shaft
- Disused adit
- Outcrop (Proven)



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

The Coal Authority

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

INTEGRAL GEOTECHNIQUE (WALES) LTD.
INTEGRAL HOUSE
7 BEDDAU WAY
CAERPHILLY
MID GLAMORGAN
CF83 2AX

Our reference:	**51003480366001**
Your reference:	**14275/JJ**
Date of your enquiry:	**18 February 2025**
Date we received your enquiry:	**18 February 2025**
Date of issue:	**18 February 2025**

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

Shaft Plan and Data Sheets

FORMER HOOVER CANDY SITE, MERTHYR TYDFIL, MERTHYR TYDFIL

I refer to the enquiry dated 18 February 2025, received 18 February 2025, in connection with the above.

As requested I enclose the mine entry data sheet(s) held for the mine entry/entries referred to.

Mine Entry Data

Shaft/adit:	Adit
Reference:	305204-072
Source:	Other: 51E 60Q 62C(Y)
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	59
Treatment details:	Unknown*
Conveyance:	Not Applicable
Easting:	305719
Northing:	204561
Other information:	None

*For your information, before the coal industry was nationalised in 1947, there was no requirement for a mine operator to record mine entry treatment details when a mine was abandoned. Therefore, it is not unusual for us to have no treatment details for many of the 176,000 recorded mine entries on our database. Despite this lack of information, please be assured that the fact we have no treatment recorded does not necessarily mean that the mine entry was left untreated when abandoned.

Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	305204-013
Source:	OS 1:2500 Glamorgan 12/5 (1919, 1900, 1876); Ab plans 4117 4325 6951 SWR1879 SWR1882 Geological Sheet Other: Old Merthyr Town Plans 1851 58G 58P 60F 60M (Y).
Colliery name:	Unknown
Entry name:	Pencae Bach South
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown*
Conveyance:	Not Applicable
Easting:	305719
Northing:	204547
Other information:	None

*For your information, before the coal industry was nationalised in 1947, there was no requirement for a mine operator to record mine entry treatment details when a mine was abandoned. Therefore, it is not unusual for us to have no treatment details for many of the 176,000 recorded mine entries on our database. Despite this lack of information, please be assured that the fact we have no treatment recorded does not necessarily mean that the mine entry was left untreated when abandoned.

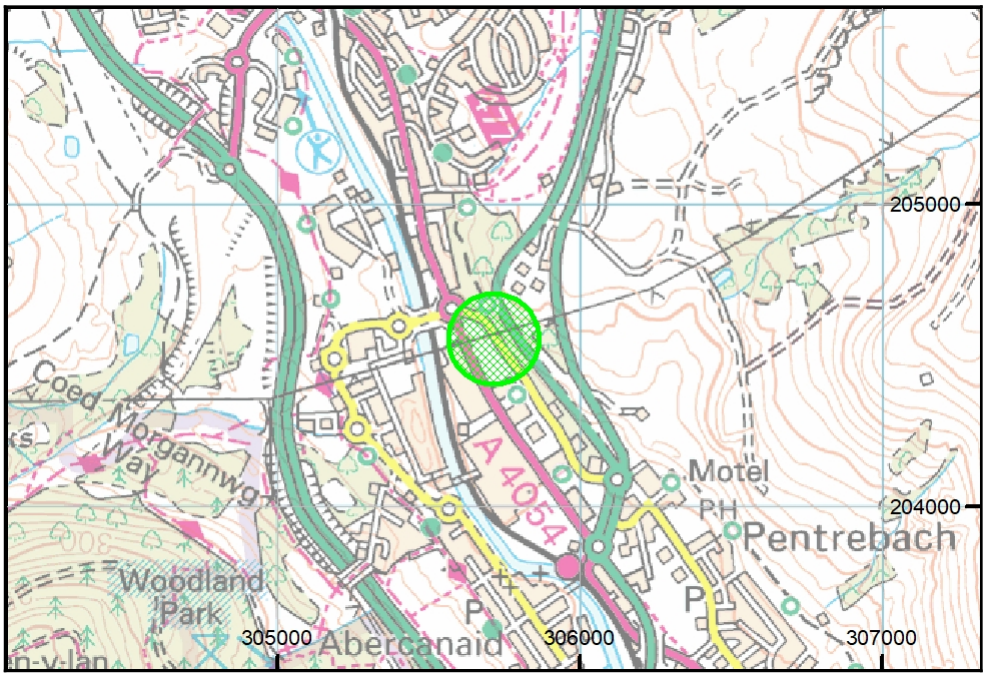
Mine Entry Data (continued)

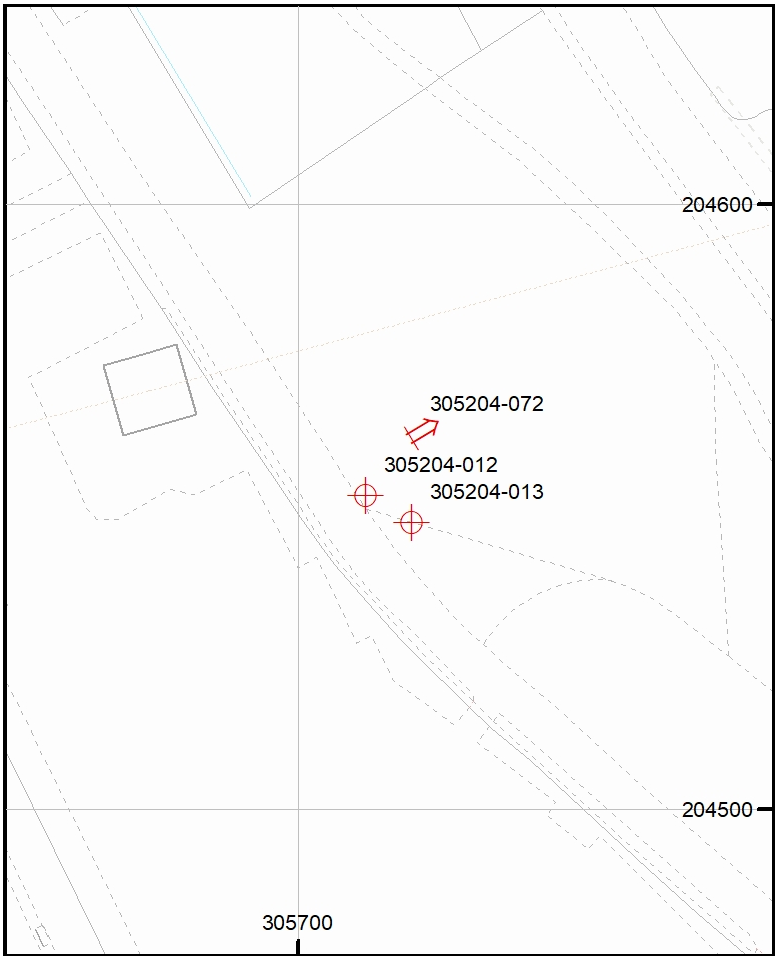
Shaft/adit:	Shaft
Reference:	305204-012
Source:	OS 1:2500 Glamorgan 12/5 (1919, 1900, 1876); Ab plans 4117 4325 6951 SWR1879 SWR1882 Geological Sheet Other: Old Merthyr Town Plans 1851 62C 55N 58G 58P 60F 60M (Y).
Colliery name:	Unknown
Entry name:	Pencae Bach North
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown*
Conveyance:	Not Applicable
Easting:	305711
Northing:	204552
Other information:	None

*For your information, before the coal industry was nationalised in 1947, there was no requirement for a mine operator to record mine entry treatment details when a mine was abandoned. Therefore, it is not unusual for us to have no treatment details for many of the 176,000 recorded mine entries on our database. Despite this lack of information, please be assured that the fact we have no treatment recorded does not necessarily mean that the mine entry was left untreated when abandoned.

Location map

Approximate position of enquiry





This plan shows the approximate location of the disused mine entry / entries referred to in the attached mining report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by visiting www.groundstability.com.

If you wish to discuss the relevance of any of the information contained in this report, you should seek the advice of a qualified mining engineer or surveyor. If you or your advisor wish to examine the source plans from which the information has been taken, these are available to view, free of charge, at our Head Office in Mansfield. To book an appointment please ring 01623 637225. Should you or your advisor wish to carry out a physical investigation that may enter, disturb or interfere with any disused mine entry, prior permission of the owner must be sought. For coal mine entries, the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries).

Our emergency telephone number is 0800 288 4242.

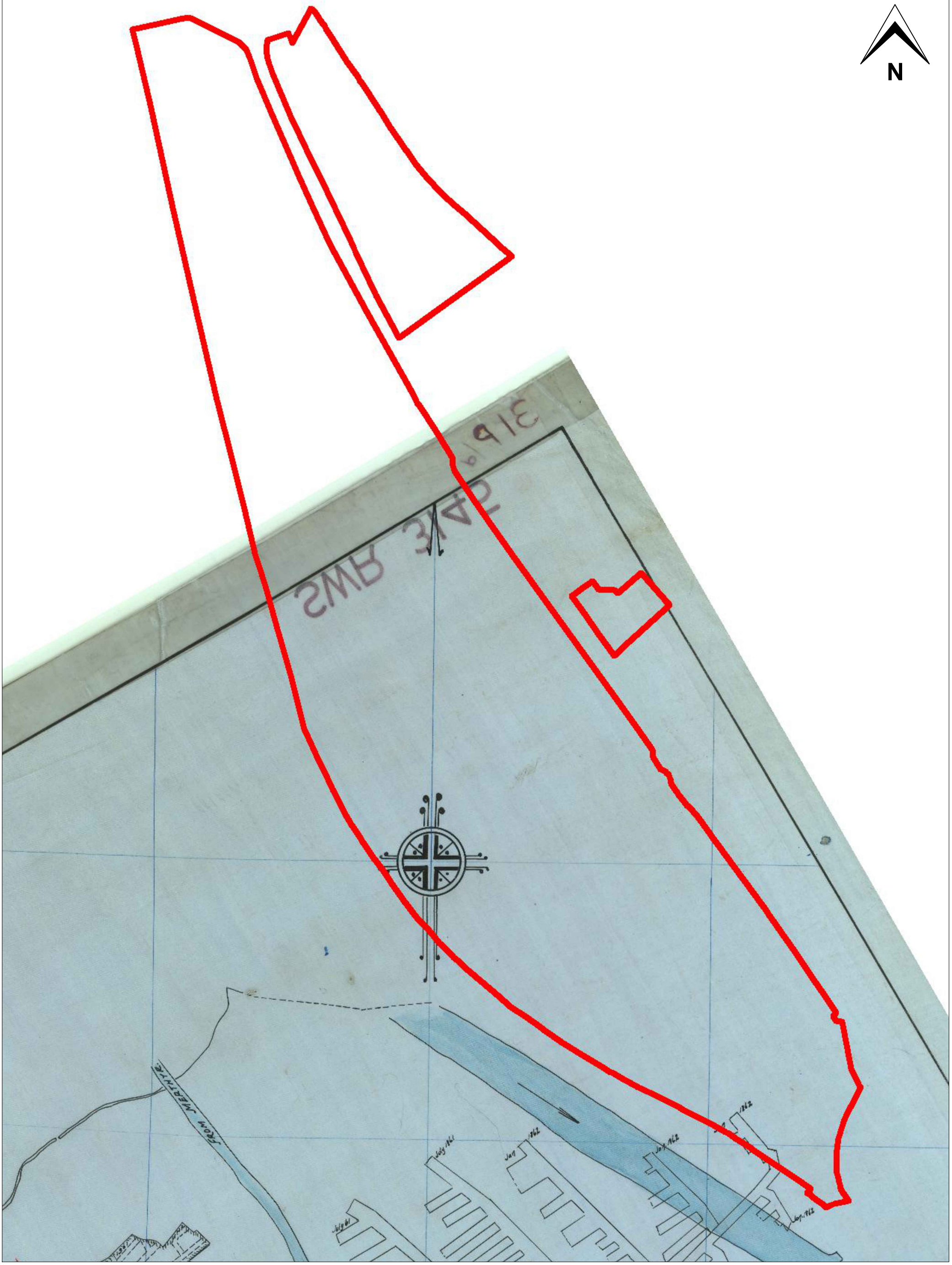
Key

Disused Adit or Mineshaft

Mapping sourced from Ordnance Survey

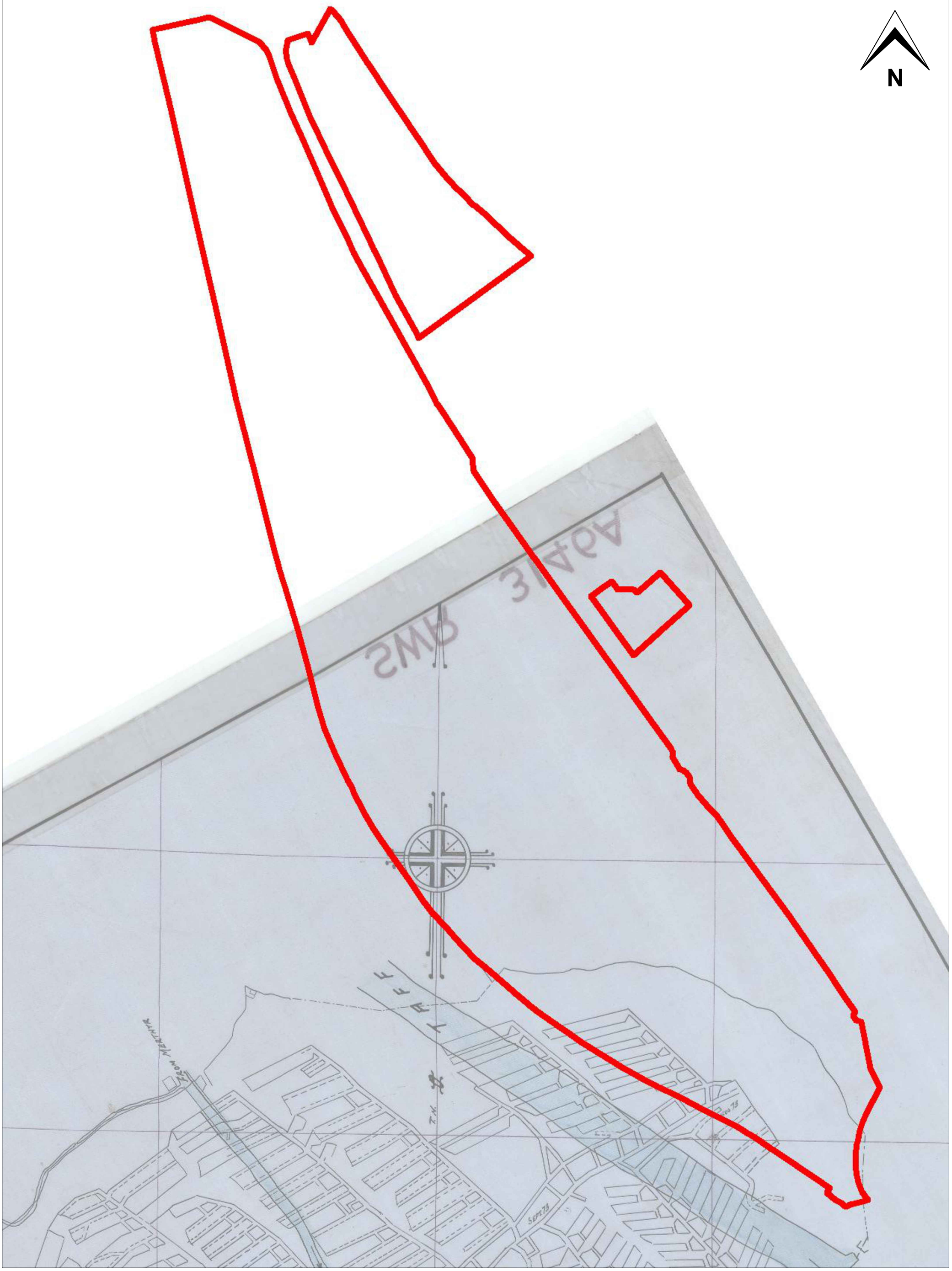
APPENDIX C

GEOREFERENCED MINE ABANDONMENT PLANS



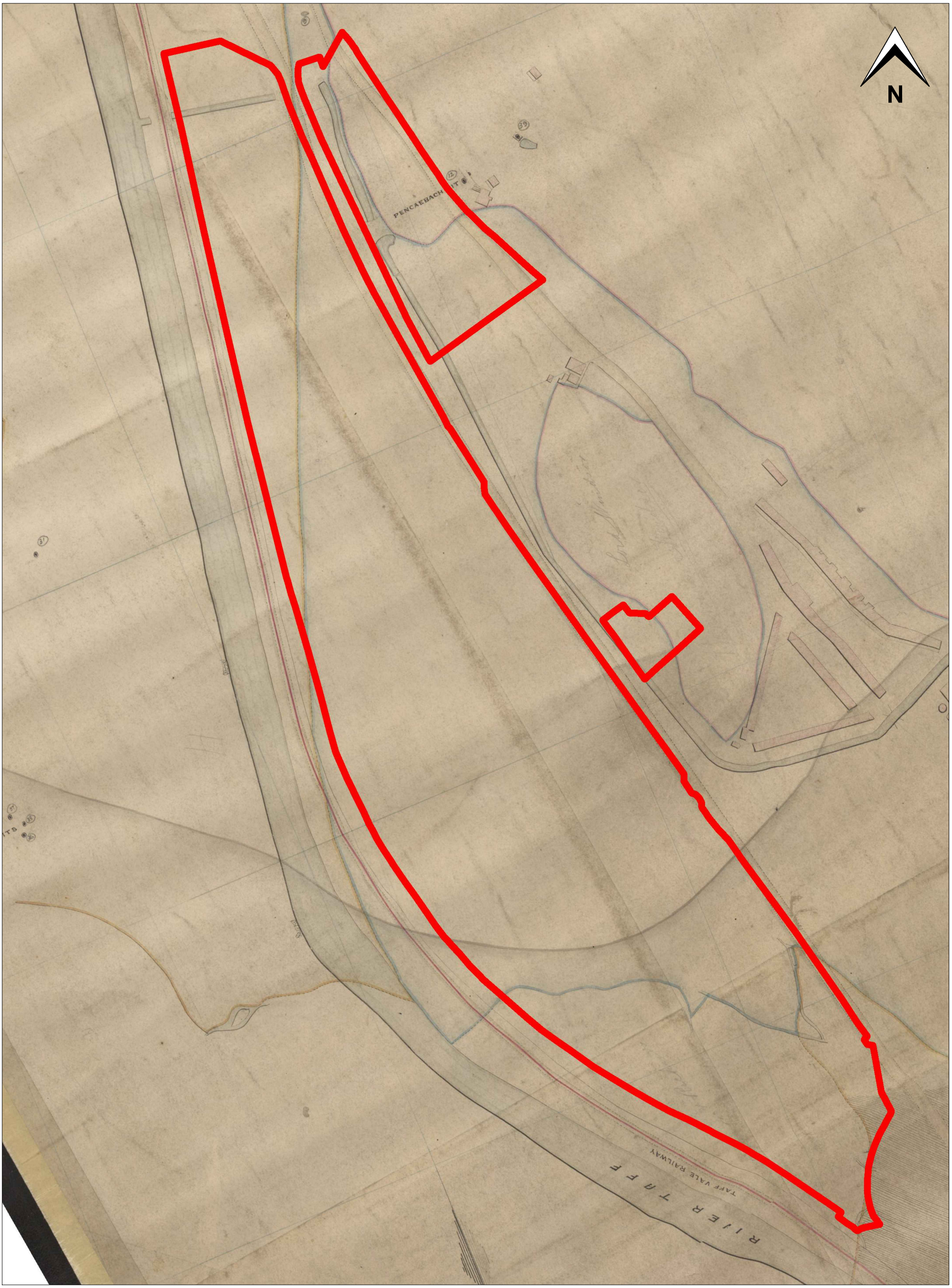
Abandonment Plan SWR3145 (Workings in Two Foot Nine Seam)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	**Intégral** Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		



Abandonment Plan SWR3146 (Workings in Six Foot Seam)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		

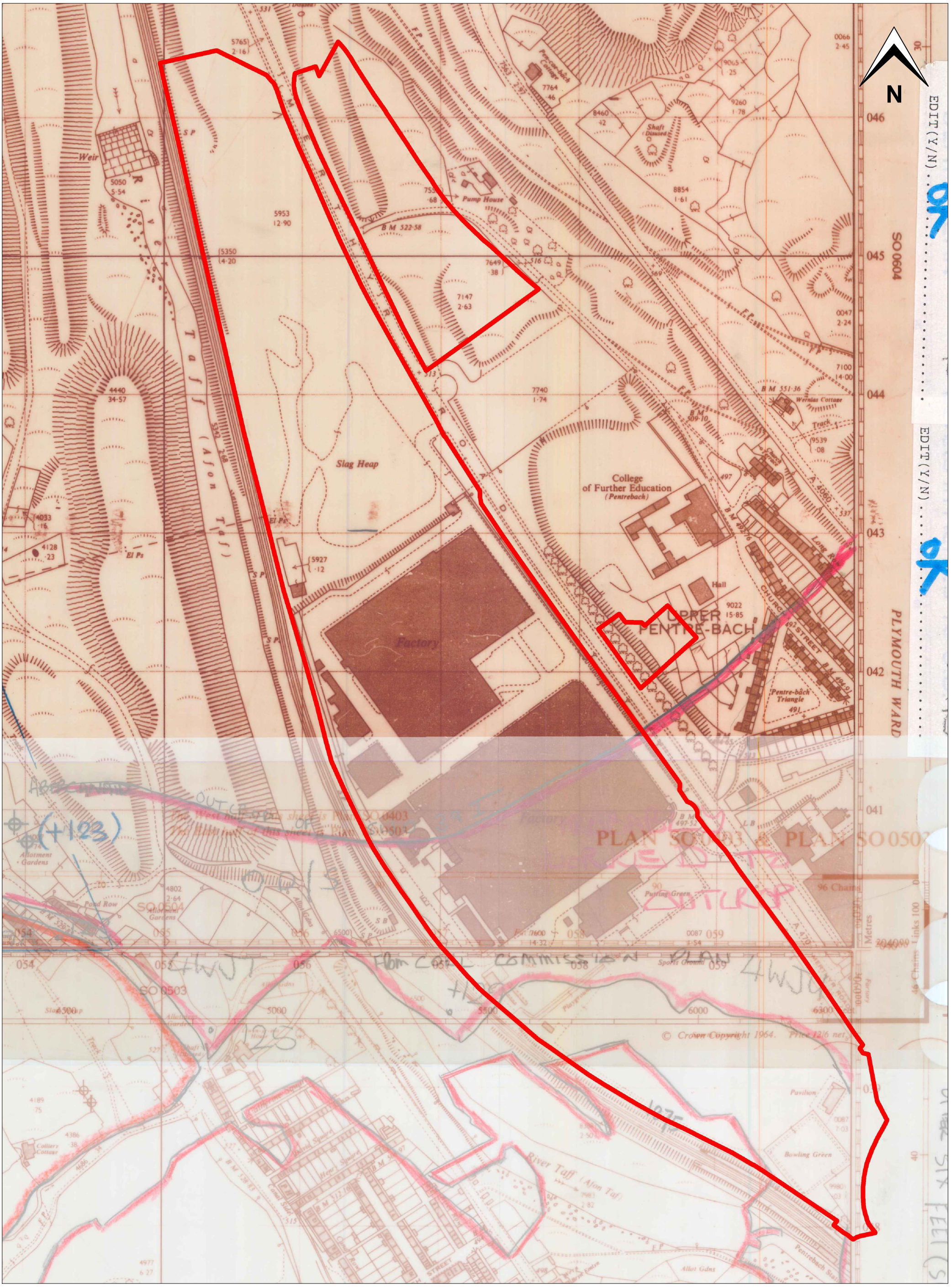


Abandonment Plan SWR3186 (Workings in Two Foot Nine Seam)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		

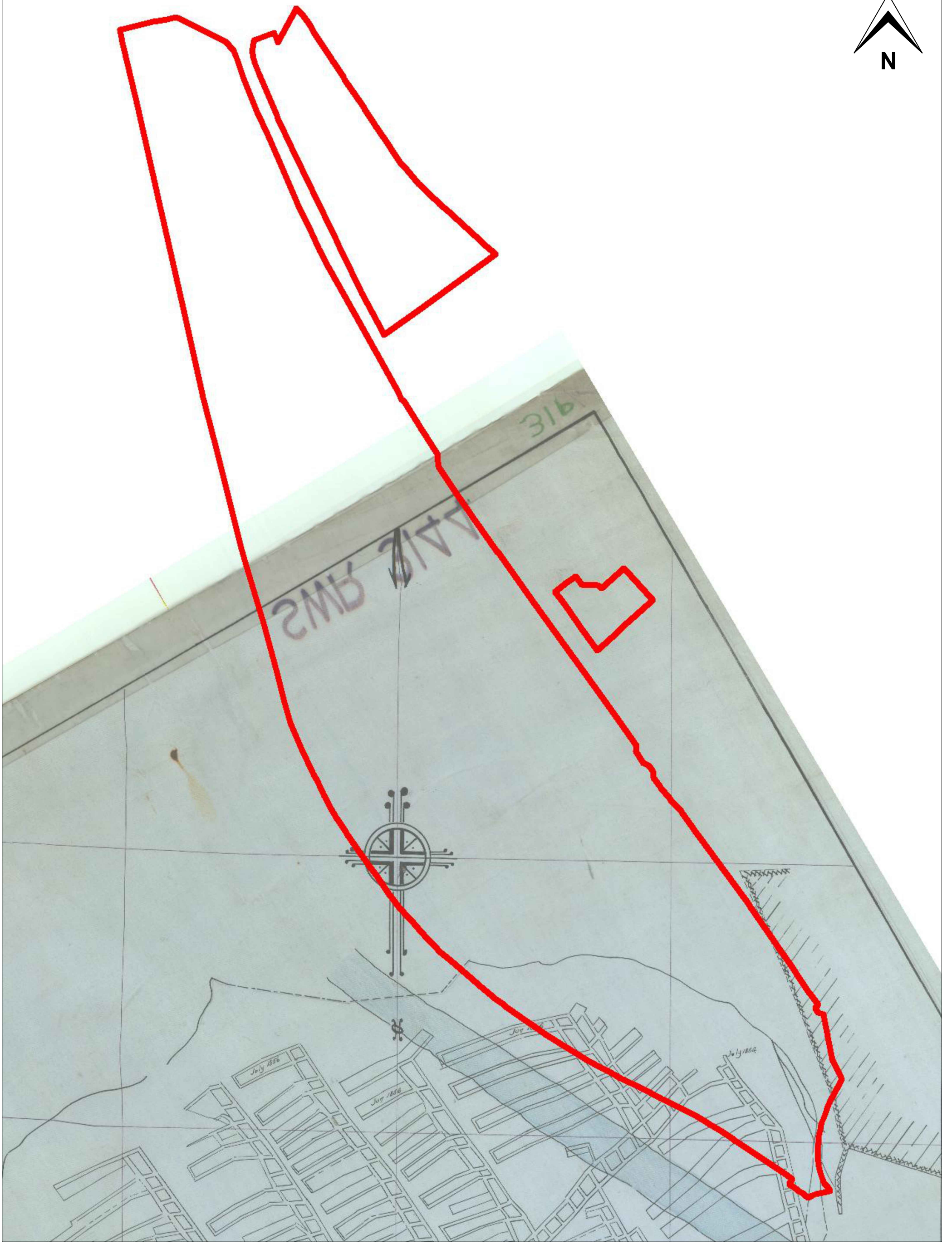
Abandonment Plan SWR3621 Sheet 4 of 4 (Workings in Four Foot Seam)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		



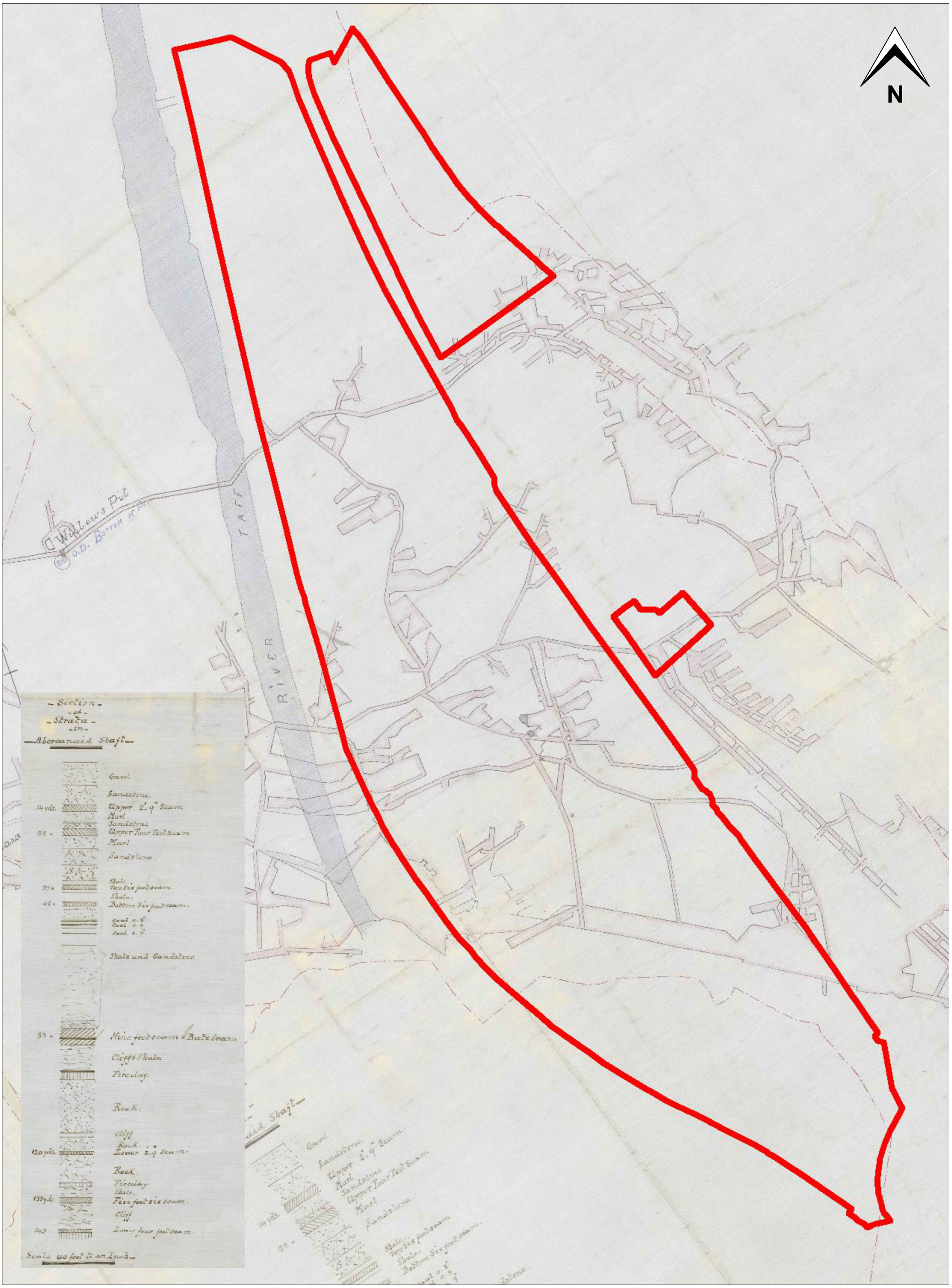
Plans 320403_SW039I and 320404_SW039I (Workings in Upper Six Feet Rider)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		



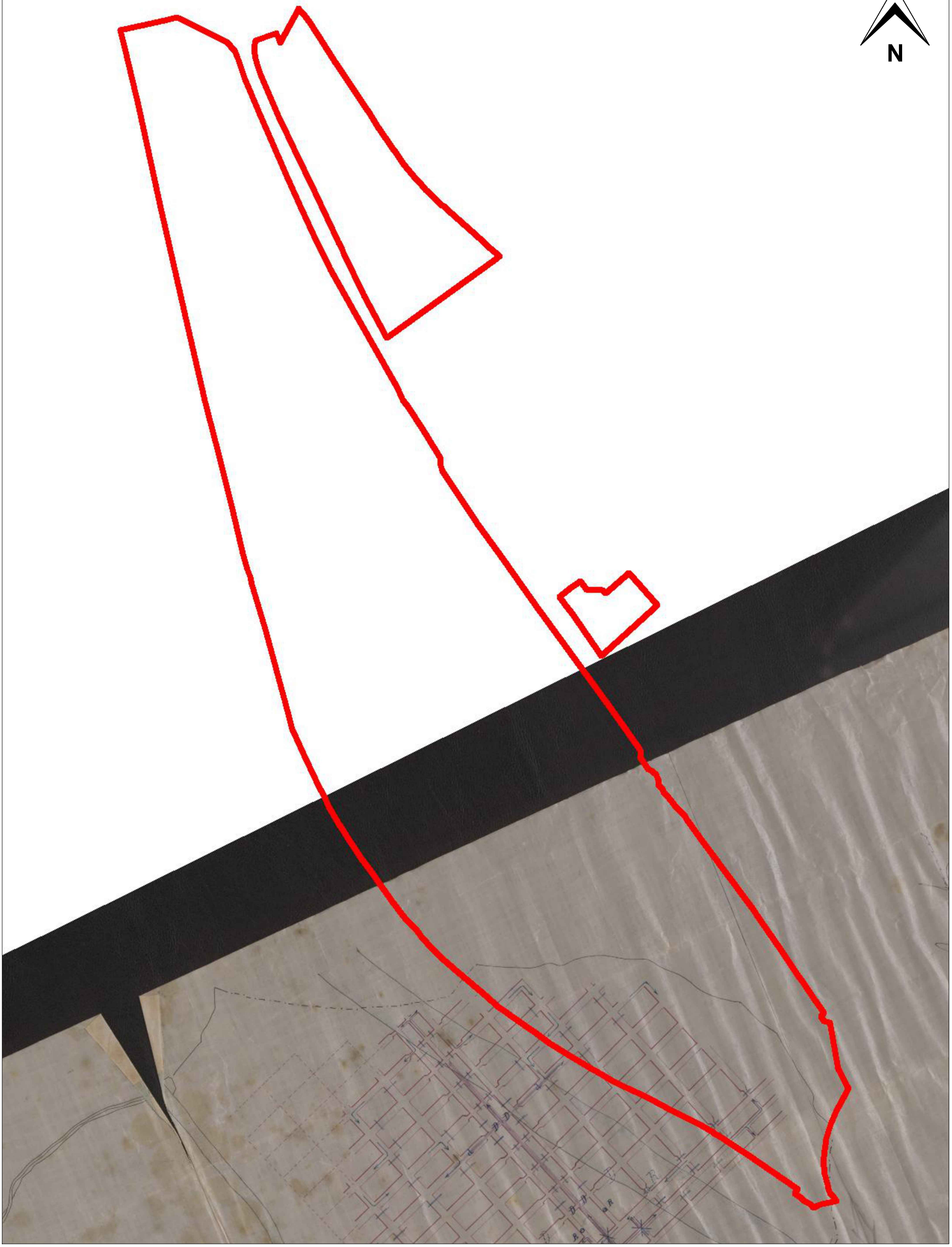
Abandonment Plan SWR3144 (Workings in Four Foot Seam)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		



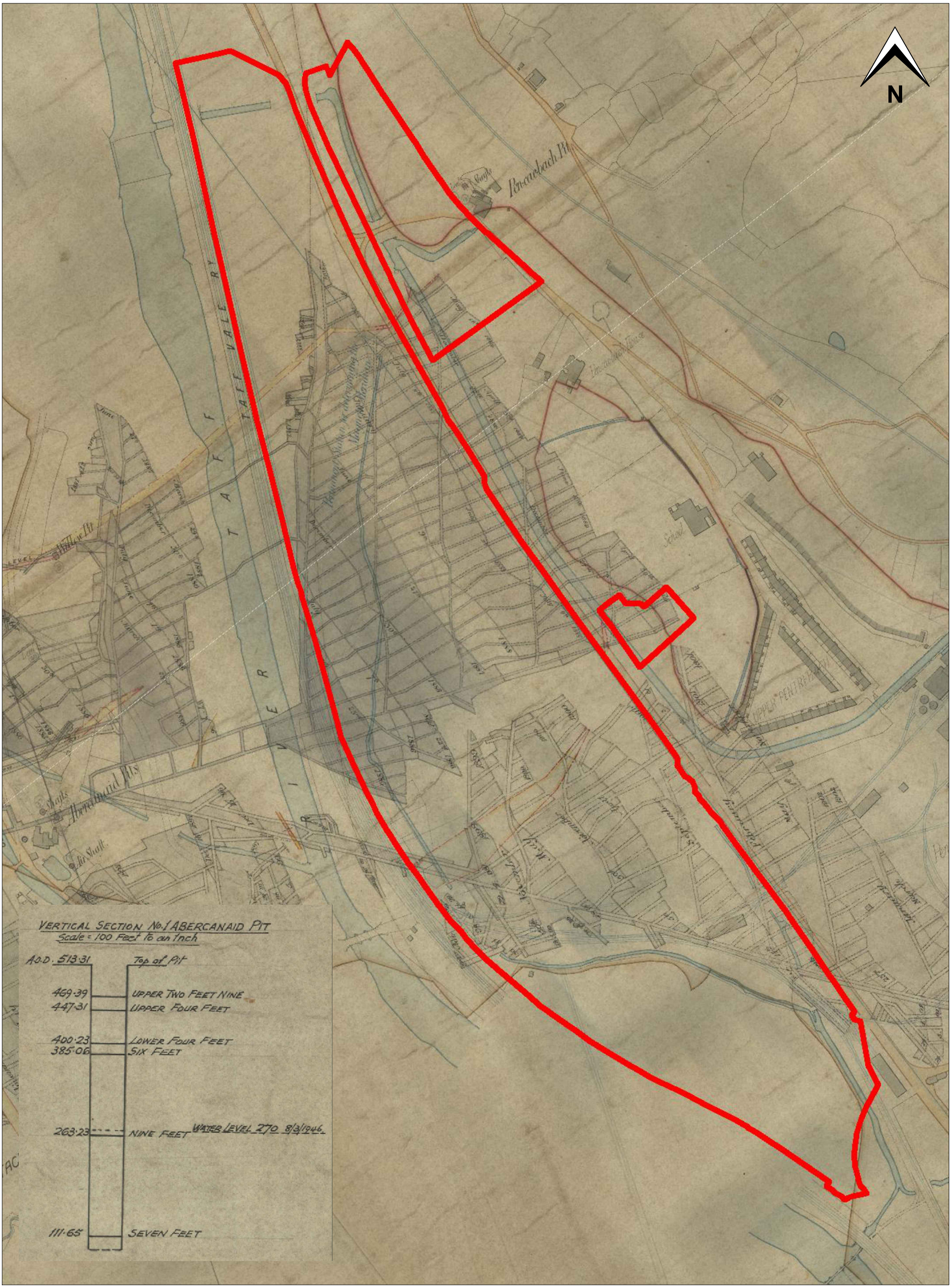
Abandonment Plan SWR4357 (Workings in Nine Foot Seam)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		



Abandonment Plan SWR233 sheet 4 of 5 (Proposed Workings in Lower Nine Feet Seam)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		



VERTICAL SECTION No.1 ABERCANAID PIT
Scale = 100 Feet to an Inch

Abandonment Plan SWR1882 Sheet 2 of 3 (Workings in Lower Seven Feet Seam)

Project: Former Hoover Candy Site, Merthyr Tydfil	Job No.: 14275	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land Limited	Scale: 1:2,500 at A3		

APPENDIX D

TRIAL PIT LOGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP101

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

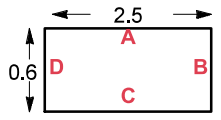
Engineer : Redstart

Ground Level : 149.42 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305934.92 E 204022.26 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.25	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.			
					0.25	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal.		149.17	
	0.50 - 0.50 - 1.00	ES1 B2				PID @ 0.5mbgl = 0.0ppm			
1	1.00 -	ES3				PID @ 1.00mbgl =0.0ppm			
	1.50 - 1.80	B4							
2					3.75				
	2.50 - 2.50 - 2.80	ES5 B6				PID @ 2.5mbgl = 0.0ppm			
3						with low cobble content of brick from 2.9mbgl			
	3.50 - 3.80	B8							
						PID @ 4.0mbgl = 0.0ppm			
4	4.00 -	ES7			4.00	Trial pit terminated at scheduled depth of 4.0mbgl		145.42	

PLAN



Groundwater:

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface. No Groundwater Encountered

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

Quantum Geotech
Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
AH	A Jones	1 Of 2	4.2	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP101
Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.42 m A.O.D. *Level to Ordnance Datum* Coordinates: 305934.92 E 204022.26 N *Co-ordinates to National Grid*

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP102

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

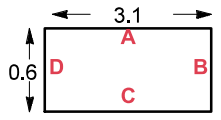
Engineer : Redstart

Ground Level : 149.03 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305990.87 E 203945.21 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.10	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.			
					0.10	MADE GROUND - Black slightly silty slightly gravelly ASH with fine to medium coal. Gravel is angular to sub angular fine to coarse siltstone and sandstone.		148.93	
	0.50 - 0.50 - 1.00	ES1 B2				PID @ 0.5mbgl = 0.0ppm			
					1.00				
1	1.00 -	D ES3				PID @ 1.00mbgl =0.0ppm			
					1.10	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal.		147.93	
	1.50 - 1.70	B4							
2									
	2.50 - 2.50 - 2.70	D ES5 B6				PID @ 2.5mbgl = 0.0ppm			
					2.90				
3						with medium cobble content of brick from 3.2mbgl			
	3.50 - 3.70	B7							
						PID @ 4.0mbgl = 0.0ppm			
4	4.00 -	ES8			4.00	Trial pit terminated at scheduled depth of 4.0mbgl		145.03	

PLAN



Groundwater:

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface. No Groundwater Encountered

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	
AH	A Jones	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP102
Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.03 m A.O.D. *Level to Ordnance Datum* Coordinates: 305990.87 E 203945.21 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
AH	A Jones	2 Of 2		

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP103

Dates : 13/7/22 - 13/7/22

Location :

Job Number : Q0838

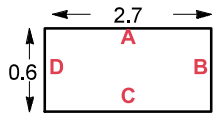
Engineer : Redstart

Ground Level : 149.85 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305997.06 E 203881.52 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.10	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.			
					0.10			149.75	
						MADE GROUND - Dark reddish brown black slightly silty slightly gravelly ASH with fine to medium coal.			
	0.50 -	ES1							
	0.50 - 0.80	B2				PID @ 0.5mbgl = 0.7ppm			
1	1.00 -	ES3				PID @ 1.00mbgl =0.8ppm			
	1.40 - 1.60	B4							
					3.30				
2									
	2.40 - 2.80	B5							
	2.50 -	ES6				PID @ 2.5mbgl = 2.7ppm			
3									
					3.40	Soft brown slightly clayey sandy SILT.		146.45	
	3.50 - 3.70	B							
		B7			0.60				
						PID @ 4.0mbgl = 0.0ppm			
4	4.00 -	ES8			4.00	Trial Pit terminated at scheduled depth of 4.0mbgl		145.85	
		D9							

PLAN



Groundwater:

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface. No Groundwater Encountered

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
AH	A Jones	1 Of 2	4.2	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP103
Dates : 13/7/22 - 13/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.85 m A.O.D. *Level to Ordnance Datum* Coordinates: 305997.06 E 203881.52 N *Co-ordinates to National Grid*

Contract : Hoover Candy Factory
Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP104

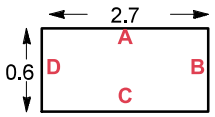
Dates : 12/7/22 - 12/7/22
Location :

Job Number : Q0838
Engineer : Redstart

Ground Level : 149.85 m A.O.D. *Level to Ordnance Datum*
Coordinates: 305996.98 E 203835.08 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.05	TARMAC		149.80	
					0.05	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal.			
	0.50 - 0.50 - 0.80	ES1 B2			0.85	PID @ 0.5mbgl = 0.0ppm			
1	1.00 - 1.00 - 1.50	ES3 B4			0.90	MADE GROUND - Black slightly silty slightly sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse siltstone, sandstone and ash, fine to medium coal. PID @ 1.00mbgl =0.0ppm		148.95	
					1.40				
2	2.00 - 2.20	B5							
	2.50 - 2.50 - 3.00	ES6 B7			2.30	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal. PID @ 2.5mbgl = 0.0ppm		147.55	
					1.10				
3									
	3.50 - 4.00	B8			3.40	MADE GROUND - Brown slightly silty sandy Gravel with low cobble content of sandstone and slag. Gravel is sub angular to sub rounded fine to coarse siltstone and sandstone, angular to sub angular fine to coarse slag and ash with rare fine coal.		146.45	
					0.60	PID @ 4.0mbgl = 0.0ppm			
4	4.00 -	ES9			4.00	Trial pit terminated at scheduled depth of 4.0mbgl		145.85	

PLAN



Groundwater:

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface. No Groundwater Encountered

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
AH	A Jones	1 Of 2	4.2	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP104
Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.85 m A.O.D. *Level to Ordnance Datum* Coordinates: 305996.98 E 203835.08 N *Co-ordinates to National Grid*

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP105

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

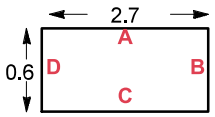
Engineer : Redstart

Ground Level : 149.86 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305952.61 E 203879.04 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Legend	Red. Level A.O.D.	WATER
					0.05	TARMAC		149.81	
					0.05	MADE GROUND - Grey slightly silty slightly sandy GRAVEL. Gravel is angular fine to coarse limestone.		149.71	
					0.10				
					0.15	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal.			
	0.50 - 0.50 - 0.60	ES1 B2				PID @0.5mbgl = 0.0ppm			
	0.70 -	B3				between 0.6mbgl lenses of Black slightly silty slightly sandy Gravel with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse siltstone, sandstone and ash, fine to medium coal.			
1	1.00 -	ES4				PID @ 1.0mbgl = 0.0ppm			
	1.50 - 1.80	B5							
					3.25	with glass and steel bar at 1.7mbgl			
2									
	2.50 - 2.50 - 2.80	ES6 B7				with low cobble content of sandstone from 2.4mbgl PID @ 2.5mbgl = 0.0ppm			
3						with iron bars from 3.0mbgl			
	3.50 - 3.50 - 4.00	ES8 B9			3.40	Firm dark grey silty slightly sandy slightly gravelly CLAY. PID @ 3.5mbgl = 0.0ppm		146.46	
					0.60				
4					4.00	Trial Pit terminated at scheduled depth of 4.0mbgl		145.86	

PLAN



Groundwater: Seepage at 3.4mbgl

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface.

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	
AH	A Jones	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP105
Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.86 m A.O.D. *Level to Ordnance Datum* Coordinates: 305952.61 E 203879.04 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
AH	A Jones	2 Of 2		

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP106

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

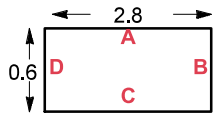
Engineer : Redstart

Ground Level : 149.74 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305866.73 E 203887.11 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Legend	Red. Level A.O.D.	WATER
	0.10 -	D1			0.25	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.			
					0.25	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal.		149.49	
	0.50 -	ES2				PID @ 0.5mbgl = 0.0ppm			
	0.50 - 1.00	B3							
					1.05				
1	1.00 -	ES4				PID @ 1.00mbgl =0.0ppm			
	1.30 - 1.50	B5			1.30	MADE GROUND - Black slightly silty slightly sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse siltstone, sandstone and ash, fine to medium coal.		148.44	
					0.20				
					1.50	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal.		148.24	
	1.60 -	ES6				PID @ 1.60mbgl = 0.0ppm			
	1.80 -	D7			0.70				
2									
					2.20	MADE GROUND - Black slightly silty slightly sandy GRAVEL. Gravel is angular to sub angular fine to coarse siltstone, sandstone and ash, fine to medium coal.		147.54	
	2.40 - 2.60	B8							
	2.50 -	ES9				PID @ 2.5mbgl = 0.0ppm			
					0.90				
3									
					3.10	MADE GROUND - Brown slightly silty sandy GRAVEL with low cobble content of sandstone and slag. Gravel is sub angular to sub rounded fine to coarse siltstone and sandstone, angular to sub angular fine to coarse slag and ash with rare fine coal.		146.64	
	3.30 - 3.60	B10							
	3.50 -	ES11				PID @ 3.5mbgl = 0.0ppm			
					0.90				
4									
					4.00	Trial pit terminated at scheduled depth of 4.0mbgl		145.74	

PLAN



Groundwater:

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface. No Groundwater Encountered

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
AH	A Jones	1 Of 2	4.2	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP106
Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.74 m A.O.D. *Level to Ordnance Datum* Coordinates: 305866.73 E 203887.11 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
AH	A Jones	2 Of 2		

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP107

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

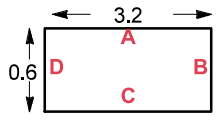
Engineer : Redstart

Ground Level : 149.92 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305806.81 E 203943.36 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Legend	Red. Level A.O.D.	WATER
					0.15	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.			
					0.15	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal.		149.77	
	0.30 - 0.50	B B1							
	0.50 -	ES2				PID @ 0.5mbgl = 0.0ppm			
1	1.00 -	ES3				PID @ 1.00mbgl =0.0ppm			
					1.95				
	1.30 - 1.50	B4							
2									
					2.10	Brown silty slightly gravelly SAND. Gravel is angular to sub angular fine to coarse sandstone.		147.82	
	2.30 - 2.50	B B5							
	2.50 -	ES6				PID @ 2.5mbgl = 0.0ppm			
					1.10				
						very wet from 2.7mbgl			
3									▼1
					3.20	Brown slightly silty slightly sandy GRAVEL with low cobble content of sandstone. Gravel is sub angular to sub rounded fine to coarse sandstone, sub angular fine to coarse siltstone. Wet from 3.2mbgl		146.72	
	3.50 - 4.00	LB7			0.80				
						PID @ 4.0mbgl = 0.0ppm			
4	4.00 -	ES8			4.00	Trial Pit terminated at scheduled depth of 4.0mbgl		145.92	

PLAN



Groundwater: becoming wet from 3.2mbgl

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface.

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	
AH	A Jones	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP107
Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.92 m A.O.D. *Level to Ordnance Datum* Coordinates: 305806.81 E 203943.36 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	
AH	A Jones	2 Of 2		All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP108

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

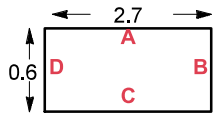
Engineer : Redstart

Ground Level : 149.56 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305874.80 E 203988.35 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Legend	Red. Level A.O.D.	WATER
					0.10	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.			
					0.10	MADE GROUND - Dark reddish brown slightly silty slightly gravelly ASH with fine to medium coal.		149.46	
	0.50 - 0.50 - 1.00	ES1 B2				PID @ 0.5mbgl = 0.0ppm			
1	1.00 -	ES3			1.80	PID @ 1.00mbgl =0.0ppm			
	1.40 - 1.60	B4							
					1.90	MADE GROUND - Black slightly clayey slightly sandy gravelly SILT. Gravel is angular to sub angular fine to coarse siltstone and fine to medium coal.		147.66	
2	2.00 - 2.50	B5			0.80				
	2.50 -	D ES6				PID @ 2.5mbgl = 0.0ppm			
					2.70	Very soft brown slightly clayey sandy SILT.		146.86	
	2.80 - 3.10	B7				very wet from 2.7mbgl			
3					0.50				
	3.20 -	ES8				PID @ 3.2mbgl = 0.0ppm			
					3.20	Trial Pit terminated at 3.2mbgl due to pit collapsing		146.36	

PLAN



Groundwater: becoming very wet from 2.7mbgl

Stability: Sides collapsing from 2.7mbgl.

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface.

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	
AH	A Jones	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP108
Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.56 m A.O.D. *Level to Ordnance Datum* Coordinates: 305874.80 E 203988.35 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
AH	A Jones	2 Of 2		

AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP109

Dates : 13/7/22 - 13/7/22

Location :

Job Number : Q0838

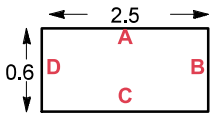
Engineer : Redstart

Ground Level : 150.19 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305851.92 E 204032.73 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.15	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.			
	0.30 - 0.50	B2			0.15	MADE GROUND - Dark reddish brown black slightly silty slightly gravelly ASH with fine to medium coal.		150.04	
	0.50 -	ES1			0.35	PID @ 0.5mbgl = 0.0ppm			
					0.50	Trial Pit terminated at 0.5mbgl on location of LP gas main. Window sample hole to be carried out between services.		149.69	

PLAN



Groundwater:

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. Hole terminated due to LP gas main at 0.5mbgl. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface. No Groundwater Encountered

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	
AH	A Jones	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP109
Dates : 13/7/22 - 13/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 150.19 m A.O.D. *Level to Ordnance Datum* Coordinates: 305851.92 E 204032.73 N *Co-ordinates to National Grid*

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP110

Dates : 13/7/22 - 13/7/22

Location :

Job Number : Q0838

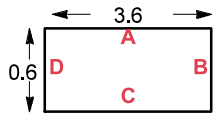
Engineer : Redstart

Ground Level : 161.01 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305546.44 E, 204606.43 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thickness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.10	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.			
					0.10	MADE GROUND - Dark reddish brown slightly silty slightly sandy GRAVEL with low cobble content of brick and siltstone and low boulder content of siltstone to 0.7mbgl. Gravel is angular to sub angular fine to coarse siltstone and brick.		160.91	
	0.50 - 0.50 - 0.70	ES1 B2				PID @ 0.5mbgl = 0.1ppm			
1	1.00 -	ES3			1.80	PID @ 1.00mbgl =1.9ppm			
	1.50 - 1.70	B4							
					1.90	MADE GROUND - Black slightly silty slightly sandy GRAVEL. Gravel is angular to sub angular fine to coarse siltstone, sandstone and ash, fine to medium coal.		159.11	
2	2.20 - 2.40	B5							
	2.50 -	ES6				PID @ 2.5mbgl = 8.1ppm			
3	3.20 - 3.50	B7			2.10				
						PID @ 4.0mbgl = 27.3ppm			
4	4.00 -	ES8			4.00	Trial pit terminated at scheduled depth of 4.0mbgl		157.01	

PLAN



Groundwater:

Stability: Sides collapsing 0.1-1.9mbgl

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface. No Groundwater Encountered

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	
AH	A Jones	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP110
Dates : 13/7/22 - 13/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 161.01 m A.O.D. *Level to Ordnance Datum* Coordinates: 305546.44 E 204606.43 N *Co-ordinates to National Grid*

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AH	A Jones	2 Of 2			

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP111

Dates : 13/7/22 - 13/7/22

Location :

Job Number : Q0838

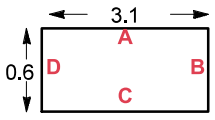
Engineer : Redstart

Ground Level : 160.20 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305521.68 E 204618.00 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.05	Rough vegetation over TOPSOIL - Black slightly sandy slightly gravelly SILT.		160.15	
					0.05	MADE GROUND - Black silty slighty sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse siltstone, sandstone, timber and metal.			
	0.50 - 0.50 - 1.00	ES1 B2			0.95	PID @ 0.5mbgl = 0.0ppm			
1	1.00 -	ES3				PID @ 1.00mbgl =5.6ppm			
					1.00	Trial Pit terminated at 1.0mbgl on location of low pressure gas main. Area heavily congested with unknown gas lines leading to / from existing and former gas sub station.		159.20	

PLAN



Groundwater:

Stability: Stable

Shoring: None

Remarks: Hole marked out using EHLP suppliede by client. Area CAT and Genny scanned with PAS B Survey carried out prior to issueing of Permit to Excavate. Hole terminated at 1.0mbgl on location of LP gas main. On completion hole backfilled with arrisings compacted in reverse order of excavation. Turf replaced at surface. No Groundwater Encountered

Equipment Used: 11 Tonne wheeled excavator with toothless bucket

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Operator:	Logged By.	Sheet No.	m Per Page	
AH	A Jones	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP111
Dates : 13/7/22 - 13/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 160.20 m A.O.D. *Level to Ordnance Datum* Coordinates: 305521.68 E 204618.00 N *Co-ordinates to National Grid*

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP112

Dates : 28/6/22 - 28/6/22

Location :

Job Number : Q0838

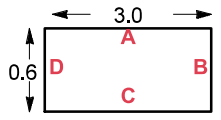
Engineer : Redstart

Ground Level : 161.66 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305630.39 E 204575.63 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thickness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.10	Tarmac.			
					0.10 0.20	MADE GROUND - Dense grey sandy angular to subangular fine to coarse GRAVEL of limestone. (SUB-BASE)		161.56	
	0.30 - 0.50	B1			0.30	MADE GROUND - Dense black clayey gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of brick, coal and concrete.		161.36	
	0.40 -	ES1		(Insitu PID.) - 0ppmv	0.20				
	0.60 - 1.00	B2			0.50	MADE GROUND - Dense black sandy angular to subangular fine to coarse GRAVEL of brick, coal, concrete, wood and slag.		161.16	
	0.70 -	D ES2		(Insitu PID.) - 0ppmv					
1					0.80				
					1.30	MADE GROUND - Medium dense greyish brown gravelly fine to coarse SAND with a high cobble content of subrounded sandstone. Gravel is angular to subrounded fine to coarse of brick, slag, sandstone, metal and concrete. (DEMOLITION WASTE)		160.36	
	1.50 - 2.00	B3		(Insitu PID.) - 0ppmv					
	1.50 -	ES3			0.70				
2	2.00 - 2.50	B4			2.00	MADE GROUND - Medium dense black gravelly fine to coarse SAND with a high cobble and medium boulder content of subrounded sandstone. Gravel is angular to subrounded fine to coarse of brick, concrete and sandstone.		159.66	
	2.10 -	ES4		(Insitu PID.) - 0ppmv					
	2.50 - 3.00	B5			1.00				
3	3.00 -	ES5		(Insitu PID.) - 0ppmv	3.00			158.66	

PLAN



Groundwater:

Stability: Unstable from 1.30m

Shoring: None

Remarks: 1.) Unstable from 1.30m, 2.) No groundwater encountered.

Equipment Used: 9 tonne excavator

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Operator:	Logged By.	Sheet No.	m Per Page	
QGL	T.Goodrick	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP112
Dates : 28/6/22 - 28/6/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 161.66 m A.O.D. *Level to Ordnance Datum* Coordinates: 305630.39 E 204575.63 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	
QGL	T.Goodrick	2 Of 2		All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP113

Dates : 28/6/22 - 28/6/22

Location :

Job Number : Q0838

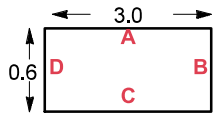
Engineer : Redstart

Ground Level : 160.72 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305684.81 E 204542.09 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.10	Tarmac.			
	0.15 - 0.30	B1			0.10	MADE GROUND - Dense grey sandy angular to subangular fine to coarse GRAVEL of limestone. (SUB-BASE)		160.62	
	0.20 -	ES1		(Insitu PID.) - 0ppmv	0.05			160.57	
	0.40 - 0.80	B2			0.15	MADE GROUND - Loose black sandy angular to subangular fine GRAVEL of coal. (COAL DUST)			
	0.50 -	ES2		(Insitu PID.) - 0ppmv					
1	1.00 -	D		(Insitu PID.) - 0ppmv					
	1.00 - 1.50	B3							
	1.00 -	ES3							
					2.85				
2	2.00 -	D		(Insitu PID.) - 0ppmv					
	2.00 - 2.50	B4							
	2.00 -	ES4							
	2.50 - 3.00	B5							
3	3.00 -	ES5		(Insitu PID.) - 0ppmv	3.00			157.72	

PLAN



Groundwater:

Stability: Unstable from 0.80m

Shoring: None

Remarks: 1.) Unstable from 0.80m, 2.) No groundwater encountered.

Equipment Used: 9 tonne excavator

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Operator:	Logged By.	Sheet No.	m Per Page	
QGL	T.Goodrick	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP113
Dates : 28/6/22 - 28/6/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 160.72 m A.O.D. *Level to Ordnance Datum* Coordinates: 305684.81 E 204542.09 N *Co-ordinates to National Grid*

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Trial Pit No. TP114

Dates : 28/6/22 - 28/6/22

Location :

Job Number : Q0838

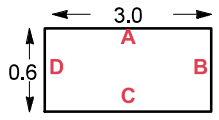
Engineer : Redstart

Ground Level : 158.00 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305725.53 E, 204493.60 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thick-ness)	Strata Description	Strata Legend	Strata Red. Level A.O.D.	WATER
					0.10	Tarmac.			
	0.20 - 0.50	B1			0.10 0.05	MADE GROUND - Dense grey sandy angular to subangular fine to coarse GRAVEL of limestone. (SUB-BASE)		157.90 157.85	
	0.50 -	ES1		(Insitu PID.) - 0ppmv	0.15 0.50	MADE GROUND - Medium dense black gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of mudstone and coal. (COLLIERY SPOIL)			
	0.70 - 1.20	B B2			0.65	MADE GROUND - Loose grey sandy angular to subangular fine to coarse GRAVEL of mudstone with a high cobble and boulder content of angular mudstone. (COLLIERY SPOIL)		157.35	
1	1.00 -	ES2		(Insitu PID.) - 0ppmv					
	1.50 - 2.00	B3			1.35				
2	2.00 -	ES3		(Insitu PID.) - 0ppmv	2.00			156.00	

PLAN



Groundwater:

Stability: Unstable from 0.50m

Shoring: None

Remarks: 1.) Unstable from 0.50m, unable to advance beyond 2.00m,
2.) No groundwater encountered.

Equipment Used: 9 tonne excavator

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Operator:	Logged By.	Sheet No.	m Per Page	
QGL	T.Goodrick	1 Of 2	4.2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Trial Pit No. TP114
Dates : 28/6/22 - 28/6/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 158.00 m A.O.D. *Level to Ordnance Datum* Coordinates: 305725.53 E 204493.60 N *Co-ordinates to National Grid*

APPENDIX E

WINDOWLESS SAMPLE BOREHOLE LOGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS133

Dates : 11/7/22 - 11/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 157.98 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305676.40 E 204482.45 N *Co-ordinates to National Grid*

	Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.06)	Asphalt		157.92	
							0.06	MADE GROUND - Grey silty slightly sandy GRAVEL. Gravel is fine to coarse angular sandstone. (SUB-BASE)			
							(0.24)			157.68	
							0.30	MADE GROUND - Black slightly clayey sandy GRAVEL. Gravel is fine to coarse angular mudstone with occasional brick, clinker and glass.			
	0.50	ES 1				(Insitu PID.) - 0ppmv					
1	1.00 - 2.00	B 1				(Insitu PID.) - 0ppmv					
	1.00	ES 2									
2	2.00 - 4.00	B 2			2.00	SPT (S) 1 (1-0-**0-0-0-1**)					
	2.40 - 2.60	ES 3				(Insitu PID.) - 0ppmv					
3					3.00	SPT (S) 0 (1-0-**0-0-0-0**)					
							(5.90)				
								..... between 3.5 and 4.5mbgl pinkish brown			
	3.90	ES				(Insitu PID.) - 0ppmv					
4	3.90 - 4.10	ES 4			4.00	SPT (S) 11 (1-3-**3-3-2-3**)					
	4.00 - 6.00	B 3									
5					5.00	SPT (S) 4 (1-1-**1-1-1-1**)					
	5.50 - 5.70	ES 5				(Insitu PID.) - 0ppmv		..... below 5.5mbgl Gravel is fine to coarse angular slag			
6											
							6.20	Terminated at 6.2mbgl		151.78	

Equipment used:

Remarks:

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
		1 Of 1	7	

AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Borehole No. WS133

Dates : 11/7/22 - 11/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 157.98 m A.O.D.
Level to Ordnance Datum

Coordinates: 305676.40 E
204482.45 N
Co-ordinates to National Grid

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	AGS
		1 Of 1	2		

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS134

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 160.57 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305646.92 E 204546.58 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.06)	Asphalt		160.51	
							0.06	MADE GROUND - Grey silty slightly sandy GRAVEL. Gravel is fine to coarse angular sandstone.		160.37	
							(0.14)				
							0.20	MADE GROUND - Black very silty slightly sandy GRAVEL with low cobble content. Gravel is fine to coarse angular brick, clinker, mudstone and slag, Cobbles are angular concrete and brick.			
	0.50	ES				(Insitu PID.) - 0ppmv					
	0.50	ES 1									
1	1.00	ES				(Insitu PID.) - 0ppmv					
	1.00 - 2.00	B 1									
	1.00	ES 2									
2	2.00	SPTLS 1			2.00	SPT (S) 5 (1-1-**2-1-1-1**)					
	2.00 - 4.00	B 2									
	2.50 - 2.70	ES 3				(Insitu PID.) - 0ppmv					
3	3.00	SPTLS 2			3.00	SPT (S) 4 (1-2-**1-1-1-1**)	(5.80)				
4	4.00 - 6.00	B 3			4.00	SPT (S) 7 (1-1-**2-2-2-1**)					
	4.00	SPTLS 3				(Insitu					
	4.00 - 4.20	ES 4				PID.) - 0ppmv					
5					5.00	SPT (S) 6 (2-1-**1-2-2-1**)					
	5.20 - 5.50	ES				(Insitu PID.) - 0ppmv		..... below 5.2mbgl brown			
	5.20 - 5.50	ES 5									
6					6.00	SPT (S) 6 (1-1-**1-2-2-1**)	6.00	Terminated at 6.0mbgl		154.57	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No Groundwater Encountered

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
QGL	T Goodrick	1 Of 1	7	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS134

Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 160.57 m A.O.D. *Level to Ordnance Datum* Coordinates: 305646.92 E 204546.58 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	AGS
		1 Of 1	2		

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS135

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 162.12 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305623.62 E 204604.93 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.06)	Asphalt		162.06	
							0.06	MADE GROUND - Grey silty GRAVEL. Gravel is fine to coarse angular sandstone. (SUB-BASE)			
							(0.24)			161.82	
	0.50	ES 1				(Insitu PID.) - 0ppmv	0.30	MADE GROUND - Dark grey to black gravelly SILT with high cobble content. Gravel is fine to coarse angular brick, clinker, slag and concrete. Cobbles are angular brick.			
							(0.90)				
1	1.00 - 2.00 1.00	B 1 ES 2				(Insitu PID.) - 0ppmv					
							1.20	MADE GROUND - Black very silty GRAVEL with pockets of orange sandy Gravel. Gravel is fine to coarse angular brick, clinker, coal and slag.		160.92	
2	2.00 2.00 - 4.00	SPTLS 1 B 2			2.00	SPT (S) 10 (3-2-**2-2-3-3**)					
	2.50 - 2.70 2.50 - 2.70	ES ES 3				(Insitu PID.) - 0ppmv					
							(3.30)				
3	3.00	SPTLS 2			3.00	SPT (S) 5 (1-1-**1-1-1-2**)					
4	4.00 - 6.00 4.00 4.00 - 4.20	B 3 SPTLS 3 ES 4			4.00	SPT (S) 7 (1-1-**2-1-2-2**) (Insitu PID.) - 0ppmv					
	4.50 - 4.70 4.50 - 4.70	ES ES 5				(Insitu PID.) - 1.2ppmv	4.50	MADE GROUND - Grey silty slight sandy GRAVEL. Gravel is fine to coarse angular mudstone. (COLLIERY SPOIL)		157.62	
5	5.00	SPTLS 4			5.00	SPT (S) 7 (1-2-**2-2-1-2**)					
							(1.50)				
6					6.00	SPT (S) 7 (1-1-**2-1-2-2**)	6.00	Terminated at 6.0mbgl		156.12	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
QGL	P Darby	1 Of 1	7	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS135

Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 162.12 m A.O.D. *Level to Ordnance Datum* Coordinates: 305623.62 E 204604.93 N *Co-ordinates to National Grid*

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS136

Dates : 14/7/22 - 14/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 160.96 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305534.69 E 204618.68 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.20 0.20	B 1 ES 1				(Insitu PID.) - 0ppmv	(0.30)	TOPSOIL - Brown slightly gravelly SILT with many rootlets. Gravel is fine angular coal and mudstone.			
	0.50 0.50	B 2 ES 2				(Insitu PID.) - 0ppmv	0.30 (0.60)	MADE GROUND - Dark brown to black very silty GRAVEL. Gravel is fine to coarse angular brick, mudstone, rare clinker and slag.		160.66	
1	1.00 1.00 1.00 - 2.00	B 3 ES 3 B 4				(Insitu PID.) - 0ppmv	0.90 (1.70)	MADE GROUND - Black slightly silty very sandy GRAVEL with low cobble content. Gravel is fine to coarse sub-angular to angular slag, mudstone, clinker and brick. Cobbles are sub-angular slag.		160.06	
2	2.00 2.00 - 4.00	SPTLS 1 B 5			2.00	SPT (S) 12 (1-2-**2-3-4-3**)					
	2.40 - 2.60	ES 4				(Insitu PID.) - 0.7ppmv					
3	3.00	SPTLS 2			3.00	SPT (S) 5 (1-1-**1-1-1-2**)	2.60	Orangeish brown sandy GRAVEL with low cobble content. Gravel is fine to coarse angular brick and occasional slag. Cobbles are sub-angular slag. ..... between 3.3 and 3.6mgl layer of fine to coarse sub-angular slag Gravel		158.36	
4	4.00 4.00 - 4.20 4.00 - 6.00	SPTLS 3 ES 5 B 6			4.00	SPT (S) 7 (1-3-**3-2-1-1**) SPT (S) 7 (1-3-**3-2-1-1**) (Insitu PID.) - 3ppmv	(3.40)				
5	5.00	SPTLS 4			5.00	SPT (S) 4 (1-1-**1-1-1-1**)					
	5.50 - 5.70	ES 6				(Insitu PID.) - 0ppmv					
6							6.00	Terminated at 6.0mbgl		154.96	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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QGL	P Darby	1 Of 1	7	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS136

Dates : 14/7/22 - 14/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 160.96 m A.O.D. *Level to Ordnance Datum* Coordinates: 305534.69 E 204618.68 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS137

Dates : 19/7/22 - 19/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.13 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305856.88 E 204014.02 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.10 - 0.60	B 1					(0.10)	TOPSOIL - Dark brown sandy SILT with many rootlets.		150.03	
	0.20	ES 1				(Insitu PID.) - 0ppmv	0.10	MADE GROUND - Black gravelly SAND. Gravel is fine to coarse angular to sub-angular coal, slag and mudstone.			
	0.50	ES 2				(Insitu PID.) - 0ppmv					
	0.50	ES ES2									
	0.60 - 1.20	B 2									
1	1.00	ES 3				(Insitu PID.) - 0ppmv					
2							(3.70)				
					2.20	SPT (S) 2 (1-1-**1-1-0-0**)					
	2.50	ES 4				(Insitu PID.) - 0ppmv					
3											
					3.20	SPT (S) 0 (1-0-**0-0-0-0**)					
							3.80	Brown slightly clayey sandy SILT.		146.33	
4	4.00 - 5.00	B 3				(Insitu PID.) - 0ppmv					
	4.00	ES 5									
	4.00	ES ES5			4.20	SPT (S) 5 (1-1-**1-2-1-1**)					
							(1.40)				
5											
					5.20	SPT (S) 50/265mm (4-6-**10-15-18-7/40mm**)	5.20	Brown sandy GRAVEL. Gravel is fine to coarse sub-rounded to sub-angular siltstone.		144.93	
							(1.00)				
6	6.00	D 1									
							6.20	Terminated at 6.2mbgl		143.93	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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QGL	T Goodrick	1 Of 1	7	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS137
Dates : 19/7/22 - 19/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 150.13 m A.O.D. *Level to Ordnance Datum* Coordinates: 305856.88 E 204014.02 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS101

Dates : 18/7/22 - 18/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 149.57 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305917.88 E 203992.55 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.20 0.20	ES 1 ES ES1				(Insitu PID.) - 0ppmv	(0.25)	TOPSOIL - Dark grey sandy SILT with many rootlets			
	0.50 - 3.50 0.50	B 1 ES 2				(Insitu PID.) - 0ppmv	0.25	MADE GROUND - Black, red and brown fravelly fine to ocarse SAND. Gravel is fine to coarse angular to sub-rounded mudstone, slag and coal.		149.32	
1	1.00	ES 3			1.10	(Insitu PID.) - 0ppmv SPT (S) 4 (4-1-**1-1-1-1**)					
2					2.10	SPT (S) 6 (1-1-**2-2-1-1**)	(3.40)				
	2.50 2.50	ES 4 ES ES4				(Insitu PID.) - 0ppmv					
3					3.10	SPT (S) 0 (1-0-**0-0-0-0**)					
	3.70	D 1					3.65 (0.20)	Orange silty SAND.		145.92	
4	4.00 4.00 4.10	ES 5 ES ES5 D 2			4.10	(Insitu PID.) - 0ppmv SPT (S) 6 (4-2-**2-1-2-1**)	3.85 (0.20) 4.05 (0.45)	Dark brown to black sandy SILT. Dense brown sandy GRAVEL. Gravel is fine to coarse rounded to sub-angular siltstone.		145.72 145.52	
					4.50	SPT (C) 50/85mm (25-50/10mm----)	4.50	Terminated at 4.5mbgl upon refusal		145.07	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS101
Dates : 18/7/22 - 18/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.57 m A.O.D. *Level to Ordnance Datum* Coordinates: 305917.88 E 203992.55 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	
QGL	T Goodrick	1 Of 1	2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS102

Dates : 18/7/22 - 18/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 149.81 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305938.18 E 203902.96 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA					
Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water	Install/ Backfill
0.20	ES 1				(Insitu PID.) - 0ppmv	(0.20)	TOPSOIL - Dark grey sandy SILT with many rootlets				
0.30 - 3.00	B 1					0.20	MADE GROUND - Black, red and brown fravelly fine to ocarse SAND. Gravel is fine to coarse angular to sub-rounded mudstone, slag and coal.		149.61		
0.50	ES 2				(Insitu PID.) - 0ppmv						
0.50	ES ES2										
1 1.00	ES 3				(Insitu PID.) - 0ppmv						
				1.60	SPT (S) 20 (3-4-**4-5-5-6**)						
						(3.20)					
2				2.10	SPT (S) 19 (2-5-**6-4-5-4**)						
2.50	ES 4				(Insitu PID.) - 0ppmv						
3				3.10	SPT (S) 4 (1-2-**1-1-1-1**)						
3.50 - 4.00	B 2					3.40	Brown sandy SILT.		146.41		
						(0.70)					
4 4.00	ES 5				(Insitu PID.) - 0ppmv						
4.00	ES ES5			4.10	SPT (S) 25 (1-2-**2-4-8-11**)	4.10	Dense brown sandy GRAVEL. Gravel is fine to coarse rounded to sub-angular sandstone, mudstone and siltstone.		145.71		
						(0.40)					
				4.50	SPT (C) 50/90mm (25-50/15mm---)	4.50	Terminated at 4.5mbgl upon refusal		145.31		

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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Operator:	Logged By.	Sheet No.	m Per Page	
QGL	T Goodrick	1 Of 1	7	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS102
Dates : 18/7/22 - 18/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.81 m A.O.D. *Level to Ordnance Datum* Coordinates: 305938.18 E 203902.96 N *Co-ordinates to National Grid*

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QGL	T Goodrick	1 Of 1	2		

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS103

Dates : 18/7/22 - 18/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 149.73 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305874.80 E 203949.53 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.20	ES 1				(Insitu PID.) - 0ppmv	(0.20)	TOPSOIL - Dark grey sandy SILT with many rootlets			
							0.20	MADE GROUND - Black, red and brown fravelly fine to ocarse SAND. Gravel is fine to coarse angular to sub-rounded mudstone, slag and coal.		149.53	
	0.50 - 2.50	B 1				(Insitu PID.) - 0ppmv					
	0.50	ES 2									
	0.50	ES ES2									
1	1.00	ES 3				(Insitu PID.) - 0ppmv					
	1.00	ES ES3									
							(2.70)				
2					2.10	SPT (S) 2 (1-0-**0-0-1-1**)					
	2.50	ES 4				(Insitu PID.) - 0ppmv					
							2.90	Brown sandy SILT.		146.83	
3	3.00 - 0.00	D									
	3.00	D 1			3.10	SPT (S) 4 (1-1-**1-1-1-1**)					
							(0.90)				
	3.50	ES 5				(Insitu PID.) - 0ppmv					
							3.80	Dense brown sandy GRAVEL. Gravel is fine to coarse rounded to sub-angular sandstone, mudstone and siltstone.		145.93	
4							(0.50)				
					4.10	SPT (S) 51/275mm (4-12-**9-14-14-14/50mm**)					
					4.30	SPT (C) 50/85mm (25-50/10mm—)	4.30	Terminated at 4.3mbgl upon refusal		145.43	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS103

Dates : 18/7/22 - 18/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.73 m A.O.D. *Level to Ordnance Datum* Coordinates: 305874.80 E 203949.53 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS104

Dates : 19/7/22 - 19/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.71 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305817.55 E 203996.24 N *Co-ordinates to National Grid*

	Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.20 - 0.70	B 1				(Insitu PID.) - 0ppmv	(0.20)	TOPSOIL - Dark brown sandy SILT with many rootlets.			
	0.30	ES 1					0.20	MADE GROUND - Black gravelly SAND. Gravel is fine to coarse angular to sub-angular coal and slag.		150.51	
	0.50	ES 2				(Insitu PID.) - 0ppmv					
	0.70 - 1.20	B 2									
1	1.00	ES 3				(Insitu PID.) - 0ppmv	(1.80)				
	1.20 - 2.00	B 3									
2	2.00 - 4.00	B 4					2.00	MADE GROUND - Orangeish brown to black gravelly SAND. Gravel is fine to coarse angular to sub-angular slag.		148.71	
					2.20	SPT (S) 0 (1-0-**0-0-0-0**)					
	2.50	ES 4				(Insitu PID.) - 0ppmv					
3							(2.10)				
					3.20	SPT (S) 2 (1-1-**1-1-0-0**)					
4	4.00	D 1					4.10	Silty gravelly SAND. Gravel is fine to coarse sub-rounded to sub-angular siltstone.		146.61	
					4.20	SPT (S) 7 (2-2-**1-2-2-2**)					
5	5.00	D 2					(2.10)				
					5.20	SPT (S) 21 (2-3-**2-3-6-10**)					
6	6.00	D 3					6.20	Terminated at 6.2mbgl		144.51	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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QGL	T Goodrick	1 Of 1	7	

AGS

Contract : Hoover Candy Factory		Borehole No.
Client : Merthyr Tydfil County Borough Council		WS104
Dates : 19/7/22 - 19/7/22	Job Number : Q0838	Ground Level : 150.71 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Redstart	Coordinates: 305817.55 E 203996.24 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS105

Dates : 14/7/22 - 14/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.95 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305854.66 E, 204127.59 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.10)	TOPSOIL - Dark brown SILT with many rootlets.		150.85	
	0.20 0.20	B 1 ES 1				(Insitu PID.) - 0ppmv	0.10	MADE GROUND - Black silty SAND / GRAVEL with low cobble content. Gravel is fine to coarse angular clinker, mudstone and occasional coal and slag. Cobbles are angular brick.			
	0.50 0.50	B 2 ES 2				(Insitu PID.) - 0ppmv					
1	1.00 1.00 1.00 - 2.00	B 3 ES 3 B 4				(Insitu PID.) - 0ppmv					
							(3.20)				
2	2.00 2.00 - 2.20 2.00 - 3.30	SPTLS 1 ES 4 B 5			2.20	(Insitu PID.) - 0ppmv SPT (S) 4 (1-1-**1-1-1-1**)		..... between 2.4 and 2.5mbgl silty Gravel. Gravel is fine to coarse angular mudstone. (COLLIERY SPOIL)			
3	3.00	SPTLS 2			3.20	SPT (S) 12 (1-6-**4-2-2-4**)					
							3.30 (0.25)	Brown very sandy GRAVEL. Gravel is fine to coarse sub-rounded to sub-angular sandstone and quartz.		147.65	
					3.55	SPT (S) 50/5mm (25-**50/5mm**—)	3.55	Terminated at 3.55mbgl upon refusal		147.40	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Borehole No. WS105

Dates : 21/7/22 - 21/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.15 m A.O.D.
Level to Ordnance Datum

Coordinates: 305797.72 E
204200.51 N
Co-ordinates to National Grid

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS106

Dates : 21/7/22 - 21/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.15 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305797.72 E 204200.51 N *Co-ordinates to National Grid*

Samples Depth	Samples Type No.	Sample Run Diam. (mm)	Sample Run Recovery (%)	Tests Depth	Tests SPT & Hand Vane Results	STRATA Depth (Thickness)	STRATA DESCRIPTION	STRATA Legend	Red. Level . A.O.D.	Water
						(0.20)	Concrete			
0.30 - 0.70	B 1					0.20	MADE GROUND - Orangeish brown and black gravelly SAND. Gravel is fine to coarse angular to sub-angular slag and mudstone.		150.95	
0.50 0.50	ES 1 ES ES1				(Insitu PID.) - 0ppmv					
0.70 - 1.20	B 2									
1.00	ES 2				(Insitu PID.) - 0ppmv					
						(2.90)				
				2.20	SPT (S) 4 (1-1-**1-1-1-1**)					
2.50 2.50	ES 3 ES ES3				(Insitu PID.) - 0ppmv					
3.10 - 5.00	B 3			3.20	SPT (S) 14 (1-6-**4-2-2-6**)	3.10	MADE GROUND - Black and light brown silty gravelly SAND. Gravel is fine to coarse angular to sub-angular slag, coal and mudstone.		148.05	
4.00	ES 4				(Insitu PID.) - 0ppmv	(1.90)				
				4.20	SPT (C) 8 (3-4-**2-2-2-2**)					
5.00	D 1					5.00	Brown silty sandy GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded siltstone.		146.15	
				5.20	SPT (C) 10 (1-1-**1-2-3-4**)	(1.10)				
				6.10	SPT (C) 13 (2-3-**4-3-3-3**)	6.10	Terminated at 6.1mbgl		145.05	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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QGL	T Goodrick	1 Of 1	7	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS106
Dates : 14/7/22 - 14/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 150.95 m A.O.D. *Level to Ordnance Datum* Coordinates: 305854.66 E 204127.59 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS107

Dates : 15/7/22 - 15/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.97 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305797.32 E, 204013.27 N *Co-ordinates to National Grid*

	Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.20)	Concrete			
	0.20 0.20	B 1 ES 1				(Insitu PID.) - 0ppmv	0.20 (0.20)	MADE GROUND - Grey and black slightly silty GRAVEL. Gravel is fine to coarse angular slag.		150.77	
	0.50 0.50 0.50	ES B 2 ES 2				(Insitu PID.) - 0ppmv	0.40	MADE GROUND - Black silty sandy GRAVEL with medum cobble content. Gravel is fine to coarse angular clinker, brick, slag and coal. Cobbles are angular brick.		150.57	
1	1.00 1.00 1.00 - 2.00	B 3 ES 3 B 4				(Insitu PID.) - 0ppmv					
2	2.00 - 4.00	B 5					(3.10)				
					2.20	SPT (S) 6 (1-1-**1-1-2-2**)					
	2.50 - 2.70	ES 4				(Insitu PID.) - 0ppmv					
3											
					3.20	SPT (S) 4 (1-1-**1-1-1-1**)					
							3.50	MADE GROUND - Orangeish brown sandy GRAVEL. Gravel is fine to coarse angular slag and brick.		147.47	
	3.80 - 4.00	ES 5				(Insitu PID.) - 0ppmv	(0.70)				
4											
					4.20	SPT (S) 0 (1-0-**0-0-0-0**)	4.20	Soft brown very sandy CLAY.		146.77	
	4.30 - 4.50	ES 6				(Insitu PID.) - 0ppmv					
	4.50 - 5.00	B 6					(1.30)				
5											
					5.20	SPT (S) 18 (1-1-**2-4-6-6**)					
					5.60	SPT (C) 50/85mm (25-50/10mm—)	5.50 (0.10) 5.60	Brown sandy GRAVEL. Gravel is fine to coarse sub-rounded to sub-angular sandstone and mudstone. Terminated at 5.6mbgl upon refusal		145.47 145.37	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Borehole No. WS107

Dates : 15/7/22 - 15/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.97 m A.O.D.
Level to Ordnance Datum

Coordinates: 305797.32 E
204013.27 N
Co-ordinates to National Grid

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS108

Dates : 5/7/22 - 5/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.00 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305752.51 E 203963.26 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
						(0.20)	Reinforced Concrete			
0.20 0.20	B 1 ES 1				(Insitu PID.) - 0ppmv	0.20 (0.20)	MADE GROUND - Grey slightly silty slight sandy GRAVEL. Gravel is fine to coarse angular sandstone.		150.80	
0.50 0.50	B 2 ES 2				(Insitu PID.) - 0ppmv	0.40	MADE GROUND - Black and reddish brown very silty sandy GRAVEL with medium cobble content and steel fragments. Gravel is fine to coarse angular to sub-angular sandstone, brick and concrete. Cobbles are angular brick and concrete.		150.60	
1 1.00 1.00	B 3 ES 3				(Insitu PID.) - 0ppmv					
1.20 - 2.20	B 4					(1.80)				
1.90 - 2.10	ES 4				(Insitu PID.) - 0ppmv					
2 2.30 - 2.50	ES 5			2.20	SPT (S) 17 (1-1-**1-7-4-5**) (Insitu PID.) - 0ppmv	2.20	MADE GROUND - Brown and grey slighty clayey sandy GRAVEL. Gravel is fine to coarse angular brick, slag and glass.		148.80	
2.90 - 3.10	ES 6				(Insitu PID.) - 0ppmv	(0.70)				
3 3.10 - 3.50	D 1					2.90 (0.20)	MADE GROUND - Brown SAND. Dand is fine to medium.		148.10	
3.30 - 3.50	ES 7			3.20	SPT (S) 13 (2-2-**3-3-3-4**) (Insitu PID.) - 0ppmv	3.10 (0.40)	Soft brown silty CLAY.		147.90	
3.50 - 4.70	B 5					3.50	Brown and grey sandy GRAVEL. Gravel is fine to coarse rounded to angular mudstone. siltstone and sandstone.		147.50	
4						(1.20)				
				4.20	SPT (S) 20 (2-9-**3-5-5-7**)					
				4.70	SPT (C) 50/115mm (25-50/40mm—)	4.70	Terminated at 4.7mbgl upon refusal		146.30	

Equipment used:

Remarks:

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AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS108
Dates : 5/7/22 - 5/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.00 m A.O.D. *Level to Ordnance Datum* Coordinates: 305752.51 E 203963.26 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS109

Dates : 20/7/22 - 20/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.08 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305744.63 E, 204008.85 N *Co-ordinates to National Grid*

	Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.25)	Concrete			
	0.30	ES				(Insitu PID.) - 0ppmv	0.25	MADE GROUND - Black and light brown gravelly SAND. Gravel is fine to coarse angular coal, slag and mudstone.		150.83	
	0.30 - 0.70	B 1									
	0.30	ES 1				(Insitu PID.) - 0ppmv					
	0.30	ES ES1									
	0.50	ES 2									
	0.70 - 1.20	B 2									
1	1.00	ES				(Insitu PID.) - 0ppmv					
	1.00	ES 3									
	1.00	ES ES3									
	1.20 - 3.20	B 3					(3.05)				
2											
					2.20	SPT (S) 0 (1-0-**0-0-0-0**)					
	2.50	ES 4				(Insitu PID.) - 0ppmv					
3											
					3.20	SPT (S) 4 (1-1-**1-1-1-1**)	3.30	Brown silty SAND.		147.78	
	3.50 - 4.50	B									
	3.50 - 4.50	B 4									
4	4.00	ES 5				(Insitu PID.) - 0ppmv					
	4.00	ES ES5					(1.60)				
					4.20	SPT (S) 6 (2-1-**2-2-1-1**)					
5							4.90	Brown sandy GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded siltstone.		146.18	
					5.10	SPT (C) 50/90mm (25-50/15mm—)	(0.20)				
							5.10	Terminated upon refusal at 5.1mbgl		145.98	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS109
Dates : 20/7/22 - 20/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.08 m A.O.D. *Level to Ordnance Datum* Coordinates: 305744.63 E 204008.85 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS110

Dates : 19/7/22 - 19/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.39 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305705.36 E 204006.32 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.25)	Concrete			
	0.30 - 0.70	B 1					0.25	MADE GROUND - Greyish brown gravelly SAND. Gravel is fine to coarse sub-rounded to sub-angular siltstone and sandstone (SUB-BASE)		151.14	
	0.50	ES 1				(Insitu PID.) - 0ppmv	(0.45)				
	0.70 - 1.20	B 2					0.70	MADE GROUND - Grey slightly sandy GRAVEL. Gravel is fine to coarse angular mudstone.		150.69	
1	1.00	ES 2				(Insitu PID.) - 0ppmv					
	1.00	ES ES2									
	1.20 - 3.00	B 3									
2											
					2.20	SPT (S) 9 (1-2-**2-2-2-3**)	(3.05)				
	2.50	ES 3				(Insitu PID.) - 0ppmv					
	2.50	ES ES3									
3											
					3.20	SPT (S) 13 (1-2-**4-5-3-1**)					
							3.75	Dark brown sandy SILT.		147.64	
4	4.00	ES 4				(Insitu PID.) - 0ppmv					
	4.00	ES ES4									
					4.20	SPT (S) 4 (1-1-**1-1-1-1**)	(0.85)				
					4.60	SPT (C) 50/95mm (25-50/20mm—)	4.60	Terminated at 4.6mbgl upn refusal		146.79	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS110
Dates : 19/7/22 - 19/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.39 m A.O.D. *Level to Ordnance Datum* Coordinates: 305705.36 E 204006.32 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS111

Dates : 19/7/22 - 19/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.27 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305698.51 E, 204035.90 N *Co-ordinates to National Grid*

	Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.25)	Concrete			
	0.30	ES 1				(Insitu PID.) - 0ppmv	0.25	MADE GROUND - Black gravelly SAND. Gravel is fine to coarse angular to sub-angular coal, slag and mudstone.		151.02	
	0.50	ES 2				(Insitu PID.) - 0ppmv					
1	1.00	ES 3				(Insitu PID.) - 0ppmv					
	1.20 - 3.00	B 1					(2.85)				
2					2.20	SPT (S) 5 (1-1-**2-1-1-1**)					
	2.50	ES 4				(Insitu PID.) - 0ppmv					
3					3.20	SPT (S) 4 (1-1-**1-1-1-1**)	3.10	Brown silty SAND.		148.17	
	3.50	D 1									
	3.50 - 4.00	B 2					(1.30)				
4	4.00	ES 5				(Insitu PID.) - 0ppmv					
					4.20	SPT (S) 27 (3-9-**8-6-4-9**)					
					4.45	SPT (C) 50/85mm (25-50/10mm—)	4.40 (0.25)	Brown sandy GRAVEL. Gravel is fine to coarse sub-rounded siltstone.		146.87	
							4.65	Terminated upon refusal at 4.65mbgl		146.62	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory		Borehole No.
Client : Merthyr Tydfil County Borough Council		WS111
Dates : 19/7/22 - 19/7/22	Job Number : Q0838	Ground Level : 151.27 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Redstart	Coordinates: 305698.51 E 204035.90 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS112

Dates : 5/7/22 - 5/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.52 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305684.62 E, 204066.93 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.08)	Asphalt			
	0.20	ES 1				(Insitu PID.) - 0ppmv	0.08 (0.27)	MADE GROUND - Brownish grey sandy GRAVEL with occasional wood fragments.		151.44	
							0.35	Gravel is fine to coarse angular sandstone.		151.17	
	0.50	ES 2				(Insitu PID.) - 0ppmv		MADE GROUND - Reddish brown and grey sandy GRAVEL with medium cobble content. Gravel is fine to coarse angular brick, mudstone and hardened paint. Cobbles are angular brick.			
1	1.00	ES 3				(Insitu PID.) - 0ppmv					
	1.40 - 1.50	ES 4				(Insitu PID.) - 0ppmv	(1.95)	..... below 1.2mbgl occasionial 0.05m thick bands / pockets of black gravelly Silt. Gravel is fine to coarse angular clinker. (Sample ES4)			
2	2.00 - 2.20	ES 5				(Insitu PID.) - 0ppmv					
					2.20	SPT (S) 50/95mm (4-25-**35-15/20mm**–)					
					2.30	SPT (C) 50/85mm (25-50/10mm—)	2.30	Terminated at 2.3mbgl upon refusal		149.22	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS112

Dates : 5/7/22 - 5/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.52 m A.O.D. *Level to Ordnance Datum* Coordinates: 305684.62 E 204066.93 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS113

Dates : 15/7/22 - 15/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.75 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305680.87 E 204133.84 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.05)	Asphalt		150.70	
							0.05	Concrete			
							(0.18)	MADE GROUND - Orangeish brown sandy GRAVEL with medium cobble content. Gravel is fine to coarse angular brick. Cobbles are angular brick.		150.52	
	0.50	B 1				(Insitu PID.) - 0ppmv	0.23				
	0.50	ES 1									
1	1.00	B 2				(Insitu PID.) - 0ppmv	(1.57)				
	1.00	ES 2									
	1.00 - 1.80	B 3									
	1.80 - 2.00	ES 2				(Insitu PID.) - 0ppmv	1.80	MADE GROUND - Soft dark brown to black gravelly CLAY. Gravel is fine to coarse angular to sub-rounded sandstone and occasional brick and glass.		148.95	
	1.80 - 2.00	ES 3									
2	1.80 - 2.40	B 4			2.00	SPT (S) 2 (3-3-**2-0-0-0**)	(0.60)				
	2.40 - 3.00	B 5					2.40	Soft brown sandy CLAY.		148.35	
	2.70 - 2.90	ES 4				(Insitu PID.) - 0ppmv	(0.60)				
3					3.00	SPT (S) 50/120mm (2-9-**21-29/45mm**–)	3.00	Reddish brown sandy GRAVEL. Gravel is fine to coarse sub-rounded to sub-angular sandstone and mudstone.		147.75	
					3.20	SPT (C) 50/95mm (25-50/20mm—)	(0.30)				
							3.30	Terminated at 3.3mbgl		147.45	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory		Borehole No. WS113
Client : Merthyr Tydfil County Borough Council		
Dates : 15/7/22 - 15/7/22	Job Number : Q0838	Ground Level : 150.75 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Redstart	Coordinates: 305680.87 E 204133.84 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS114

Dates : 5/7/22 - 8/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.03 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305643.46 E, 204148.83 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.20)	Reinforced Concrete			
	0.20 0.20	B 1 ES 1				(Insitu PID.) - 0ppmv	0.20 (0.25)	MADE GROUND - Black sandy GRAVEL with medium cobble content. Gravel is fine to coarse angular slag, concrete and brick. Cobbles are sub-angular to angular brick and slag.		150.83	
	0.50 0.50	B 2 ES 2				(Insitu PID.) - 0ppmv	0.45	Loose reddish brown mottled light brown gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of mudstone and clinker. (MADE GROUND)		150.58	
1	1.00 1.00	B 3 ES 3				(Insitu PID.) - 0ppmv					
	1.20 - 2.20	B 4					(1.75)				
2	2.00	ES 4									
	2.20 - 3.20	B 5			2.20	SPT (S) 21 (2-4-**4-2-7-8**)	2.20	Medium dense black sandy angular to subrounded fine to coarse GRAVEL of mudstone and coal. (MADE GROUND)		148.83	
							(1.00)				
3	3.00	ES 5									
	3.20 - 3.45	D 1			3.20	SPT (S) 50/130mm (1-6-**25-25/55mm**-)	3.20 (0.25)	Dense greyish brown sandy gravelly SILT. Gravel is subrounded to rounded fine to coarse of sandstone. (ALLUVIUM)		147.83	
					3.45	SPT (C) 50/80mm (25-50/5mm----)	3.45	Terminated at 3.45mbgl upon refusal		147.58	

Equipment used: Dando Terrier
Remarks: 1.) Hand pit dug to 1.20m,
2.) Refusal at 3.45m.
3.) No Groundwater Encountered

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Borehole No. WS114

Dates : 5/7/22 - 8/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.03 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305643.46 E 204148.83 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS116

Dates : 21/7/22 - 21/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.76 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305653.31 E 204171.16 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.25)	Concrete			
	0.30 - 0.80	B 1					0.25	MADE GROUND - Orangeish red gravelly SAND. Gravel is fine to coarse angular to sub-angular mudstone and slag.		150.51	
	0.50	ES 1				(Insitu PID.) - 0ppmv					
	0.80 - 1.20	B 2									
1	1.00 1.00	ES 2 ES ES2				(Insitu PID.) - 0ppmv	(1.35)				
	1.50	D 1									
							1.60	MADE GROUND - Black sandy SILT.		149.16	
	1.80 - 2.80 1.80 - 2.80	B B 3					(0.10) 1.70	Brown sandy SILT.		149.06	
2											
					2.20	SPT (S) 6 (1-1-**4-2-0-0**)	(1.30)				
	2.50 2.50	ES 3 ES ES3				(Insitu PID.) - 0ppmv					
3							3.00	Brown sandy GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded siltstone.		147.76	
					3.20	SPT (S) 43 (6-5-**8-6-12-17**)					
	3.50	D 2					(0.90)				
					3.90	SPT (C) 50/80mm (25-50/5mm----)	3.90	Terminated at 3.9mbgl upon refusal		146.86	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS116
Dates : 21/7/22 - 21/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 150.76 m A.O.D. *Level to Ordnance Datum* Coordinates: 305653.31 E 204171.16 N *Co-ordinates to National Grid*

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Operator:	Logged By.	Sheet No.	m Per Page	
QGL	T Goodrick	1 Of 1	2	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS117

Dates : 21/7/22 - 21/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.70 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305613.70 E 204190.90 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA					
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water	Install/ Backfill
							(0.30)	Concrete				
	0.40 - 1.20	B 1					0.30	MADE GROUND - Reddish brown sandy GRAVEL. Gravel is fine to coarse angular to sub-angular mudstone and slag.		151.40		
	0.50	ES 1				(Insitu PID.) - 0ppmv						
	0.50	ES ES1										
1	1.00	ES 2				(Insitu PID.) - 0ppmv	(1.40)					
	1.00	ES ES2										
	1.20 - 1.70	B 2										
							1.70	Terminated upon refusal on suspected concrete slab at 1.7mbgl		150.00		

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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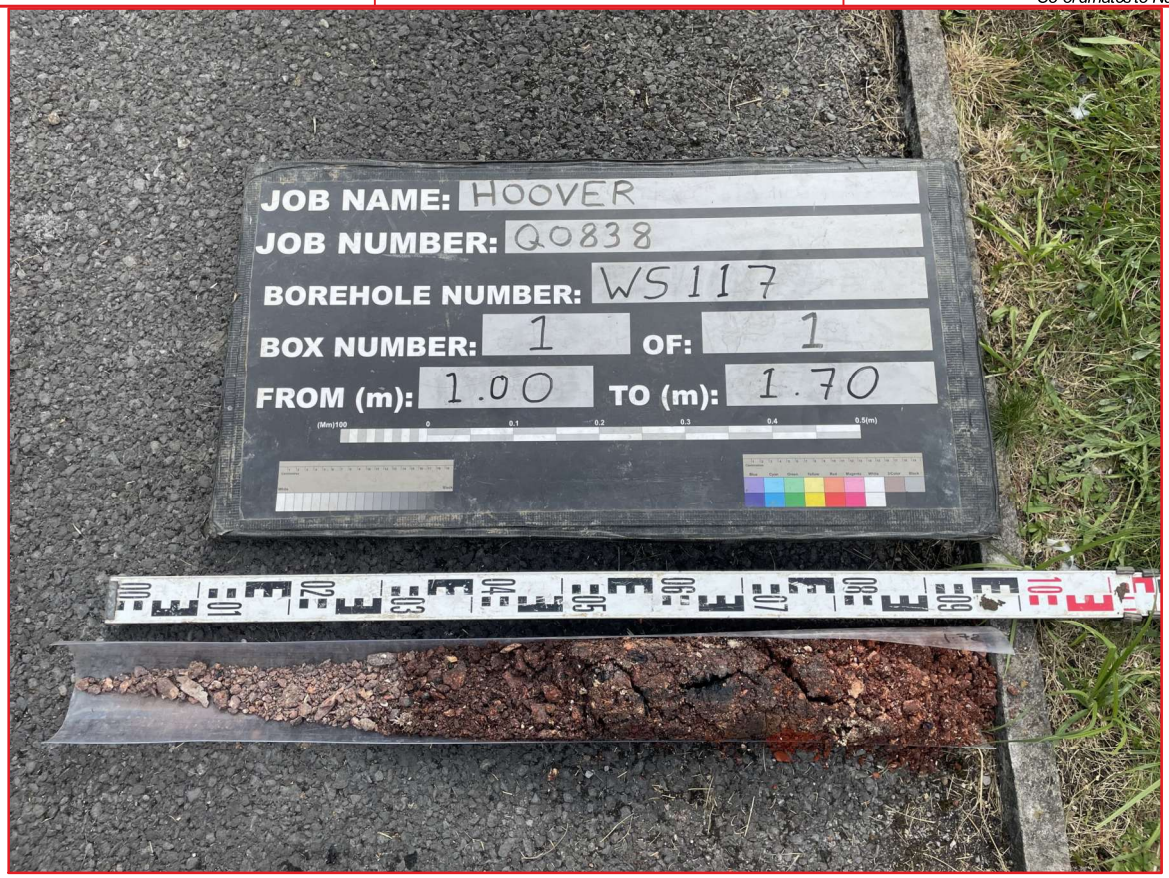
AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS117
Dates : 21/7/22 - 21/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.70 m A.O.D. *Level to Ordnance Datum* Coordinates: 305613.70 E 204190.90 N *Co-ordinates to National Grid*



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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS118

Dates : 21/7/22 - 21/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.70 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305613.68 E 204190.89 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA			Red. Level . A.O.D.	Water
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend		
							(0.30)	Concrete			
	0.40 - 1.20	B 1					0.30	MADE GROUND - Reddish brown sandy GRAVEL. Gravel is fine to coarse angular to sub-angular mudstone and slag.		151.40	
	0.50	ES 1				(Insitu PID.) - 0ppmv					
1	1.00	ES 2				(Insitu PID.) - 0ppmv	(1.40)				
	1.00	ES ES2									
	1.20 - 1.70	B 2									
							1.70	Terminated upon refusal on suspected concrete slab at 1.7mbgl		150.00	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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Operator:	Logged By.	Sheet No.	m Per Page	
QGL	T Goodrick	1 Of 1	7	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS118
Dates : 21/7/22 - 21/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.70 m A.O.D. *Level to Ordnance Datum* Coordinates: 305613.68 E 204190.89 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS119

Dates : 5/7/22 - 5/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.55 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305623.21 E, 204208.00 N *Co-ordinates to National Grid*

	Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.20)	Reinforced Concrete			
	0.20	ES 1				(Insitu PID.) - 0ppmv	0.20	MADE GROUND - Reddish brown sandy GRAVEL. Gravel is fine to coarse angular brick.		151.35	
							(0.10)			151.25	
	0.50	ES 2				(Insitu PID.) - 0ppmv	0.30	MADE GROUND - Dense grey to dark grey sandy angular to subangular fine to coarse GRAVEL of mudstone.			
1	1.00	ES 3				(Insitu PID.) - 0ppmv					
	1.20 - 2.20	B 4									
2							(3.40)				
	2.20 - 3.20	B 5			2.20	SPT (S) 18 (2-2-**4-5-5-4**)					
	2.50	ES 4									
3											
	3.20 - 3.70	B 6			3.20	SPT (S) 50/270mm (9-10-**9-9-12-20/45mm**)					
	3.50	ES 5									
					3.70	SPT (C) 50/85mm (25-50/10mm—)	3.70	Terminated at 3.7mbgl upon refusal		147.85	

Equipment used: Dando terrier

Remarks: 1.) Hand pit dug to 1.20m,
2.) Refusal at 3.70m,
3.) Cable Percussion follow on.
4.) No Groundwater Encountered

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QGL	T.Goodrick	1 Of 1	7	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS119

Dates : 5/7/22 - 5/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.55 m A.O.D. *Level to Ordnance Datum* Coordinates: 305623.21 E 204208.00 N *Co-ordinates to National Grid*

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QGL	T.Goodrick	1 Of 1	2	All measurements in metres unless otherwise stated

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS120

Dates : 15/7/22 - 15/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.77 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305636.53 E 204259.49 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.20)	Concrete			
							0.20	MADE GROUND - Greyish brown sandy GRAVEL with medium cobble content and occasional pockets of brown gravelly clay. Gravel is fine to coarse angular slag and occasional clinker.		151.57	
	0.50	B 1				(Insitu PID.) - 0ppmv					
	0.50	ES 1									
1	1.00	B 2				(Insitu PID.) - 0ppmv					
	1.00	ES 2									
	1.00 - 2.40	B 3					(2.20)				
	1.80 - 2.00	ES 3				(Insitu PID.) - 0ppmv					
2	2.00	SPTLS 1			2.00	SPT (S) 28 (2-2-**2-4-8-14**)					
					2.40	SPT (C) 50/90mm (25-50/15mm—)	2.40	Terminated at 2.4mbgl upon refusal		149.37	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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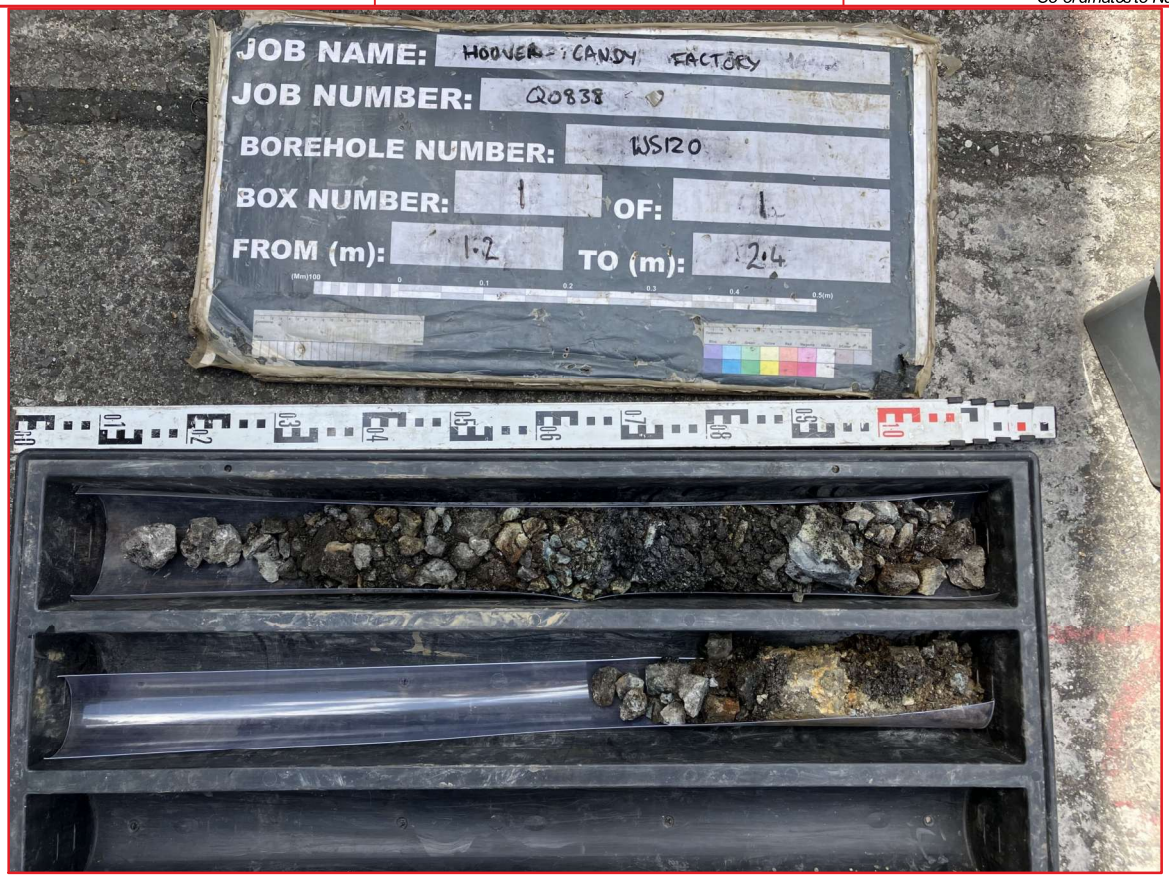
QGL	P Darby	1 Of 1	7	

AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS120

Dates : 15/7/22 - 15/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.77 m A.O.D. *Level to Ordnance Datum* Coordinates: 305636.53 E 204259.49 N *Co-ordinates to National Grid*



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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS121

Dates : 15/7/22 - 15/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.70 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305716.72 E 204281.51 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA					
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water	Install/ Backfill
							(0.30)	Concrete				
	0.50 0.50	B 1 ES 1				(Insitu PID.) - 0ppmv	0.30	MADE GROUND - Reddish brown sandy GRAVEL. Gravel is fine to coarse angular brick.		151.40		
1	1.00 1.00	B 2 ES 2				(Insitu PID.) - 0ppmv	(2.40)					
2					2.20	SPT (S) 0 (1-0-**0-0-0-0**)						
	2.70 - 3.60 2.70 - 3.60	B B 3					2.70	MADE GROUND - Dark brown and black sandy GRAVEL. Gravel is fine to coarse angular slag and clinker.		149.00		
3	3.00 - 3.20	ES 3				(Insitu PID.) - 0ppmv	(0.90)					
	3.30 - 3.40	ES 4			3.20	SPT (S) 18 (1-1-**1-4-6-7**) (Insitu PID.) - 0ppmv		..... between 3.3 and 3.4mbgl black liquid on gravel surfaces. No odour.				
	3.60 - 4.50 3.60 - 4.50	B B 4					3.60	Brown sandy GRAVEL. Gravel is fine to coarse angular sandstone and mudstone.		148.10		
4	4.00 - 4.20	ES 5				(Insitu PID.) - 0ppmv	(0.90)					
					4.20	SPT (S) 38 (1-**4-6-8-8-16**)						
					4.50	SPT (C) 50/85mm (25-50/10mm---)	4.50	Terminated upon refusal at 4.5mbgl		147.20		

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS121

Dates : 15/7/22 - 15/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.70 m A.O.D. *Level to Ordnance Datum* Coordinates: 305716.72 E 204281.51 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS122

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.02 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305895.73 E 204244.41 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.20	ES				(Insitu PID.) - 0ppmv	(0.30)	MADE GROUND - Brown silty slightly sandy GRAVEL. Gravel is fine to coarse angular limestone.			
	0.20	B 1									
	0.20	ES 1					0.30			149.72	
	0.50	B 2				(Insitu PID.) - 0ppmv	(0.50)	MADE GROUND - Grey silty slightly sandy GRAVEL. Gravel is fine to coarse angular mudstone. (COLLIERY SPOIL)			
	0.50	ES 2									
							0.80			149.22	
1	1.00	D				(Insitu PID.) - 0ppmv		MADE GROUND - Black ashy gravelly SILT. Gravel is fine to coarse angular clinker and coal.			
	1.00	ES									
	1.00	B 3									
	1.00	ES 3									
	1.00 - 2.00	B 4									
	1.40 - 1.60	ES 4				(Insitu PID.) - 0ppmv	(1.20)				
2	2.00	SPTLS 1			2.00	SPT (S) 23 (5-6-**6-5-6-6**)	2.00	Brown sandy GRAVEL. Gravel is fine to coarse rounded to angular sandstone.		148.02	
	2.00 - 2.20	ES 5				SPT (S) 23 (5-6-**6-5-6-6**) (Insitu PID.) - 0ppmv	(0.40)				
					2.40	SPT (C) 50/10mm (10-20-**50/10mm**—)	2.40	Terminated at 2.4mbgl upon refusal		147.62	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No Groundwater Encountered

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QGL	P Darby	1 Of 1	7	All measurements in metres unless otherwise stated

AGS

Contract : Hoover Candy Factory		Borehole No.
Client : Merthyr Tydfil County Borough Council		WS122
Dates : 12/7/22 - 12/7/22	Job Number : Q0838	Ground Level : 150.02 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Redstart	Coordinates: 305895.73 E 204244.41 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS123

Dates : 13/7/22 - 13/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 150.75 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305909.73 E 204255.58 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.30	ES					(0.40)	MADE GROUND - Brown silty slightly sandy GRAVEL and low cobble content. Gravel is fine to coarse angular siltstone. Cobbles are angular siltstone.			
	0.30	B 1				(Insitu PID.) - 0ppmv					
	0.30	ES 1					0.40			150.35	
	0.50	B 2				(Insitu PID.) - 0ppmv		MADE GROUND - Grey silty slightly sandy GRAVEL. Gravel is fine to coarse angular mudstone. (COLLIERY SPOIL)			
	0.50	ES 2									
1	1.00	ES				(Insitu PID.) - 0ppmv					
	1.00	B 3									
	1.00	ES 3					(2.00)				
2					2.00	SPT (S) 23 (5-6-**6-5-6-6**)					
					2.40	SPT (C) 50/10mm (10-15-**50/10mm**—)	2.40	Terminated at 2.40mbgl		148.35	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No Groundwater Encountered

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Contract : Hoover Candy Factory		Borehole No.
Client : Merthyr Tydfil County Borough Council		WS123
Dates : 13/7/22 - 13/7/22	Job Number : Q0838	Ground Level : 150.75 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Redstart	Coordinates: 305909.73 E 204255.58 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS124

Dates : 13/7/22 - 13/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 149.38 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305877.98 E 204214.50 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.06)	Asphalt		149.32	
	0.20	B 1				(Insitu PID.) - 0ppmv	0.06	MADE GROUND - Grey silty GRAVEL. Gravel is fine to coarse angular siltstone (SUB-BASE)			
	0.20	ES 1					(0.24)			149.08	
	0.50 - 0.00	B				(Insitu PID.) - 0ppmv	0.30	MADE GROUND - Grey silty slightly sandy GRAVEL. Gravel is fine to coarse angular mudstone.			
	0.50	ES									
	0.50	B 2					(0.70)				
	0.50	ES 2									
1	1.00 - 2.00	B 3									
	1.10 - 1.30	ES				(Insitu PID.) - 0ppmv	1.00	MADE GROUND - Dark grey to black slightly sandy slightly gravelly SILT. Gravel is fine to coarse angular clinker and coal.		148.38	
	1.10 - 1.30	ES 3									
							(1.20)				
2					2.00	SPT (S) 50/245mm (5-16-**15-14-15-6/20mm**)					
	2.20 - 2.40	D					2.20	Orangey brown silty slightly gravelly SAND. Gravel is fine to coarse rounded sandstone.		147.18	
	2.20 - 2.40	D 1					(0.20)				
					2.40	SPT (C) 50/95mm (25-50/20mm—)	2.40	Terminated at 2.4mbgl		146.98	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No Groundwater Encountered

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AGS

Contract : Hoover Candy Factory **Client : Merthyr Tydfil County Borough Council**		**Borehole No.** **WS124**
Dates : 13/7/22 - 13/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 149.38 m A.O.D. *Level to Ordnance Datum* Coordinates: 305877.98 E 204214.50 N *Co-ordinates to National Grid*

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AGS

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS125

Dates : 12/7/22 - 12/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 149.50 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305870.03 E 204232.60 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.10	ES 1				(Insitu PID.) - 0ppmv	(0.20)	MADE GROUND - Grey silty GRAVEL. Gravel is fine to coarse angular to sub-angular siltstone.			
	0.30	B 1					0.20			149.30	
	0.50	B 2				(Insitu PID.) - 0ppmv	(0.60)	MADE GROUND - Black sandy GRAVEL with low cobble content. Gravel is fine to coarse sub-angular to angular slag and clinker. Cobbles are sub-angular slag.			
	0.50	ES 2					0.80				
1	1.00	B 3				(Insitu PID.) - 0ppmv		Brown slightly gravelly silty SAND. Gravel is fine to coarse rounded to sub-angular sandstone and quartz.		148.70	
	1.00	ES 3					(0.60)				
	1.60 - 1.80	ES 4				(Insitu PID.) - 1.8ppmv	1.40	Brown and grey sandy GRAVEL. Gravel is fine to coarse sub-rounded to sub-angular sandstone and quartz.		148.10	
2	2.00	SPTLS 1					(1.05)				
					2.20	SPT (S) 24 (9-4-**6-6-7-5**)					
					2.45	SPT (C) 50/80mm (25-50/5mm-----)	2.45	Terminated at 2.45mbgl upon refusal		147.05	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No Groundwater Encountered

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AGS

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS125
Dates : 12/7/22 - 12/7/22 Location :	Job Number : Q0838 Engineer : Redstart
Ground Level : 157.79 m A.O.D. *Level to Ordnance Datum*	
Coordinates: 305648.51 E 204465.93 N *Co-ordinates to National Grid*	

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QGL	P Darby	1 Of 1	2		

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS126

Dates : 11/7/22 - 11/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 157.79 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305648.51 E 204465.93 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
0.20	B 1				(Insitu PID.) - 0ppmv	(0.25)	TOPSOIL - Greyish brown slightly gravelly SILT with many rootlets. Gravel is fine to coarse angular mudstone and occasionial slag.			
0.20	ES 1					0.25	MADE GROUND - Grey gravelly SILT. Gravel is fine to coarse angular mudstone.		157.54	
0.50	B 2				(Insitu PID.) - 0ppmv	(0.55)				
0.50	ES 2					0.80	MADE GROUND - Grey, locally orange, silty GRAVEL. Gravel is fine to coarse angular mudstone. (COLLIERY SPOIL)		156.99	
1.00	B 3				(Insitu PID.) - 0ppmv					
1.00	ES 3									
1.20 - 2.20	B 4									
2.20	SPTLS 1			2.20	SPT (S) 5 (1-1-**1-1-1-2**)					
2.20 - 4.20	B 5									
2.40 - 2.60	ES 4				(Insitu PID.) - 0ppmv					
3.20	SPTLS 2			3.20	SPT (S) 4 (1-1-**1-1-1-1**)					
						(5.40)				
3.90 - 4.10	ES 5				(Insitu PID.) - 0ppmv					
4.20	SPTLS 3			4.20	SPT (S) 6 (1-1-**1-1-2-2**)					
4.20 - 6.20	B 6									
5.20	SPTLS 4			5.20	SPT (S) 15 (1-4-**4-4-3-4**)					
5.40 - 5.60	ES 6				(Insitu PID.) - 0ppmv					
6.20	SPTLS 5			6.20	SPT (S) 6 (1-1-**1-1-2-2**)	6.20	Terminated at 6.2mbgl		151.59	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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QGL	P Darby	1 Of 1	7	

Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS126
Dates : 11/7/22 - 11/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 157.79 m A.O.D. *Level to Ordnance Datum* Coordinates: 305648.51 E 204465.93 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS127

Dates : 28/7/22 - 28/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 152.79 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305701.30 E, 204344.25 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
							(0.07)	CONCRETE pavier.		152.72	
	0.30 - 0.50	B 1					(0.05)	MADE GROUND: Yellowish brown slightly silty SAND. Sand is fine to medium.		152.67	
	0.50	ES 2				(Insitu PID.) - 0ppmv	0.07				
							0.12 (0.68)	MADE GROUND: Reddish brown black slightly clayey slightly sandy GRAVEL with low cobble content of concrete. Gravel is angular to sub angular fine to coarse sandstone, siltstone, brick, concrete and ash.			
							0.80			151.99	
1	1.00	ES 3				(Insitu PID.) - 0ppmv		MADE GROUND: Reddish grey slightly sandy GRAVEL. Gravel is angular fine to coarse brick and ash.			
	1.00 - 1.20	B 4									
	1.20 - 3.50	B 5			1.20	SPT () 4 (1-1-**1-1-1-1**)					
			101	70							
2					2.00	SPT () 6 (2-3-**3-1-1-1**)					
							(2.75)				
	2.50	ES 6	101	75		(Insitu PID.) - 0ppmv					
3					3.00	SPT () 26 (4-8-**7-7-7-5**)					
			101	100							
							3.55 (0.35)	Dense dark brown sandy gravelly SILT. Gravel is subrounded to rounded fine to coarse of sandstone. (ALLUVIUM)		149.24	
	3.70	D 7									
	3.80	ES 8				(Insitu PID.) - 0ppmv					
4	4.00 - 4.50	B 9			4.00	SPT () 50/295mm (6-6-**10-11-19-10/70mm**)	3.90 (0.60)	Dense brown slightly silty sandy GRAVEL. Gravel is sub angular to sub rounded fine to coarse sandstone.		148.89	
			101	100							
					4.50	SPT () 50/233mm (11-12-**14-18-15-3/8mm**)	4.50	Window sample refused at 4.5mbgl		148.29	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS127
Dates : 28/7/22 - 28/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 152.79 m A.O.D. *Level to Ordnance Datum* Coordinates: 305701.30 E 204344.25 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS128

Dates : 4/7/22 - 4/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 151.70 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305602.23 E 204242.38 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA					
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water	Install/ Backfill
							(0.22)	Reinforced CONCRETE				
	0.20 0.20	B 1 ES 1				(Insitu PID.) - 0ppmv	0.22 (0.23)	MADE GROUND - Grey slightly silty slightly sandy GRAVEL. Gravel is fine to coarse angular sandstone. (SUB-BASE)		151.48		
	0.50 0.50	B 2 ES 2				(Insitu PID.) - 0ppmv	0.45	MADE GROUND - Grey clayey slightly snady GRAVEL with medium cobble content. Gravel is fine to coarse angular mudstone. Cobbles are angular mudstone. (COLLIERY SPOIL)		151.25		
1	1.00 1.00 1.00 - 1.70	B 3 ES 3 B 4				(Insitu PID.) - 0ppmv	(1.25)					
	1.70 - 2.00 1.80	B 5 ES 4				(Insitu PID.) - 0ppmv	1.70	MADE GROUND - Black, grey and brown locally clayey sany GRAVEL with medium cobble content. Gravel is fine to coarse angular slag, brick and mudstone. Cobbles are angular slag.		150.00		
2	2.00 - 3.00	B 6			2.20	SPT (S) 50/245mm (4-5-**6-19-22-3/20mm**)						
							(2.30)					
3	3.00 - 4.00	B 7										
	3.30	ES 5			3.20	SPT (S) 26 (3-3-**6-7-6-7**) (Insitu PID.) - 0ppmv						
4	4.00 - 4.45 4.00 - 4.54 4.10	B B 8 ES 6			4.20	(Insitu PID.) - 0ppmv SPT (S) 50/200mm (2-8-**17-15-18/50mm**-)	4.00 (0.54)	Brown slightly silty sandy GRAVEL. Gravel is fine to coarse sub-rounded to sub-angular sandstone and siltstone.		147.70		
					4.57	SPT (C) 50/90mm (25-50/15mm---)	4.54	Terminated at 4.54mbgl upon refusal		147.16		

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl.

Groundwater at 4.0mbgl

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Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS128
Dates : 4/7/22 - 4/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 151.70 m A.O.D. *Level to Ordnance Datum* Coordinates: 305602.23 E 204242.38 N *Co-ordinates to National Grid*

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QGL	P Darby	1 Of 1	2	

Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS129

Dates : 21/7/22 - 21/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 155.56 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305581.87 E 204322.26 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA					
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water	Install/ Backfill
							(0.10)	Asphalt				
	0.20	ES				(Insitu PID.) - 0ppmv	0.10	MADE GROUND - Grey and black sandy GRAVEL with medium cobble content. Gravel is fine to coarse angular slag and coal. Cobbles are angular slag.		155.46		
	0.20	ES 1					(0.30)					
	0.20	ES ES1					0.40	MADE GROUND - Grey sandy GRAVEL. Gravel is fine to coarse angular slag.		155.16		
	0.50 - 1.10	B 1				(Insitu PID.) - 0ppmv	(0.40)					
	0.50	ES 2					0.80	MADE GROUND - Grey slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse angular mudstone.		154.76		
1	1.00	ES 3				(Insitu PID.) - 0ppmv						
	1.00	ES ES3										
	1.10 - 3.50	B 2										
2					2.10	SPT (S) 7 (2-2-1-1-3-2)						
							(3.10)					
	2.50	ES 4				(Insitu PID.) - 0ppmv						
3					3.10	SPT (S) 5 (1-1-1-1-1-2)						
							3.90	MADE GROUND - Grey, brown and black gravelly SAND. Gravel is fine to coarse sub-angular to sub-rounded slag, siltstone and coal.		151.66		
4	4.00 - 5.00	B 3				(Insitu PID.) - 0ppmv						
	4.00	ES 5			4.10	SPT (S) 23 (5-7-5-5-6-7)						
	4.00	ES ES5					(1.65)					
5												
							5.55	Terminated upon refusal at 5.55mbgl		150.01		

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS130

Dates : 20/7/22 - 20/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 156.94 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305552.88 E 204472.52 N *Co-ordinates to National Grid*

	Samples		Sample Run		Tests		STRATA					
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water	Install/ Backfill
							(0.20)	Concrete				
	0.20 - 0.50	B 1					0.20					
	0.30	ES 1				(Insitu PID.) - 0ppmv	(0.30)	MADE GROUND - Grey gravelly SAND. Gravel is fine to coarse sub-rounded to sub-angular limestone.		156.74		
	0.30	ES ES1					0.50			156.44		
	0.50 - 1.00	B 2						MADE GROUND - Black, red and orange sandy GRAVEL. Gravel is fine to coarse mudstone, coal and slag.				
	0.60	ES 2				(Insitu PID.) - 0ppmv						
	0.60	ES ES2										
1	1.00 - 2.00	B 3										
	1.00	ES 3				(Insitu PID.) - 0ppmv						
	1.00	ES ES3					(1.50)					
2	2.00 - 4.00	B 4			2.00	SPT (S) 12 (2-3-**3-3-3-3**)	2.00	MADE GROUND - Brown to grey sandy GRAVEL. Gravel is fine to coarse sub-angular to angular mudstone.		154.94		
	2.50	ES 4				(Insitu PID.) - 0ppmv						
3					3.00	SPT (S) 9 (2-2-**2-2-2-3**)	(2.30)					
4	4.00	ES 5			4.00	SPT (S) 9 (2-2-**3-2-2-2**)						
					4.30	SPT (S) 9 (2-2-**3-2-2-2**) (Insitu PID.) - 0ppmv SPT (C) 50/80mm (25-50/5mm----)	4.30	Terminated at 4.3mbgl upon refusal		152.64		

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council		Borehole No. WS130
Dates : 20/7/22 - 20/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 156.94 m A.O.D. *Level to Ordnance Datum* Coordinates: 305552.88 E 204472.52 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS131

Dates : 20/7/22 - 20/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 157.28 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305565.99 E 204550.63 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA				
Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
						(0.25)	Concrete			
0.30 - 0.60	B 1				(Insitu PID.) - 0ppmv	0.25	MADE GROUND - Dark grey slightly clayey sandy GRAVEL. Gravel is fine to coarse angular to sub-angular mudstone.		157.03	
0.30	ES 1									
0.30	ES ES1				(Insitu PID.) - 0ppmv					
0.50	ES 2				SPT (C) 14					
0.60 - 4.00	B 2			0.60	(5-4-**6-3-2-3**)					
				1.00	SPT (S) 14 (3-2-**2-3-2-7**)					
				2.00	SPT (S) 8 (1-1-**3-3-1-1**)					
						(3.95)				
2.50	ES 3				(Insitu PID.) - 0ppmv					
2.50	ES ES4									
				3.00	SPT (S) 16 (1-1-**1-1-5-9**)					
4.00	ES 4			4.00	SPT (S) 18 (2-2-**2-4-6-6**)					
4.20 - 4.80	B 3				SPT (S) 18 (Insitu PID.) - 0ppmv	4.20	MADE GROUND - Black and grey gravelly SAND. Gravel is fine to coarse angular coal and slag.		153.08	
						(0.60)				
				4.80	SPT (C) 50/80mm (25-50/5mm----)	4.80	Terminated at 4.8mbgl upon refusal		152.48	

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. No groundwater encountered

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AGS

Contract : Hoover Candy Factory		Borehole No.
Client : Merthyr Tydfil County Borough Council		WS131
Dates : 20/7/22 - 20/7/22	Job Number : Q0838	Ground Level : 157.28 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Redstart	Coordinates: 305565.99 E 204550.63 N *Co-ordinates to National Grid*

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Contract : Hoover Candy Factory

Client : Merthyr Tydfil County Borough Council

Window Sample No. WS132

Dates : 11/7/22 - 11/7/22

Location :

Job Number : Q0838

Engineer : Redstart

Ground Level : 156.52 m A.O.D. *Level to Ordnance Datum*

Coordinates: 305700.46 E, 204437.82 N *Co-ordinates to National Grid*

Samples		Sample Run		Tests		STRATA					
	Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water	Install/ Backfill
							(0.06)	Asphalt		156.46		
							0.06	MADE GROUND - Grey silty slightly sandy GRAVEL. Gravel is fine to coarse angular sandstone. (SUB-BASE)		156.30		
							(0.16)					
	0.50	ES 1				(Insitu PID.) - 0ppmv	0.22	MADE GROUND - Purpleish brown sandy GRAVEL. Gravel is fine to coarse angular brick, mudstone and slag.				
1	1.00 - 2.00	B 1				(Insitu PID.) - 0ppmv						
	1.00	ES 2						..... between 1.5 and 2.0mbgl occasional thin (<5cm) thick layers of black silt.				
2	2.00 - 4.00	B 2										
					2.20	SPT (S) 4 (1-1-**1-1-1-1**)						
	2.50 - 2.70	ES 3				(Insitu PID.) - 0ppmv	(4.48)					
3												
					3.20	SPT (S) 4 (1-1-**1-1-1-1**)						
4	4.00 - 4.20	ES 4				(Insitu PID.) - 0ppmv						
					4.20	SPT (S) 4 (1-1-**1-1-1-1**)						
	4.70 - 5.70	B 3					4.70	MADE GROUND - Soft dark grey to black silty CLAY. Slight hydrocarbon odour		151.82		
	4.80 - 5.00	ES 5				(Insitu PID.) - 13ppmv						
5												
					5.20	SPT (S) 0 (1-0-**0-0-0-0**)	(1.00)					
	5.70 - 6.20	B 4					5.70	MADE GROUND - Soft brownish grey slightly gravelly CLAY. Gravel is fine to coarse sub-angular slag. (REWORKED NATURAL GROUND)		150.82		
	5.80 - 6.00	ES 6				(Insitu PID.) - 0ppmv						
6							(0.50)					
							6.20	Terminated at 6.2mbgl		150.32		

Equipment used: Dando Terrier

Remarks: PAS survey undertaken prior to breaking ground. Hand excavated service clearance pit undertaken to 1.2mbgl. Damp below 4.7mbgl

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Contract : Hoover Candy Factory Client : Merthyr Tydfil County Borough Council	Borehole No. WS132

Dates : 11/7/22 - 11/7/22 Location :	Job Number : Q0838 Engineer : Redstart	Ground Level : 156.52 m A.O.D. *Level to Ordnance Datum* Coordinates: 305700.46 E 204437.82 N *Co-ordinates to National Grid*

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