

Rhydycar West

Hydrogeology & Hydrology Assessment Desk Top Study



November 2022

Version 2

Rhydycar West

Hydrogeology & Hydrology Assessment

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EXECUTIVE SUMMARY

The Brief	Tetra Tech Environment Planning & Transport Limited (formally 'WYG') was instructed by Marvel Limited ('the client') to prepare a Hydrogeological and Hydrological Assessment in support of the outline planning for the construction of a proposed leisure resort on land situated at Rhydycar West, Merthyr Tydfil, Wales. This report has been updated following drainage works that were implemented at the site by Merthyr Tydfil County Borough Council in April and May 2022. These works have changed the hydrological baseline conditions at the site and therefore this report has been updated to account for these changes. A Phase I Geo-Environmental Assessment, Desktop Study and Coal Mining Risk Assessment and Flood Consequence Assessment Report have been prepared in parallel to this report. Both reports should be read in conjunction within this assessment.
The Site	The site is situated to the south-west of Merthyr Tydfil town centre, on the eastern slopes of Mynydd Aberdâr south of the village of Heolgerrig. The site is approximately 31.2 hectares (ha) in size and is located at National Grid Reference (NGR) 304591, 204873.
Site History	The site has been mined for both ironstone and coal for over 200 years. Intensive mining began in the 1760's when the site became the main mineral take for the Cyfartha Iron Works. Several collieries were present at the site and the surrounding area including Cwm Glo Pit, Lower Colliers Row Pit, Glyndyrys Pit and Cwm Pit. As a result, there are a large number of spoil tips present on the site, including the main development platform which includes tipped material from the construction of the A470 dual carriage way. The ironstone and mine workings beneath the site have modified the hydrogeological and hydrological environment beneath the site. These drainage systems act as preferential pathways for groundwater flow beneath the site, with anthropogenic features like spoil tips and subsidence features influencing the drainage network.
Geology	The entire site development is shown to be underlain by Glacial Till deposits and that extensive Made Ground (Spoil Tips) are present across much of the site. The site is situated in the northern outcrop of the South Wales Coalfield. The underlying solid geology shown to be present beneath the site is the Middle and Lower Coal Measures Formations of the South Wales Coal Group. There are thirteen named coal seams, twelve named ironstone veins, and one Marine Band which are shown to outcrop across the site and surrounding area.
Hydrogeology	The coal measures aquifer constitutes a complex multi-layered aquifer system rather than one continuous groundwater body. The aquifer is designated a 'Secondary A Aquifer' by NRW whereas the Glacial Till deposits are designated 'unproductive'. The mining of numerous coal seams and iron veins at the site and in the surrounding area has largely disrupted the natural hydrogeological conditions in the Coal Measures aquifer by the creation of open shafts and disused workings. The site is not shown to be situated within an NRW defined groundwater SPZ. The Water Framework Directive overall classification of the aquifer is 'poor'. There are no licensed groundwater abstractions within 250m of the site boundary. Two private water supplies have been identified but these are greater than 500m from the site boundary.

Hydrology	The majority of the site is largely characterised by a series of small streams and ephemeral channels which are shown to drain issuing streams from the base of spoils tips and water emerging from former mine workings or springs at the base of soil tips. Drainage works undertaken by the Council at the base of the A470 tip capture and divert surface water run-off and spring water to the Cyfartha junction. The land ownership area is split into five hydrological catchment areas of which the site sits within areas 3, 4 and 5. There are no licensed or private water supplies abstracting surface water within 250m of the site boundary.
Environmental Database Search	Pollution Controls: There are no Integrated Pollution Controls, Integrated Pollution Prevention and Controls or Local Authority Pollution Prevention and Controls recorded within 250m of the site. Waste: There are no historical or registered landfills or waste management facilities recorded within 250m of the site. Hazardous Substances: There are no records pertaining to the Control of Major Hazards Sites (COMAH), storage of explosive materials or the Notification of Installations Handling Hazardous Substances (NIHHS) within 250m of the site. Environmentally Sensitive Areas: The majority of the site is located within the Rhydyar Gorllewin/ Rhydyar West SINC and the Cwm Glo a Glyndyrys SSSI is recorded within the area of the site designated for the position of the ski slope and access road. There is also designated woodland immediately southwest and west of the site. Scheduled Ancient Monuments: Cyfarthfa balance pond and leat (adjacent to the boundary); Cwm Pit and head of railway (largely within the south-western area of the site); Black Pins early ironstone workings (68m west) and; Vale of Neath railway cutting and tunnel portal (199m southwest). Flooding: There is no potential on site for groundwater flooding at the surface or below ground level. However, there is potential for surface water flooding at low lying ground to the east of the tub boat canal. Industrial Land Use: There are no trade entities on-site and the closest records relate to Rhydyar Business Park located 75m to the northeast of the site.
Conceptual Site Model	The CSM qualitatively describes the hydrological and hydrogeological environment both prior to and postdating mining activities within the proposed development boundary and the wider site area. Hydrogeological CSM – Pre-Mining Prior to mining at the site, groundwater flow within the main water bearing sandstone horizons would have likely been down geological dip towards the south-west of the site; providing baseflow to the River Taff. Springs emerging at the boundary between sandstone aquifers and low permeability mudstone layers would have been drained by both defined and ephemeral streams, crossing the site in a general east to west orientation. Hydrogeological CSM – Post-Mining The hydrological and hydrogeological environment that exists at the site is complex as a result of this extensive mining with numerous preferential groundwater flow pathways, recharge, and discharge zones. A series of interconnected shafts and adits that exist beneath the site largely control the sites hydrogeology. A former engine shaft located off-site to the southeast is thought to be the main groundwater discharge point for this drainage system. Workings of the Bute and Nine Feet coal seams which are present beneath the site are connected to this drainage system. Grouting of the A470 and deterioration of the drainage network, through mine

	collapse and silting, are reported (Arup 2008) to have increased groundwater levels beneath the site. The basin area (the 'hollow') between the A470 tip and the Cyfartha Pond and Leat acts as a natural soakaway and flooding basin as there is no direct outlet for the Nant Melin Canaid. Water which drains from this area re-emerges as a series of springs on the eastern side of the Glyndyrys/ A470 tip. Hydrological CSM Similar to the hydrogeological system, the hydrology environment has been shaped/modified by the extensive mining works and recent council drainage works at the site. The proposed development is situated between the Nant Rhydycar to the north and the Nant Cannaid to the south and is located within three of the five hydrological catchments across the ownership boundary. The site is largely drained via a series of small streams and drainage channels, a combination of natural and artificial. The Nant Melin Canaid, which flows through Cwm Pit in the south-eastern area and into the basin ('hollow') between the A470 Tip and Cyfartha Pond, has no direct outlet. Water collecting in the hollow discharges to groundwater, providing potential recharge to the underlying groundwater (present in flooded disused workings) and emerging as springs at the base of tips (overlying the boulder clay) to the east of this position (eastern extent of the proposed development). Some of these flows are now captured/ diverted by the new drainage network, created by the Council, which discharges to the Cyfartha Junction. From this point, water flows via a dismantled railway track, towards the former 'Glyndyrus Pond' before eventually discharging to culverts under the A470 at the south-eastern boundary of the land ownership boundary. A Hydrological Map has been prepared as part of this study which outlines the key hydrological features that have been surveyed by Tetra Tech as part of this assessment prior to the recent drainage works completed by the council. A map which shows the partial drainage network and other features surveyed by Tetra Tech in June 2022 is presented in Appendix G.
Risk Assessment	A qualitative risk assessment has been carried out to assess the potential risk the proposed development poses during the construction and operational phases of the planned development. The risk assessment methodology and the sensitivity of the identified receptors has been outlined. Potential mitigation options have been put forward to prevent, remove, and reduce significant adverse effects that have been identified in the risk assessment.
Conclusions and Recommendations	The implementation of specific mitigation measures within the construction and operational phases of the proposed development, in conjunction with good environmental controls, will ensure that any impacts and/or effects on the hydrology and hydrogeology will be quickly controlled and will have a minor to negligible residual risks. This assessment provides a detailed account of the hydrogeological and hydrological environment at the site which is considered to be sufficient to support the outline planning application and therefore not considered to be a barrier to the proposed development. Accordingly, no objections to the development should be sustained on grounds of Hydrology & Hydrogeology. Further recommendations for the collection of site-specific data have been made based on consultation with NRW. These recommended works are to be undertaken to support the detailed design stage and will include; • Drilling of groundwater monitoring boreholes across the site to facilitate groundwater level and quality monitoring; • Preparation of a Groundwater Monitoring Strategy and Plan for agreement with NRW;

- Undertake surface water quality and flow monitoring of key hydrological features;
- Refine and update the CSM through the collection of ground investigation data to support the detailed design stage of the application.
- The recently installed drainage network at the site is incomplete and its effectiveness is not yet to be tested in the absence of any significant rainfall / storm events at the time of the site visit. As such, further investigations and assessment should be carried out to conclude whether elements of the network should be incorporated into the proposed development/ drainage design.

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
AOD	above Ordnance Datum
bgl	below ground level
BGS	British Geological Survey
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
C4SL	Category 4 Screening Levels
CIEH	Chartered Institute of Environmental Health
CLEA	Contaminated Land Exposure Assessment
CoC	Constituent of Concern
CSM	Conceptual Site Model
DEFRA	Department of Environment, food and Rural Affairs
DQRA	Detailed Quantitative Risk Assessment
DTS	Desktop Study
DRO	Diesel Range Organics
DWS	Drinking Water Standard
EA	Environment Agency (England)
EPH	Extractable Petroleum Hydrocarbons
EQS	Environmental Quality Standards
FOC	Fraction Organic Carbon
GPR	Ground Penetrating Radar
LOD	Limit of detection
LQM	Land Quality Management
NRW	Natural Resources Wales
OS	Ordnance Survey
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PPE	Personal Protection Equipment
ppm	parts per million
PRO	Petroleum Range Organics
SGV	Soil Guideline Values
SOM	Soil Organic Matter
SVOC	Semi-volatile organic compounds
TPH	Total Petroleum Hydrocarbon
TSV	Tier 1 Screening Values
VOC	Volatile Organic Carbon
VPH	Volatile Petroleum Hydrocarbons
AOD	above Ordnance Datum

1.0 INTRODUCTION

1.1 INSTRUCTION

Tetra Tech Environment Planning & Transport Limited (formally 'WYG') was instructed by Marvel Limited ('the client') in respect of an outline application for erection of a mixed leisure development comprising indoor snow centre (up to 39,200 sq m), waterpark (up to 7,500 sq m), indoor activity centre (up to 9,000 sq m), external activity areas, hotel accommodation (up to 418 bedrooms), forest lodge accommodation (up to 30 units), car parking (up to 830 spaces) and associated earthworks, access, drainage, servicing and utilities connections/infrastructure on land situated at Rhydycar West, Merthyr Tydfil, Wales (known hereafter as "the site").

The location of the site is shown on Figure 1.

1.2 BRIEF

It is intended that this desk based hydrological and hydrogeological assessment will inform the initial Environmental Impact Assessment (EIA) Scoping stage of the process and serve as a reference in respect of baseline data available for the hydrological and hydrogeological environment when it comes to the EIA stage.

The proposed development plan for the site is shown in the Holder Mathias Architects Masterplan presented at the end of this report as Figure 2 (drawing reference RHDR-HMA-LE-ZZ-DR-A-PL-010, issued 18th January 2022).

The proposed redevelopment of the site for the construction of commercial development is considered to represent the main potential risk to the hydrological (surface water) and hydrogeological (groundwater) environment and is therefore the subject of this desk-based assessment.

Significant drainage works were carried out by Merthyr Tydfil County Borough Council at the site during April and May 2022. The works were put on hold until further notice and as a result, the network remains incomplete. A site visit was undertaken by Tetra Tech on Friday 10th June to survey the drainage works. A site report was completed on Friday 10th June, which outlines the findings of the survey, and is appended to this report in Appendix G. This Hydrogeological and Hydrological Desktop report has been updated to account for the changes to the baseline hydrological conditions at the site.

A Phase I Geo-Environmental Assessment, Desktop Study and Coal Mining Risk Assessment (February 2022) has also been prepared by Tetra Tech in parallel to this report which provides a review of the associated environmental implications and sensitivities associated with the proposed development and provides an initial qualitative assessment of the potential risks. In addition, Tetra Tech have prepared a Flood Consequence Assessment Report (February 2022) to assess the potential of the proposed development to increase flood risk elsewhere, as well as assessing flood risk to the proposed development itself owing to the number of watercourses within the site boundary. Both of these reports should be read in conjunction with this report.

1.3 PROPOSED DEVELOPMENT

The proposed development comprises a mixed leisure development comprising indoor snow centre (up to 39,200 sq m), waterpark (up to 7,500 sq m), indoor activity centre (up to 9,000 sq m), external activity areas, hotel accommodation (up to 418 bedrooms), forest lodge accommodation (up to 30 units), car parking (up to 830 spaces) and associated earthworks, access, drainage, servicing and utilities connections/infrastructure. The proposed development plans are presented at Figure 2.

1.4 REPORT OBJECTIVES

Tetra Tech were instructed to complete a hydrological and hydrogeological desk-based study, which involved the review of the development proposals; the collation of supporting assessments, a review of regulatory

consultee responses; objector concerns; and published hydrological, geological and hydrogeological information for the local area including consideration of available hydrogeological studies and hydraulic testing results for the area.

The main objective of this works is to develop an understanding of the hydrological and hydrogeological site setting, so that a preliminary Conceptual Site Model (CSM) can be developed, thus enabling the later more detailed assessment of potential impacts to the water environment associated with the proposed development.

A preliminary assessment of potential risks to the hydrological and hydrogeological environments has been completed in accordance with current best practice and guidance, which includes an assessment of the groundwater flow regime through the former coal and ironstone workings and relationships between other off-site former coal and ironstone workings.

1.5 REPORT SCOPE

This report includes the following key elements:

- A record of the site visit and visual inspection walkover;
- A discussion of the current site status and key associated environmental influences observable by general visual inspection around the site;
- An historical site and area review, primarily referring to past editions of Ordnance Survey Maps;
- A discussion of the general expected ground and groundwater conditions within the topographical and area context referring to our own geological and hydrogeological maps library;
- Details of an Environmental database search (Groundsure Report) of key relevant agencies, including Local and Statutory Authorities such as the Natural Resources Wales;
- A preliminary hydrological and hydrogeological risk assessment following the development of a conceptual site model (CSM) that provide an initial characterisation of the hydrological and hydrogeological environment.
- A site survey was undertaken in June 2022 to survey the recent Council drainage works. The hydrological baseline and CSM has been updated to account for these changes.
- An executive summary of the report to allow a rapid, layman's overview.

1.6 LEGAL FRAMEWORK & GUIDANCE

This assessment has been completed in accordance with the following legislation (where applicable):

- The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (the EIA Regulations);
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2000/60/EC), commonly referred to as "The EU Water Framework Directive";
- The Groundwater (England and Wales) Regulations 2009;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;
- The Water Resources Act 1991;
- The Water Act 2014;
- The Flood and Water Management Act 2010;
- The Private Water Supplies (Wales) Regulations 2017;
- The Water Supply (Water Quality) Regulations 2018;

- The Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016;
- Part 2A of The Environmental Protection Act (EPA) 1990;
- Environment (Wales) Act 2016;
- The Control of Pollution Act 1974;
- The Contaminated Land (Wales) Regulations 2006, and as amended (2012); and,
- Environmental Permitting (England and Wales) Regulations 2016 and as amended.

The following guidance documents which underpin and support the aforementioned regulatory framework have been referenced where applicable when undertaking the necessary assessments and identifying suitable mitigation measures with respect to the on-site hydrological and hydrogeological regime:

- Risk Assessment for your Environmental Permit, published online by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA), published 1st February 2016 and updated 21st March 2021 and relevant guidance provided by Natural Resources Wales (NRW) - <https://naturalresources.wales/permits-and-permissions> [checked October 2021];
- Surface Water Pollution Risk Assessment for your Environmental Permit, published online by DEFRA and the EA, dated February 2016 (and last updated 10th August 2021);
- Environment Agency Environmental Management Guidance – Infiltration Systems: Groundwater Risk Assessments, dated February 2016 (and last updated 25th November 2020);
- The Environment Agency's approach to groundwater protection dated February 2018 (version 1.2) which has been adopted by NRW;
- Groundwater source protection zones (SPZs), published online by the EA on 1st August 2019 - <https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs> [checked October 2021];
- Environment Agency Land contamination risk management (LCRM), published online, dated 8 October 2020. (Last updated 19 April 2021).

1.7 LIMITATIONS

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

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

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

2.0 SITE INFORMATION

2.1 LOCATION

The site is situated to the south-west of Merthyr Tydfil town centre, on the eastern slopes of Mynydd Aberdâr south of the village of Heolgerrig. The site is approximately 31.2 hectares (ha) in size and is located at National Grid Reference (NGR) 304591, 204873.

A site location plan is presented in Figure 1.

2.2 SITE DESCRIPTION & CONTEXT

The site covers an area of approximately 30.4ha, which is designated a Site of Interest for Nature Conservation (SINC). There is a large legacy of mining related features at the site and the surrounding area such as open spoil tips, the A470 spoil tip, abandoned mine entries, shafts and associated infrastructure. Thus, public access to the site is currently restricted due to the extent of potential hazards (mining features and tip stability) and safety concerns at the site.

Spoil tips, associated with the Glyndyrys Colliery and construction of the A470 trunk road, are located within the central and northern area of the site. Topographically, the site comprises largely elevated areas and large breaks of slope associated with the A470 & Glyndyrys spoil tips. An unnamed spoil tip, comprising of mostly slag material, encroaches onto the south-western area of the site and is included within the Scheduled Ancient Monument (SAM) for Cwm Pit and Head of Railway. A basin area, known as the 'Marshy Area', is located within the central, western extent of the site, and situated between the Glyndyrys Tip and the Cyfarthfa Balance Pond and Leat.

During spring 2022, tip drainage works were undertaken by MTCBC. A site visit was completed on Friday 10 June 2022 to survey the works. It is understood that the works were undertaken to enhance pre-existing drainage provisions and improve stability of tips across the site. The works are currently on hold, leaving them incomplete. The works present a new baseline for the site. The key findings of the site visit are as follows:

The recent drainage works have been implemented to mitigate against known drainage issues at the site, namely;

- Water discharge from the Nant Meline Canaid Stream which ponds behind the A470/ Glyndyrys Tip,
- Spring emergence of this ponded water at the base of A470/ Glyndyrys Tip,
- Discharge of water from the railway tunnel entrance and areas of flooding.

A summary of the site features observed during the Tetra Tech site visit is outlined in the site report presented at Appendix G. The site includes land designated as Site Specific Scientific Interest (SSSI) and is bounded by SSSI to the east, west and north. The site is bound by the Cyfarthfa Balance Pond (former reservoir) and Leat and Cwm Pit and Head of Railway, which are designated SAM. Two further SAM's, the Vale of Neath Railway Cutting and Tunnel Portal and Black Pins Early Ironstone Workings, are both located outside of the site boundary to the south and west.

2.3 WIDER SITE CONTEXT

The land ownership at Rhydycar West covers an area of approximately of 230 ha as shown on Figure 1. This area covers undeveloped land consisting of natural mature woodland and marshland combined with anthropogenic derived spoil tips and mining features relating to the long history of coal and ironstone extraction works.

The north-western extent of the land ownership is characterised by less mature woodland and wide-open spaces, with coniferous forestry on its western edge. The land initially slopes steeply to the east but flattens off along the eastern boundary to a gentler slope. Numerous streams flow across this area from south-west to

north-east, and numerous ponds and small reservoirs dot the landscape. There are several farm buildings towards the western boundary that are used for the keeping of horses, and a road bisects the central portion of this site in a north-south orientation. There is also a Scheduled Ancient Monument (Cwm Du Shaft and Air Fan) in this area.

In the northern area of the land ownership area, south of Heolgerrig village, there are more mature trees present, but is also given over to wide open spaces located largely on areas of previous tips. Streams in this area are generally shown to flow west to east.

Directly north of the site boundary, within the central area of the land ownership, is an area of young to mature woodland and open spaces. Some streams flow through the area, mostly west to east. There are a small number of ponds shown to be present.

To the west and south-west of the site, there is an old ruin associated with the Cwm Pit Colliery, and the entrance of the old Cwmbâch-Abercanaid Tunnel. It is also the location of three SAMs; Abercanaid-Cwmbach rail tunnel, the former Cwm Pit Colliery and the remains of the Cyfarthfa Tub Boat canal and pond which is located along the western boundary of the site.

Several water features are shown to be located in this area, largely orientated west to east with some trending north-south with discharge of water collecting into an unnamed stream which flows through Cwm Pit and into the site, with discharge into a basin area between the A470 tip and the Cyfarthfa Pond and Leat.

The eastern and south-eastern extent of the site largely comprises of dense woodland in its south-western corner, although the remainder of the site is given over to thinner woodland, open space and a large area of reeds and marsh. This is the area of the former 'Glyndyrys Pond'. Several streams are shown to flow through the site mostly with a west-east orientation, although some are shown to flow north-south. Beyond the land ownership to the east the A470 dual carriage way with River Taff and southern extent of Merthyr Tydfil beyond with Merthyr Leisure Centre located 150m north-east of the site.

To the south, beyond the site boundary, is the undeveloped extension of Mynydd Aberdâr with Bike Park Wales located 1km to the south.

2.4 PREVIOUS SITE REPORTS

The site has previously been subject to several assessments and associated reports, some of which have been made available to the Tetra Tech study team by our client Marvel Ltd. The following site-specific reports which are relevant to this desk study are outlined and discussed further below:

- Borehole Investigation and Monitoring Report 1980-1988. Author & date unknown;
- Environmental Statement, Ground Conditions Chapter. William's Thomas Consulting Limited. Ref. CAC0026. June 2002;
- Report on Mining Hazards on Land South of Heolgerrig, (Merthyr Village), Merthyr Tydfil. Blandford Consulting Report. Ref. BC/MB/03.07.02. July 2002;
- Condition Survey of Former Mine Workings Site. Land at Rhyd y Car, Merthyr Tydfil, South Wales. Merebrook Consulting Engineers Limited. Ref. CSR-B1060-05-7. December 2005;
- Merthyr Village Hydrogeology Survey Report Stage 1. Parsons Brinckerhoff Limited. Ref. HDC91340A. May 2006;
- Overview for Steve. L. Smith. WAG Land Reclamation. September 2007;
- Review of Site Stability and Remedial Options. Volume 1: Review of Site Stability and Assessment of Potential Hazards. Arup Group. Ref. 07/7391. April 2008;
- Reclamation Scheme Land at Rhydyar, Merthyr Tydfil. Environmental Statement. Merebrook Consulting Engineers Limited. Ref. ES-S3846-08-106. June 2008; and,
- Risk Assessment Report, Heolgerrig Merthyr Tydfil. Halcrow Group Limited. October 2009.

No reliance on the information contained within these reports can be made, as the information was gathered by others on behalf of their respective clients and whilst pertinent technical information contained within the reports is referenced the reader is advised to refer to these reports directly if they require further details in respect of the context under which the information was obtained.

A brief summary of the overall outcomes and findings of these documents in context of the hydrological and hydrogeological environment is provided in the following sections.

2.4.1 Boreholes Investigation and Monitoring Report (1980-1986)

This document collates the findings of four separate ground investigations undertaken at the site between 1980 and 1986. The borehole and trial pit logs provide details on the encountered geology, depth to encountered mine workings, groundwater strikes and standing water levels recorded upon completion of the boreholes.

Investigations largely targeted known tip areas at the site, with a good coverage of exploratory holes shown (Figure 5) within the eastern extent of the land holding and within the western levels zone. Conversely, there is limited coverage within the Cwm Pit zone in the south-western area of the site.

2.4.2 Williams Thomas Consulting Limited – Environmental Statement, Ground Conditions Chapter (2002)

A Ground Conditions chapter was written by Williams Thomas Consulting Limited as part of the Environmental Statement for Merthyr Village Limited in June 2002. Much of the desk-based information pertaining to the hydrology and hydrogeology is also detailed in the 2008 Arup report (Volume 1). Relevant information is outlined below:

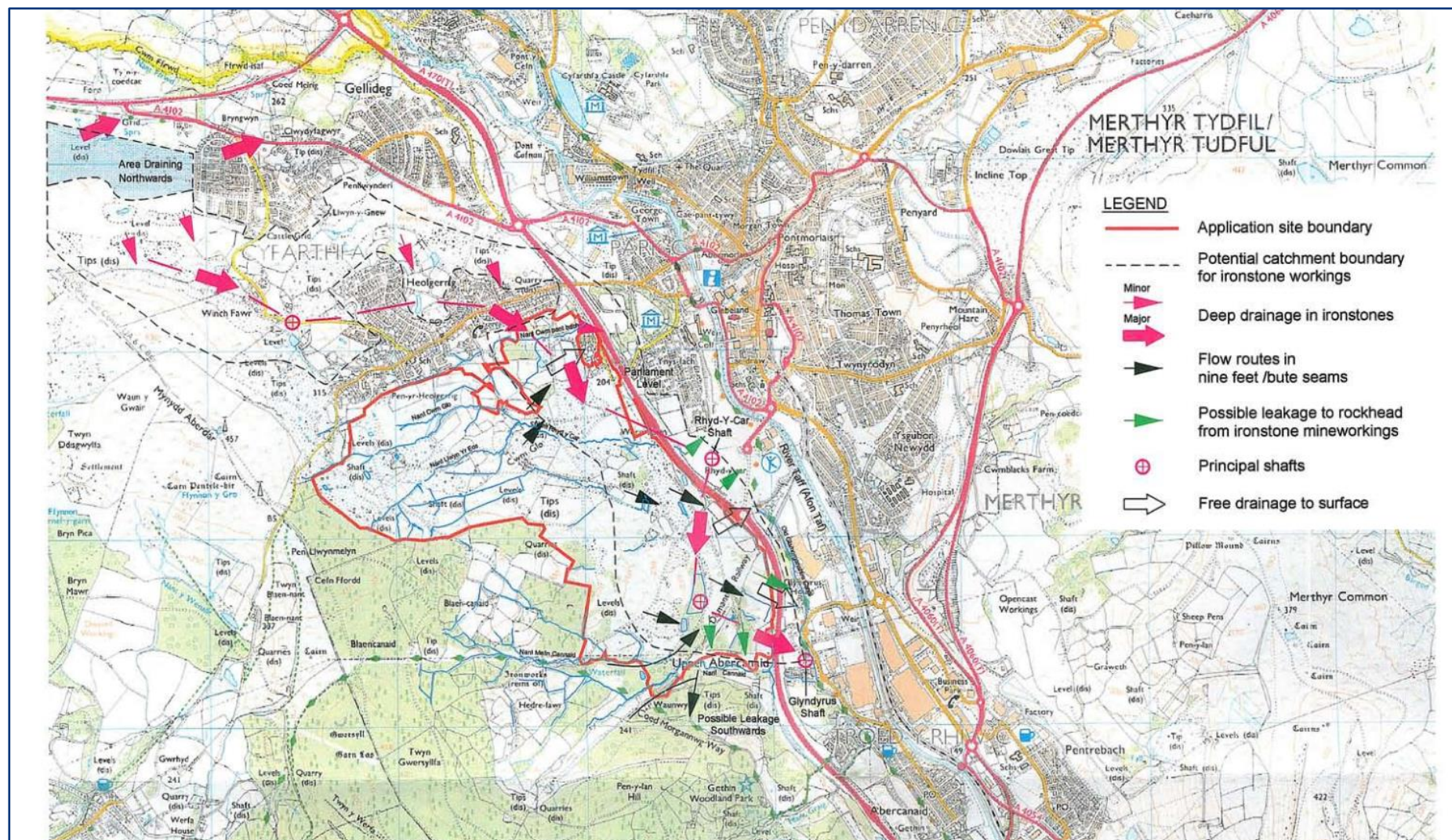
- The site is underlain by extensive 18th Century and 19th Century ironstone workings which extend northwards as far as their outcrop to the north-west of the site; and southwards towards the Glyndyr's shaft¹ at Upper Abercanaid. These workings are thought to form a near continuous north-south under drainage system through the Cyfarthfa mineral take;
- Most of the groundwater present within the drainage system appears to originate to the north of Heolgerrig, with limited infiltration of water into this system to the south of Heolgerrig.
- A substantial discharge of mine water is reported to overflow from the 'Glyndyr's shaft';
- Piezometers located in the environs of the site show quite rapid and significant responses to heavy rainfall which likely indicates that the discharge via 'Glyndyr's shaft' is restricted;
- Water levels recorded in groundwater monitoring boreholes at the site, during dry weather, are typically between 160 – 162m AOD but have been as high as 170m AOD. At this level, discharge was likely to have occurred at the Parliament Level (off-site to the east) which is located at circa 167m AOD. However, owing to the grouting of the A470, this is thought to be limited and instead, groundwater discharge occurs at rockhead during periods of high groundwater levels.
- Groundwater discharges from the Nine Feet and Bute Coal Seams, which outcrop on the western and southern flanks of the landownership boundary, between 190 and 215m AOD. These
- No licensed groundwater abstractions were found to be present within the site boundary; with three present within 250 metres of the site boundary.

A simplified hydrogeological model has been drawn by Williams Thomas Consulting Ltd as part of the packages of work encompassing the Environmental Statement in 2002 for Merthyr Village Limited. This is repeated below in Insert 1. The conceptual drawing presents the potential catchment boundary of the ironstone workings, the major and minor flow paths of groundwater in the ironstone workings, the flow routes in the Nine Feet / Bute

¹ Please note that this is incorrect and instead, this is known as the 'Upper Abercanaid Engine Shaft'.

Coal Seams, possible leakage to 'rockhead' from the ironstone workings and free drainage flow to surface drainage.

Insert 1 – Simplified Hydrogeological Model – ‘Merthyr Village, Merthyr Tydfil Phase 2. Williams Thomas Consulting Limited. 13/05/2002



The ironstone workings catchment area is shown to encompass land to the north-west of Heolgerrig (excluding areas of urbanisation) which extends to the south-east across the eastern portion of the site and slightly beyond the eastern site boundary and A470 Trunk Road.

The major groundwater flow lines within the ironstone workings are shown to be within workings connected by the 'principal shafts', with discharge at 'Glyndyrys Shaft' in the south-eastern corner of the catchment area (outside of the development area). Groundwater flow within the Nine Feet / Bute Coal seams have largely been inferred to flow from west to east with possible leakage indicated towards the south of the site. Possible leakage of mine water to rockhead is also indicated on the drawing.

2.4.3 Blandford Consulting – Report on Mining Hazards on Land South of Heolgerrig (2002)

This report considers the geology and mining history of the Heolgerrig area with a view of commenting upon the condition of the land and any hazards that are present. We understand that the report was prepared by the previous owner of the site (Merthyr Village Limited) and that it largely draws hydrogeological information from reports prepared by others, such as Hydrogeology of West Merthyr (Arup, 1997). References to the hydrogeological environment are summarised below;

- Ironstone workings amount to an area of approximately 2km², with groundwater draining to the Parliament Level (invert level at 167m AOD);
- Drainage of later ironstone workings was via achieved via the sinking of the Rhydyar Shaft. This shaft was connected to the Glyndyrys Shaft from two cross measure 'drivages' which ultimately made the Rhydyar Shaft redundant; with all water draining to the Glyndyrys Shaft;
- Mine workings in the Bute and Nine Feet Seams appear to have been drained separately from the above workings via adits at elevations between 190 to 225m AOD;
- Mine workings in seams above the Nine Feet Seam are thought to drain to levels (adits) in the Nant Canaid Valley, seepage at rockhead or to Castle Pit (off-site to the south) via old workings;
- Site walkover observations by Blandford Consulting concurred with the 1997 Arup Assessment (Section 2.4.7.), which stated that there are a number of adits on the upper slopes of the valley (west of the development) where water freely discharges, including from spoil heaps and water filled bell pits and crown holes.

2.4.4 Merebrook Projects Limited – Condition Survey of Former Mine Workings Site (2005)

A Condition Survey Report was written by Merebrook Consulting Limited in 2005 on behalf of Merthyr Village Limited. The report provides an initial view on the geotechnical hazards at the site and their potential impact on existing land. The works comprised a brief review of available information for the site and a site walkover survey.

The report provides limited detail on the site hydrogeology and hydrology and refers the reader to the Arup 1997 report for further details.

2.4.5 Parsons Brinckerhoff Ltd - Merthyr Village Hydrogeology Survey Stage 1 (2006)

Parsons Brinckerhoff Limited (PB) were appointed to undertake an initial survey of existing groundwater monitoring boreholes at the site for the proposed Merthyr Village development. Groundwater level monitoring boreholes (13 No.) were all installed within the southern area of the site; none are shown to be present within the central and northern area of the land ownership boundary. The report presented the location and condition of the existing monitoring boreholes, depth to groundwater (where accessible) and the requirement for further investigation to install further monitoring wells.

Two previous studies had been undertaken at the site to investigate the groundwater levels beneath the site prior to this report. The first study was undertaken by Sir William Halcrow in 1980 which investigated the stability of the tips at the Colliers row site and the new alignment of the A470 dual carriageway. The study involved the monitoring of 15No. piezometers. The second study is the hydrogeological report written by Arup in 1997 which monitored 6No. piezometers.

In total, 25No. piezometers at 15No. locations were surveyed by PB at the site in 2006. It should be noted that the report does not refer or include a survey of the 15No. boreholes drilled at the site in 1986 by AMCO as detailed in the Boreholes Investigation and Monitoring Report detailed in Section 2.5.1.

Of the 15No. boreholes that PB planned to survey and record the groundwater levels, only borehole 'CZ9A' was found to be accessible. Boreholes CZ4, CZ10, BH5941, BH5944, BH5946 and BH8940 could not be located with the remaining boreholes found to be inaccessible.

Borehole CZ9A was drilling in August 1980 near to the former Glyndyrys Pit Tips and was found to comprise two piezometers. The shallowest piezometer, which terminates at 190.20m AOD (below the base of the colliery spoil tip), was found to be dry. The report states that this is consistent with previous monitoring records. The deeper piezometer, which is installed to 175.10m AOD, encountered water at 176.40m AOD. Again, this is consistent with previous results. The report states that the Sir William Halcrow report found the maximum water level rise to be at 176.52m AOD.

2.4.6 Overview Report for Steve L. Smith, WAG Reclamation (2007)

This report provides an overview of the sites mining history and current site setting. The report makes specific comments on the hydrological and hydrogeological environment, as summarised below:

- The rising water table requires consideration, with a rise in water levels of 10m over a 10-year period indicated;
- Free drainage through the system is now inhibited, e.g., by blockages or debris in the 'Glyndyrys shaft';
- The grouting regime associated with the construction of the A470 Trunk road has reduced the storage volume available in the ironstone workings at depth, restricted the flow route to the 'Glyndyrys shaft' and has restricted (or sealed) the potential overflow to the Parliament level.
- The changes in the site hydrology is evidenced by the amount of land that is now boggy that was previously dry land.

2.4.7 Arup – Review of Site Stability and Remedial Options (Volume 1), 2008

This report was prepared by Arup Group (Arup), and it reviewed available information in respect of the stability of the land on account of the mining related hazards and provides remedial options for the site. The report also provides a comprehensive review of existing site reports covering the sites mining and coal past; its geology, hydrology and hydrogeology. This includes the 'Arup Report on Hydrogeology of West Merthyr, 1997' and 'Arup Report on Hydrology of the site and surroundings, 1997' both of which, Tetra Tech have not been provided a copy of. A short summary of the report findings are outlined within this section below.

Hydrology

The hydrology of the site is dominated by a series of upland catchments originally developed over steep moorland and agricultural pasture over relatively impermeable strata. The average rainfall for the area is 1500mm which experiences relatively low evapotranspiration rates and would generate high flash flood type regimes after rainfall.

Three principal named catchments are thought to be draining the site:

- Nant Cwm Pant Bach streams drains the extreme north of the site and has now been diverted along the A470 to join the Nant Rhyd y Car;

- Nant Rhyd y Car stream with its two tributaries; the Nant Cwm Glo and Nant Llwyn yr Eos, drains the north central area of the site; and,
- The Nant Canaid stream forms the southern boundary of the site, and the extreme south of the site is drained, via a number of small tributaries, to this stream.

The hydrological drainage network at the site has been heavily modified by previous mining related activities; a large area of the site between Nant Canaid and Nant Rhyd y Car (the proposed development falls within this area) has no direct outlet to the surface water drainage system. Three culverts in the south-eastern area of the landholding take storm water flow under the A470. Much of the surface water flow infiltrates via ponds, tips and subsidence features which contribute to groundwater flow in the Made Ground (tips) at the interface with the underlying superficial deposits. There is a potential for infiltration to greater depths via mining related features such as former mine shafts, though this is expected to be minor.

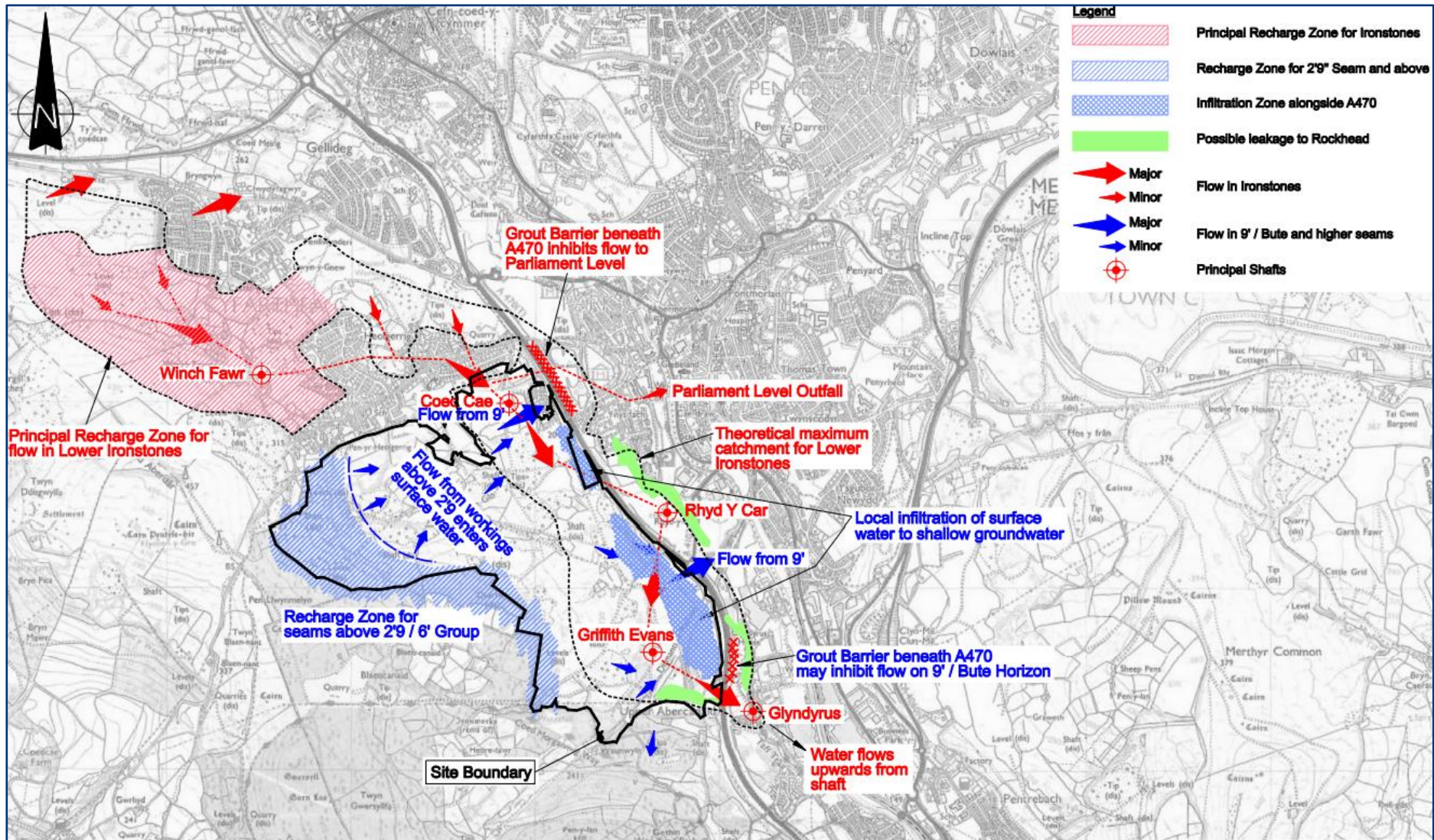
The report also states that significant modifications exist within the named catchments, in the form of artificial ponds, marshy areas, restrictions or complete blockage of watercourses by tipping, water emerging from former mine entrances, and locations where water sinks into the ground via subsidence features. In heavy rain, many manmade features (tracks and tramway inclines) also act as ephemeral storm water courses. These modifications have disrupted the natural drainage and increased the storage capacity for storm water and the connectivity of the surface water system to the groundwater system.

Hydrogeology

Prior to mining activities at the site, the hydrogeology of the site is thought to have been relatively straightforward i.e. underlain by low permeability glacial deposits and mudstone bedrock, groundwater flows would have been minor and flows probably largely confined to the interface between the superficial deposits and the bedrock. However, following a period of extensive mining at the site, catchment characteristics have been modified by opening and loosening of the ground due to subsidence, thus increasing the mass permeability of the bedrock, and by providing underground flow routes through workings and along drainage galleries.

The report provides a simplified conceptual hydrogeological model for the site and surroundings which is described qualitatively in the report text with the aid of a drawing (Figure 4 in the Arup Report). The model drawing has been repeated in Insert 2 below for ease of reference with a summary of the model provided in the text below.

Insert 2 – Simplified Hydrogeological Model – Arup (2008)



The simplified hydrogeological model is separated into three headings; development of mine drainage, catchment areas and water levels. The headings from the report are summarised below in turn:

Development of Mine Drainage:

- The lowest drainage level to operate within the catchment area was the early 19th century Parliament Level, which allowed free drainage of the extensive ironstone workings below the Gellideg Coal on the north flank of Mynydd Aberdâr;
- The Parliament Level connected to Winch Fawr Shaft, where drainage connections to early workings in the Gellideg, Seven Feet and No. 2 Yard Coals also existed;
- The invert level of Parliament Level, located on the Glamorgan Canal, is about 167m Above Ordnance Datum (AOD) whereas the base of the lowest worked ironstone at Winch Fawr is about 200m AOD. This gives an overall gradient to Parliament Level of about 8° and a catchment of up to about 2km² draining via this system;
- As the ironstone and coal workings progressed down dip, the deeper workings could not be drained by gravity. A pumping engine pit was sunk at Rhyd y Car (in c.1800) where the lowest extensively worked ironstone (the Big Vein) is at about 132mAOD;
- The ironstone mine plans indicate that the drainage which formerly flowed from Parliament Level was intercepted by a down dip tunnel on the Rosser Veins Ironstone and connected to Rhyd y Car;
- Connections from Rhyd y Car to pits further south within the mineral take are recorded on the ironstone plans. Cross measures level from Rhyd y Car connects to the Big Vein workings at Griffiths Evans Pit and finally, a roadway to connect “Griffiths Evans Pit” to ‘Glyndyrys Engine Pit’ was driven. This latter connection would have allowed pumping at Rhyd y Car to cease, with all of the flow being pumped out at Glyndyrys. Thus, on abandonment the whole of the ironstone workings from the northern crop were interconnected and draining southwards to Glyndyrys, some 4km, forming a near continuous system through the whole Cyfarthfa mineral leasehold;
- The pattern of coal workings in the seams from the Gellideg to the No. 2 Yard Coals indicates that their workings were also largely dewatered into the ironstone drainage system beneath them;
- Mine plans indicate that workings in the Bute and Nine Feet Seams were largely dewatered separately from the underlying seams. In the Cwm Glo area, the Nine Feet / Bute workings appear to have been drained to several high level adits which discharge on the hillside at elevations between 190m and 225m AOD, such as Coed Cae Level and Colliers Row Level, both of which still discharge water. Connections between the Nine Feet / Bute Workings and the Glydyrys Shaft drainage route are only apparent in the south of the site;
- Workings on the seams above (from the Six Feet to the Two Feet Nine and higher) were almost exclusively worked from levels along the outcrops. However, it should be noted that some water from these higher elevated seams may drain via mineshafts and air pit connections to lower levels, thus eventually to join the lower groundwater system in the ironstones. Also, opening of the strata due to subsidence will have increased the rock mass permeability and may allow some infiltration from the upper levels down to lower levels. However, the thickness of drift deposits will limit this effect over much of the site;
- The mine drainage system therefore now dominates the hydrogeology of this area. A dynamic and potentially unstable situation with progressive deterioration and collapse of mineworking’s having the potential to cause substantial (and sometimes sudden), unpredictable changes in hydrogeology as time passes.

Catchment Areas:

- The site is thought to be drained via the worked ironstone horizons with discharge to the ‘Glyndyrys shaft’ located off-site to the south-east. Theoretically this could include the entire tract of land on the

north-east flank of Mynydd Aberdâr, defined to the north and east by the Rosser Vein outcrop, to the east by the thick drift cover along the River Taff and the south by the Nant Canaid stream;

- Workings on seams above the Two Feet Nine Seam are very unlikely to contribute to the ironstone drainage system. These workings would either drain to levels on the mountainside or down geological dip, away from the Glyn-dyrs system;
- In the north-west of the landholding, much of the ironstone drainage flows to the Winch Fawr shaft, thence southwards to Glyndyrys shaft. However, there is an area in the extreme north which flows north-eastwards to the surface water system; and,
- The discharge at Glyndyrys shaft measured in the 1990's averaged about 50l/sec, suggesting an effective catchment area of 1.7km². This is approximately the area of potential catchment north of the Nant Cwm Bach. It is possible that most of the drainage in the ironstone system beneath the site is derived from this area, north of Heolgerrig, where drift cover is less and where there is little evidence of surface runoff.

Groundwater Levels:

Information collected during the Arup Hydrogeology of West Merthyr 1997 report indicates that groundwater levels in the ironstone drainage system and associated coal horizons (seams below the Nine Feet) had tended to rise over the 20 years prior to the study. Typical levels for the centre of the site (measured in piezometers installed by the Opencast Executive in the c.1970's) up to c.1981 were in the range 161.9m to 167.6m AOD whereas from c.1986 – 1988, monitoring indicated levels from 162.8 to 169m AOD, with levels on the Seven Feet – Bute Coals reaching 170m AOD.

The water levels measured in March 1997 reached a maximum of 171.8m AOD, which is over 10m higher than the outfall on the Glyndyrys Shaft. This trend towards higher levels is thought to be indicative of deterioration in the subterranean drainage routes as workings collapse or siltation occurs. Other contributory factors could be the blocking of the drainage route to the Parliament Level by grouting beneath the A470, thus inhibiting flow from this level in periods of high groundwater flows, or possibly an increasing contribution from higher levels as subsidence opens new drainage paths through collapsed strata.

2.4.8 Merebrook Consulting Engineers Limited – Environmental Statement (2008)

An Environmental Statement was written by Merebrook Consulting Limited in June 2008 as part of the proposed reclamation of the site. The Environmental Statement provides a description of the geology & hydrogeology (Section 12) and hydrology & flood risk assessment (Section 13) findings, respectively.

The information contained within the geology and hydrogeology chapter largely draws upon the previous studies which have been summarised herein.

The hydrology and flood risk assessment chapter provides background information on the hydrological system that exists at the site and the surrounding area and discusses the potential for flooding. The report also presents recommendations to ensure minimal impact to the surface water network.

Information on the hydrogeology at the site reported within this chapter of the Environmental Statement is summarised below:

- The entire ironstone workings are thought to be drained by via the Glyndyrys Shaft which is located off-site to the south-east;
- Monitoring of historic groundwater level monitoring boreholes showed quite rapid and significant responses to heavy rainfall. The report states that this could indicate that the discharge route to the Glyndyrys is restricted;
- Grouting of the A470 has disrupted flows to the Parliament Level which is located outside of the land holding to the east. Groundwater levels in excess of 171m AOD have been recorded which likely discharge to rockhead via broken strata as a result of mining subsidence;

- There are some high level discharges via the Nine Feet and Bute Seams which outcrop between 190 and 215m AOD, discharging into surface watercourses;
- A sink area (the “hollow”) located to the west of the ‘Glyndyrys Tip’ acts as a control of surface water in this area of the site, which effectively dams and intercepts the Nant Melin Cannaid and diverts surface run-off to lateral groundwater flow in the Made Ground and to some extent, by infiltration to historic underground workings through joints, fissures and shafts. During periods of heavy rainfall there is a greater contributing inflow than the capacity of groundwater flow and the underground system can accommodate, resulting in rapid build of water in the ‘hollow’ – which can exceed an area of 1ha. This localised system of control is considered critical as otherwise, water would freely drain overland towards the A470. The report suggests that any reclamation and development works should maintain the status quo of the water management system or provide an equally alternative solution; and,
- The report discusses the potential for the deep mine water drainage route beneath the site could be disrupted if former mining shafts that are loosely backfilled or open, where then to become capped naturally by impermeable material. This could likely cause a rise in the water table beneath the site.

The Hydrology and Flood Risk Chapter (Chapter 13) largely presents background information on the hydrological environment at the site already reviewed in previous site reports. The key information presented in this chapter is summarised below:

- Watercourses at the site largely drain west to east and drain the site via a series of culverts beneath the A470 providing drainage routes towards the River Taff;
- The main site catchments are referred to as the Nant Cwm Pant Bach, Nant Rhyd y Car, Central and Nant Melin Cannaid as present spatially in Figure 13.1 within the report;
 - Surface water features within the Nant Cwm Pant Bach is largely fed by surface issues and land drains which have been altered by mine tipping;
 - Watercourses within the Nant Rhyd y Car have also been affected by historic tipping activities. Culverts were partly removed along the Cwm Glo tips by British Coal in the 1980’s leaving behind brick lined channel inverts;
 - The Central catchment largely comprises a series of ephemeral streams and channels which drain to various ponds and subsidence related features which transmit partly to underground flow paths and partly towards the A470;
 - The northern tributary of the Nant Cannaid stream within the Nant Melin Cannaid catchment was diverted in the 19th Century to provide water for the lower Collieries Row Pit balancing pond as a feeder for the CyfarthfaTub Boat Canal. The balancing pond is still present at the site and is reported to be maintained by flow from the diverted tributary. Most of the water is thought to drain into a hollow (as stated above) which drains into the underground mine workings and shallow superficial deposits beneath the Glyn-dyrus Tip towards the ‘Glyn-dyrus Shaft’ as well as land east of the tip material creating various springs and ponds which discharge to culverts beneath the A470; and,
 - Watercourses within the existing Nant Cannaid catchment to the south of the site flow west to east and drain through a culvert beneath the A470.
- The south and central portions of the site (referred as the ‘Central Catchment’ and ‘Nant Melin Cannaid Catchment’) are drained by poorly defined infiltration zones, land drains, springs and ditches as opposed to clearly defined surface watercourses.

2.4.9 Halcrow Group Limited – Heolgerrig Merthyr Tydfil Risk Assessment (2009)

The Heolgerrig Merthyr Tydfil Risk Assessment Report (2009), which was commissioned by Merthyr Tydfil County Borough Council, provides an independent health and safety hazard assessment of the Heolgerrig site,

Merthyr Tydfil, and subsequent discussion on the appropriateness of the remedial scheme proposed. The assessment followed the submission of a planning application by the site owner at the time, Merthyr Village Limited (MVL), for the proposed reclamation of 221 hectares (ha) of land by means of open excavation, including coal excavation and washing of coal from selected tips and reinstatement works. The reclamation proposed by the landowner was designed to mitigate risks posed by abandoned shallow mine workings together with their associated mine entries.

The following comments are made in the report with respect to the hydrological and hydrogeological environment, based on the available information made to Halcrow Group Limited (Halcrow), including the 1997 Arup report, and from their visits to the site:

- The overflow for deeper mine drainage is reported to be Glyndyrys Shaft that lies to the southeast of the site. Outflow for mine drainage within the landholding was observed at Coed Cae Level by Halcrow during the site inspection and is believed to take place from Cwmdy Level. Outflows from other adits were observed on a more minor scale within the site;
- The mine drainage system will be controlled by a series of 'cross drivages and interconnections' within the mine workings. The potential for deterioration of this system over time cannot be discounted, but in the event of such an enhanced zone of permeability is likely to remain;
- Given the geological and mining setting there is likely to be a significant mine drainage input entering the site from beyond the northern boundary (i.e. from outside the landholding to the north); and,
- There is no evidence to suggest a loss of significant watercourses across the site due to shallow mining.

2.4.10 Previous Report Summary

Previous reports, with relevance to the hydrological and hydrogeological environment at the site and the surrounding area have been reviewed and summarised herein. The Arup Remedial Options Report (Volume 1, 2008) provides a detailed account of the hydrogeological and hydrological environment at the site, drawing upon the previous 1997 study (also prepared by Arup) for West Merthyr which included the site area. The majority of the reports refer to this study, with the previous geology & hydrogeology (Chapter 12) and hydrology & flood risk assessment (Chapter 13) section of the 2008 ES, drawing up the information within these aforementioned documents.

The 2008 Arup report states that the hydrological network at the site has been heavily modified by previous mining related activities. There is no direct output for the surface water within the central area of the site, with much of the water infiltrating via ponds, tips and subsidence features which contribute to groundwater flow in the spoil tips (i.e., Glyndyrys & A470 tips) at the interface with the underlying superficial deposits.

A key drainage outlet from the site is reported to be the basin area between the Cyfarthfa Pond and A470 tip (referred to as the "hollow") which effectively dams and intercepts the Nant Melin Cannaid and diverts surface water run-off to groundwater flow through the tip material (A470 Tip/ Glyndyrys Tip) and to some extent, by infiltration to historic underground workings through joints, fissures, and shafts. The 2008 ES Chapter reports that during periods of heavy rainfall there is a greater contributing inflow than the capacity of groundwater flow and the underground system can accommodate, resulting in rapid build of water which can exceed an area of 1ha. The report goes on to state that localised system of control is considered critical as otherwise, water would freely drain overland towards the A470 development works should maintain the status quo of the water management system or provide an equally alternative solution.

Based on the 1997 Arup Group Study, and subsequently repeated by several of the subsequent previous reports, the ironstone workings beneath the site are drained by the Abercanaid Engine Shaft, which is located outside the site boundary to the south-east. It is important to note that this engine shaft has been incorrectly called the 'Glyndyrys Shaft' in all the reports that have been reviewed. A detailed account on the ironstone workings and their influence on the hydrogeological environment beneath the site is presented within the 2008 Arup report. the construction of the A470 dual carried way to the east of the site is reported by Arup and others to have resulted in groundwater levels within the underlying works to rise at the site.

The review of the above reports has enabled a detailed risk assessment to be undertaken (Section 6.0) which considers the key hydrological and hydrogeological receptors/ hazards identified in these reports.

3.0 SITE SETTING

3.1 INTRODUCTION

This section provides details of the site walkover survey; previous historical site uses; the solid and drift geology; and the hydrological and hydrogeological environment proximal to the site. As part of this assessment the following resources have been consulted:

- Available reports which are referenced and summarised in Section 2.4;
- British Geological Survey (BGS) Sheet No.231 (Merthyr Tydfil) Solid and Drift Edition (1979);
- Published Hydrogeological Map of South Wales including hydrometric area 58 and parts of 54, 55, 56, 57, 59, 60 and 61 (British Geological Survey) Sheet 18, (1986);
- The physical properties of minor aquifers in England and Wales. Environment Agency R&D Publication 68. Technical Report WD/00/04;
- N. S. Robins and J. Davies, 2016. Hydrogeology of Wales. British Geological Survey;
- Geology of the South Wales Coalfield, Part V, the country around Merthyr Tydfil. Memoir for 1:50,000 Geological Map, Sheet 231. British Geological Survey;
- BGS website (British Geological Survey, 2021);
- MAGIC interactive mapping website (DEFRA, 2021); and,
- Groundsure GeolInsight Report (Ref. 7002094-Rhydycar) attached at Appendix B.

In addition to the above, a separate Ground Conditions Report has been prepared by Tetra Tech which provides a detailed account of the ground conditions, previous mining activity and geology at the site. In addition, a Flood Risk Consequence Assessment has been prepared by Tetra Tech which considers the potential of the proposed development to increase flood risk elsewhere, as well as assessing flood risk to the proposed development itself owing to the number of watercourses within the site boundary. Both these reports should be read in conjunction within this report with the emphasis on the hydrogeological and hydrological environment in the following sections.

3.2 REGIONAL GEOLOGICAL OVERVIEW

The geological strata in the South Wales region is largely characterised by the Coal Measures Group, Millstone Grit Group and Carboniferous Limestone Formations of the Carboniferous Period. The Carboniferous strata of South Wales are folded into a broad east – west trending, asymmetrical synclinorium, with subsidiary fold structures. The overall structure of the synclinal structure is rather complex due to extensive faulting and the presence of minor folds associated with compressional fold structures. The Coal Measures occupy the central area of outcrop in the South Wales Coalfield, with narrower Millstone Grit and Carboniferous Limestone outcropping on the peripheral northern, eastern and southern margins.

The Dinantian (Carboniferous) Limestone Group in the South Wales area are largely characterised by ‘muddy limestones’ (Upper Limestone Shales) overlying massive, well jointed dolomitic limestones and calcareous mudstones (Main Limestone) which in turn overlies an alternating sequence of calcareous shales and thin limestone bands (Lower Limestone Shales).

The Millstone Grit Group in South Wales broadly consists of cyclic sequences of shales and sandstones with subordinate soil horizons (seat-earths) and coal seams. The main sandstone formations of the Millstone Group are found on the northern and eastern margins. The Millstone Group in South Wales commonly show rapid lateral changes from silty mudstones to laterally in persistent, coarse grained, cross-bedded sandstone and conglomerate. On the northern outcrop, to the north-west of Merthyr Tydfil, the sandstones constitute 150m of the Millstone Grit Group.

The Coal Measures comprise rhythmic sequences of mudstones, siltstones, sandstones, grits, fireclays and coal seams. The Lower and Middle Coal measures strata are predominantly argillaceous in nature. The Lower and Middle Coal Measures reach their maximum thickness of 900m in the Swansea area to the west of the coalfield, then decrease in thickness eastwards, with 425m thickness near Merthyr Tydfil. The Upper Coal Measures, typically referred to as the 'Pennant Measures', typically comprise bluish grey, weathered brown, thick massive or cross bedded feldspathic and micaceous, fine to coarse grained and locally pebbly sandstones.

3.3 SITE SPECIFIC GEOLOGY

The site is covered by the British Geological Survey (BGS) 1:50,000 Scale (solid and drift) Geological Map, Sheet 231, Merthyr Tydfil. An extract of the geology at the site and surrounding area is presented in Figure 3

3.3.1 Made Ground

A review of BGS Geological Mapping for the site (Sheet 231) indicates that extensive deposits of Made Ground (spoil tip materials from mining activities) are present across the site. These are identified as being an "Artificial Deposits". The Made Ground is described as being of a variable composition, man-made, and varying with depth across the site. Most the Made Ground is considered likely to comprise spoil from the ironstone and coal mine workings at the site.

3.3.2 Superficial Deposits

A review of the Drift Geological Mapping for the site (Sheet 231) indicates that the entire site area is underlain by Glacial Till, Devensian – Diamictic Deposits. The Glacial Till Deposits formed approximately up to 2 million years ago in the Quaternary Period.

Glacial Till is an unsorted sediment consisting of components of all sediment size that were deposited on the bases, edges, and surfaces of glaciers. They were deposited towards the end of the Devensian during the last Ice Age in the UK.

Previous reports (see Section 2.4) indicate that the Glacial Till is at its thickest in the eastern extent of the site and ranges between 5 to 12m.

3.3.3 Solid Geology

The site is situated in the northern outcrop of the South Wales Coalfield. The underlying solid geology shown to be present beneath the site is the Middle and Lower Coal Measures Formations of the South Wales Coal Group. The Lower Coal Measures Formation of the Langsettian (Westphalian A) is shown on the Solid Geological Mapping of the site to outcrop along the eastern boundary of the site, and the South Wales Lower Coal Measures of the Duckmantian (Westphalian B) across the remainder of the site area.

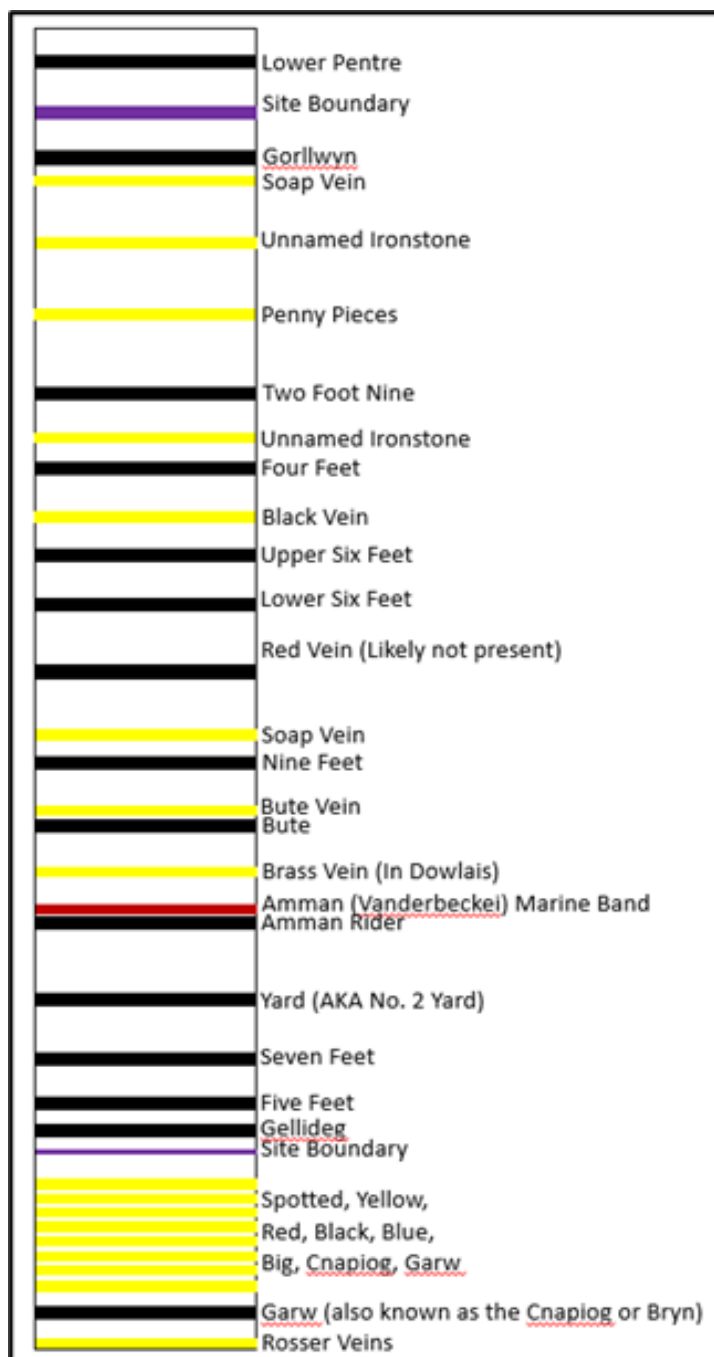
The South Wales Lower and Middle Coal Measures formed approximately 309 to 313 million years ago in the Carboniferous Period. Both are composed of deltaic cyclothems of mudstone, siltstone, sandstone, with frequent seatearths and coals with Marine Bands that record periodic transgressions, alternating in cycles. The major rock unit beneath the site is mudstone, interbedded with some silty sandstone horizons, siltstones, coal seams and ironstone veins.

The Lynfi Member and Rhonda Member, thick sandstone horizons of the Upper Coal Measures Formation are shown to outcrop to the south-west of the site along the ridge of the Mynydd Aberdâr hillside. The Upper Coal Measures Formation, also known as the Pennant Sandstone Formation, is stratigraphically above the Middle and Lower Coal Measures Formations. The dip direction of the Coal Measures strata within the vicinity of the site is shown to be towards the south, south-east with a dip angle of between 6 and 13 degrees. Based on the recorded dip direction of the geological strata, sandstone members of the Upper Coal Measures Formation will not be present beneath the site.

There are thirteen named coal seams, twelve named ironstone veins, and one Marine Band which are shown to outcrop across the site as shown on the Geological Map for the site in Figure 3. These seams/veins are listed below in stratigraphic order presented in Insert 3 which has been drawn based on the information provided in Barclay et al, 1988² and Robertson, 1932³.

The column is not drawn to scale and is purely for conceptual purposes although an attempt has been made to represent the closeness of coal seams and ironstone veins in relation to their distribution across the site area.

Insert 3: Conceptual representation of Coal Seam and Ironstone Vein Stratigraphy



² Barclay, et al. 1988. Geology of the South Wales Coalfield, Part IV, the Country around Merthyr Tydfil. 3rd Edition. British Geological Survey.

³ Robertson, T. 1932. Geology of the South Wales Coalfield, Part V, the Country around Merthyr Tydfil. 2nd Edition. British Geological Survey.

The ironstone present at the site were mined from both levels and shafts. Most of the ironstone veins mined in the area appear to be present below the Gellideg Seam Coal Seam, although some are present at the same elevation as the Gorllwyn Coal Seam.

3.3.4 Faulting

No faults are shown to be present beneath the proposed development site. The Arup (2008) report states that a fault trending north-west to south-east was proven in workings within the Seven Feet Seam to the east of Glyndyrys Tip and had a downthrow of 4.6m; but could be as much as 10m in places.

The Merthyr fault is shown to be located off-site to the east, and generally follows the direction of the River Taff, with a downthrow inferred to be towards the west and a horizontal off-set of approximately 260m. The Merthyr fault intersects the Gellideg Coal Seam and other seams east of the site on the opposite (eastern) side of the River Taff.

None of the faults detailed above impact the development site.

3.3.5 Historical Borehole Logs

The BGS hold historical records for 2No. exploratory hole records within the proposed development area, located in the north-eastern extent. A further 161 No. records are held by the BGS within 250m of the site, the majority of which are associated with the construction of the A470 road. A summary of the BGS borehole records (including only those 30m+ given the numerous changes between strata encountered within the boreholes i.e., major sandstone bands (0.50m), coal seams and Marine bands is presented in the table below.

The sandstone horizons encountered at depth were generally found to be fine grained, hard and micaceous in nature. BGS borehole record SO00NW17, located 4.2km outside the site boundary encountered a relatively large thickness of sandstone between 21.64 to 28.32m bgl (186.54m to 179.86m AOD). Generally, the thicknesses of sandstone horizons were less than 0.5 metres thickness and interbedded between thicker shale horizons.

Table 3-1 – Summary of BGS Borehole Logs (Within Proposed Development Area)

Name	Depth	Distance and Direction from Site	Grid Reference
470 PENTREBACH/CEFN COED P113	4.5	On site (Northern Boundary)	304820, 205100
A470 PENTREBACH CEFNCOED B41	48.6	On site (Northern Boundary)	304680, 205220

Table 3-2 – Summary of BGS Borehole Logs within 200m of Proposed Development Area

Name	Depth (m)	Distance and Direction from Site	Grid Reference
A470 PENTREBACH PB 180	45	14m NE	304754, 205196
A470 PENTREBACH CEFNCOED B34	53	16m NE	304840, 205100
A470 PENTREBACH PB 181	44	18m NE	304742, 205209
A470 PENTREBACH PB 183	42	18m NE	304702, 205238
A470 PENTREBACH PB 182	44	21m NE	304724, 205226
470 PENTREBACH PB 184	44.5	23m N	304682, 205254

Name	Depth (m)	Distance and Direction from Site	Grid Reference
470 PENTREBACH PB 167	43	32m NE	304793 205188
A470 PENTREBACH PB 163	42	36m NE	304838 205144
A470 PENTREBACH PB 185	42	38m NW	304664 205266
A470 PENTREBACH PB 172	42	46m E	304875, 205076
A470 PENTREBACH- CEFNCOD PB 69	37.9	53 E	304987, 204470
A470 PENTREBACH- CEFNCOD PB 69	31.1	53mNE	304700, 205280
A470 PENTREBACH- CEFNCOD PB 65	41.5	54m SE	304983 204421
A470 PENTREBACH- CEFNCOD PB 66	41.5	60m E	304998 204444
A470 PENTREBACH PB 186	42.5	63m NE	304646 205284
A470 PENTREBACH PB 164	42	70m NE	304872, 205157
A470 PENTREBACH- CEFNCOD PB 76	42	71m NE	304997, 204491
A470 PENTREBACH PB 165	42	83m E	304912 205075
A470 PENTREBACH CEFNCOD B35	37.3	84m NE	304870 205180
A470 PENTREBACH- CEFNCOD PB 68	39	87m E	305025 204452
TAFF VALLEY TRUNK ROAD. 184,184A	35.05	88m NE	304720 205310
A470 PENTREBACH PB 171	42	89m NE	304901, 205142
A470 PENTREBACH PB 145	42	91m SE	304912, 205048
A470 PENTREBACH- CEFNCOD PB 75	38	38m	305023 204484
A470 PENTREBACH- CEFNCOD B24	39.3	94m E	305030 204470
TAFF VALLEY T.K. TP.631, BH'S.183,183A,183B	31.7	101m NE	304920 205130
A470 PENTREBACH PB 166	33	102 E	304920, 205130
A470 PENTREBACH PB 168	42	108m NE	304881, 205204
A470 PENTREBACH PB 226	42	109m NE	305018 204531
A470 PENTREBACH- CEFNCOD PB 67	42	112m SE	305016 204371
A470 PENTREBACH PB 187	45	112m NW	304604 205313
A470 PENTREBACH- CEFNCOD PB 63	42	117m E	305054 204439

Name	Depth (m)	Distance and Direction from Site	Grid Reference
A470 PENTREBACH-CEFNCOED PB 77	38	119m E	305057, 204459
A470 PENTREBACH-CEFNCOED PB 78	36	124m NE	305038, 204525
A470 PENTREBACH-CEFNCOED PB 79	33	126m E	305057, 204493
A470 PENTREBACH PB 173	40.5	127m E	304986 204810
A470 PENTREBACH PB 169	42	129m NE	304873, 205244
A470 PENTREBACH-CEFNCOED PB 88	36	134m SE	305023, 204562
A470 PENTREBACH-CEFNCOED PB 60	41.5	131m SE	305014, 204330
A470 PENTREBACH PB 161	42	134m SE	3049337, 205005
A470 PENTREBACH-CEFNCOED PB 86	36.2	135m NE	30505, 204526
A470 PENTREBACH PB 144	42.35	137m E	304958, 205039
A470 PENTREBACH PB 188	42	138m NW	304584 205330
AFF VALLEY TRUNK ROAD. 187	30.1	139m N	304680, 205370
A470 PENTREBACH PB 127	40.0	142m E	305002, 204785
A470 PENTREBACH-CEFNCOED PB 64	42	145m SE	305065, 204381
A470 PENTREBACH PB 225	42	147m E	304996, 204885
A470 PENTREBACH-CEFNCOED PB 87	42	149m NE	305032, 204587
A470 PENTREBACH PB 227	42	154m SE	305053, 204349
A470 PENTREBACH PB 130	42	154m E	305009, 204866
A470 PENTREBACH PB 139	37	156m NE	305018 204625
TAFF VALLEY TRUNK ROAD. 186	35.1	157m N	304730 205380
A470 PENTREBACH PB 126	42	158m E	305016 204764
A470 PENTREBACH PB 170	42	161m NE	304866, 205296
A470 PENTREBACH PB 189	44	163m NW	304564, 205346
A470 PENTREBACH PB 125	42	164m E	305016, 204737
A470 PENTREBACH PB 122	42	170m E	305028 204846
A470 PENTREBACH-CEFNCOED PB 89	36	172m NE	305071, 204564
A470 PENTREBACH-CEFNCOED PB 81	42	173m E	305033, 204804
A470 PENTREBACH PB 134	42	174m NE	304994, 204941

Name	Depth (m)	Distance and Direction from Site	Grid Reference
A470 PENTREBACH-CEFNCOED PB105	42.2	174m SE	305009, 204697
A470 PENTREBACH-CEFNCOED PB104	42.2	177m NE	305018, 204667
A470 PENTREBACH PB 135	42	177m NE	304972, 204968
A470 PENTREBACH-CEFNCOED PB 53	41	177m SE	305002 204258
A470 PENTREBACH CEFNCOED B42	35	177m NW	304540, 205340
A470 PENTREBACH-CEFNCOED PB 62	42	179M SE	305082, 204345
A470 PENTREBACH PB 136	42	181m SE	304991, 205003
A470 PENTREBACH/CEFN COED B33	40.4	184m SE	304980, 204980
A470 PENTREBACH PB 140	42	184m NE	305058, 204612
A470 PENTREBACH PB 138	41.5	185m NE	305048, 204631
A470 PENTREBACH PB 190	32	186m NW	304549, 205363
A470 PENTREBACH PB 137	42	186m NE	305029, 204907
A470 PENTREBACH CEFNCOED B38/38A	34.4	189m NE	304810 205370
A470 PENTREBACH-CEFNCOED PB 85	42	192m NE	305081, 204587
A470 PENTREBACH PB 124	43.5	193m E	305042, 204722
A470 PENTREBACH PB 132	42	195m NE	305003, 204963
A470 PENTREBACH PB 133	42	197m NE	305024, 204939
A470 PENTREBACH PB 128	42	199m E	305050, 204885
A470 PENTREBACH PB 129	43	200m E	305060, 204804

No 'Water Well' records exist within the site boundary. The closest water well record to the site is shown to be located at the Triumph Works (NGR 305190, 204690). The borehole was drilled in 1997 to a depth of 93mbgl which recorded a water strike at 44.2 metres (120m AOD). No other details are recorded for the well.

A second water well record (SO00SW100) is located off-site at Blaencanid Farm (NGR 303500,204700) at the end of Gernant Road, approximately 650m to the west of the site). The abstraction borehole was drilled to a depth of 58mbgl and struck groundwater at 15.24mbgl (301.1m AOD) and 39.00mbgl (277.30m AOD). The borehole encountered 6 metres of boulder clay (Glacial Till) and shale to the base of the borehole. The borehole was pump tested at 350gallons per hour (38m³ /day) in April 1993 although no further details are provided for the record.

Consultation with Merthyr Tydfil County Borough Council and NRW (Section 3.5.11) has confirmed that there are no licensed groundwater abstractions or private water supplies within 500m of the site boundary. Therefore, there are no nearby potable supplies that could be potentially impacted by the proposed development.

3.4 REGIONAL HYDROGEOLOGY OVERVIEW

The Coal Measures Group generally comprises low permeability hydrogeological units composed of interbedded carbonaceous mudstones and sandstones with subordinate siltstones and coal seams. The Upper Coal Measures is largely dominated by thick, sandstones horizons whereas the Lower and Middle Measures are dominated by argillaceous mudstones and siltstones.

Coal Measures sandstones are often very well cemented, extremely hard and dense, and in consequence possess very little primary porosity or intergranular permeability. The permeability of the sandstones directly relates to the distribution and size of the fractures (secondary porosity) present in the sandstone horizons.

The Coal Measures therefore constitutes a complex multi-layered aquifer system rather than one continuous groundwater body. Under natural (pre-mining) conditions, the sandstone horizons act as individual aquifers, separated by the intervening lower permeability mudstones/siltstones layers. This condition however has largely been disrupted by large scale mining across the South Wales Coalfield which has largely disrupted the hydrogeological environment and created hydraulic continuity between water bearing sandstone layers and historic mine workings; even those present in the Middle and Lower Coal Measures Formations.

The Upper Coal Measures Formation contains large quantities of groundwater within the sandstone horizons. The porosity of these sandstone aquifers is poor, typically not exceeding 2%, and often less where folding and faulting have resulted in secondary cementation by calcite and silica (resulting in a reduction in porosity).

Groundwater yields from abstraction boreholes drilled into the Coal Measures appears to be variable, both spatially and seasonally. The largest yields are obtained from the Upper Coal Measures Formation sandstones which have a thickness greater than 60m, but yields are unlikely to be more than 5-10L/S (432 - 864m³/day).

Large portions of the sandstone aquifers had been dewatered from pumping for the purposes of dewatering coal mines, resulting in a lowering of groundwater levels. Following the cessation of coal mining and its associated pumping, observations indicate groundwater levels are starting to rebound.

3.5 SITE SPECIFIC HYDROGEOLOGY

A detailed account of the sites hydrogeology is outlined within the Hydrogeological CSM in Section 5.

3.5.1 Aquifer Designations

The superficial deposits beneath the site comprise Glacial Till deposits which are categorised by Natural Resource Wales (NRW) as Secondary Undifferentiated Aquifer. This has been assigned in cases where it has not been possible to attribute either a Secondary A or B aquifer to the soil type due to the variable characteristics. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

The solid geology beneath the site comprises the Middle and Lower Coal Measures Formation of the Coal Measures Group which are categorised by NRW as 'Secondary A' Aquifers. These 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.

3.5.2 Hydrogeology – Superficial Deposits

The review of the previous ground investigation reports and historical BGS borehole records Glacial Till deposits present beneath the site largely comprise clay rich, "boulder clay", which increases in thickness from 2 to 3m in the west to as much as 15m alongside the A470 to the east of the site. Groundwater flow within the deposits is anticipated to be minimal given the low permeability nature of boulder clay. The presence of boulder clay across the site will largely promote surface runoff across and limit vertical flow to (and recharge of) the underlying Coal measures beneath the site.

There is a potential for some groundwater flow to occur within secondary pathways created from collapsed disused mines located at a shallow depth beneath the site. These areas would provide localised areas of recharge to groundwater present in the disused mine working's should a hydraulic connection exist, although such pathways are likely to be limited in extent to the areas of subsidence.

Several coal and ironstone derived spoil tips are shown to be present across the site. These mine tips are shown to largely overly till deposits beneath the site. These tips will act as separate, individual aquifer systems and can be referred to as "anthropogenic aquifers". These Made Ground 'aquifers' will be recharged directly by rainfall infiltration and inflows of streams and surface water run-off.

3.5.3 Hydrogeology – Solid Geology

The solid geology beneath the site comprises the Middle and Lower Coal Measures Formation of the Coal Measures Group. Both formations comprise sequences of mudstones, siltstones, sandstones and coal seams. For the purpose of this study, both will be considered as one geological unit, which constitutes a complex multi-layered aquifer system, rather than one continuous groundwater body.

Argillaceous strata predominate at the site, acting as aquitards (low permeability strata) and often isolating the thin and impersistent subordinate sandstone horizons. Coal measures sandstones are fine grained and often very well cemented. In consequence, groundwater storage and flow primarily occurs within and through fractures and joint sets in the sandstone horizons which is a type of secondary permeability. The permeability of the sandstones is therefore controlled by the natural joints and fractures and, more recently, due to the presence of tension zones (subsidence) caused by mining.

There will also be an element of intergranular flow, although this is anticipated to be minimal due to the cementation of Coal Measures sandstone. Sandstone horizons in the Middle and Lower Coal Measures Formations are often thinner and comprise less water in comparison with those in the Upper Coal Measures which are shown to outcrop to the south-west of the site.

The mining of numerous coal seams and iron veins at the site and in the surrounding area has largely disrupted the natural hydrogeological conditions in the Coal Measures by the creation of open shafts and disused workings. Many mine drainage adits continue to drain the coal seam and ironstone veins long after the cessation abandonment of mines and the rebound of groundwater levels. These mine features have created hydraulic continuity between layers which were previously isolated and, in some cases, between aquifer horizons and flooded disused workings. A detailed account of the hydrogeological system beneath the site, as a result of the historical mining, is outlined in Section 2.4.

Lower permeability, clay rich Glacial Till deposits are shown to be present across the majority site area confining the Coal Measures. The presence of till material overlying the coal measures will restrict rainfall recharge to the water bearing sandstones beneath the site, largely resulting in rainfall runoff. The low permeability mudstone layers will also retard vertical groundwater flow through the Coal Measures, limiting groundwater recharge to the underlying water bearing sandstone horizons and therefore confining groundwater flow to the shallow interface. However, some recharge to the shallow sandstone horizons is likely to take place through fractures and joints present in the mudstone in the absence of the overlying Glacial Till.

The predominant recharge zone to the underlying sandstone horizons will be where they outcrop to the west at a higher elevation to the site. These areas are generally where the Glacial Till deposits are absent or thin and the sandstone is exposed as escarpments given the resistant nature of the rock. Localised recharge is also expected to occur via mining features or in areas of subsidence.

Groundwater flow within the Coal Measures is anticipated to be down geological dip of the strata towards the to the south, south-east of the site. Groundwater will also emerge as springs at the junction between the base of water bearing sandstones and underlying mudstones layers; at rockhead via fractures in the rock as a result of subsidence or from mining adits/ shafts.

3.5.4 Hydraulic Properties

Due to the solid geology largely comprising of very low permeability mudstone across most of the site area the unit is not generally the target of many hydrogeological investigations or abstraction boreholes, and as such there is very little available hydrogeological data relating to the Coal Measures in South Wales.

Transmissivity for the Coal Measures ranged from 0.15 to 225m²/day. The lower values were associated with small diameter observation boreholes monitored in pump tests. The larger values are likely to be unrealistically high as they were derived from non-steady state data from the pumping of abandoned mine workings and therefore reflect the large volumes of storage present in the workings; rather than within the sandstone units.

The only transmissivity and storage values specifically for the Lower Coal Measures Formation are from a test on a production borehole at Pengarnddu, Merthyr Tydfil (SO 0810,0860). The transmissivity values obtained were within a narrow range of 3 to 15m²/d. Storage coefficients calculated from the surrounding observation boreholes indicated confined conditions with 1×10^{-4} to 4×10^{-5} (dimensionless). Similarly, the only transmissivity for the Middle Coal Measures Formation is from a test carried out at Aberdare Golf Club which provided a value of 11m²/day⁴.

3.5.5 Groundwater Recharge

The hydrogeological system beneath the site is anticipated to be complex as a result of the extensive mining legacy at the site. Recharge to the sandstone aquifers of the Coal Measures and mine workings will predominantly occur via the following pathways:

- Direct infiltration where the sandstone horizons outcrop or are exposed due to mining related subsidence;
- Recharge via the former ironstone workings and area of outcrop to the north-west of the site (outside of the landholding area);
- Indirect recharge from surface runoff over the low permeability mudstone layers and Glacial Till;
- Infiltration through fractures and joints in the mudstone and sandstone layers where the Glacial Till is thin or absent;
- Through former mine shafts, crown holes and bell pits, providing recharge to the underlying flooded disused workings;
- Through areas of ground subsidence increasing the permeability of the overlying clay/mudstone via fractures, recharging shallow mine workings and/or sandstone horizons;
- Natural rebound (rising) in the groundwater levels following the cessation of pumping; and,
- Via ponds, watercourses and natural soakaways;

A detailed account of the hydrogeological Conceptual Site Model (CSM) is presented in Section 5.

3.5.6 Groundwater Vulnerability

Guidance released by the EA (Environment Agency, March 2017) states that activities that have the potential to affect the quality or quantity of groundwater must prevent groundwater pollution. All groundwater is vulnerable to pollution, and some geological formations are more vulnerable than others. The risks of groundwater pollution from any given activity depend in part on:

- The physical, chemical and biological properties of the underlying soil and rocks;
- Depth and quality of soil;
- The presence of glacial sediment and other materials – known as ‘drift’ deposits; and,

⁴ The Physical Properties of Minor Aquifers in England and Wales. Environment Agency R&D Report Publication 68. Technical Report WD/00/04. (2000).

- Depth of the unsaturated zone.

All of the above affect how groundwater is more or less vulnerable to pollution, with type of vulnerability generally one of the following:

- Intrinsic vulnerability – this relates to the physical characteristics, it includes soil type, presence of superficial soils, or rock type; and,
- Specific vulnerability – this relates to the effect of the proposed activity including any contaminant and consequent risk to groundwater.

The secondary superficial aquifer, located to the north of the site is classified as 'Low Vulnerability'. Low Vulnerability aquifers are defined as *"Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability."*

The secondary bedrock aquifers on site are classified as 'Medium vulnerability'. These are defined as *"Areas intermediate between high and low vulnerability"*

3.5.7 Groundwater Source Protection Zones

The EA defines groundwater Source Protection Zones (SPZs) around identified abstractions to aid the assessment of risk to groundwater or abstraction sources from development. SPZs have three subdivisions and bespoke SPZs are defined for all major abstraction sources intended for human consumption or food use, e.g. boreholes and springs. These sub-divisions are defined as follows:

- SPZ1 – Inner protection zone - defined as the 50-day travel time from any point below the water table to the abstraction source. This zone has a minimum radius of 50 metres;
- SPZ2 – Outer protection zone - defined by a 400-day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the abstraction source, depending on the size of the abstraction;
- SPZ3 – Source catchment protection zone - defined as the area around an abstraction source within which all groundwater recharge is presumed to be discharged at the abstraction source.

The site is not shown to be situated within an NRW defined groundwater SPZ.

3.5.8 Groundwater Levels & Flow Direction

Reports reviewed in Section 2.4 indicate that groundwater levels beneath the site have risen in recent times owing to deterioration and collapse of the underlying drainage system (mine workings), as well as the grouting of the A470. The previous Merebrook ES Chapter 12 (2008) indicated that groundwater levels showed rapid response to heavy rainfall which could indicate that the groundwater discharge route to the Upper Abercanaid Engine Shaft (off-site to the south-east) is restricted.

As part of the WYG (now Tetra Tech) site walkover in c.2017, groundwater levels were recorded in accessible groundwater monitoring boreholes within the southern and central area of the landholding. An electric dip meter was used to determine the depth to groundwater in accessible on-site monitoring boreholes over two monitoring visits on the 31st May and 15th June 2017.

The groundwater levels recorded are presented in the following tables (results presented in m bgl in Table 3-2, and m AOD in Table 3-3). All boreholes were found to be blocked at depth, except for monitoring borehole CZ9A. The depth of these recorded blockages is also presented in the tables with the total drilled borehole depth obtained from the borehole logs (Borehole Investigation and Monitoring Report, 1980-1988).

Table 3-2 Recorded Groundwater Levels (m bgl)

Borehole ID	Recorded Groundwater level (31/05/2017)	Recorded Groundwater level (15/06/2017)	Depth of Blockage	Depth of Drilled Borehole	Response Zone	Strata)
BH7005	DRY	DRY	52.90m	105.50	56.36 – 104.36	CM
BH7006	14.80	13.99	14.90	24.50	13.00 – 15.50	CM
BH7007	2.51	2.48	3.20	9.50	2.00 – 4.00	GT
CZ9Aa	DRY	13.28	-	13.30	10.40 – 13.30	ST
CZ9Ab	25.59	25.56	-	28.20	Unknown	
BH7014	1.63	1.61	1.65	17.50	9.50 – 11.00	GT
BH7015	1.35	1.29	4.90	11.50	2.50 – 5.50	ST

Table Notes:

CM = Coal Measures

GT = Glacial Till

ST = Spoil Tip

Table 3-3 – Recorded Groundwater Levels (m AOD)

Borehole ID	Recorded Groundwater level (31/05/2017)	Recorded Groundwater level (15/06/2017)	Depth of Blockage	Depth of Drilled Borehole	Response Zone	Strata
BH7005	DRY	DRY	168.75	116.15	168.29 – 117.29	CM
BH7006	223.00	223.81	222.90	213.30	224.80 – 222.30	CM
BH7007	227.31	227.33	226.61	220.31	227.81 – 225.81	GT
CZ9Aa	DRY	189.85	-	189.83	192.73 – 189.83	ST
CZ9Ab	177.54	177.57	-	174.93	Unknown	
BH7014	178.20	178.22	178.18	162.33	170.33 – 168.83	GT
BH7015	176.92	176.98	173.37	166.77	175.77 – 172.77	ST

Table Notes:

CM = Coal Measures

GT = Glacial Till

ST = Spoil Tip

The shallower monitoring installation (piezometer) CZ9Aa is shown to be installed within the base of the tip material from 10.40 to 13.30mbgl on the borehole log. The depth of installation within the deeper piezometer, CZ9Ab, is however not recorded on the borehole but is anticipated to be installed within the underlying Coal

Measures. CZ9 is not covered and therefore the water level recorded in the shallow piezometer (CZ9Aa) on the 15th June 2017 is considered to be rainfall collecting within the pipework rather than the water level within the spoil tip.

The response zone for monitoring boreholes BH7005 and BH7006 is thought to be within the Coal Measures; BH7007 and BH7014 within the Glacial Till deposits; and BH7015 within a spoil tip. Historical groundwater level data recorded for the aforementioned boreholes has not been made available to Tetra Tech at the time of writing this report. Rest water levels recorded following the completion of drilling are provided on the borehole logs, however this is insufficient data to comment on whether the groundwater levels are still rising beneath the site. Groundwater flow within the sandstone horizons present beneath the site occurs within and through fractures and joint sets present in the rock. Following the cessation of mining at the site and rebound of groundwater levels, the disused tunnelways and drainage channels that extend beneath the site now represent the principal pathway for groundwater flow; with the majority of groundwater discharge occurring at the Glyndyrys Shaft and minor discharges occurring from the Bute and Nine Feet Coal Seams.

Due to the limited availability of groundwater level data, the vertical stratification of the Coal Measures and given that flow is largely controlled by the disused mine workings, it is not considered possible to identify groundwater flow direction using current groundwater level and borehole data. It is considered more prudent to assume that groundwater flow is coincident with the dip of the strata (i.e., towards the south and south-east) although this is expected to be limited, with flow strongly controlled by the former mine workings beneath the site.

3.5.9 Groundwater Quality

The chemistry of groundwater in the Coal Measures varies widely from good quality with low total dissolved solids to highly mineralised groundwater in South Wales. Higher quality groundwater is normally obtained from springs and shallow abstraction boreholes, whereas groundwater often becomes sulphate rich with increasing depth (BGS Hydrogeology Map for South Wales, Sheet 18, 1986).

Groundwater present within disused coal mine workings beneath the site has the potential to be of poor quality with possible high levels of dissolved inorganic ions, low levels of dissolved oxygen, iron and sulphate. Within the disused workings, reducing (anoxic) conditions dominate. Such conditions favour the presence of iron and manganese ions in solution. At discharge zones, where groundwater reacts with oxygen, the iron and manganese ions precipitate out of solution, forming an orange brown coloured deposit.

Low permeability mudstone and clay layers present across most the site will offer some protection to the water bearing sandstone horizons of the Coal Measures from surface pollution sources; assuming no pathways from the surface to the underlying sandstone horizons exist within the mudstone e.g. fractures.

Overall groundwater quality status for the area has been classified as a function of the requirements of the Water Framework Directive (WFD). The WFD establishes a framework for the protection of surface water and groundwater systems, with an overarching purpose to prevent deterioration and improve the status of aquatic ecosystems, promote sustainable water use, reduce pollution to groundwater and contribute to mitigating effects of flood and droughts. The Groundsure Report (Appendix B) provides information on the classification of surface waters and groundwater bodies in Wales within the WFD Cycle 2 (2015-2021). The chemical status of the South-Eastern Valleys 'Carboniferous Coal Measures', which underlie the proposed development area, is classified as 'poor' and have an overall status of 'Poor'.

3.5.10 Licensed Groundwater Abstractions

According to the Groundsure Report, there are no groundwater abstraction boreholes that have been identified within 250m of the site boundary.

The previous WYG Desktop Study (2018) identified a groundwater abstraction 26m from the south-eastern boundary of Zone 6 (Glyndyrys Pit) which was operated by TBS (South Wales) Limited (License No. 21/57/22/0035). The supply was used for general washing/process washing purposes associated with activities

at the site and had been licensed since 14th October 1999. The borehole was recorded to be drilled to 93 metres depth although no further details regarding the abstraction rate are recorded.

NRW were contacted on 23rd June 2017 for further information on groundwater abstraction license 21/57/22/0035 and associated water quality data (if available); with their response included in Appendix D. The borehole was initially licensed in 1994 to abstract 4m³ /hour (96m³ /day) and 1,464m³ /year. The license was however deregulated in March 2005. Deregulated licenses include any abstraction of less than 20m³ /day and therefore is no longer actively monitored by NRW.

As discussed in Section 3.3.5, a groundwater supply well was drilled at Blaencanid Farm (SO 035 047) in 1993 for the purposes of groundwater abstraction. The status of the abstraction well is unknown, and no groundwater abstraction license is held by the NRW although it may be that the borehole abstracts less than 20m³/d (where no license is required) and therefore a private water supply. The borehole is however located up-hydraulic gradient to groundwater flow beneath the site and is outside of the proposed development area.

3.5.11 Private Water Supplies

As part of the previous WYG Desktop Study (2018), an information request was submitted to Merthyr Tydfil Borough Council on 23rd June 2017 for details of any private water supplies within 500m of the site boundary (this was the land ownership boundary) with the response from the council attached in Appendix D Two private water supplies are located within 500m of the site at Blaencanid Farm (303511,204690) and at Bike Park Wales.

Limited details were held by the Council regarding Blaencanid Farm such as date of drilling, construction details, depth of borehole and recorded water levels. No water quality information for the supply has been collected/submitted to the Council for the last 17 years. Therefore, the supply is not likely to be used for human consumption and could no longer be in use.

Following a further information request submitted to the Council on 27th October 2021, the following information was obtained. The supply located at Bike Park Wales was installed to a depth of 100m in April 2013. The water quality for the borehole is “satisfactory” and the resting water level is 15.5m below ground level. Given that the supply is drawing from the coal measures aquifer and potentially former mine workings, the water is not thought to be used for human consumption.

3.6 HYDROLOGY

3.6.1 Hydrological Catchments

The presence of surface water features, including streams, rivers, drainage ditches and ponds have been initially determined from Ordnance Survey (OS) Maps for the site, many of which have been confirmed during the site walkovers in c.2017 and 2021.

The land at the site generally slopes downwards from the west to the east towards the A470 which bounds the eastern area of the land holding. There are several streams which are shown to be crossing the site area, generally flowing in an east to west orientation towards the River Taff which is located approximately 600m to the west of the A470 at an approximate elevation of 165m to 155m AOD past the site. Several large ponds and emerging springs from the base of tips are also shown to be present across the site.

The site and the surrounding area is situated within the ‘River Taff – Conf Taf Fechan to Conf R Cynon’ catchment of the Severn Basin according to the EA Catchment Data Explorer . The catchment covers an area of approximately 4,828ha with the River Taff spanning a length of 17.6km within the catchment. The River Taff has an overall water body classification (both chemical and ecological) of moderate in 2009 (Cycle 1) and 2015 (Cycle 2) under the WFD water body classification assessment.

There are considered to be five main catchment areas draining the entirety of the Rhydycar West landholding as shown in Figure 4 and summarised in turn below;

- **Catchment Area 1** – The Nant Cwm Pant Bach drains land within the north-western area of the site (Zone 1) and the land located beyond off-site;
- **Catchment Area 2** - The principal stream in this catchment is the Nant Rhyd y Car which is fed by the Nant Cwm Glo and the Nant Llwyn Yr Eos streams which drain the central area of Zone 1;
- **Catchment Area 3** – Characterised by a series of small channels and ephemeral streams which drain emerging springs from the base of tips and drifts within the southern area of Zone 1 and central part of Zone 4;
- **Catchment Area 4** – The diverted channel of the Nant Canaid stream flows close to the southern boundary of the site, through the Cwm Pit and discharges into a large marshy ponded area adjacent to the former Tub Boat Canal; and,
- **Catchment Area 5** – Comprises the original Nant Canaid stream which flows close to the southern site boundary before discharging into the River Taff to the east of the site.

The proposed development is situated within Catchments 3, 4 and 5. These catchment areas have been summarised below in turn;

Catchment Area 3

This catchment area was previously referred to as the 'Central catchment' in the Merebrook ES Chapter 13 (2008). The northern extent of the proposed development is located within the southern extent of Catchment Area 3. The catchment is largely characterised by a series of small streams and ephemeral channels which are shown to drain to issuing streams from the base of spoils tips and water emerging from former mine entrances within Catchment 1. Water from this area flows to ponds within the eastern area of the site prior to being discharged off-site via a series of culverts beneath the A470.

Catchment Area 4

This catchment area was previously referred to as the 'Nant Melin Cannaid catchment' in the Merebrook ES Chapter 13 (2008). The central and southern extent of the proposed development is located within Catchment Area 4.

A tributary of the Nant Cannaid, referred to as the 'Nant Melin Cannaid' in the 2008 ES, is sourced from emerging springs to the west and north-west of the site. The 2008 ES states that this stream was diverted in the 19th century to provide a source of water to the Cyfarthfa Pond and Tub Boat Canal. This tributary is no longer present and has been infilled. Water in the Cyfarthfa Pond is thought to receive water emerging from the base of a tip located to the west of the pond and from surface water run-off.

Contemporary OS mapping shows the Nant Melin Cannaid stream to 'sink' (infiltrate into the ground) close to the former Cwm Pit Colliery at SO065863. Tetra Tech did not find any evidence of the stream to be sinking into the ground during the walkover and rather, the stream was observed to flow past the Cyfarthfa Pond (at a lower level) and discharge into a ponded, marshy area which Merebrook referred to as the 'hollow'. The location of this hollow area is depicted on Figure 3. Water collects in this basin, behind the Glyndyrys Tip and acts as a natural soakaway. No drainage outlet has been observed by Tetra Tech or reported by others.

Drainage works which were started in April 2022 by the Council attempted to divert water away from this area as outlined in the Tetra Tech Site Visit Report at Appendix G. However, the works were put on hold and water from this stream continues to discharge into the 'hollow' area behind the A470/Glyndyrys tip, with water flowing through and re-emerging at the base of the tip to the east. At the base of the tip, drains have been installed by the Council to capture water which emerges as spring water and from surface water run-off. Water is then channelled to a discharge point at the former Cyfarthfa Junction which comprises a large stone lined channel which cascades down towards the former Aberdare to Merthyr railway line/ widened track. Like much of the network, this stone lined channel remains unfinished.

It should be noted that the weather preceding the visit by Tetra Tech in June 2022 had been dry, with limited to no rainfall for several days. As a result, low flow conditions of key water features were observed, and no water was found to be flowing in the newly constructed drainage ditches at the base of tip. Water within the hollow is therefore likely being lost to ground/ providing recharge to mine workings at depth.

Catchment Area 5

Catchment Area 5 is the smallest catchment area in terms of land area. The Nant Canaid stream flows close to the southern boundary of the site, adjacent to former Aberdare to Merthyr railway track before flowing from the to the east beneath the A470. Water flowing within the Nant Canaid is sourced from springs and surface runoff from land situated offsite to the west. Water is also shown to flow along the former Aberdare to Merthyr railway track which is sourced from spring water emerging from within the Abernant Tunnel. A cut of drain has been installed by the Council to divert water to the former Cyfartha Junction however, the drainage channel was not completed.

3.6.2 Flooding

No potential for flooding from groundwater was found at either the surface or below ground level. There is, however, potential for onsite surface water pluvial flooding in low lying ground at the Tub Boat canal to the East of the site. This area has been designated as having a 1 in 30-year risk of flooding greater than 1m. Further information regarding flooding at the site is presented in the Tetra Tech Flood Consequence Report.

3.6.3 Licensed Surface Water Abstractions

No licensed surface water abstractions have been identified within 250m of the site boundary. Previous consultation with NRW in c.2017 identified one surface water abstraction located within the south-eastern area of the site which was registered to Hoover Plc (21/57/22/0025). The abstraction is recorded to be located at the Nant Canaid stream at 'Glyndyrys' for the purpose of evaporative cooling. The permit started on the 30th October 2003 and at the time, it was shown to be licensed.

NRW were contacted on 23rd June 2017 for further information on surface water abstractions and associated water quality data (if available) with their response attached in Appendix C. Surface water license 21/57/22/0025 was revoked in August 2014 following the cessation of trading by Hoover Plc in 2009.

3.6.4 Surface Water Quality

NRW were contacted on 23rd June 2017 for further information on water quality data (if available) for surface water features in and around the proposed development site with their response attached in Appendix D. No surface water monitoring data exists for the surface water features located within the site boundary. The NRW monitored water quality in the River Taff to the east of the site between 1990- 2010 at two locations; Abercanaid (grid ref. SO 05461 04637, approximately 400m east of the south-eastern corner of the site boundary) and Rhydycar Sports Centre (grid ref. SO 04988 05621). Recorded water quality data for the River Taff at these two localities is attached in Appendix C.

3.6.5 Discharge Consents

Based on site specific information (Groundshare Report – Appendix B) no current discharge consents have been identified within the site boundary.

The Groundshare report has indicated that there is one record relating to an historical discharge consent 94m north-west of the site boundary, issued by NRW for an 'unspecified substance' to be discharged to the 'Glyndyrys Shaft' by British Coal Opencast. The license was granted by the NRW on the 12th September 1986 and later revoked on the 18th September 1986.

The only active discharge consent is located 438m to the north-east and relates to Sewer discharges to the river taff from the Rhyd-y-car leisure centre.

3.6.6 Pollution Incidents and Prosecutions

A summary of recorded Pollution Incidents and Prosecutions sourced from the Environment Agency and Natural Resources Wales is presented in the table below.

Table 3-4 – Summary of Pollution Incidents and Prosecutions within 500m of the site.

Location	Details
240m East of the site	Pollution incident involving an 'unidentified oil' occurred on 04/05/2016, resulting in category 3 (Minor) water impact.
294m Southeast of the site	Pollution incident involving 'Rocks and Gravel' occurred on 26/11/2002, resulting in category 3 (Minor) water impact.
448m North of the site	Pollution incident involving 'Soils and Clay' occurred on 10/03/2017, resulting in category 3 (Minor) water impact.
470m North of the site	Pollution incident involving 'Soils and Clay' occurred on 01/03/2017, resulting in category 3 (Minor) water impact.
478m North of the site	Pollution incident involving 'Soils and Clay' occurred on 30/01/2017, resulting in category 3 (Minor) water impact.

3.7 SITE HISTORY

3.7.1 Mining History

The mining history for the site and surrounding area has been extensively covered in previous reports for the site, therefore the mining history will only be briefly described here, with a more detailed account of the mining history provided in the Tetra Tech Ground Conditions Report.

The site has been mined for both ironstone and coal for over 200 years. The earliest recorded evidence of mine working at the site is from a historical mine plan dated c.1826, located in the northern area of the site. The Cyfarthfa Tub Boat Canal was built on the site between c.1777 and c.1778, the source of water for the canal extended from the diverted 'Nant Melin Canaid' stream in the southern area of the site (Cwm Pit) to the ironstone workings due north of the site.

By c.1800, the veins and seams worked by the iron works were almost exhausted, and mining moved further south and westwards along the line of the canals. As the canal crossed coal seams within the site, work began in mining the site in earnest, with shafts being sunk and levels dug to target the coal seams and ironstone veins across the site.

The Cyfarthfa and Ynys Fach Iron Works were running into difficulties by the 1860's and were closed in 1874/5 due to strikes. However, the Cyfarthfa Iron Works was re-fitted to be able to run the Bessemer process, and subsequently re-opened in 1879. By the time the iron works closed several on-site pits were operative, including Coedcae Pit, Cwm Glo Pit, Lower Colliers Row Pit, Glyndyrys Pit and Cwm Pit. Several drifts were also still being worked and it is thought these were mostly targeting the ironstones on site. It is from the ironstone works that the majority of the tips are thought to be derived; stone was brought out of the site on trams and dumped at the surface to weather in order allow the extraction of the iron. Then, following this weathering process, the remaining rock was tipped along the edges of the workings.

Coal mining eventually began to peter out across the site, most collieries on site being closed by 1900, with coal only accessed by levels. Two levels (Lucy No. 5 and Lucy No. 4) closed in 1950 and 1955 respectively. Small, licensed patch workings continued across the site on the Gorllwyn seam, with the last one closing in 1964.

3.7.2 Historical Uses

The historical development of the site and surrounding area (including the entirety of the landholding) has been assessed from historical Ordnance Survey (OS) maps which are presented at Appendix B. The historical review is based upon the proposed development area and the nearby surrounding area, with the focus on the former collieries; Cwm Pit, Glyndyrys Pit and Lower Colliers Pit.

Cwm Pit

Cwm Pit is a designated SAM which largely falls within the south-western area of the site. Cwm Pit is recorded in the earliest maps available at 1876-1881 in the far south of the zone. The pit comprises of several buildings and a minor tramway network. A larger railway crosses through the south of the area, and enters a tunnel in the southern corner, part of the area's mainline infrastructure. The railway is in a cutting, with Cwm Pit elevated above it.

By c.1900, additional buildings have been added, as well as an extension of tip material in multiple locations to the north; these tips are often accompanied by a small tramway. By c.1919, the tips associated with the pit have increased in size dramatically, covering much of the previously wooded and open land adjacent to the north.

Curnfelin coal drift is also recorded at this date, likely providing additional spoil. It is presumed that the pit ceased operations during some time leading up to c.1957. By this date, Cwm Pit is no longer labelled, and many of its buildings are removed. However, a square structure is now labelled as a chimney, as well as a slag heap 100m to the north. This suggests there may have been further processing of tip material past the mining phase. In general, past c.1958, all labels related to mining change from being marked as "old", to being completely removed in most modern maps. The railway briefly crossing the south of the site is dismantled by c.1983, post this date the area of woodland is shown to increase in size. Otherwise, after 1958, there is very little alteration in land usage.

Glyndyrys Pit

Generally, early maps record much of the central and southern area of the site as being used for mining related operations. Glyndyrys Pit (ironstone) is located within the central region of the site. The pit is accompanied by two large railway lines which cross each other in the central to southern extent of the zone (Cyfarthfa Crossing), and a network of smaller tramways constructed upon significantly elevated tips. A smithy (i.e. a blacksmith's forge) is recorded to the west of the pit.

To the east of the site, much of the area is occupied by the large Glyndyrys pond. The southeast is dominated by tip material infrequently crossed by tramways and paths, as well as a number of mining related infrastructure such as shafts, engine houses, and levels. Any remaining land in the area appears to be agricultural land.

By c.1900 Glyndyrys pit is recorded as 'disused' and its associated tramways are removed, however there is a large extension of tip material to the north of Cyfarthfa Crossing. An additional section of railway along the southern site border also connects the two main lines, although by the first time it appears in c.1900, it is already labelled as "old", before being dismantled by c.1919. At this time, Glyndyrys pond is also visibly dramatically reduced in size; potentially due a breach in its dam as it is no longer required, with the Glamorganshire Canal now largely disused.

Most mining features are labelled as old/disused from this point onwards, indicating a cessation of activity. By c.1951 Glyndyrys pond has fully dried up, and by c.1957-1964 the eastern railway has been dismantled. This rapid reduction in site activity also coincides with the removal of labels at Glyndyrys pit, with only the shaft building remaining. The western railway is fully dismantled by c.1964, during which time an electric transmission line is constructed across the area, with one large pylon footed on old tip material. There is little change from this date onwards, other than springs and issues being shown within the footprint of the absent Glyndyrys pond.

Lower Collieries Pit

In early maps, Lower Colliers Row is marked just north of the site's northern boundary. At its southern end is a large coal shaft neighbouring an old coal level and an old ironstone level. North of the row is a single air shaft. These elements surround a long row of what is interpreted as terraced housing.

Several tramways intersect a large area of tip material to the south. North of Lower Colliers Row is a reservoir, from which a sluice connects it to a canal originating from Cyrfather Pond, and passing by the mining area. The area to the north of the pit is largely comprised of open woodland, through which the Cwm Pit railway runs roughly north to south following the line of the canal. The Nant Rhyd-y-Car is present beyond this area.

The frequency of locations related to mining increases towards c.1900, with the addition of levels, reservoirs and railway extensions. Bordering much of these industrial features is spoil tip material. By c.1900, to the east of Lower Colliers Row, a new railway is under construction. There is also additional tip material deposition across the area. In maps dating to 1919, this tip material spreads into the path of the canal. Additional coal measures along the railway line in the west also coincides with a great increase in the amount of tip material.

By c.1951, mining activity appears to have greatly reduced and the large Cwm Pit railway has been removed. The tips continue to expand until c.1958, at which point all railways are removed and the Pit at Lower Colliers Row is marked as a 'ruin'. Some small buildings are constructed on the tip material and then quickly removed by 1969, possibly housing.

By 1986-1989, all of the buildings at Lower Colliers Row are removed, and the reservoir to its north has been reclassified as a pond. There is little change from this point onwards other than an increased woodland density on many of the old tips.

3.8 BGS RECORDED MINERAL SITES

With reference to 'BritPits', a database maintained by the BGS of currently active and closed surface/underground mineral workings, the following mineral sites are recorded within 500m of the proposed development.

Table 3-5 – Summary of BGS Recorded Mineral Sites within 500m of the site.

Site Name	Status	Type	Commodity	Distance and Direction from Site
The Willows	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Ironstone	On site
Lower Colliers Row Tips	Ceased	Tip at a mine, quarry or other location from which mineral is being extracted, Working may be termed Slate Waste Tip, Shale, Bing, Coal Tip or Coal Bing.	Coal, Surface Mined	On site
Pen-cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	On site
Glyndyrys Pit	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	On site
Pen-Cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed	Coal, Deep	57m NW

Site Name	Status	Type	Commodity	Distance and Direction from Site
		colliery, mine, drift mine, slant, level adit or ingoing eye		
Pen-Cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	82m SE
Pen-Cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	120m NW
Upper Aber-canaid	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	137m S
Rhyd-y-car Pit	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	148M NE
Pen-Cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	169 NW
Upper Aber-canaid	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	218 SE
Pen-Cae	Ceased	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Sandstone	263m
CWM Pit	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	295m
Pen-Cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Ironstone	304m
Rhyd-y-car	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	316m N
Upper Aber-canaid	Ceased	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Sandstone	373m S
Upper Aber-canaid	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed	Coal, Deep	377m SE

Site Name	Status	Type	Commodity	Distance and Direction from Site
		colliery, mine, drift mine, slant, level adit or ingoing eye		
Lucy No 4 Level	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	379m SE
Waunwylt	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal Deep	413m SW
Pen-Cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal Deep	423m NW
Pen-Cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal Deep	434m NW
Waunwylt	Ceased	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Sandstone	452m S
Upper Aber-Canaid	Ceased	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Sandstone	455m SE
Lucy Thomas No.5 Mine	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	465 NW
Pen-Cae	Ceased	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Sandstone	472m W
Pen-Cae	Ceased	Wholly underground, access by shaft, adit or drift. Working may be termed colliery, mine, drift mine, slant, level adit or ingoing eye	Coal, Deep	480m NW

3.9 ENVIRONMENTAL DATABASE SEARCH

Regulatory authority information relevant to the site and its surroundings has been obtained from the undertaking of an environmental database search with a summary outlined below.

- Pollution Controls: There are no Integrated Pollution Controls, Integrated Pollution Prevention and Controls or Local Authority Pollution Prevention and Controls recorded within 250m of the site.
- Waste: There are no historical or registered landfills or waste management facilities recorded within 250m of the site.

- **Hazardous Substances:** There are no records pertaining to the Control of Major Hazards Sites (COMAH), storage of explosive materials or the Notification of Installations Handling Hazardous Substances (NIHHS) within 250m of the site.
- **Environmentally Sensitive Areas:** The majority of the site is located within the Rhydycar Gorllewin/ Rhydycar West SINC and the Cwm Glo a Glyndyrys SSSI is recorded within the area of the site designated for the position of the ski slope. There is also designated woodland immediately southwest and west of the site. Furthermore, there are a number of scheduled ancient monuments close to the site. These are as follows; Cyfarthfa balance pond and leat (adjacent to the boundary); Cwm Pit and head of railway (largely falls within the south-western extent of the site); Black Pins early ironstone workings (68m west) and; Vale of Neath railway cutting and tunnel portal (199m southwest).
- **Flooding:** There is no potential on site for groundwater flooding at the surface or below ground level. However, there is potential for surface water flooding at low lying ground to the east of the tub boat canal.
- **Industrial Land Use:** There are no trade entities on-site and the closest records relate to Rhydycar Business Park located 75m to the northeast of the site.

4.0 SITE WALKOVER

4.1 OVERVIEW

WYG (now Tetra Tech) initially visited site over two separate occasions in May and June 2017. The walkover included the entire 230ha land holding area. As part of the current redevelopment plans for the site, Tetra Tech visited site in May and September 2021, with the focus on surveying hydrological features within the site boundary and immediate surrounding area. The findings from the visits in 2017 and 2021 are discussed in turn below. The findings from these visits were used to support a contemporary hydrological map which is attached at Appendix F.

However, during spring 2022, tip drainage works were carried out by the Council which have altered the baseline. Tetra Tech visited site on 10th June 2022 to survey the works. The findings from the visit are summarised in Section 4.4 and the full sites report attached at Appendix G.

4.2 SITE WALKOVER VISITS – 2017

A site walkover inspection was carried out by a consultant hydrogeologist from WYG on the 30th and 31st May 2017. Weather conditions during the site walkover were generally poor, with sporadic rain spell and overcast conditions experienced over the two days. The weather in South Wales in advance of the site walkover had largely been dry over the months of April and May 2017. A second site walkover of the site was carried out on the 15th June 2017 to further inspect the land area and to measure groundwater levels at accessible monitoring borehole locations, following a one-week period of heavy rainfall. The groundwater levels are therefore expected to reflect conditions following prolonged heavy rainfall.

The general site layout and photographic plate locations are presented on Figure 5 and at Appendix D, respectively. The main aim of the site walkover visits was to observe and ascertain the hydrological and hydrogeological conditions which exist at the site in line with the scope of this report. Due to health concerns and safety concerns relating to the mining legacy of the site and the rather dense vegetation present, it was not possible to inspect all locations across the site.

The site largely comprises undeveloped land consisting of natural mature woodland and marshland combined with anthropogenic derived spoil tips and mining features relating to the long history of coal and ironstone extraction works. There are numerous recorded and unrecorded mine entries, comprising both shafts and adits, which are associated with an extensive network of underground tunnels and roadways beneath the surface.

Key observations made during the walkover visits are presented in Appendix D. Please note, the visits in 2017 covered the entire landholding. Only the areas that cover the site boundary and the immediate surrounding area are summarised below and in Appendix D. A summary of the two visits to the site in 2017 site walkovers is presented below:

- The water conditions observed at the site during the first site walkover (30th-31st May 2017) are considered to be representative of 'low flow' conditions. An increase in the amount of water at the site following a brief (one week) period of heavy rain was evident during the second site visit (15th June 2017), both in terms of the water levels observed in the surface water features, and the increased flow rates observed to be emerging from the base of tips and mine features;
- Springs have been observed to emerge from the base of several tips particularly within the southern area of the land ownership area (both on site and in the immediate surrounding area), which are then drained by streams crossing the site in a general west to east orientation. The water quality of the emerging spring water was observed to be clear and transparent;
- A large area of stagnant water was observed to be located adjacent to the former Tub Boat Canal Balancing Pond within the south-western area of the site as shown in Figure 4. This area is being fed by water flowing via the diverted Nant Canaid stream, but also receives water from the tub boat balancing pond. Water collecting in this marshy area ('hollow') is thought to be slowly discharged

through fissures and cavities present in the underlying ground and emerging via springs at the base of the Glyn-dyrys Tip to the east of this locality;

- Spring water collecting within the Abernant tunnel, off-site in the south-eastern corner of the land ownership boundary is being drained via a pipe with water found to be emerging from a manhole chamber at the entrance of tunnel. Water discharging from this point then flows along the former railway track (Aberdare to Merthyr Line) before discharging into the original Nant Canaid stream at the site boundary;
- Several crown holes and areas of subsidence have been identified across the site which were often filled with stagnant water. These areas are likely providing localised groundwater recharge both to the sandstone aquifers of the coal measures and the underlying workings;
- Surface water at the site is discharged via several culverts at the site boundary, beneath the A470, before discharging into the Glamorgan Canal at the site boundary or directly into the River Taff (via the Nant Rhyd y Car stream) to the east of the site;
- The main discharge point for groundwater within the former workings beneath the site is from a stone building (former Engine Houses – ‘Abercanaid Engine Shaft’) located at Upper Abercanaid in the south-eastern corner of the site into the Glamorgan Canal. Groundwater was estimated to be discharging at 50L/sec at this point and was noted to be generally clear and transparent.

4.3 SITE WALKOVER VISITS - 2021

Tetra Tech carried out two separate visits in May and September 2021 to inspect hydrological and hydrogeological features located within the proposed development area and the immediate surrounding area.

The site walkovers concentrated on the proposed development area and nearby area to the site. A summary of the two visits is presented in the following sections with the general site layout and photographic plate locations presented on Figure 6 and at Appendix E. The findings of these visits have been used to construct an up-to-date Hydrological Map for the site as shown Appendix F which should be read in conjunction with this section along with the findings of the c.2017 walkover in Appendix D.

4.3.1 Site Visit (26th May 2021)

At the time of the visit, the weather was dry except for a few light rain showers later on in the afternoon. The weather in South Wales ahead of the visit had been wet, with several prolonged rainfall events in the past few weeks. The visit was largely focused on the proposed development area and the hydrological areas of interest within this area.

The survey began atop the A470 spoil tip (Locality 1) which is located within the central area of the proposed development. The ‘hollow’ (as referred to in the 2008 ES) was observed from atop the A470 tip. The client representative explained that during a recent visit to the site a few days earlier (21st May 2021), following a rainfall event, that this area was flooded with ponded water visible from the top of the tip. We understand that a culvert was previously constructed during the placement of the A470 tipped materials onto the existing spoil tip from the Glyndyrys Colliery, but this has collapsed. The inlet and outlet for this culvert has not been observed by Tetra Tech.

Evidence of recent flooding can be observed at Locality 2 as result of a large storm event in c.2020 and from the overtopping of water from the ‘hollow’ (as referred to as in the 2008 ES). The site representative explained that the culvert (Locality 3) for the Nant Melin Cannaid, which discharges into the ‘hollow’ (at the site boundary), became blocked and resulted in floodwater damaging the adjacent track and exposing a coal seam along the former Great Western railway line. A vehicular track which runs along the southern extent of the development boundary has also become damaged as a result of water overtopping from the ‘hollow’ (see Locality 4).

A culvert outfall was observed along the northern bank of the Nant Cannaid stream at Locality 5 which is located outside of the development boundary to the south-west. It is thought that the Nant Melin Cannaid stream which flows through Cwm Pit was previously diverted via this culvert (304454,204384), beneath the present-day spoil

tip, with no visible water discharging at this point into the Nant Cannaid stream. This culvert had not been surveyed previously and had been obscured by a tree which had recently fallen during a storm event.

Water was observed to be flowing along the former Aberdare to Merthyr railway line. Water was also observed to be flowing during the visit by WYG in c. 2017 (see 'Locality 27'). The source of water is thought to be combination of groundwater discharge (from the tunnel) and surface water run-off from tributary watercourses which discharge along the route from springs emerging up on the hillside, to the west of the proposed development.

Groundwater seepage was noted on the western extent of the railway bridge at Locality 7. Approximately 40m further down from the bridge, at Locality 8, there is an area of the cutting where subsidence has taken place and a coal seam has been exposed. This is thought to be the result of flooding associated with overtopping of water from the 'hollow' and during a storm even in c.2020 where the Nant Melin Cannaid culvert become blocked. Cobble sized coal fragments were observed further down-gradient of this locality along the former railway track. It is worth noting that this area of subsidence/ erosion is considerably greater than when it was first surveyed in May 2017.

Several springs (7 no.) were observed to be emerging at the base of the Glyndyrus Tip at Locality 9 (previously Locality 31 in the 2017 site walkover). Water emerging at this point is thought to be predominantly sourced from water which soaking away within the area to the west of the Glyndyrus Tip, known as the 'hollow' (proposed outdoor activity area). A stone lined drain was also observed as shown in Plate 30. Water discharging from these springs collects within the depression adjacent to the railway line before flowing through a culvert beneath the track and emerging on the eastern side where it is joined by water which is flowing along the railway line. The culvert on the western side of the track has been silted up and is no longer visible. Water flows away from this area within an incised channel and discharges into a ponded area at Locality 27.

Evidence of recent flooding was observed at an area of the site known as the 'Cyfarthfa Junction' (Locality 10). This is an area where there would have been several railway lines crossing. We understand that previously, water sourced from the Mynydd Aberdâr tunnel would have discharge in this area and potentially still does during large storm events. Springs were noted to emerge at the base of the Glyndyrus Tip at this locality (previously 'Locality 37 in c. 2017 site walkover'). A further spring was observed at Locality 11 within a densely vegetated area with frequent cobbles of brick and slag material on the ground. Groundwater was observed to slowly up-well at this point. There was little in the way of water discharging from this point at the time of the visit. However, a considerable amount of water was noted to be discharging locally from this this area; spreading diffusely away from this locality towards the south-east. As such, it is likely to be several, diffuse springs and/or groundwater emerging in this area (most likely from the 'Hollow' which is located behind the tips at a higher elevation).

There is much evidence of flooding and washout of materials (brick, slag etc.) which was also observed in the previous walkover in c. 2017 (see 'Locality 45'). Water is thought to discharge towards an area noted to be "Glyndyrus Pond" (located outside of the development area) prior to discharging from site at a culvert beneath the A470.

The former Cyfarthfa Tub Boat Canal was surveyed with water observed to be stagnant and non-flowing. At Locality 11, there was evidence of water seeping from the Leat and slowly draining into the 'hollow' area. This was observed during the walkover by WYG in c.2017. A small, incised channel was observed to flow between a break in the Leat at Locality 12, towards the ponded water within the basal area of the 'hollow'. Water is sourced from overtopping of water in the Cyfarthfa Pond but is also likely receiving run-off and seepage from the tip located directly west of this locality.

The Nant Melin Cannaid stream was observed at Locality 13 within the basin area between the Cyfarthfa Canal and the Glyndyrus Tip. There are several areas of ponded water within this area. We understand that a culver may have been constructed previously to drain this area, but no such feature could be observed.

Water was observed to be flowing out of the Cyfarthfa Pond along the north-western point and into the 'Leat' (Locality 15). Stagnant, pooled water was observed within the south-western corner of the Cyfarthfa Pond (Locality 16) which is not shown on contemporary OS mapping. This area is close to where the diverted channel

from the Nant Melin Cannaid would have discharged into the pond. No evidence of water or a channel entering the pond was observed by Tetra Tech and is understood to have been backfilled. Water in the pond is thought to be sourced from springs emerging from the base of the adjacent tip and run surface water run-off.

4.3.2 Site Visit (3rd September 2021)

A second visit to site was undertaken by a Principal Hydrogeologist from Tetra Tech. One of the main objectives of this further visit was to view key hydrological features and areas of interest during a sustained period of little to no rainfall. It was hoped that features such as a culvert draining the 'hollow' area of the site (beneath the A470 Tip), or further outfalls along the Nant Canaid stream, may be visible during low water levels.

The culvert for the Nant Cannaid stream was observed at Locality 17 which is located outside of both the development boundary and the landholding. This area was found to be heavily silted with fragments of coal and mudstone/ sandstone gravel. There was small stream of water flowing and discharging into the culvert beneath the A470. Drains which are shown to discharge into this area were found to be dry.

The Nant Canaid stream was observed at the edge of the landholding at Locality 18. Water level in the stream at this point was low with little flow observed. The stream is lined with rounded cobbles and gravels of mudstone and sandstone and occasional coal fragments. The stream was dry at Locality 19 with much larger boulders and cobbles of mudstone and fallen trees and branches within the dry stream.

The culvert outfall that was observed at Locality 5 previously was surveyed during this visit. The water level in the Nant Canaid at this point was largely dry which allowed a close inspect of this culvert. No water was observed to be flowing from this point and was found to be very silted close to the exist of this culvert.

Locality 20 shows a culvert for the Nant Canaid beneath a trackway which crosses both the stream and adjacent railway line. The culvert is stone lined and is free from debris. This is not typical for culverts at the site which are predominantly silted up (as shown for the culvert at Locality 21) or buried. A tree has fallen before the entrance of the culvert which is effectively acting as a dam. Near to Locality 21, on the bend of the stream, a stone archway can just be seen. This culvert is largely buried with only the top of the stone arch visible. This is potentially the culvert outfall for the previously diverted Nant Melin Cannaid at Cwm Pit (as shown on contemporary OS Mapping).

Metal tram lines were observed to be present within the Nant Melin Cannaid up-gradient of Cwm Pit at Locality 22. It is unclear whether this has been transported during heavy flows within the stream from the former ironstone works further to the west, or it was part of the infrastructure which diverted the stream into several directions (see Appendix F). Near to this point, there is a fenced rectangular area of the site located within an area of dense vegetation. The purpose of this fenced off area is not known but likely an area of subsidence or potentially a former shaft.

A brick lined culvert was observed at the base of the stone masonry wall at Cwm Pit (Locality 23) (Grid Reference 04405,04346). The ground level at this point is much higher than the level of the stream bed which provides some indication in the amount of erosion that this stream has caused, completely washing away the tram lines and underlying materials that were present in this area of Cwm Pit. The stream bed level is circa 1m lower than the base of the culvert entrance. The impact the stream is having on the Cwm Pit masonry wall can be seen in Locality 24, where the foundations of the wall are almost completely exposed as a result of the water eroding away the soils along the wall. The original ground level in this area is likely marked by the line of vegetation growing out of the wall and is also a likely indicator of the levels that the stream has reached during periods of heavy flows.

An attempt was made to find evidence of where the Nant Melin Cannaid was previously diverted (as indicated by the word "sinks" on OS Mapping – see Locality) beneath the adjacent tip; most likely discharging from the culvert that was observed at Locality 21. No obvious culvert or drainage pipe could be observed owing to dense vegetation and trees which have fallen in the stream at this locality. The ground level adjacent to this area, along the path that runs along the eastern side of the stream, is higher compared to the surrounding level. It is likely the stream was previously banked and channel to a culvert which underlies this area which is likely now blocked

from debris. The stream now flows in a north-easterly direction along the former tramway/ railway line and into the area proposed to be the outdoor activity centre.

The 'hollow' area (Locality 14) was observed to be dry, with the water in the Nant Melin Cannaid shown to stop at approximately Locality 25 and percolate below ground. No water was observed to be flowing within the stream leading away from the leat (Locality 13) or within the leat itself. No water was observed to be overtopping the Cyfarthfa Pond during this visit.

A small culvert was observed at Locality 25. This is thought to relate to the drain feature was marked on OS mapping as well as historical mapping. The channel previously fed the former Glyndyrys Pond which was located to the north-east of this locality (outside of the red line boundary). No water was found to be flowing through this culvert or the much larger culvert (Locality 26) beneath the adjacent railway line. During the last visit, water was observed to be flowing through this culvert which is sourced from the water discharging from Locality 9. Water flowing away from this culvert spreads over the land to the east and is discharged from the site from a culvert beneath the A470.

A circular depression (area of collapse), approximately 3m x 3m (at ground level) was observed at Locality 27. On previous visits, this area has been completely flooded by water. No water could be seen at the base of the collapse and several branches from fallen trees were present within the hole. Current OS Mapping shows this area to 'sink' west of the two 'pond' features. Water discharging from Locality 9 flows into these pond features (the smaller of the two is potentially this area of collapse) prior to flowing in a southerly direction through the culvert beneath the railway track at Locality 26.

Locality 9 was visited and was found to be largely dry with no obvious signs of springs discharging at the base of the tip; although there was some water that is ponded in this depressed area and flowing towards the culvert and the ponded areas observed at Locality 27. No water was observed to be flowing along the former Aberdare to Merthyr railway line at this locality. The stream was observed to be flowing at Locality 28 and was discharging below ground at this point, most likely through a fissure as a result of underlying subsidence either within the underlying soils or below mine workings.

Evidence of past flooding can be seen at Locality 29. Numerous fallen trees and washed materials, such as brick and slag, is present in this area of the site. No running water was observed at the time of the visit. Water was observed to spread across this area during the previous visit, discharging through a culvert at the site boundary (into the former Glyndyrys Pond) and along the former railway line near to Locality 10 off-site. Near to this locality, at Locality 30, there is a large (10m x 10m) collapse from an exposed coal seam which is circa 8m deep. This area was dry at the time of the visit by the site representative remarked that this has been full of water previously.

The spring that was observed at Locality 11 was found to be dry during this visit. An area further north of this locality at Locality 31, which is known to discharge water at the base the tip was also found to be dry although standing water was observed nearby.

A drainage channel, within a cutting for a former railway line, was observed at Locality 32 but was found to be dry. The ground within this area is very boggy. An attempt was made to locate an adit which is marked on historical OS mapping, but this could not be found owing to the dense vegetation in this area of the site. No running water could be observed at the time of the visit.

4.4 SITE WALKOVER VISIT - JUNE 2022

A site walkover visit was undertaken by an Associate Hydrogeologist from Tetra Tech site on Friday 10th June 2022 to survey the tip drainage works that were constructed by the Council. It is understood that the works were undertaken to enhance pre-existing drainage provisions and improve stability of tips across the site. The works are currently on hold, leaving them incomplete. Findings from the visit are attached at Appendix G.

5.0 CONCEPTUAL SITE MODEL

5.1 INTRODUCTION

The Hydrogeological and Hydrological Conceptual Site Model (CSM) is presented in this section. The CSM qualitatively describes the hydrological and hydrogeological environment both prior to and postdating mining activities within the proposed development boundary and the wider site area. The CSM has been informed by the information contained within the desk-based study and from the site walkover visits (Section 4) which will form the basis of the Preliminary Risk Assessment and will help with the appropriate identification and evaluation of environmental risks (Section 6).

The hydrogeological and hydrological CSM for the site will be discussed in turn within the following sections, although there is crossover between the two.

5.2 HYDROGEOLOGY

The first stage in the development of the hydrogeological CSM was to consider the site and the surrounding area prior to mining taking place. Then, the CSM is described in detail for the site in its current setting (post-mining), to assess the effects that mining has had on the hydrogeological system at the site. The CSM for the site has therefore been split into pre-mining and post-mining phases which are qualitatively summarised in the following sub-headings.

5.2.1 Hydrogeological CSM – Pre-Mining

The pre-mining CSM is presented graphically in Figure 7 and discussed below in the following points:

- Glacial Till soils, comprising predominantly of clay and silt, are present across much of the site, thickening from west to east. These low permeability soils overly thick mudstone layers interbedded with thinner sandstone horizons and coal seams of the Middle and Lower Coal Measure Formations;
- Groundwater within the interbedded sandstone units beneath the site would be recharged where these units outcrop at or close to the surface at higher elevations to the west of the site where the Glacial Till deposits would be thin or absent. Recharge would also take place where fractures and jointing is present in the mudstone units;
- The Glacial Till soils and interbedded mudstone units would have acted as confining layers with groundwater within the sandstone units likely confined and under pressure;
- Groundwater flow within the main water bearing sandstone horizons would have likely been down geological dip towards the south-west of the site, with a groundwater flow direction towards the base of the Merthyr Valley most likely providing baseflow to the River Taff and other hydraulically connected watercourses;
- Inter porosity flow within the sandstone units is expected to have been limited given that these units are often cemented. Instead, flow would have likely predominated via fractures / fissures / faults in these units;
- Springs emerge at the junction between the base of the sandstone and the underlying mudstone at outcrop or where the overlying Glacial Till deposits are thin or absent. Several springs are marked on OS Mapping off-site to the west of the site and have been observed within the development boundary;
- Water emerging from springs and surface water run-off over the Glacial Till soils would have been drained by a series of defined watercourses crossing the site in a general west to east orientation, and ultimately discharging into the River Taff (off-site) to the east;
- Erosion and downcutting of the River Taff has helped shape (along with glaciation) the Merthyr Valley along the Merthyr Fault, a major fault line. The River Taff at the base of the valley would represent the major discharge zone and most significant area for surface water/groundwater interaction.

5.2.2 Hydrogeological CSM – Post-Mining

The site and the surrounding area has been extensively worked for the extraction of both coal and ironstone since the mid-18th Century, with mining at the site ceasing in the 1960's. Mining beneath the site has disrupted the 'normal' hydrogeological environment and has created hydraulic continuity between water bearing sandstone layers and the historic mine workings. Consequently, the hydrological and hydrogeological environment that exists at the site is now more complex as a result of this extensive mining with numerous preferential groundwater flow pathways, recharge, and discharge zones.

Both the site and wider area is underlain by ironstone workings which progressed down dip (towards the south) from the most northern outcrop of the ironstone (outside of the site and land ownership boundary to the north-west, west of Heolgerrig) to beneath the proposed development area and beyond. Mine abandonment plans for the site detail an extensive network of interconnected tunnelways and shafts which previously targeted the productive coal seams and ironstone veins of the Coal Measures Group. Workings are shown to have been sunk to the north-west of the site (west of Heolgerrig), targeting the ironstone at outcrop and extending deep beneath the site down geological dip towards the south and south-east of the site, with workings shown extend beyond the River Taff to the east of the site.

As these works progressed, adits and cross drivages were constructed to permit water to drain downwards to the lowest seam whilst the overlying seams could be worked. Based on a review of the available previous site reports (Section 2.4.), the lowest level from which all mine water was discharged from was the Parliament Level. This level is situated off-site to the north and east of the site, with the seam closely following the former route of the Glamorgan Canal.

Drainage from the Parliament Level was later intercepted by an engine shaft that was drilled at Rhyd-y-Car in c.1801. The Rhyd-y-Car engine shaft is located off-site, approximately 900m to the north of the site at the former Ynysfach Ironworks. In order to permit further exploitation of the ironstone further south (i.e. beneath the proposed development area), a further cross measure was constructed between Rhyd-y-Car and an engine shaft which was sunk at the Glyndyrys Pit, which is located on site. Later again, the Glyndyrys shaft was connected to the Upper Abercanaid Engine Shaft which is located outside of the development boundary to the south-east of the site. Upon abandonment of the workings, all mine water across the entirety of the ironstone workings now discharges from the Upper Abercanaid Engine Shaft. This engine shaft is the main discharge point for groundwater beneath the site. Groundwater was observed to be discharging from this shaft by WYG (now Tetra Tech) in c.2017 at approximately 40 to 60 litres/second with water discharging in the former Glamorganshire Canal and ultimately, to the River Taff. The invert level of the water discharge is at approximately 163m AOD.

The Five Feet/ Gellideg to the Yard coal seams, which have been extensively worked across much of the land holding and the northern and eastern extents of the proposed development boundary, are understood to drain to the lower ironstone workings. The workings (and drainage pattern) for the overlying Bute and Nine Feet coal seams are drained separately, with drainage patterns differing across the land ownership boundary. Unlike the coal seams beneath, the Nine Feet Seam was worked from several adits along the strike of the seam in order to allow drainage via gravity direct to outcrop.

Working of the Bute and Nine Feet coal seams within the southern portion of the land ownership boundary (and beneath the proposed development) are thought to connect to the underlying ironstone drainage system; although localised discharges to rockhead and upwelling from mineworking's between 190 to 225m AOD is also taking place in this part of the site.

Drainage within to overlying coal seams largely occurs from levels/ adits at outcrop further up elevation to the west of the proposed development, providing a source of water for a number of watercourses which and discharge into the Nant Melin Cannaid and Nant Cannaid streams. However, there is also the potential for connections to exist to the underlying ironstone drainage network.

The abandoned tunnelways and drainage pits beneath the site and the wider land ownership area now represent the dominant pathway for groundwater flow beneath the site. The abandoned mine shafts (those which are not backfilled/ capped) are areas of groundwater recharge to the flooded workings below. These shafts represent

vertical recharge zones to groundwater present in deeper disused workings beneath the site. Figure 9 displays the recorded adits and shafts across the land ownership boundary. Groundwater recharge to both the sandstone units of the coal measures and flooded mine workings will also occur via areas of subsidence or open crown holes due to collapse in the below workings.

Former shafts and areas of subsidence (e.g., collapsed mine workings and crown holes) will also act as areas of groundwater discharge, particularly during periods of prolonged rainfall which will result in rising groundwater levels. Previous site reports, such as Arup (2008) have stated that groundwater levels within the underlying ironstone drainage system and seams below the Nine Feet coal seam have risen over the years; and are circa 10m above the level at which groundwater is discharging from the Upper Abercanaid Engine Shaft. The rise in groundwater levels is thought to be attributed to deterioration of the underlying ironstone drainage network as a result of mine collapse. In addition, the grouting of the A470 has also likely disrupted the natural flow groundwater within the system, limiting discharge from the Parliament Level off-site, resulting in an increased discharge to rockhead further to the west of the site. Typically, following the cessation of mining and dewatering, levels are expected to rebound overtime. It should be noted that there is no recent groundwater level information at the site.

Perched groundwater levels within the numerous spoil tips at the site will be recharged via direct rainfall and indirectly via emerging springs and surface water run-off. A basin area which is referred to as the 'hollow', located on site between the Cyfarthfa Pond and the Glyndyrys Tip, is receiving water from the Nant Melin Cannaid stream and is acting as a natural soakaway. There is no outfall for this stream and as a result, water infiltrates to ground and flows through the tipped materials of the Glyndyrys Tip, and discharges at the base of the tip to the east. It is not clear whether all water which is discharging from these springs on the eastern side of the tip is solely sourced from water the soakaway area or whether a component is the result of water upwelling from underlying mine workings. In addition, this area may also be acting as a localised groundwater recharge zone to the underlying ironstone drainage network.

Springs emerging at the base of spoil tips are anticipated to be collected and subsequently channelled towards the main discharge point at the Cyfarthfa Junction. The Cyfarthfa Pond, which is located just outside of the proposed development boundary, is thought to receive water from springs emerging at the base of the adjacent tip.

5.3 HYDROLOGICAL CSM

Similar to the hydrogeological system, the hydrology environment has been shaped and modified by the extensive mining works. A detailed description of the hydrological catchment areas at the site is presented in Section 3.6.1. This includes recent alterations to the baseline because of drainage works undertaken by the Council in Spring 2022. Prior to the change in baseline, observations made by Tetra Tech in 2017 and 2021 were used to inform a Hydrological Map which is attached at Appendix E.

The proposed development is situated between the Nant Rhydyrcar to the north and the Nant Cannaid to the south and is located within three of the five hydrological catchments across the ownership boundary. The site is largely drained via a series of small streams and drainage channels, a combination of natural and artificial drainage channels.

The Nant Cannaid flows continues to flow along the southern boundary of the land ownership boundary. Water flowing within the Nant Cannaid is sourced from several springs and surface runoff from land situated off-site to the west as well as several small tributaries to the Nant Cannaid.

A diverted channel of the Nant Cannaid, known as the Nant Melin Cannaid, flows through Cwm pit and discharges into a basin area known as the 'hollow'. This area also receives water from the Cyfarthfa Pond, with water flowing along the former route of the tub boat canal and into the basin during periods of heavy rainfall and the overtopping of the pond in the north-eastern corner. The pond likely receives groundwater baseflow from upwelling of former mine workings (e.g., Nine Feet seam) and from springs emerging at the base of the adjacent tip.

Water collecting in 'hollow' area is thought to drain slowly through the base of this basin, providing potential recharge to the underlying groundwater (present in flooded disused workings) and emerging as springs at the base of tips (overlying the boulder clay) to the east of this position (eastern extent of the proposed development). Water collecting in this area is then channelled via ephemeral streams, including dismantled railway tracks, towards the former 'Glyndyrus Pond' before eventually discharging to culverts under the A470 at the south-eastern boundary of the landholding.

5.3.1 Updated Hydrological Baseline – Council Drainage Works

During spring 2022, tip drainage works were undertaken by the Council. A site visit by Tetra Tech was completed on Friday 10 June 2022 to survey the works. It is understood that the works were undertaken to enhance pre-existing drainage provisions and improve stability of tips across the site. The works are currently on hold, leaving them incomplete. The works present a new baseline for the site. The key findings of the site visit are as follows:

The recent drainage works have been implemented to mitigate against known drainage issues at the site, namely;

- Water discharge from the Nant Meline Canaid Stream which ponds behind the A470/ Glyndyrus Tip,
- Spring emergence of this ponded water at the base of A470/ Glyndyrus Tip,
- Discharge of water from the railway tunnel entrance and areas of flooding.

Although the works completed thus far are likely to have a beneficial impact on the site drainage, the network is incomplete, and its effectiveness is yet to be tested in the absence of any significant rainfall / storm events at the time of the site visit.

Water from the Nant Melin Canaid is still collecting within the 'Hollow' area behind the A470 / Glyndyrus tip. This area continues to act as a natural soakaway, with water flowing through and re-emerging at the base of the tip to the east; although no water was found to be discharging within the newly installed constructed capture drain which could suggest that water from the 'Hollow' is lost to ground / below mine-workings.

Water was not largely found to be flowing within the new drainage network other than from water emerging from the cast iron pipe at the former Abernant tunnel entrance.

The Site Visit Report is appended at Appendix G. The report includes a Site Features and Photo Location Plan.

5.4 CSM SUMMARY

This section qualitatively describes the potential hazards and contaminant sources / ground conditions of the site; receptors upon which contaminants could potentially have an impact; and pathways that may exist to allow contaminants to impact upon the identified receptors. To assess the potential impact from an identified hazard or source of contamination, a risk assessment has been undertaken (Section 6). The process of risk assessment is an evaluation of the probability of harm, and comprises the identification of sources of contamination, receptors that may be affected by the contamination and pathways by which the receptors may be harmed. If one of these elements is missing, there can be no risk. If all are present, then the magnitude of risk is a function of the potential risk posed by the source; the sensitivity of the receptor and the nature of the pathway. A summary of the identified sources/ hazards, pathways and receptors are summarised below.

5.4.1 Sources/ Hazards

The main sources of potential contamination or hazards to the hydrological and hydrogeological environment identified at the site during the key stages of the development lifecycle (i.e., construction phase and operational phase) are summarised below.

Historical Related Sources/ Hazards

Potential sources due to historical site uses are also outlined below and will inform the risk assessment process for the construction and operational phases of the development, however any land contamination issues

associated with historical land uses are specifically addressed in the Tetra Tech Ground Conditions Report which is being prepared in parallel to this report.

Potential sources related to the historical activities at the site are anticipated to include:

- Mine water present within the disused workings, where the mine water demonstrates elevated levels of specific compounds which reflect historical operations carried out on site (e.g., discharges, spillages of chemicals, etc.);
- Elevated contaminants present in the ground, reflective of historical operations carried out on site;
- Spoil tips relating to the coal and ironstone workings;
- Stagnant ponds collecting both surface run-off and emerging spring water from tips.

Construction Phase Sources / Hazards

Potential sources or hazards which could impact identified receptors (Section 4.3.3) during the construction phase of the development are identified as follows:

- Accidental spillages (including fuel oil and chemicals) - release of fuel and lubricants during refuelling/maintenance of plant or the use of chemicals during the construction works;
- Historical ground conditions/contamination sources - e.g., mobilising of elevated contaminants present in the natural soils and within the spoil tips and Made Ground soils;
- Alteration of existing site drainage and infiltration to groundwater - disturbing the natural subsurface water flows and altering the water balance of local hydrogeology i.e., aquifer recharge; surface water flow characteristics (and protection due to attenuation); and potential release of suspended solids impacting on surface water and groundwater quality;
- Blocking up or destruction of underlying drainage system beneath the site as a result of excavation / development works;
- Dewatering of excavations (if required);
- Sediment laden water resulting in increased turbidity in existing drainage features and groundwater;
- Stockpiling of construction materials and construction of haul roads.

Operational Phase Sources / Hazards

Potential sources which could impact identified receptors during the operational phase of the development may include:

- Accidental Spillages (including fuel oil) – circumstantial release of fuel and/or chemicals;
- Potential contamination (E.g., anthropogenic contamination such as leaking sewer pipes);
- Alteration of drainage/infiltration/recharge to groundwater - disturbing the natural subsurface water flows and altering the water balance of local hydrogeology and hydrology
- Blocking or sealing of mine shafts – due to the redevelopment of the site to make way for urban development.

It should be noted that a number of the identified potential hazards/ sources of contamination are likely to vary both in chemical composition and quantity over a potentially short space of time.

5.4.2 Pathways

For the purposes of this risk assessment, a pathway is defined as the route along which a particle of water, substance or contaminant moves through the environment. Pathways for contaminated water on-site are as follows:

- Groundwater flow through the sandstone horizons both by intergranular flow (primary permeability) and by fracture flow (secondary permeability);
- Direct and indirect pathways that exist to groundwater present in the Coal Measures and disused mineworking's via fractures, joint sets and mine features such as shafts, crown holes, bell pits or areas of subsidence;
- Vertical infiltration of rainfall through the unsaturated zone of the spoil tips recharging perched groundwater;

- Groundwater flow through preferential pathways that exist within spoil tips at the site with groundwater emerging as springs at the base of the tips providing source of water within streams and ponds;
- Direct recharge to groundwater via ponds acting as soakaways which release water to underlying workings and emerging as springs at the base of spoil tips;
- Surface water features including streams, drainage ditches and culverts draining the land (via surface run-off) and groundwater discharge in a general west to east orientation;
- Water collecting in the 'hollow' within proposed outdoor activity centre, infiltrating via preferential pathways through the ground and spoil tips (Glyndyrys Tip), with water emerging as springs at the base of the tip;
- Historic mine features, including dismantled railways and canals, act as pathways (and receptors) for the flow of surface water from emerging springs, and;
- General overland surface water flows (unattenuated flows during precipitation events).

There is potential for pathways to be created or even altered during the redevelopment and operational phase of the site in addition to the pathways identified above. Therefore, potential pathways that could arise, or pathways which could be altered during the construction and operations phases of the site are outlined below:

- Excavation and general earthworks for the proposed development could create a potential pathway for contaminant migration to the underlying aquifer or disused workings;
- Reduction in recharge to underlying aquifer/mine workings due to the presence of temporary hardstanding in areas proposed for redevelopment at the site;
- Potential to remove covering Glacial Till deposits creating pathways to the underlying aquifer for contaminant migration and/or localised zones of recharge to groundwater;
- Removal or cut of spoil tips in area of proposed development could potentially prevent baseflow/recharge to identified emerging springs which provide a source of water to surface water features;
- Alteration of natural recharge pattern due to the introduction of new engineered drainage systems at the site; and,
- Potential destruction or blockage of groundwater discharge zones.

5.4.3 Receptors

The proposed development is subject to a number of statutory and non-statutory nature conservation designations that comprise the following:

1. Cwm Glo a Glyndyrys SSSI largely abuts the western, northern, and eastern red line boundary although, the proposed access road into site and part of the proposed snow centre are within the SSSI; and,
2. The entire development area is situated within a Site of Importance for Nature Conservation (SINC).

For the purpose of the risk assessment (Section 6) a receptor is defined as any controlled water or abstraction point that is or could be harmed by a potential pollutant/ hazard. The main receptors identified at the site are as follows:

- Groundwater within the underlying Coal Measures Aquifer (Secondary A Aquifer);
- Off-site Private Water Supplies (Blaencanid Farm and Bike Park Wales);
- On site surface water features including ponds, springs, and watercourses;
- Off-site surface water features e.g., River Taff
- Off-site Scheduled Ancient Monuments e.g., Cyfarthfa Pond and/ or Cwm Pit;
- Cwm Glo a Glyndyrys SSSI and Rhydyar West SINC.

The sensitivity of each of the receptors is considered further in Section 6.1.1.

6.0 RISK ASSESSMENT

6.1 RISK ASSESSMENT METHODOLOGY

A qualitative risk assessment has been carried out to assess the potential risk the proposed development poses to controlled waters. The risk assessment approach has been undertaken in accordance with EA guidance 'Land Contamination Risk Management (LCRM)'⁵ and 'Development of Land Affected by Contamination: A Guide for Developers'⁶ and other guidance, such as 'Groundwater risk assessment for your environment for your environmental permit'⁷

To determine the overall risk posed, an assessment of the potential effect on water (and other potential) receptors will be determined as a function of the sensitivity of the receptor and potential magnitude of impact. The assessment uses professional judgment and is carried out in context of the source-pathway-receptor philosophy. This allows a subsequent assessment of overall impact significance to be undertaken, based on the determined level of potential effect and its likelihood of occurrence.

6.1.1 Receptor Sensitivity Criteria

The value and sensitivity of a receptor will be defined by using available guidance and professional knowledge. In some cases, the inherent value of the receptor has been recognised and been afforded a statutory designation and will therefore be reflected in the overall sensitivity determination. To aid this process and provide a framework within which professional judgement can derive a determination of receptor sensitivity, assessment criteria are outlined in Table 6-1.

Table 6-1 –Receptor Sensitivity

Sensitivity Level	Description
High	A receptor with a high quality and rarity, regional or national level and limited potential for substitution. Sites of Special Scientific Interest (SSSI's). Public or Private drinking water supply abstraction (surface water or groundwater) used for human consumption. Surface water classified under the WFD as 'high' (or equivalent older chemical or biological monitoring designation). Groundwater classified under the WFD as 'good'. Watercourse designated under the Freshwater Fish Directive or known to have fish spawning grounds. Watercourse widely used for recreation, directly related to watercourse quality (e.g. swimming, salmon fishery etc.) Groundwater Source Protection Zone I.
Medium	Receptor with a high quality and rarity, local scale and limited potential for substitution/replacement or receptor with a medium quality and rarity, regional or national scale and limited potential for substitution/replacement.

⁵ Land Contamination Risk Management. How to assess and manage the risks from land contamination. Environment Agency. Last updated 19th April 2021 - <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

⁶ Development of Land Affected by Contamination: A Guide for Developers. Welsh Land Contamination Working Group and Natural Resources Wales. Version 3. May 2017;

⁷ Groundwater risk assessment for your environmental permit. How to carry out a groundwater risk assessment as part of an application for an environmental permit. EA and Department for Environment, Food and Rural Affairs. Last updated 3rd April 2018 - <https://www.gov.uk/guidance/groundwater-risk-assessment-for-your-environmental-permit>

Sensitivity Level	Description
	Groundwater not used for human or stock consumption (surface water or groundwater). Public or Private non-drinking water supply abstraction (surface water or groundwater). Surface water classified under the WFD as 'good' (or equivalent older chemical or biological monitoring designation). Watercourse known to support important fishery population. Principal Aquifer in areas of low aquifer vulnerability. Groundwater Source Protection Zone II.
Low	Receptor with a medium quality and rarity, local scale and limited potential for substitution/ replacement or receptor with a low quality and rarity, regional or national scale and limited potential for substitution/replacement. Surface water classified under the WFD as 'moderate' (or equivalent older chemical or biological monitoring designation). Watercourse not widely used for recreation, or recreation use not directly related to watercourse quality. Groundwater that displays generally poor qualitative and quantitative status under WFD. Secondary A Aquifer. Groundwater Source Protection Zone III.
Negligible	Receptor with a low quality and rarity, local scale and limited potential for substitution/replacement. Surface water classified under the WFD as 'poor or bad' (or equivalent older chemical or biological monitoring designation). Groundwater classified under the WFD as 'poor'. No designated fisheries. Un-productive strata. Not situated within a groundwater Source Protection Zone.

For the purpose of this risk assessment, the following receptors have been designated as follows:

Coal Measures Aquifer

This receptor is considered to be of **Low** sensitivity.

Surface Water features including ponds, springs, and watercourses On-Site

Surface water features on site are not used for recreational purposes and water is not abstracted for drinking water purposes. The surface water features ultimately discharge to the River Taff (off-site) which is classified under the WFD as 'moderate'. Therefore, the features are of **Low** sensitivity.

Off-Site Private Water Supplies

These off-site receptors are considered to be of **Medium** sensitivity. Both supplies are located more than 500m from the proposed development and the abstracted water is not believed to be used for human consumption.

Off-Site Surface Water Features e.g., River Taff

Surface water features on site discharge via culverts beneath the A470 and ultimately discharge into the River Taff (approximately 450m to the east from the sites eastern boundary). The River Taff is classified under the WFD as 'moderate' and as such, is considered to be of **Low** sensitivity.

Cwm Glo a Glyndyrys SSSI & Rhydycar West SINC

Cwm Glo a Glyndyrys SSSI largely abuts the western, northern, and eastern red line boundary although, the proposed access road into site and part of the proposed snow centre are within the SSSI. This is a statutory designation and as such, this receptor is considered to be of **High** sensitivity.

Scheduled Ancient Monuments

Nearby SAM's have no hydrological or hydrogeological significance or designation but have been considered with respect to potential damage from rising groundwater levels or increased flow impacts from surface water features as a result of the proposed development e.g., erosion of the feature. The SAM's are considered to be of **Medium** to **Low** sensitivity from a water perspective.

6.1.2 Magnitude of Potential Impact

The Magnitude of Potential Impact (or potential effect) refers to the 'scale' or 'amount' of an impact. Key sources/ hazards have been identified and the potential magnitude of potential impact has been determined through the predicted change from the baseline conditions throughout the various phases of development.

In order to define level of impact magnitude the following guidance has been adopted for the purpose of providing a transparent assessment. The professional judgement of the technical author is used in the decision-making process when characterising impacts in accordance with the criteria set out Table 6-2.

Table 6-2 Magnitude of Potential Impact Criteria

Magnitude	Description
No Change	No loss or alteration of characteristics, features, or elements; No observable impact on receptors/features.
Negligible	Noticeable, temporary (for part of the development duration) change; or Barely discernible change for any length of time, over a small area, to any key characteristics or features; Results in effects on attribute of insufficient magnitude to affect the use/integrity.
Minor	Noticeable, temporary (during the project duration) change, over a partial area, to key characteristics or features. Impact predicted to extend over a small area; Impact predicted to affect small numbers of people; Impact predicted to affect a small number of other receptors (ecological, businesses, facilities); Impact not predicted to have trans-boundary effects, but possibility remains; Slight but discernible change in environmental conditions predicted; Impact not predicted to entail unusual/complex effects for receptors; Impact not predicted to affect particularly scarce features/resources; Impact not predicted to result in breaches of legislation or statutory Environmental Quality Standard or Objectives; Impact not predicted to result in loss of attribute; Impact will continue for a short period of time only; Impact will be temporary; Impact will be intermittent and/or rare; Impact will be reversible; Impact will be possible to avoid, reduce, repair, or compensate for; or Slight positive change in environmental conditions resulting in minor improvements in quality or value of a receptor.
Moderate	Significant, permanent / irreversible changes, over the majority of the development area and potentially beyond, to key characteristics or features. Impact predicted to extend over a moderate area; Impact predicted to affect moderate numbers of people;

Magnitude	Description
	Impact predicted to affect some other receptors (ecological, businesses, facilities); Impact unlikely to have trans-boundary effects, but possibility remains; Moderate change in environmental conditions predicted; Impact unlikely to entail unusual/complex effects for receptors but possibility remains; Impact unlikely to affect particularly scarce features/resources but possibility remains; Impact entails a low probability that breaches of legislation or statutory Environmental Quality Standard or Objectives will occur; Impact unlikely to result in loss of attribute but possibility remains; Impact will continue for a moderate period of time; Impact will be semi-permanent; Impact will be intermittent; Impact will be possible to avoid, reduce, repair, or compensate for; or Notable positive change in environmental conditions resulting in measurable improvements in quality or value of a receptor
Major	Very significant, permanent / irreversible changes, over the whole development area and beyond (i.e. off-site), to key characteristics or features of character or distinctiveness. Impact certain or likely to occur; Impact predicted to extend over a large or very large area; Impact predicted to affect considerable numbers of people; Impact predicted to affect considerable numbers of other receptors (ecological, businesses, facilities); Impact predicted to have trans-boundary effects; Significant change in environmental conditions predicted; Impact will entail unusual/complex effects for receptors; Impact will affect particularly scarce features/resources; Impact entails a high probability that breaches of legislation or statutory Environmental Quality Standard or Objectives will occur; Impact will result in total loss of attribute; Impact will continue for extended periods of time; Impact will be permanent rather than temporary; Impact will be continuous rather than intermittent, or where intermittent, frequent rather than rare; Impact will be irreversible; Impact will be very difficult to avoid, reduce, repair, or compensate for; or Significant positive change in environmental conditions resulting in major improvements in quality or value of a receptor.

6.1.3 Significance of Impacts

There are published transparent methodologies for assessing significance for certain environmental topics (noise, ecology, etc.), there is no definitive guidance available specific to the water environment. From the guidance provided in the revised Development Control Advice Note (DCAN) 10 'Environmental Impact Assessment' and the Amended Circular on EIA consultation paper, published in June 2006 by the Department for Communities and Local Government (DCLG) 'Environmental Impact Assessment: A Guide to Good Practice and Procedures', it can be concluded that a significant effect may be broadly defined as one that should be brought to the attention of those affected and those involved in the decision-making process.

The 'significance of impact' is determined as a function of the sensitivity level and the magnitude of potential impact using the matrix system in Table 6-3.

Table 6-3 – Impact Significance Matrix

	Receptor Sensitivity			
Magnitude of Impact	Very Low	Low	Medium	High
No Change	Negligible	Negligible	Negligible	Minor
Negligible	Negligible	Minor	Minor	Moderate
Minor	Minor	Minor	Moderate	Major
Moderate	Minor	Moderate	Moderate	Major
Major	Moderate	Major	Major	Major

The probability of the magnitude of impact occurring is defined in Table 6-4 and applied to the impact significance determined in Table 6-3, to provide an overall Impact of Significance/ Risk Level (Table 6-5).

Broad definitions which determine the probability or likelihood of an event occurring are provided in Table 6-4 and have been applied to this assessment.

Table 6-4 – Definitions of Impact Probability or Likelihood

Descriptor	Description
Certain	Very likely to occur
Likely	Will probably occur
Possible	May occur
Unlikely	Not expected to occur

Table 6-5 – Overall Impact Significance/ Risk Level

	Impact Probability			
Impact Significance	Certain	Likely	Possible	Unlikely
Major	Major	Major	Moderate	Minor
Moderate	Major	Moderate	Minor	Negligible
Minor	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Again, a certain amount of professional judgement will be applied when determining the probability of a risk occurring that accounts for specific local circumstances relevant to the site. The following definitions are proposed in relation to the significance of environmental impacts is presented below.

Table 6-6 – Impact Significance / Overall Risk Definition

Level of Significance	Description
Negligible	No discernible effect. An impact that is likely to have imperceptible or insignificant impact
Minor	Slight, very short or highly localised impact of no significant consequence. These effects may be raised as local issues but on their own are unlikely to be of importance in the decision-making process. When combined with other effects these could have a more material influence.
Moderate	Intermediate limited (extent / duration / magnitude) impact that may be considered as significant. These effects are likely to be important considerations at a local level. These could have influence on decision making especially when combined with other similar effects
Major	- Very large or considerable impact (extent/duration/magnitude); - Effects, both adverse and beneficial, which are likely to be important considerations at a regional or district level because they contribute to

Level of Significance	Description
	achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation. In isolation, these could have a material influence on the decision-making process.

6.2 RISK ASSESSMENT – CONSTRUCTION PHASE

Table 6-7 overleaf considers the main risks to the identified hydrological and hydrogeological receptors associated with the construction phase of the development. It should be noted that the risk assessment and overall risk rating does not include mitigation measures. Design mitigation is considered separately in Section 6.4.

Table 6-7 – Construction Phase Risk Matrix

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (Does Not Include Mitigation)	Comments
Accidental spillages – circumstantial release of fuels and/ or chemical	Secondary A / Undifferentiated Aquifer (Low)	Direct and indirect pathways that exist to groundwater present in the Coal Measures and disused mineworking's via fractures, joint sets, and mine features such as shafts, crown holes, bell pits or areas of subsidence	Moderate	Moderate	Possible	Minor	Glacial Till overlies the Secondary A aquifer which will afford some protection. However, the 'event of probability' is set at 'possible' owing to preferential pathways that exist at the site e.g., mineworking's, areas of subsidence and natural soakaways i.e., the 'hollow'.
	Off-site Private Water Supplies (Medium)		Moderate	Moderate	Unlikely	Negligible	Given the distance to the identified private water supplies (>500m), the overall risk is deemed to be minor.
	On-site Surface Water Features (Low)	Direct spillage to receptor; surface water run-off and diffuse overland flow; groundwater baseflow; contaminant migration via on-site surface water features e.g., springs, drainage channels and streams	Major	Major	Possible	Moderate	There are several water features present within the site and nearby area. The release of oil/ chemicals into on-site surface water features would likely result in breaches of water quality standards and extend over a large area.
	Off-site Surface Water Features e.g. River Taff (Low)		Major	Major	Possible	Moderate	Potential for contaminant migration via existing features to main watercourses e.g., River Taff.
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Possible	Minor	Potential for release of contaminants to the Cyfarthfa Pond and Leat from construction works associated with the snow dome/ haul roads via surface water run-off/ baseflow.

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (Does Not Include Mitigation)	Comments
	SSSI (High)		Major	Major	Possible	Moderate	Potential for migration of contaminants via surface water features and other pathways into the SSSI area (off-site).
Historical contamination - mobilisation of elevated contaminants during construction and excavation activities.	Secondary A / Undifferentiated Aquifer (Low)	In addition to pre-existing pathways, excavation and general earthworks for the proposed development could create potential pathways for contaminant migration; vertical infiltration via the unsaturated zone of spoil tips.	Moderate	Moderate	Possible	Minor	Magnitude of potential impact is based on the potential for the presence of hazardous contaminants (metals e.g., Lead) to be present within spoil tips on site which could be mobilised to groundwater during the construction works. Earthworks could potentially create new pathways to underlying groundwater.
	Off-site Private Water Supplies (Medium)		Moderate	Moderate	Unlikely	Negligible	Magnitude of potential impact is based on the potential for the presence of hazardous contaminants (metals e.g., Lead) to be present within spoil tips on site. Given the distance to the identified private water supplies (>500km), the overall risk is deemed to be minor.
	On-site Surface Water Features (Low)	Diffuse overland flow; infiltration through groundwater baseflow; direct deposition of contaminated spoil into surface water features; surface water features including emerging	Moderate	Moderate	Possible	Minor	Excavation and general earthworks have the potential to mobilise contaminants and sediment present in the spoil tips. Magnitude of potential impact is based on the potential for the presence of hazardous contaminants (metals e.g., Lead) to be present within spoil tips on site.

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (Does Not Include Mitigation)	Comments
	Off-site Surface Water Features e.g. River Taff (Low)	springs at base of tips and drainage channels; ponds and natural areas of soakaway (i.e., the 'hollow'); historical mine features e.g., tram and railway lines.	Moderate	Moderate	Possible	Minor	Potential for contaminant migration via existing features to main watercourses e.g., River Taff. The 'event of probability' is set at 'possible' to account for distance of the river (circa 600m).
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Possible	Minor	Potential for release of contaminants to the Cyfarthfa Pond and Leat from construction works associated with the snow dome/ haul roads via surface water run-off/ baseflow.
	SSSI (High)		Moderate	Major	Possible	Moderate	Potential for migration of contaminants via surface water features and other pathways into the SSSI area (off-site).
Alteration of drainage / infiltration / recharge to groundwater	Secondary A / Undifferentiated Aquifer (Low)	Reduced unsaturated zone within superficial deposits / spoil tips; removal of aquifer protection to the underlying aquifer/ mine workings; reduction in recharge to underlying spoils tips/ aquifer; creation of new pathways for contaminant migration & recharge zones	Moderate	Moderate	Likely	Moderate	Potential for disturbing the natural subsurface flows and altering the water balance of local hydrogeology and ultimately reducing recharge to the underlying aquifer or creation of new pathways e.g. mine water discharge (assessed separately below). Risk considered to be minor owing to extensive thickness of Glacial Till in this part of the site however, the magnitude of potential risk is set a 'major', owing to the potential for disruption to flow within the spoil tips and underlying aquifer/ mine workings both at the site and beyond.

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
	Off-site Private Water Supplies (Medium)		Moderate	Moderate	Unlikely	Negligible	Development works are unlikely to impact upon the supply at the off-site abstractions.
	On-site Surface Water Features (Low)	Alteration of natural recharge pattern due to the introduction of new engineered drainage systems at the site and introduction of hard standing; reduction in flows/ spring discharge	Moderate	Moderate	Likely	Moderate	Removal or alteration of spoil tips, in particular where springs emerge (e.g., Glyndyrus Tip) could impact upon the flows within down-gradient channels by reducing/ increasing flows or removing water features in its's entirety.
	Off-site Surface Water Features e.g. River Taff (Low)		Moderate	Moderate	Likely	Moderate	The recent drainage works that have been undertaken by the Council have altered the baseline at the site. The site now comprises both informal and more formal drainage channels. Water from the Nant Melin Canaid is still collecting within the 'hollow' area behind the tip and as a result, this area continues to act as a natural soakaway. Cut of drains have been installed at the base of the tip and channel the water to the former Cyfartha Junction, where water is discharged off-site along the former railway track. Although the recent drainage works are likely to have a beneficial impact, the network remains incomplete, and its effectiveness is yet to be tested in the absence of any significant rainfall / storm

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
							events at the time of the site visit. In addition, the impact from an increased flow discharge from this point, on the land and surface water features beyond the Cyfartha Junction (main discharge point), is unknown.
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Unlikely	Negligible	Proposed works are not anticipated to adversely impact upon the levels within the SAMs. The proposed re-alignment of the Nant Melin Canaid within the south-western area of the site within the Cwm Pit SAM will have a beneficial impact by preventing erosion of the stone masonry wall.
	SSSI (High)		Moderate	Major	Possible	Moderate	Removal or alteration of spoil tips, in particular where springs emerge (e.g., Glyndyrus Tip) could potentially impact upon the flows within down-gradient channels by reducing flows or removing water features in its entirety. This could result in reduction in levels within ponds/ water features in the SSSI area.
Mine water discharge	Secondary A / Undifferentiated Aquifer (Low)	Direct and indirect pathways that exist to groundwater present in the Coal Measures and disused mineworking's	Moderate	Moderate	Possible	Minor	Groundwater/ surface water quality at the site is unknown and would need to be confirmed through ground investigation.

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
	Off-site Private Water Supplies (Medium)	via fractures, joint sets, and mine features such as shafts, crown holes, bell pits or areas of subsidence. Release of mine water either already occurring at the site or the result of alteration to the drainage through redevelopment of the site.	Moderate	Moderate	Unlikely	Negligible	Given the distance to the identified private water supplies (>500m), the overall risk is deemed to be minor.
	On-site Surface Water Features (Low)		Moderate	Moderate	Possible	Minor	Groundwater/ surface water quality at the site is unknown and would need to be confirmed through ground investigation.
	Off-site Surface Water Features e.g. River Taff (Low)		Moderate	Moderate	Possible	Minor	
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Unlikely	Negligible	The proposed development is unlikely to result in the release of mine water into the SAM's. The quality of the surface water features is unknown and will need to be ascertained through ground investigation and the collection of surface water samples.
	SSSI (High)		Moderate	Major	Possible	Moderate	Potential for mine water release beyond the site boundary within the SSSI. Groundwater/ surface water quality at the site is unknown and would need to be confirmed through ground investigation

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
Blocking up or destruction of underlying ironstone drainage system / preferential pathways beneath the site as result of the planned development works.	Secondary A / Undifferentiated Aquifer (Low)	Reduction in permeability and flow through mine workings resulting in increased groundwater levels, increased spring emergence and increased watercourse flows/ flood risk.	Major	Moderate	Possible	Moderate	Redevelopment works could potentially damage / block the underlying drainage system without incorporation of mitigation measures and appropriate design. The Glyndyrys Shaft, which forms part of the underlying ironstone drainage, is located within the central area of the site boundary. Limiting or restricting flow in the ironstone drainage system could result in disruption to drainage network and result in groundwater level rise and increased flows at mine adits/ rockhead at a higher elevation to the west and north of the site.
	Off-site Private Water Supplies (Medium)		Moderate		Unlikely	Negligible	Both supplies are not thought to be abstracting from ironstone drainage system and instead, likely drawing water from sandstone units or workings that are not hydraulically connected to the ironstone drainage system beneath the site.
	On-site Surface Water Features (Low)		Major	Moderate	Possible	Moderate	Increased groundwater levels could potentially result in increased spring emergence/ flows to the surface water features both within the site development and off-site. The event probability has been risked as 'possible' as features such as the Glyndyrys Shaft and other workings beneath the site (at depth), could be impacted without adequate protection during the construction phase. There is
	Off-site Surface Water Features e.g. River Taff (Low)		Major	Moderate	Possible	Moderate	

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
							the potential for a reduction in flow from the Upper Abercanaid Engine Shaft (off-site) with a reduced flow of water into the River Taff.
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Possible	Minor	Increased levels could result in increased discharge of groundwater via springs/ mine entrances at higher elevations off-site, resulting in increased flows through watercourses e.g., increased flows and levels in the Nant Melin Canaid which flows through Cwm Pit; ultimately discharging into the 'hollow' within the proposed development. Increased flows could result in further erosion and damaged to the Cwm Pit Masonry Wall and other features without mitigation measures (see Table 6-9).
	SSSI (High)		Major	Major	Possible	Moderate	Increased groundwater levels could potentially result in increased spring emergence/ flows to the surface water features.
Dewatering of excavations (<u>only where required</u>)	Secondary A / Undifferentiated Aquifer (Low)	Lowering of groundwater levels in the underlying aquifer and mine workings; reduction of recharge to the underlying	Moderate	Minor	Likely	Moderate	Should dewatering of excavations be required at the site, the lowering of the levels would result in a localised, temporary lowering of groundwater levels in the underlying aquifer/ mine workings/ spoil tips.

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
	Off-site Private Water Supplies (Medium)	aquifer or below to hydraulically connected surface water features	Moderate	Moderate	Unlikely	Negligible	Dewatering on site is unlikely to impact upon the two PWS given the large distances (>500m) to both.
	On-site Surface Water Features (Low)		Moderate	Moderate	Possible	Minor	Should dewatering of excavations be required at the site, this could result in the reduction in the availability of groundwater and baseflow to hydraulically connected surface water features both on and off site. Surface water levels in the Cyfarthfa Pond and Leat are unlikely to be impacted by dewatering as they are not thought to be in hydraulic connection with the groundwater.
	Off-site Surface Water Features e.g. River Taff (Low)		Moderate	Moderate	Possible	Minor	
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Unlikely	Negligible	
	SSSI (High)		Moderate	Major	Possible	Moderate	
Sediment laden water resulting increased turbidity in	Secondary A / Undifferentiated Aquifer (Low)	Vertical infiltration through unsaturated zone/ preferential pathways	Moderate	Moderate	Possible	Minor	Potential for sediment laden water to enter groundwater via recharge pathways e.g., the 'hollow' or local recharge zones. Overall risk reflects the fact that site

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
existing drainage features and underlying groundwater							specific control measures will be adopted to prevent/ limit sediment run-off.
	Off-site Private Water Supplies (Medium)	Diffuse overland flow; infiltration through groundwater baseflow; surface water features including emerging springs at base of tips and drainage channels; ponds and natural areas of soakaway (i.e., the 'hollow'); historical mine features e.g., tram and railway lines.	Moderate	Moderate	Unlikely	Negligible	Not anticipated to impact upon the two supplies given the large distances (>500m) to both.
	On-site Surface Water Features (Low)		Moderate	Moderate	Possible	Minor	Excavation and construction works could potentially mobilise sediment to enter nearby watercourses without mitigation measures in place.
	Off-site Surface Water Features e.g. River Taff (Low)		Moderate	Moderate	Possible	Minor	
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Possible	Minor	There is potential for sediment laden water to enter the Cyfarthfa Pond and Leat as a result of works for the Snow Dome and nearby proposed works with mitigation measures.

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
	SSSI (High)		Moderate	Major	Possible	Moderate	Excavation and construction works could potentially mobilise sediment to enter nearby watercourses without mitigation measures in place.
Stockpiling of construction materials and the construction of haul roads	Secondary A / Undifferentiated Aquifer (Low)	Vertical infiltration of contaminants through the preferential pathways and/ or unsaturated zone to the groundwater table/ mine workings.	Moderate	Moderate	Possible	Minor	The considerable thickness of Glacial Till deposits will afford protection to the underlying groundwater. However, there is the potential for leaching of contaminants to enter groundwater via preferential pathways within spoil tips.
	Off-site Private Water Supplies (Medium)	Groundwater flow through the sandstone horizons both by intergranular flow or via preferential pathways	Moderate	Moderate	Unlikely	Negligible	Not anticipated to impact upon the two supplies given the large distances (>500m) to both.
	On-site Surface Water Features (Low)	Diffuse overland flow; infiltration through groundwater baseflow; surface water features including emerging springs at base of tips and drainage channels;	Moderate	Moderate	Possible	Minor	Stockpiling of construction materials and the construction of haul roads could potentially mobilise contaminants to enter nearby watercourses.
	Off-site Surface Water Features e.g. River Taff (Low)	ponds and natural areas of soakaway (i.e., the 'hollow');	Moderate	Moderate	Possible	Minor	Potential for contaminant migration via existing features to main watercourses e.g., River Taff. The 'event of probability' is set at 'possible' to account for distance of the river (circa 600m).

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Significance of Impact	Event Probability	Overall Risk Assessment Level (<u>Does Not Include Mitigation</u>)	Comments
	Scheduled Ancient Monuments (Medium)	historical mine features e.g., tram and railway lines.	Moderate	Moderate	Possible	Minor	Potential for release of contaminants to the Cyfarthfa Pond and Leat from construction works associated with the snow dome/ haul roads via surface water run-off/ baseflow.
	SSSI (High)		Moderate	Major	Possible	Moderate	Stockpiling of construction materials and the construction of haul roads could potentially mobilise contaminants to enter watercourses within the SSSI area.

6.3 RISK ASSESSMENT – OPERATIONAL PHASE

Table 6-8 overleaf considers the main risks to the identified hydrological and hydrogeological receptors associated with the operational phase of the development. It should be noted that the risk assessment and overall risk rating does not include mitigation measures. Design mitigation is considered separately in Section 6.4.

Table 6-8 – Operational Phase Risk Matrix

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Level of Potential Effect	Event Probability	Overall Risk Assessment Level	Comments
Accidental spillages – circumstantial release of fuels and/ or chemical	Secondary A / Undifferentiated Aquifer (Low)	Direct and indirect pathways including site drainage provisions, direct infiltration, diffuse run-off.	Moderate	Minor	Possible	Minor	There is the potential risk of accidental spillages, leakage of liquids such as fuels and chemicals as a result of maintenance. Significant quantities of fuels and/ or chemicals are not expected to be stored at the site. Proposed SuDS features would be designed to mitigate this potential hazard.
	Off-site Private Water Supplies (Medium)		Moderate	Moderate	Unlikely	Negligible	
	On-site Surface Water Features (Low)	Direct spillage to receptor; surface water run-off and diffuse overland flow; groundwater baseflow; contaminant migration via on-site surface water features e.g., springs, drainage channels and streams	Moderate	Minor	Possible	Minor	There is the potential risk of accidental spillages, leakage of liquids such as fuels and chemicals as a result of maintenance. Pollutants could be mobilised by rainwater runoff and directed into nearby surface water features without the incorporation of appropriate SuDS features.
	Off-site Surface Water Features e.g. River Taff (Low)		Moderate	Moderate	Possible	Minor	
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Possible	Minor	
	SSSI (High)		Moderate	Major	Possible	Moderate	

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Level of Potential Effect	Event Probability	Overall Risk Assessment Level	Comments
Potential contamination (E.g., anthropogenic contamination such as leaking sewer pipes or use of road salts);	Secondary A / Undifferentiated Aquifer (Low)	Indirect pathway to underlying groundwater via surface run-off and infiltration through preferential pathways that exist such as via anthropogenic drainage systems	Moderate	Moderate	Possible	Minor	Use of road salts are likely to be used across the development. There is the potential for leaks from sewer pipes in localised areas of the site. Site drainage system to account for these potential sources and anticipated to be localised in extent.
	Off-site Private Water Supplies (Medium)		Moderate	Moderate	Unlikely	Negligible	Given the distance to the identified private water supplies (>1km), the overall risk is deemed to be minor.
	On-site Surface Water Features (Low)	Diffuse overland flow; infiltration through groundwater baseflow; surface water features including emerging springs at base of tips and drainage channels; ponds and natural areas of soakaway (i.e., the 'hollow'); historical mine features e.g., tram and railway lines.	Moderate	Moderate	Possible	Minor	There is the potential for pollutants to be mobilised and enter surface water features through surface run-off and/ or entering preferential pathways.
	Off-site Surface Water Features e.g. River Taff (Low)		Moderate	Moderate	Possible	Minor	
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Possible	Minor	
	SSSI (High)		Moderate	Major	Possible	Moderate	Potential for contaminants to migrate off-site via existing watercourses and pathways.

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Level of Potential Effect	Event Probability	Overall Risk Assessment Level	Comments
Alteration of drainage / infiltration / recharge to groundwater	Secondary A / Undifferentiated Aquifer (Low)	Reduced unsaturated zone within superficial deposits / spoil tips; removal of aquifer protection to the underlying aquifer/ mine workings; reduction in recharge to underlying spoils tips/ aquifer; creation of new pathways for contaminant migration & recharge zones.	Moderate	Moderate	Possible	Minor	There is the potential that the alteration of the drainage infiltration/recharge to groundwater - disturbing the natural subsurface water flows and altering the water balance of local hydrogeology and ultimately reducing the quantity available for recharge.
	Off-site Private Water Supplies (Medium)		Moderate	Moderate	Unlikely	Negligible	Given the distance to the identified private water supplies (>500m), the overall risk is deemed to be negligible.
	On-site Surface Water Features (Low)	Alteration of natural recharge pattern due to the introduction of new engineered drainage systems at the site and introduction of hard standing; reduction in flows/ spring discharge.	Moderate	Moderate	Possible	Minor	Overall risk reflects the fact that site-specific drainage regimes will be incorporated into the development which will be considerate of the existing surface water environments.
	Off-site Surface Water Features e.g. River Taff (Low)		Moderate	Moderate	Possible	Minor	
	Scheduled Ancient Monuments (Medium)		Moderate	Moderate	Unlikely	Negligible	

Source	Receptor (Sensitivity)	Pathway	Magnitude of Potential Impact	Level of Potential Effect	Event Probability	Overall Risk Assessment Level	Comments
	SSSI (High)		Moderate	Major	Unlikely	Minor	

6.4 PROPOSED MITIGATION

This section puts forwards potential mitigation options to prevent, remove and reduce significant adverse effects that have been identified from the above risk assessment. It is best practice to consider mitigation measures for all impacts that are of a minor negative significance or higher and this has been adopted for the purpose of this assessment.

When these mitigation measures are implemented, they should reduce any identified unacceptable risks to the hydrological and hydrogeological environments at the site to a manageable, acceptable level during the construction and operational phase where necessary.

Table 6-9 below summaries the adverse significant effects, identified mitigation measures and potential residual risks.

Table 6-9 – Proposed Mitigation Measures and Residual Risk

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
Construction Phase					
Accidental Spillages (including fuel oil) – release of fuel and lubricants during refuelling / maintenance of plant or the use of chemicals during the construction works and operation phase	Secondary A / Undifferentiated Aquifer (Low)	Minor	Operations onsite including maintenance, refuelling and storage of fuels should be kept to the minimum that is required. A Construction Environment Management Plan (CEMP) will be developed for the site and will be provided to NRW. The CEMP will detail measures to minimise the potential for spills and other accidents. Measures are to include best practice pollution measures such as use of bunding and storage of potentially hazardous materials. An emergency plan for the site should also be developed and implemented if required. This plan should outline the provision of on-site equipment for containment of spillages such as emergency booms and chemicals to soak up spillages.	Negligible	Negligible
	Off-site Private Water Supplies (Medium)	Negligible		Negligible	Negligible
	On-site Surface Water Features (Low)	Moderate		Minor	Minor to Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Moderate	Where fueling of large machinery is required, drip trays and absorbent mats and pellets will be used to contain or absorb accidental spillages. Plant maintenance will also be undertaken in a designated area and similar contamination prevention measures will be adopted.	Minor	Minor to Negligible
	Scheduled Ancient Monuments (Medium)	Minor	If mitigation measures are adhered to, the likelihood of occurrence would be reduced from 'possible' to 'unlikely' and as such the overall risk is reduced to 'Minor'. To offer further surety that the mitigation measures outlined in the CEMP are implemented in full, it is recommended that a Groundwater Protection Plan (GWPP) is produced for the construction phase of the proposed development. The GWPP will identify the perceived risks to the sensitive environmental receptors, identify pollution pathways, and provide recommended mitigation measures against this risk in accordance with relevant Environment Agency guidance. A site audit will be carried out by a Hydrogeological Clerk of Works (HCoW) who will oversee the construction phase of the works and carry out routine monitoring.	Minor	Negligible
	SSSI (High)	Moderate		Minor	Minor to Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
Historical contamination - mobilisation of elevated contaminants during construction and excavation activities.	Secondary A / Undifferentiated Aquifer (Low)	Minor	During the reserved matters stage, as part of the detailed design stage, ground investigation works will be carried out to update the existing risk assessment and to inform a Groundwater Monitoring Strategy and Plan.	Negligible	Negligible
	Off-site Private Water Supplies (Medium)	Minor	Areas of contamination will be identified, and risk management procedures identified within a Remediation Strategy. An Earthworks and Remediation strategy should be developed for the site. Excavation works are to be undertaken in accordance with the agreed CEMP and Remediation Strategy. Active excavation works should be limited to periods of dry weather (where possible) to restrict pooling / surface runoff into open excavations on site. Excavation works across the site should be phased as much as possible to limit the area of open excavation at any given time.	No Change	Negligible
	On-site Surface Water Features (Low)	Minor		Negligible	Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Negligible	A CEMP will be developed for the site and adhered to. The CEMP will detail measures to minimise the potential for contamination of the underlying aquifer as a result of construction activities relating to physical disturbance of the ground.	Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Minor		Negligible	Negligible
	SSSI (High)	Moderate	Excavations for this type of development are, by their very nature, are transient and occur over relatively small timeframes (i.e. weeks). During the construction phase, strict adherence to the CEMP and PPG's should be followed.	Minor	Minor to Negligible
Alteration of drainage / infiltration / recharge to groundwater	Secondary A / Undifferentiated Aquifer (Low)	Moderate	A full list of mitigation measures associated with water, drainage and flooding which are to be employed during the Construction Phase are discussed in the Tetra Tech Drainage Strategy report.	Minor	Minor to Negligible
	Off-site Private Water Supplies (Medium)	Negligible	Site specific qualitative groundwater data (level and water quality) over a sustained period at targeted locations (and within key geological units/ mine	No Change	Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
	On-site Surface Water Features (Low)	Moderate	workings) will be required to ascertain the degree of groundwater rebound beneath the site. A network of groundwater monitoring boreholes will be installed across the development site and within key hydrological features located nearby (i.e., with the SINC and SSSI outside the development) to confirm and ascertain the interaction between spoil tips, superficial deposits, coal measures aquifer and key hydrological features within the SINC and SSSI.	Minor	Minor to Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Minor		Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Negligible		Negligible	Negligible
	SSSI (High)	Moderate	The findings of the groundwater and surface water monitoring will be used to inform the Groundwater and Surface Water Management and CEMP documents. Construction works would be carried out in such a way as to avoid damage to watercourses and the underlying drainage systems; both within the spoil tips on site and coal measures aquifer/ mine workings. This will be achieved by: • Strict supervision on site and careful programming of works; • Drainage – new drainage infrastructure will be bunged at the end of each working day to prevent water ingress and accidental contamination. Final connections will be made post-completion of road construction; • Drainage – wheel washes will be used by the contractor, and a road brush will be employed, to avoid pollution of existing drainage systems; • Excavation and Stockpiling – the contractor will use silt-traps, cut off trenches and vegetated corridors to prevent silty water from entering adjacent watercourses; • Oil Storage and Refuelling – the contractor will dedicate specific areas for oil storage and refuelling, separated a minimum of 10m	Minor	Minor to Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
			from adjacent watercourses and comply with legislation, including providing bunds sized 10 contain 110% of fuel storage capacity; - Oil Storage and Refuelling – the contractor will use fill point drip trays, bunded pallets and secondary containment units; - Oil Storage and Refuelling – the site will be enclosed and secured and fuel storage areas will be secondarily secured; - Waste Management – the contractor will develop a Site Waste Management Plan (SWMP) in accordance with PPG 6, including the retention of packaging by suppliers and the use of covered skips for any site waste; and - Incident Response – the contractor will develop a site-specific Incident Response Plan in accordance with PPG6, appoint a responsible person and train operatives in implementation and testing of the Plan periodically throughout construction of the works. - Ensure that drainage within areas outside of the development area (i.e., within the SSSI) would not be interrupted or destroyed as a result of the construction works; - Prevent damage by erosion, silting, pollution or flooding by incorporating appropriate mitigation measures which would be documented within a Surface Water Management Plan. Drainage works will be completed in accordance with an appropriate specification, e.g. the National Building Specification for other works, with cross-reference to the Specification For Highway Works and Pollution Prevention Guidance Notes, or PPGs, and particularly PPG 5: Works And Maintenance In Or Near Water.		
Mine water discharge	Secondary A / Undifferentiated Aquifer (Low)	Minor	Reduced quality mine water discharge is not expected to be a significant issue at the site. Groundwater and surface water quality will be determined	Negligible	Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
	Off-site Private Water Supplies (Medium)	Negligible	through ground investigation and surface water monitoring to support drainage design and incorporation of relevant SuDS features.	No Change	Negligible
	On-site Surface Water Features (Low)	Minor		Negligible	Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Minor		Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Negligible		Negligible	Negligible
	SSSI (High)	Moderate		Negligible	Negligible
Blocking up or destruction of underlying ironstone drainage system / preferential pathways beneath the site as result of the planned development works.	Secondary A / Undifferentiated Aquifer (Low)	Moderate	There is the potential that the development could impact upon or disrupt the underlying ironstone drainage system. Damage or blocking up to this system could cause a rise in groundwater levels and could potentially result in groundwater flooding or increased surface water flow elsewhere in the system. Shafts, such as the Glyndyrys Shaft within the proposed development, and other mine workings will be thoroughly investigated and will be adequately protected during the construction phase. These key hydrogeological areas will be investigated as part of the reserved matters stage through ground investigation and monitoring of groundwater levels.	Minor	Minor to Negligible
	Off-site Private Water Supplies (Medium)	Negligible		No Change	Negligible
	On-site Surface Water Features (Low)	Moderate		Minor	Minor to Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
	Off-site Surface Water Features e.g. River Taff (Low)	Moderate	Should grouting of mine shafts be a requirement, then a comprehensive localised hydrogeology study and investigation would be required to ensure the grouting did not impede upon the hydrogeological regime.	Minor	Minor to Negligible
	Scheduled Ancient Monuments (Medium)	Minor		Minor	Negligible
	SSSI (High)	Moderate		Minor	Minor to Negligible
Dewatering of excavations	Secondary A / Undifferentiated Aquifer (Low)	Moderate	Dewatering of excavations are likely to be required, particularly where excavations intersect the groundwater table or groundwater present within the underlying spoil tips. Prior to works, a dewatering risk assessment and method statement should be completed detailing measures to be put in place to ensure protection of the groundwater and surface water environment. In-situ hydrogeological testing is likely to be required to allow a quantitative assessment of dewatering requirements during the construction phase.	Minor	Minor to Negligible
	Off-site Private Water Supplies (Medium)	Negligible		Negligible	Negligible
	On-site Surface Water Features (Low)	Minor		Negligible	Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Minor		Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Negligible		Negligible	Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
	SSSI (High)	Moderate		Minor	Minor to Negligible
Sediment laden water resulting increased turbidity in existing drainage features and underlying groundwater	Secondary A / Undifferentiated Aquifer (Low)	Minor	A CEMP will be developed for the site and adhered to. Good site working practices utilising silt traps where required. Works restricted during periods of high rainfall. Changes to drainage regime to be kept to a minimum. Surface water run-off is to be controlled.	Negligible	Negligible
	Off-site Private Water Supplies (Medium)	Negligible		No Change	Negligible
	On-site Surface Water Features (Low)	Minor		Negligible	Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Minor		Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Minor		Minor	Negligible
	SSSI (High)	Moderate		Minor	Minor to Negligible
Stockpiling of construction materials	Secondary A / Undifferentiated Aquifer (Low)	Minor	A CEMP will be developed for the site and adhered to. Measures will include the early establishment of drainage facilities such as bunds, ditches, and silt traps to reduce the risk of problems during construction; siting of materials	Negligible	Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
and the construction of haul roads	Off-site Private Water Supplies (Medium)	Negligible	and stockpiles which are considerate of their proximity to surface water features; limiting excavation activities and site works during heavy rainfall events.	Negligible	Negligible
	On-site Surface Water Features (Low)	Minor		Negligible	Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Minor		Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Minor		Minor	Negligible
	SSSI (High)	Moderate		Minor	Minor to Negligible
Operational Phase					
Accidental spillages – circumstantial release of fuels and/ or chemical	Secondary A / Undifferentiated Aquifer (Low)	Minor	Mitigation measures associated with water, drainage and flooding at the site are outlined within the Tetra Tech Drainage Strategy Report. Potential impacts associated with the surface water drainage at the site will be addressed by the design features outlined within the aforementioned report. The effectiveness of the formal drainage network that has been partially installed at the site by the Council will be considered and incorporated into the design where proven to be effective and in line with the approved design.	Negligible	Negligible
	Off-site Private Water Supplies (Medium)	Negligible		Negligible	Negligible
	On-site Surface Water Features (Low)	Minor		Negligible	Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
	Off-site Surface Water Features e.g. River Taff (Low)	Minor		Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Minor		Minor	Negligible
	SSSI (High)	Moderate		Minor	Minor to Negligible
Potential contamination (E.g., anthropogenic contamination such as leaking sewer pipes or use of road salts);	Secondary A / Undifferentiated Aquifer (Low)	Minor	During the operational phase, any leakage from sewage pipes can be minimised by ensuring the pipework design is rigorous in terms in leakage and deterioration. For example, installing welded pipe work as opposed to conventional push fit pipes that are prone to deterioration or, installing pipe work within trenches lined with low permeability material. The UKWIR Guidance should be followed for the installation of water supply pipes at the site. This guidance outlines the methodology by which appropriate water supply pipes should be selected on Brownfield sites.	Negligible	Negligible
	Off-site Private Water Supplies (Medium)	Minor		Negligible	Negligible
	On-site Surface Water Features (Low)	Minor		Negligible	Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Minor		Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Minor		Minor	Negligible

Description of Risk	Receptor (Sensitivity)	Overall Risk	Proposed Mitigation	Residual Magnitude of Impact	Residual Risk
	SSSI (High)	Moderate		Minor	Minor to Negligible
Alteration of drainage / infiltration / recharge to groundwater	Secondary A / Undifferentiated Aquifer (Low)	Minor	The Tetra Tech Flood Consequence Assessment Report outlines the proposed mitigation measures associated with the flood risk and drainage designs. Three watercourses are proposed which will decrease pluvial flood risk significantly. Re-alignment of the Nant Melin Canaid within the Cwm Pit SAM will prevent ongoing erosion of the masonry stone wall.	Negligible	Negligible
	Off-site Private Water Supplies (Medium)	Negligible		Negligible	Negligible
	On-site Surface Water Features (Low)	Minor		Negligible	Negligible
	Off-site Surface Water Features e.g. River Taff (Low)	Minor		Negligible	Negligible
	Scheduled Ancient Monuments (Medium)	Negligible		Negligible	Negligible
	SSSI (High)	Minor		Negligible	Negligible

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

This Desktop Assessment provides a detailed account of the hydrogeological and hydrological environment at the site to inform the outline design stage of the proposed planning application. It includes a qualitative risk assessment following the development of a Conceptual Site Model which provides an initial characterisation of the water environment. Mitigation measures have been proposed which reduce potentially significant risks associated with the construction and operational phases of the proposed development to acceptable levels.

The implementation of specific mitigation measures within the construction and operational phases in conjunction with good environmental controls, can ensure that any impacts and/or effects on the hydrology and hydrogeology will be quickly controlled and will have a minor to negligible residual risk level. In addition, the incorporation of SuDS features or the proposed re-alignment of the Nant Melin Cannaid will bring beneficial impacts by preventing continued erosion of the Cwm Pit stone masonry wall.

This assessment provides a detailed account of the hydrogeological and hydrological environment at the site, which has been updated to account for the recent drainage works completed on site by the council which have altered the baseline conditions on site. This assessment is therefore considered to be sufficient to support the outline planning application and therefore not considered to be a barrier to the proposed development. Accordingly, no objections to the development should be sustained on grounds of Hydrology & Hydrogeology.

7.2 RECOMMENDATIONS

Further, site specific information that will be required to support the reserved matters stage of the application is presented below. These further works have largely been drawn from consultation with NRW (as referenced in their correspondence dated 21 May 2021 ref. CAS-147696-Q3X1) and to support the mitigation measures that have been proposed. We expect that these further works will be discussed and agreed with NRW at the detailed design stage and will likely be a condition of planning.

- Site specific qualitative groundwater data (level and water quality) over a sustained period at targeted locations (and within key geological units/ mine workings) will be required to ascertain the temporal variation in groundwater levels (including the extent of groundwater rebound) and quality beneath the site.
- A network of groundwater monitoring boreholes will be required in order to confirm and ascertain the groundwater levels and quality beneath the site. A Groundwater Monitoring Strategy and Plan will be prepared at the detailed design stage which will present a strategy for drilling groundwater monitoring boreholes at the site and proposals for groundwater monitoring.
- Interactions between spoil tips, superficial deposits, coal measures aquifer and key hydrological features within the SINC and SSSI to be further investigated through ground investigation and monitoring.
- Site specific surface water quality data at targeted locations and key features. Based on the review of available information, there is no evidence to suggest that water quality is significantly impacted. However, given the history of the site and the number of potential contaminative sources, this will need to be confirmed through surface water sampling and analysis.
- The recently installed drainage network at the site is incomplete and its effectiveness is not yet to be tested in the absence of any significant rainfall / storm events at the time of the site visit. As such, further investigations and assessment should be carried out to conclude whether elements of the network should be incorporated into the proposed development/ drainage design.

8.0 REFERENCES

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FIGURES

Figure 1 - Site Boundary

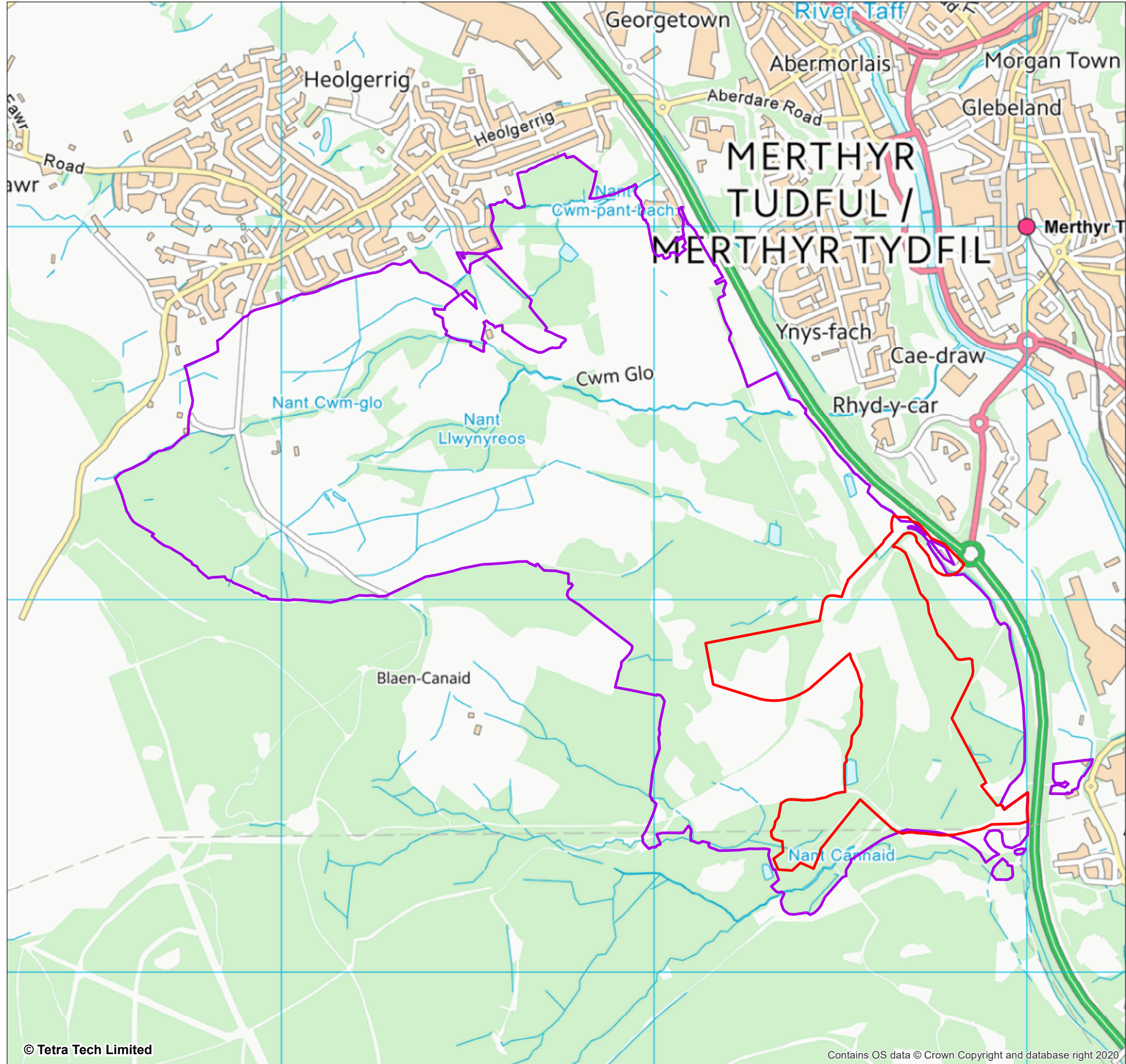


Figure 1. Site Boundary

Rydycar West

Marvel Limited



Legend

-  Site Boundary
-  Site Ownership Boundary

0 140 280 420 Meters
Scale: 1:10,000 @A3

28 January 2022
NGR: 303,765 E / 205,178 N

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Belfast
BT6 9UP

Drawn by: TH
Checked by: AJ
Office: Belfast

Revision No. 001
Project No. B023905

Tel: 028 9070 6000
Email: ireland@tetratech.com

Figure 2 – Rhydycar Development Masterplan

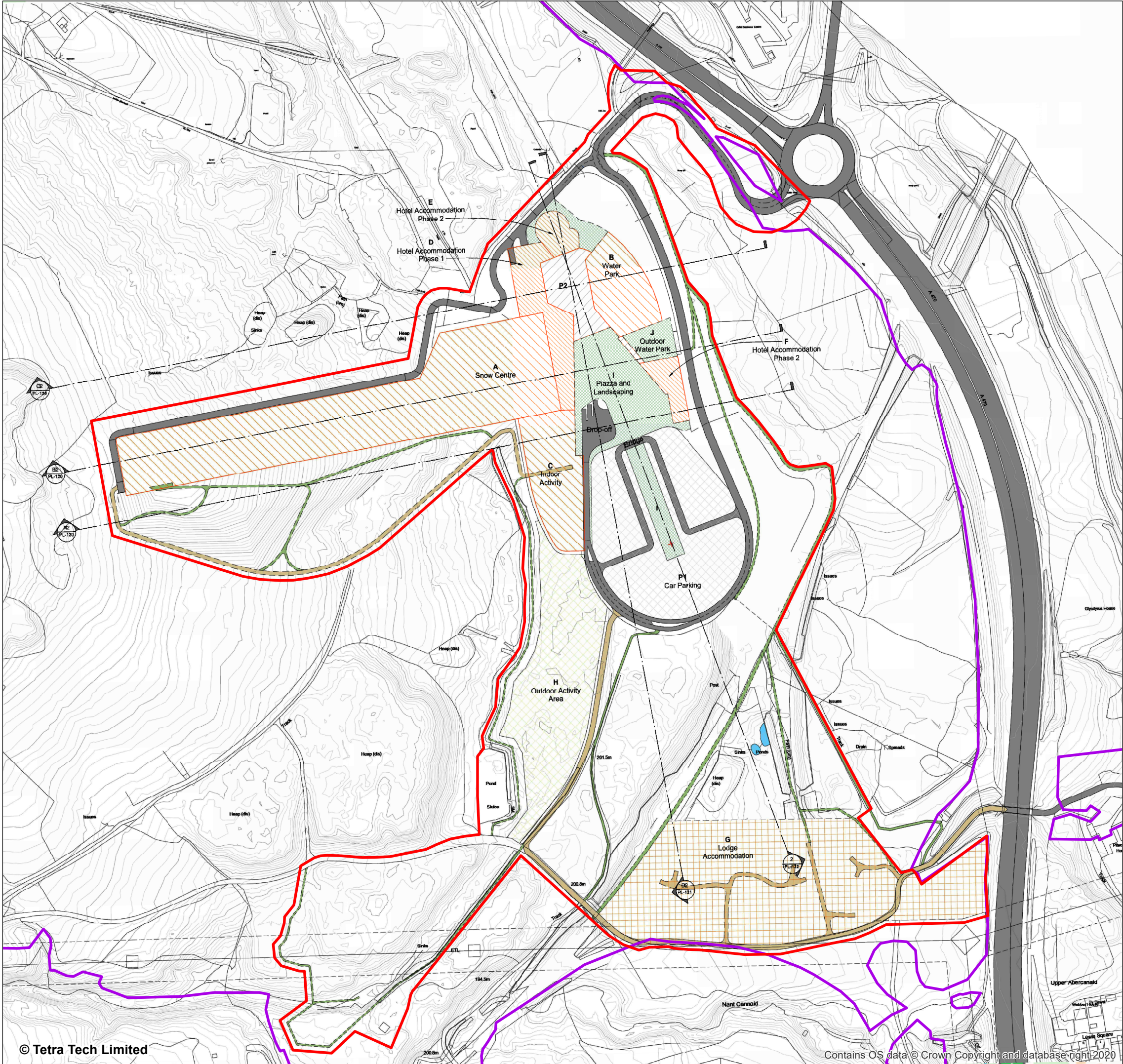


Figure 2. Rhydyar Development Masterplan

Rydyar West

Marvel Limited

Legend

- Site Boundary
- Site Ownership Boundary

0 50 100 150 Meters
Scale: 1:3,600 @A3

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Figure 3 – Bedrock Geology



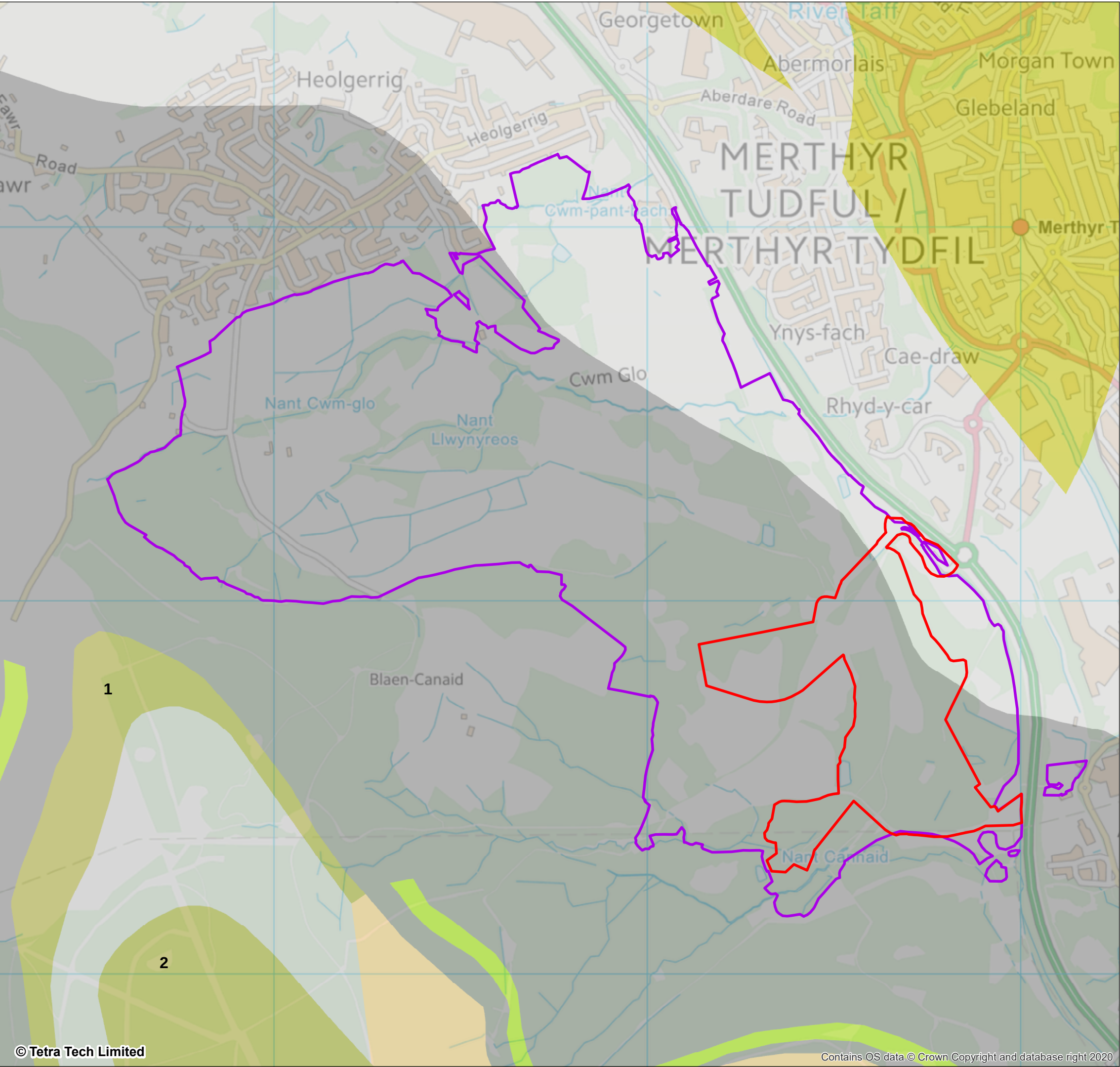


Figure 3. Bedrock Geological Plan

Rydycar West

Marvel Limited



Legend

-  Site Boundary
-  Site Ownership Boundary
-  South Wales Lower Coal Measures Formation - Sandstone
-  South Wales Lower Coal Measures Formation - Mudstones, Siltstone and Sandstone
-  South Wales Middle Coal Measures Formation - Mudstone, Siltstone and Sandstone
-  1 Llynfi Member - Sandstone
-  Llynfi Member - Mudstone, Siltstone and Sandstone
-  2 Rhondda Member - Sandstone
-  South Wales Middle Coal Measures Formation - Sandstone
-  South Wales Upper Coal Measures - Mudstone, Siltstone and Sandstone

0 140 280 420 Meters
Scale: 1:10,000 @A3

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Figure 4 – Hydrology and Catchment Areas

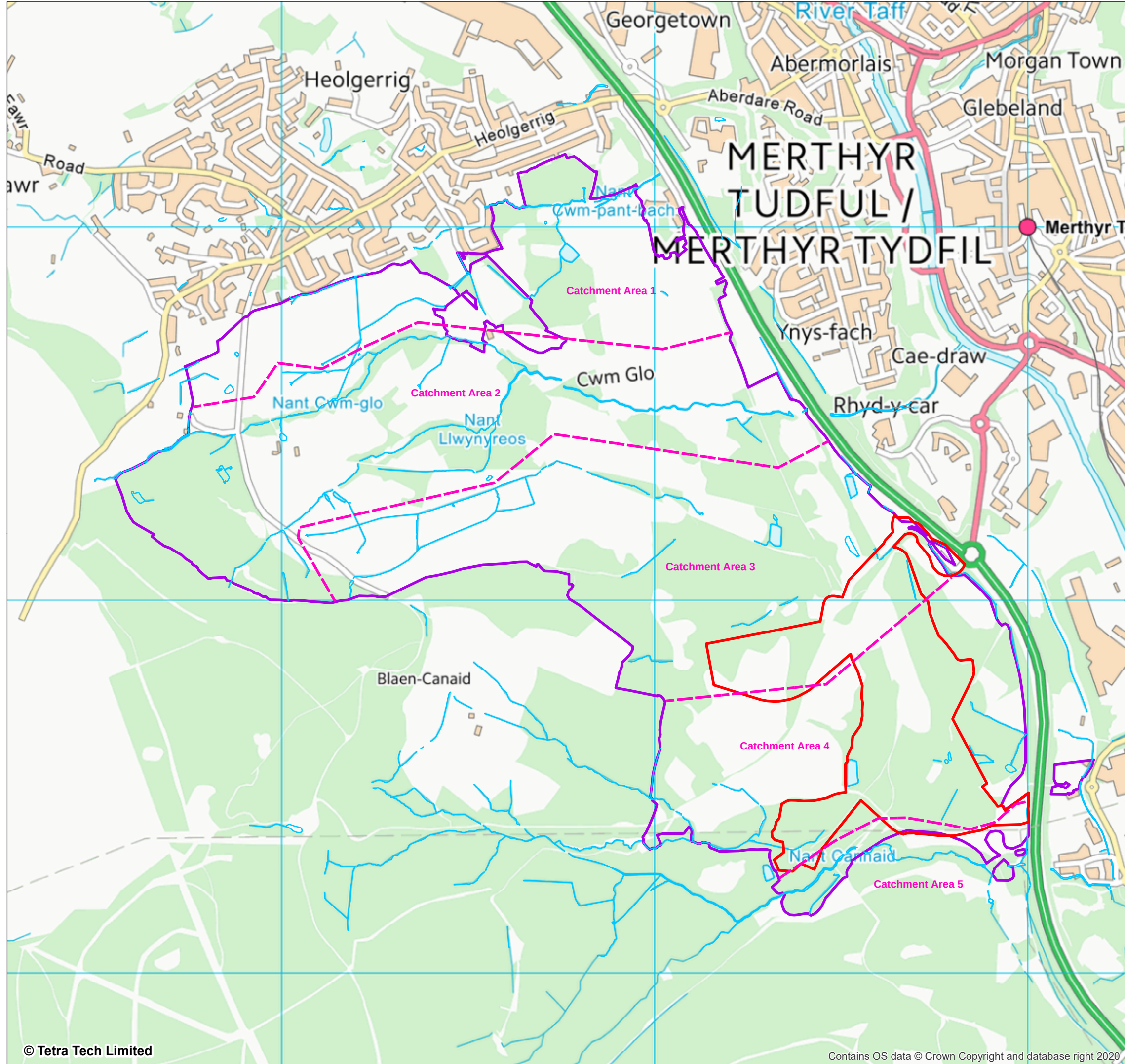


Figure 4. Hydrology and Catchment Areas

Rydycar West
Marvel Limited

Legend

-  Site Ownership Boundary
-  Site Boundary
-  Catchment Area Boundaries
-  Waterways



0 140 280 420 Meters
Scale: 1:10,000 @A3
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Figure 5 – 2017 Site Walkover Plan

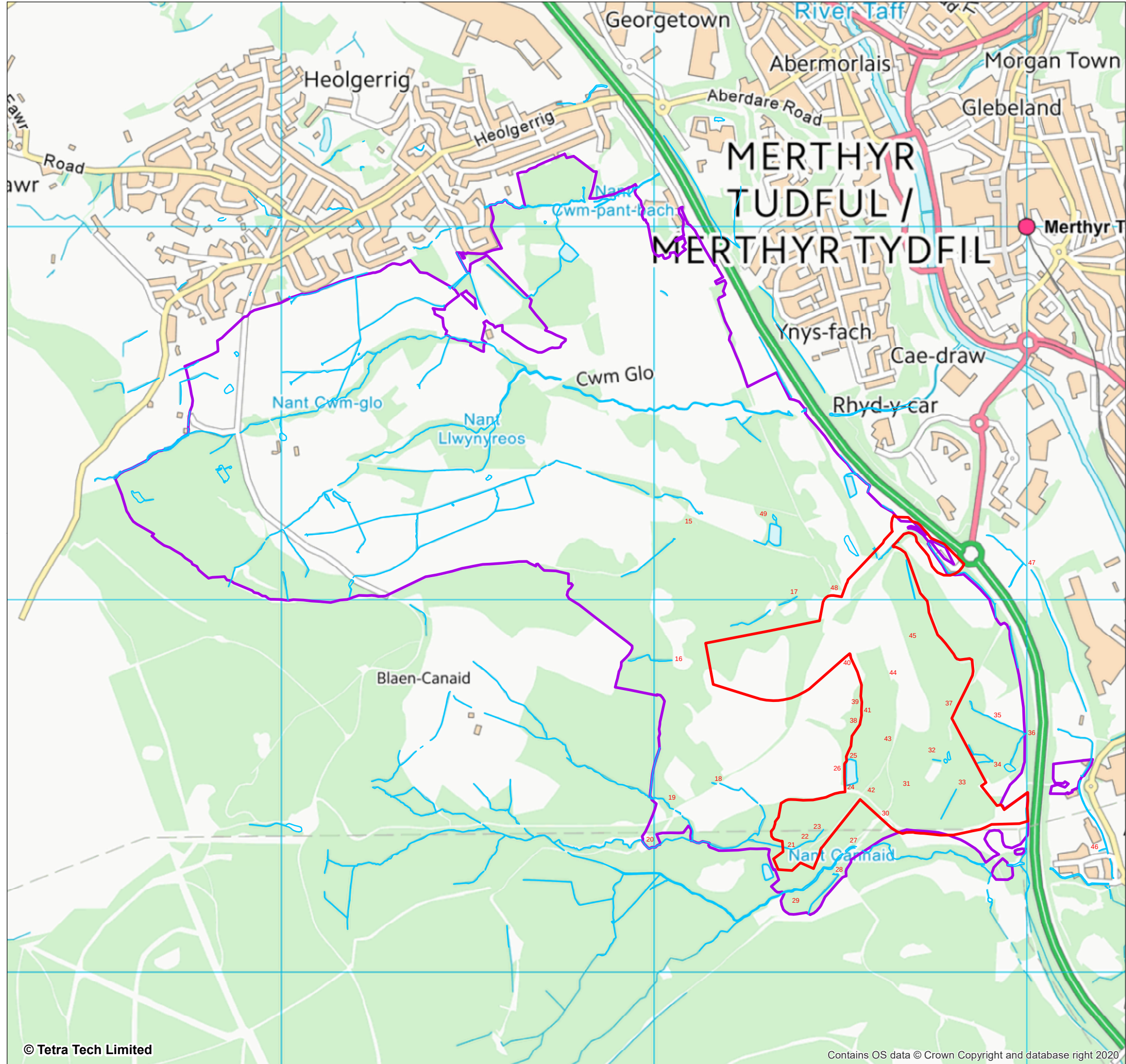


Figure 5. 2017 Site Walkover Plan

Rydycar West

Marvel Limited



Legend

-  Site Ownership Boundary
-  Site Boundary
-  Waterways

0 140 280 420 Meters
Scale: 1:10,000 @A3

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Figure 6 – 2021 Site Walkover Plan

Figure 7 – Pre-Mining Conceptual Site Model

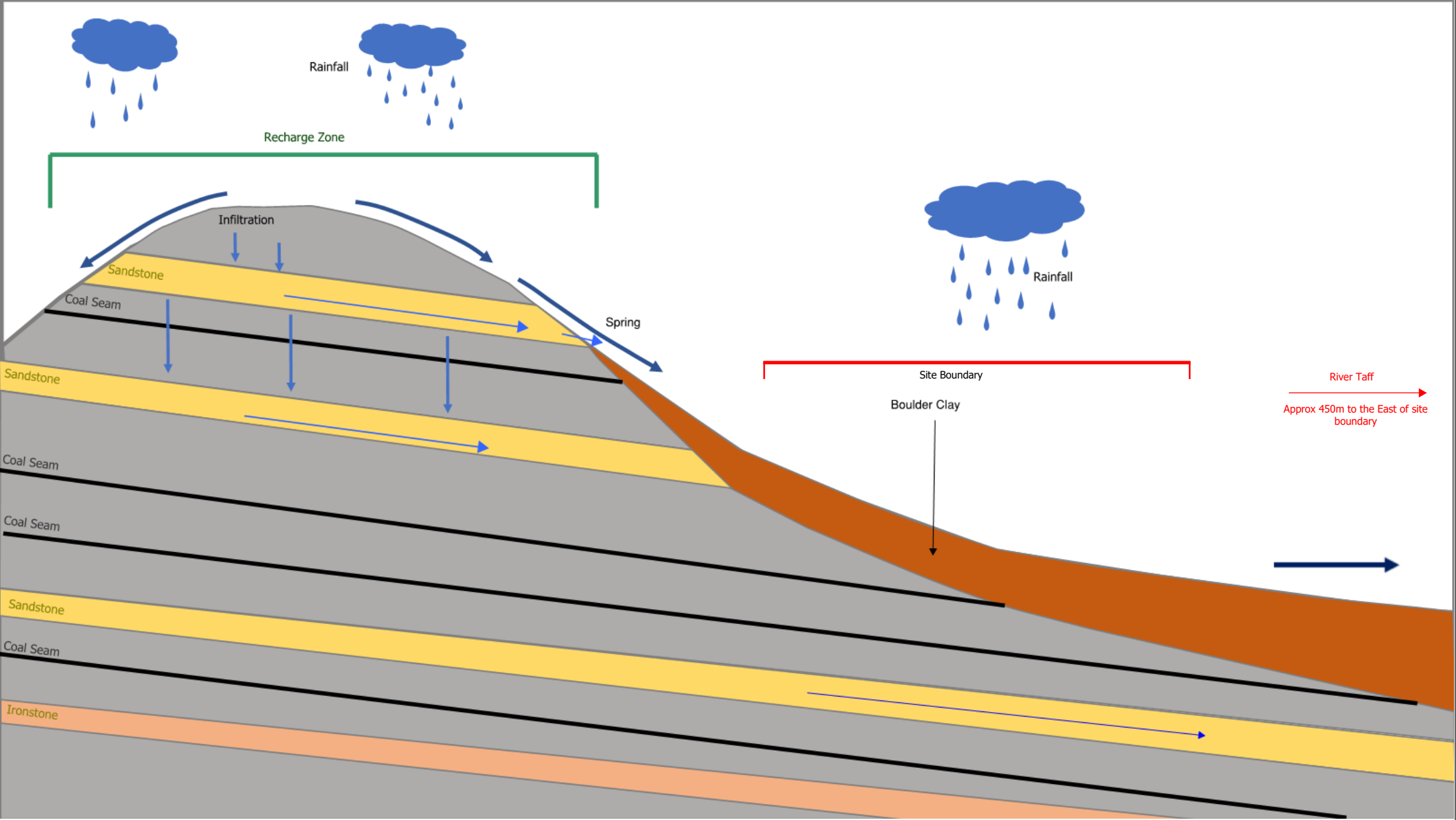


Figure 7. Pre-Mining Conceptual Site Model

Rydycar West

Marvel Limited



Legend

- Groundwater level
- Groundwater Flow Direction
- Minor Recharge
- Major Recharge

0 140 280 420 Meters
Scale: 1:10,000 @A3

04 February 2022
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Figure 8 – Post-Mining Conceptual Site Model

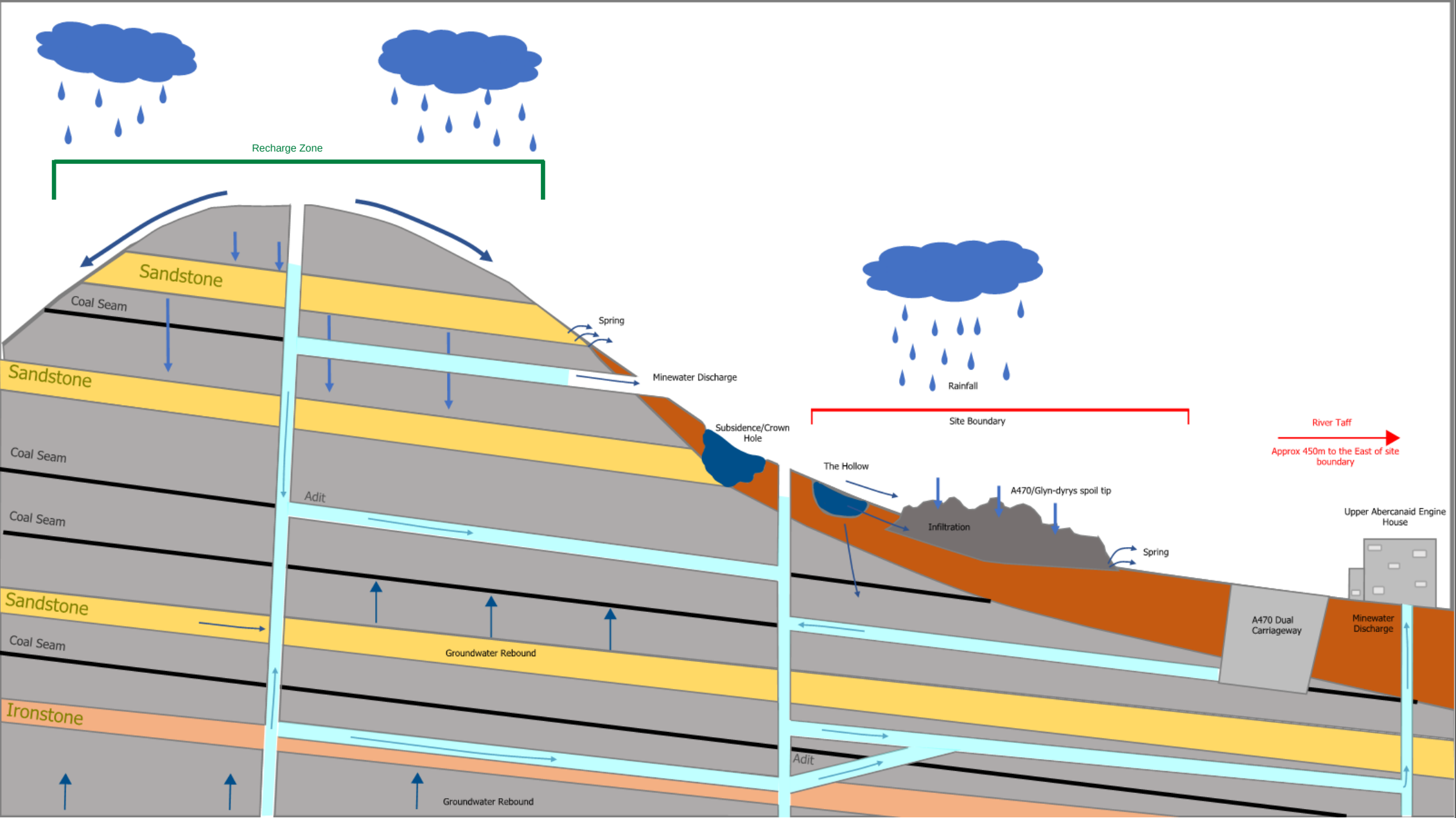


Figure 8. Post-Mining Conceptual Site Model
Rydycar West
Marvel Limited

Legend

- Groundwater level
- Groundwater Flow Direction
- Minor Recharge
- Major Recharge

0 140 280 420 Meters
Scale: 1:10,000 @A3
04 February 2022
NGR: 303,872 E / 205,212 N

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Figure 9 – Shafts and Adits on or in proximity to site

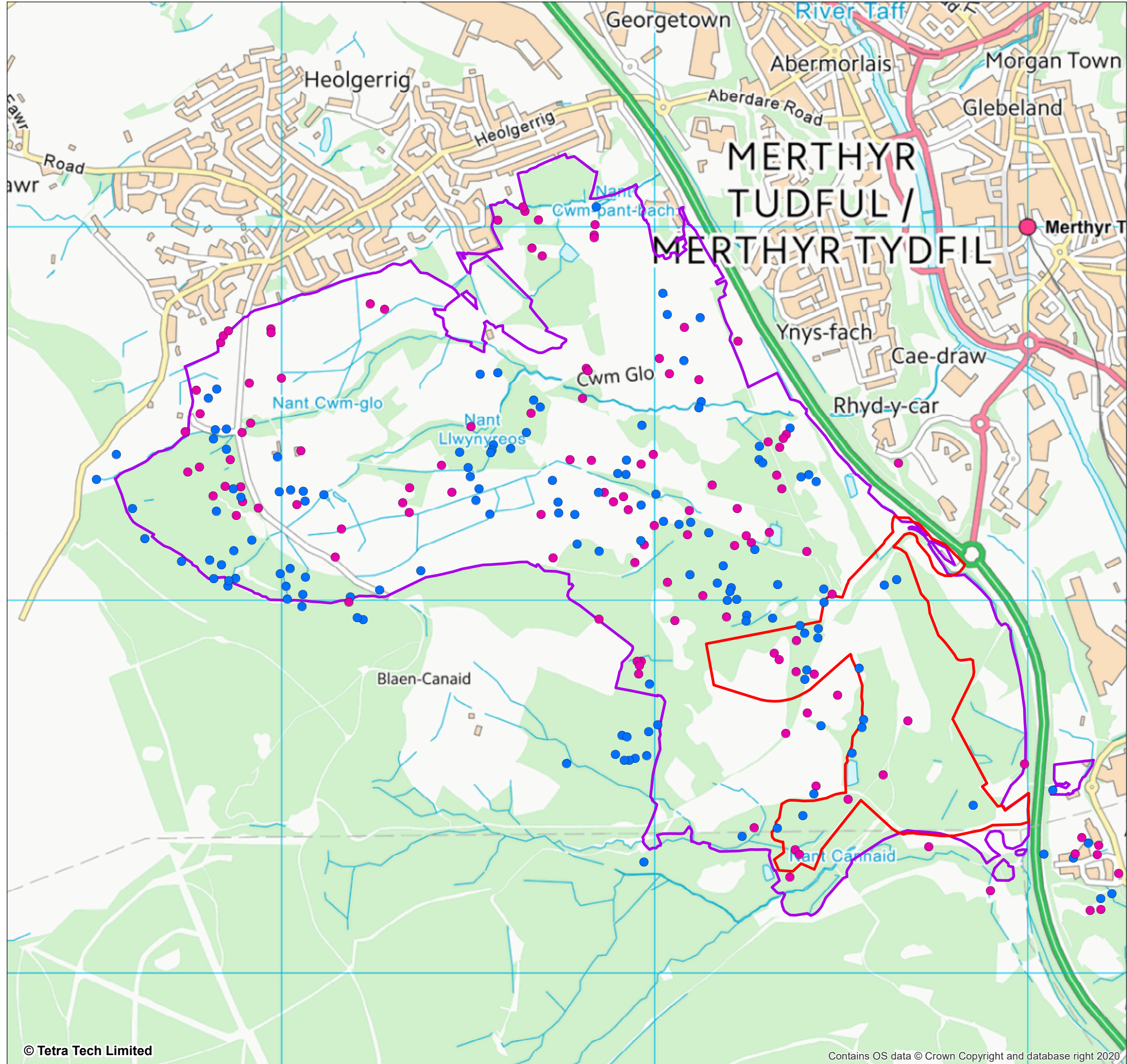


Figure 9 . Shafts and Adits on or in proximity to the site

Rydycar West
Marvel Limited



Legend

-  Site Ownership Boundary
-  Site Boundary
-  Adit
-  Shaft

0 140 280 420 Meters
Scale: 1:10,000 @A3
31 January 2022
NGR: 303,765 E / 205,178 N

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APPENDICES

APPENDIX A – REPORT CONDITIONS

APPENDIX A - REPORT CONDITIONS

HYDROLOGY & HYDROGEOLOGY DESK TOP REVIEW

This report is produced solely for the benefit of Marvel Limited and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on a study of readily accessible referenced historical records. Some of the opinions are based on unconfirmed data and information and are presented in good faith without exhaustive clarification. Where ground conditions are discussed but no physical site test results are available to confirm this, the report must be regarded as initial advice only, and further assessment should be undertaken prior to detailed activities related to the site. Where test results undertaken by others have been made available these can only be regarded as a limited sample.

Whilst confident in the findings detailed within this report because there are no exact UK definitions of these matters, we are unable to give categorical assurances that they will be accepted by Authorities or Funds etc. without question, as such bodies may have unpublished, often more stringent objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to Tetra Tech. In time improved practices or amended guidance may necessitate a re-assessment. The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report and provides an opinion on surrounding sites.

APPENDIX B– GROUNDSURE REPORT

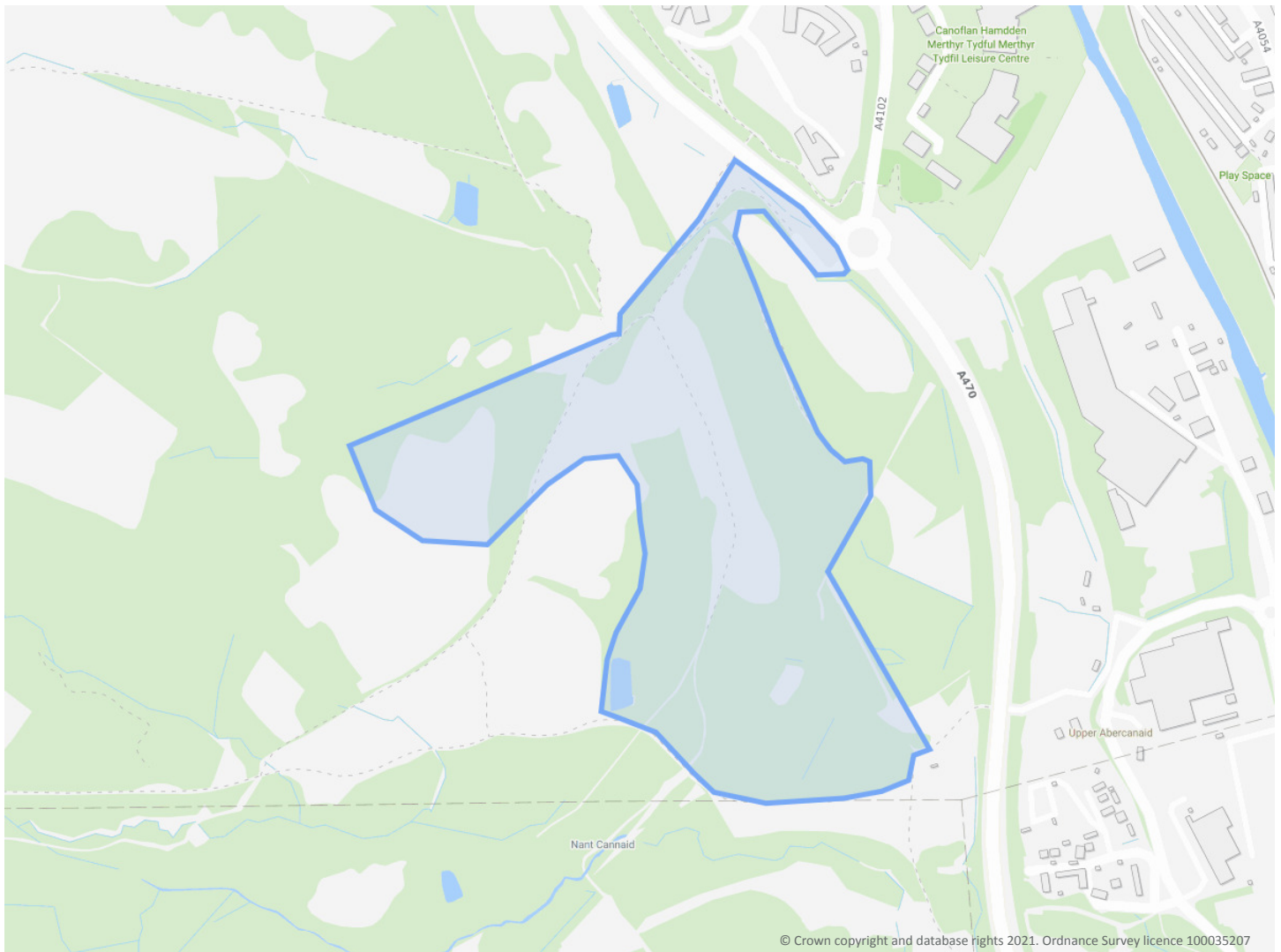
304716, 204780

Order Details

Date: 19/07/2021
Your ref: 7002094_-_Rhyd_y_Car_
Our Ref: GS-8054802
Client: WYG Environment Planning Transport Limited

Site Details

Location: 304660 204824
Area: 26.63 ha
Authority: [Merthyr Tudful - Merthyr Tydfil County Borough Council](#)



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Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

N/A: >10ha

groundsure.com/insightuserguide

Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	<u>Historical industrial land uses</u>	175	77	232	294	-
41	1.2	<u>Historical tanks</u>	0	0	1	27	-
43	1.3	<u>Historical energy features</u>	0	0	0	19	-
44	1.4	Historical petrol stations	0	0	0	0	-
44	1.5	Historical garages	0	0	0	0	-
44	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
45	2.1	<u>Historical industrial land uses</u>	221	106	307	388	-
82	2.2	<u>Historical tanks</u>	0	0	1	42	-
84	2.3	<u>Historical energy features</u>	0	0	0	36	-
85	2.4	Historical petrol stations	0	0	0	0	-
86	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
87	3.1	Active or recent landfill	0	0	0	0	-
87	3.2	Historical landfill (BGS records)	0	0	0	0	-
88	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
88	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
88	3.5	Historical waste sites	0	0	0	0	-
88	3.6	Licensed waste sites	0	0	0	0	-
88	3.7	<u>Waste exemptions</u>	0	0	4	11	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
91	4.1	<u>Recent industrial land uses</u>	0	0	7	-	-
92	4.2	Current or recent petrol stations	0	0	0	0	-
92	4.3	Electricity cables	0	0	0	0	-
92	4.4	Gas pipelines	0	0	0	0	-
93	4.5	Sites determined as Contaminated Land	0	0	0	0	-



93	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
93	4.7	Regulated explosive sites	0	0	0	0	-
93	4.8	Hazardous substance storage/usage	0	0	0	0	-
93	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
94	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
94	4.11	<u>Licensed pollutant release (Part A(2)/B)</u>	0	0	0	2	-
94	4.12	Radioactive Substance Authorisations	0	0	0	0	-
94	4.13	<u>Licensed Discharges to controlled waters</u>	0	0	1	5	-
95	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
96	4.15	Pollutant release to public sewer	0	0	0	0	-
96	4.16	List 1 Dangerous Substances	0	0	0	0	-
96	4.17	<u>List 2 Dangerous Substances</u>	0	0	0	1	-
96	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	2	7	-
97	4.19	Pollution inventory substances	0	0	0	0	-
98	4.20	Pollution inventory waste transfers	0	0	0	0	-
98	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
99	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
101	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
103	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
104	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
104	5.5	Groundwater vulnerability- local information	None (within 0m)				
105	5.6	<u>Groundwater abstractions</u>	0	0	0	1	0
106	5.7	<u>Surface water abstractions</u>	0	0	0	2	0
107	5.8	Potable abstractions	0	0	0	0	0
107	5.9	Source Protection Zones	0	0	0	0	-
107	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
108	6.1	<u>Water Network (OS MasterMap)</u>	28	10	53	-	-



116	6.2	<u>Surface water features</u>	1	4	28	-	-
116	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
116	6.4	<u>WFD Surface water bodies</u>	0	0	0	-	-
117	6.5	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
118	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	None (within 50m)				
118	7.2	Historical Flood Events	0	0	0	-	-
118	7.3	Flood Defences	0	0	0	-	-
118	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
119	7.5	Flood Storage Areas	0	0	0	-	-
120	7.6	Flood Zone 2	None (within 50m)				
120	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
121	8.1	<u>Surface water flooding</u>	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding					
123	9.1	<u>Groundwater flooding</u>	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
124	10.1	<u>Sites of Special Scientific Interest (SSSI)</u>	1	0	0	0	0
125	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
125	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
125	10.4	Special Protection Areas (SPA)	0	0	0	0	0
125	10.5	National Nature Reserves (NNR)	0	0	0	0	0
126	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
126	10.7	<u>Designated Ancient Woodland</u>	1	0	2	4	47
128	10.8	Biosphere Reserves	0	0	0	0	0
128	10.9	Forest Parks	0	0	0	0	0
129	10.10	Marine Conservation Zones	0	0	0	0	0
129	10.11	Green Belt	0	0	0	0	0
129	10.12	Proposed Ramsar sites	0	0	0	0	0



129	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
129	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
130	10.15	Nitrate Sensitive Areas	0	0	0	0	0
130	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
131	10.17	SSSI Impact Risk Zones	0	-	-	-	-
131	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
132	11.1	World Heritage Sites	0	0	0	-	-
133	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
133	11.3	National Parks	0	0	0	-	-
133	11.4	Listed Buildings	0	0	2	-	-
134	11.5	Conservation Areas	0	0	0	-	-
134	11.6	Scheduled Ancient Monuments	1	1	2	-	-
134	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
135	12.1	Agricultural Land Classification	Grade 4 (within 250m)				
136	12.2	Open Access Land	0	0	1	-	-
136	12.3	Tree Felling Licences	0	0	0	-	-
137	12.4	Environmental Stewardship Schemes	0	0	0	-	-
137	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
138	13.1	Priority Habitat Inventory	0	0	0	-	-
138	13.2	Habitat Networks	0	0	0	-	-
138	13.3	Open Mosaic Habitat	0	0	0	-	-
138	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
139	14.1	10k Availability	Identified (within 500m)				
140	14.2	Artificial and made ground (10k)	0	0	0	0	-
141	14.3	Superficial geology (10k)	0	0	0	0	-



141	14.4	Landslip (10k)	0	0	0	0	-
142	14.5	Bedrock geology (10k)	0	0	0	0	-
142	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
143	15.1	50k Availability	Identified (within 500m)				
144	15.2	Artificial and made ground (50k)	2	0	1	1	-
145	15.3	Artificial ground permeability (50k)	3	0	-	-	-
146	15.4	Superficial geology (50k)	1	0	1	0	-
147	15.5	Superficial permeability (50k)	Identified (within 50m)				
147	15.6	Landslip (50k)	0	0	0	0	-
147	15.7	Landslip permeability (50k)	None (within 50m)				
148	15.8	Bedrock geology (50k)	2	0	0	2	-
149	15.9	Bedrock permeability (50k)	Identified (within 50m)				
149	15.10	Bedrock faults and other linear features (50k)	11	1	6	7	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
151	16.1	BGS Boreholes	2	17	144	-	-
Page	Section	Natural ground subsidence					
158	17.1	Shrink swell clays	Very low (within 50m)				
159	17.2	Running sands	Very low (within 50m)				
161	17.3	Compressible deposits	Very low (within 50m)				
163	17.4	Collapsible deposits	Very low (within 50m)				
164	17.5	Landslides	Low (within 50m)				
166	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
168	18.1	Natural cavities	0	0	0	0	-
169	18.2	BritPits	4	0	7	15	-
174	18.3	Surface ground workings	196	100	281	-	-
195	18.4	Underground workings	6	5	22	30	128
202	18.5	Historical Mineral Planning Areas	0	0	0	0	-



<u>202</u>	<u>18.6</u>	<u>Non-coal mining</u>	2	0	2	0	1
203	18.7	Mining cavities	0	0	0	0	0
203	18.8	JPB mining areas	None (within 0m)				
<u>203</u>	<u>18.9</u>	<u>Coal mining</u>	Identified (within 0m)				
204	18.10	Brine areas	None (within 0m)				
204	18.11	Gypsum areas	None (within 0m)				
204	18.12	Tin mining	None (within 0m)				
204	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
<u>205</u>	<u>19.1</u>	<u>Radon</u>	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
<u>206</u>	<u>20.1</u>	<u>BGS Estimated Background Soil Chemistry</u>	9	3	-	-	-
207	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
207	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
208	21.1	Underground railways (London)	0	0	0	-	-
208	21.2	Underground railways (Non-London)	0	0	0	-	-
209	21.3	Railway tunnels	0	0	0	-	-
<u>209</u>	<u>21.4</u>	<u>Historical railway and tunnel features</u>	19	1	30	-	-
211	21.5	Royal Mail tunnels	0	0	0	-	-
<u>211</u>	<u>21.6</u>	<u>Historical railways</u>	5	1	2	-	-
212	21.7	Railways	0	0	0	-	-
212	21.8	Crossrail 1	0	0	0	0	-
212	21.9	Crossrail 2	0	0	0	0	-
212	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2021. All Rights Reserved

Capture Date: 14/04/2020

Site Area: 26.63ha



Recent site history - 2017 aerial photograph



Capture Date: 17/06/2017

Site Area: 26.63ha



Recent site history - 2010 aerial photograph



Capture Date: 22/05/2010

Site Area: 26.63ha



Recent site history - 2008 aerial photograph



Capture Date: 12/05/2008

Site Area: 26.63ha



Recent site history - 2000 aerial photograph

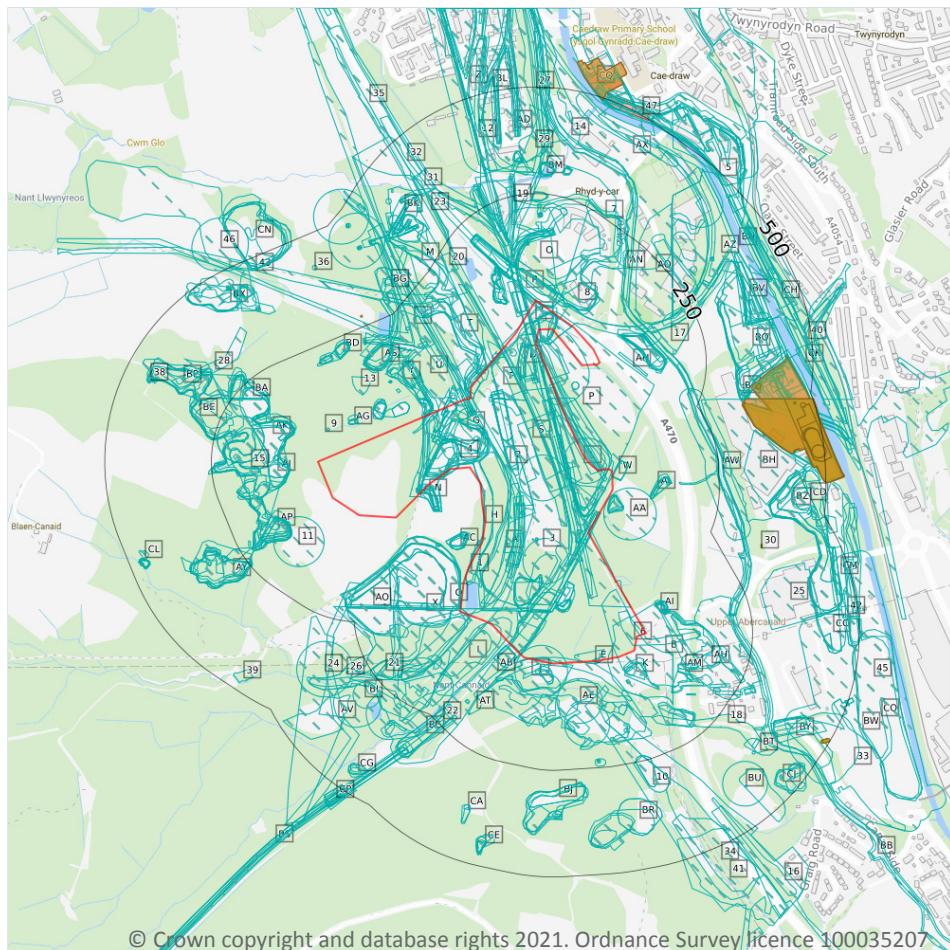


Capture Date: 18/06/2000

Site Area: 26.63ha



1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features

1.1 Historical industrial land uses

Records within 500m

778

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
1	On site	Unspecified Disused Pit	1903	1015558



ID	Location	Land use	Dates present	Group ID
2	On site	Unspecified Pit	1979	1028172
3	On site	Railway Sidings	1875	1033899
4	On site	Unspecified Ground Workings and Heaps	1922	1104141
5	On site	Railway Sidings	1948	1124869
6	On site	Railway Sidings	1875	993781
A	On site	Smithy	1875	1032871
A	On site	Unspecified Ground Workings	1921	996784
A	On site	Ironstone Pit	1875	1000020
A	On site	Unspecified Disused Tip	1988	1005152
A	On site	Unspecified Disused Tip	1979	1005153
A	On site	Unspecified Disused Tips	1979	1007175
A	On site	Railway Building	1948	1013034
A	On site	Railway Building	1903	1013035
A	On site	Railway Building	1948	1013036
A	On site	Unspecified Disused Pits	1948	1015867
A	On site	Refuse Heap	1903	1019512
A	On site	Unspecified Heaps	1875	1021406
A	On site	Unspecified Pit	1875	1028171
A	On site	Railway Sidings	1903	1086041
A	On site	Railway Sidings	1903	1033891
A	On site	Railway Sidings	1901	1036848
A	On site	Unspecified Ground Workings	1921 - 1922	1037110
A	On site	Unspecified Disused Pit	1938	1039038
A	On site	Cuttings	1915 - 1948	1039665
A	On site	Railway Sidings	1901	1042451
A	On site	Railway Sidings	1922	1043546
A	On site	Unspecified Heap	1938	1044825
A	On site	Unspecified Disused Tip	1988	1046349



ID	Location	Land use	Dates present	Group ID
A	On site	Railway Sidings	1915	1047287
A	On site	Cuttings	1964 - 1979	1054716
A	On site	Unspecified Heap	1915	1056034
A	On site	Unspecified Heap	1969	1056064
A	On site	Cuttings	1922	1059135
A	On site	Unspecified Heap	1948	1060387
A	On site	Unspecified Disused Pit	1938	1073595
A	On site	Cuttings	1875	1080217
A	On site	Unspecified Ground Workings	1969	1081827
A	On site	Unspecified Heap	1938	1084830
A	On site	Railway Sidings	1915	1085105
A	On site	Cuttings	1915	1087226
A	On site	Unspecified Heap	1922	1089836
A	On site	Railway Sidings	1901	1091710
A	On site	Railway Sidings	1922	1095333
A	On site	Railway Sidings	1915	1103307
A	On site	Unspecified Heap	1922	1103662
A	On site	Railway Sidings	1922	1104396
A	On site	Unspecified Disused Tip	1979	1105577
A	On site	Cuttings	1938	1107707
A	On site	Unspecified Heap	1948	1109398
A	On site	Unspecified Ground Workings	1915	1109769
A	On site	Cuttings	1922	1116008
A	On site	Unspecified Heap	1875	1116017
A	On site	Cuttings	1915	1116337
A	On site	Unspecified Disused Pit	1915	1118061
A	On site	Cuttings	1901	1120167
A	On site	Cuttings	1901	1121045



ID	Location	Land use	Dates present	Group ID
A	On site	Railway Sidings	1922	1123439
A	On site	Cuttings	1948	1131785
A	On site	Unspecified Heap	1948	1135709
A	On site	Railway Sidings	1903	1137091
A	On site	Railway Sidings	1921	1144925
A	On site	Cuttings	1903	1145203
A	On site	Unspecified Disused Pit	1901	1151278
A	On site	Unspecified Heap	1915 - 1921	1152727
A	On site	Cuttings	1922	1154228
B	On site	Ironstone Level	1875	992436
C	On site	Cuttings	1965	994294
C	On site	Unspecified Disused Tip	1976 - 1992	1048476
C	On site	Unspecified Heap	1948	1060988
C	On site	Unspecified Heap	1922	1072959
C	On site	Unspecified Heap	1921	1130093
C	On site	Unspecified Heap	1915	1150461
D	On site	Unspecified Ground Workings	1948	996782
D	On site	Unspecified Heaps	1875	1021408
D	On site	Old Ironstone Level	1938	1055971
D	On site	Railway Sidings	1915	1059781
D	On site	Unspecified Pit	1965 - 1992	1065060
D	On site	Cuttings	1938	1066852
D	On site	Old Ironstone Level	1915	1102750
D	On site	Old Ironstone Level	1948	1130693
D	On site	Old Ironstone Level	1921	1134202
D	On site	Cuttings	1915	1147521
D	On site	Cuttings	1922	1149662
E	On site	Unspecified Ground Workings	1901	996786



ID	Location	Land use	Dates present	Group ID
E	On site	Unspecified Pit	1988	1028164
F	On site	Unspecified Heap	1965	1000217
F	On site	Unspecified Disused Tip	1976	1038024
F	On site	Unspecified Disused Tip	1992	1041228
F	On site	Railway Sidings	1875	1044359
F	On site	Unspecified Pit	1979	1055190
F	On site	Unspecified Pit	1988	1055608
F	On site	Cuttings	1969	1078168
F	On site	Cuttings	1938	1105830
F	On site	Cuttings	1922	1127303
F	On site	Cuttings	1964	1135317
F	On site	Cuttings	1915	1135443
G	On site	Unspecified Heap	1875	1000278
G	On site	Ground Workings and Refuse Heap	1915	1007275
G	On site	Old Coal Drift	1948	1008428
G	On site	Drift	1921	1012105
G	On site	Refuse Heap	1921	1019513
G	On site	Unspecified Pit	1875	1028174
G	On site	Cuttings	1964 - 1969	1034745
G	On site	Unspecified Ground Workings	1938	1039188
G	On site	Unspecified Heap	1903	1042212
G	On site	Unspecified Heap	1921	1043908
G	On site	Unspecified Disused Tip	1979	1044490
G	On site	Coal Drift	1915	1044959
G	On site	Unspecified Disused Tip	1988	1046840
G	On site	Unspecified Heap	1964 - 1969	1049359
G	On site	Unspecified Heap	1875	1052252
G	On site	Unspecified Disused Tips	1988	1064203



ID	Location	Land use	Dates present	Group ID
G	On site	Unspecified Heaps	1964 - 1969	1072298
G	On site	Cuttings	1948	1076637
G	On site	Coal Drift	1922 - 1938	1085212
G	On site	Unspecified Heap	1901	1090330
G	On site	Cuttings	1965	1101787
G	On site	Cuttings	1903 - 1915	1104895
G	On site	Unspecified Disused Tips	1979	1122640
G	On site	Tramway Sidings	1948	1128517
G	On site	Unspecified Heap	1875	1137363
G	On site	Railway Sidings	1901	1152497
H	On site	Unspecified Heap	1948	1000279
H	On site	Old Canal	1901	1004658
I	On site	Unspecified Heap	1948	1000280
I	On site	Coal Pit	1875	1005027
I	On site	Unspecified Disused Tip	1979	1005154
I	On site	Railway Sidings	1922	1058699
I	On site	Unspecified Pit	1922	1063007
I	On site	Unspecified Heap	1948	1123875
J	On site	Unspecified Disused Tip	1979	1005155
J	On site	Unspecified Disused Workings	1988	1032158
J	On site	Refuse Heap	1964 - 1969	1071881
J	On site	Railway Sidings	1901 - 1922	1126283
K	On site	Unspecified Disused Tip	1979	1005160
L	On site	Unspecified Disused Tip	1979	1005164
L	On site	Unspecified Heap	1969	1054370
L	On site	Unspecified Heap	1964	1084558
M	On site	Unspecified Disused Tip	1992	1005165
M	On site	Unspecified Disused Tips	1976	1007176



ID	Location	Land use	Dates present	Group ID
N	On site	Refuse Heap	1921	1019517
N	On site	Old Coal Level	1948	1032272
N	On site	Unspecified Disused Tip	1979	1048969
N	On site	Railway Sidings	1922	1049687
N	On site	Coal Level	1922	1052454
N	On site	Coal Level	1938	1068974
N	On site	Coal Level	1921	1093342
N	On site	Unspecified Disused Tip	1988	1110675
N	On site	Coal Level	1915	1121071
N	On site	Railway Sidings	1922	1125393
N	On site	Unspecified Heap	1964 - 1969	1131412
O	On site	Railway Sidings	1875	1033887
P	On site	Railway Land	1922	1034338
P	On site	Refuse Heap	1938	1068317
P	On site	Old Ironstone Level	1903	1086239
P	On site	Old Ironstone Level	1901	1092266
P	On site	Railway Sidings	1922	1114667
Q	On site	Refuse Heap	1922	1039946
Q	On site	Unspecified Disused Tip	1988	1152975
R	On site	Cuttings	1976 - 1992	1043912
R	On site	Cuttings	1938	1076223
R	On site	Cuttings	1915 - 1922	1139704
R	On site	Cuttings	1976	1142556
R	On site	Cuttings	1965	1150367
S	On site	Refuse Heap	1903	1067553
S	On site	Cuttings	1922	1077917
T	On site	Railway Sidings	1921 - 1938	1070413
U	On site	Tramway Sidings	1915	1080646



ID	Location	Land use	Dates present	Group ID
U	On site	Tramway Sidings	1921 - 1922	1110190
V	On site	Railway Sidings	1901 - 1903	1086272
W	On site	Cuttings	1922	1125692
X	On site	Unspecified Disused Tip	1979	1127944
Y	On site	Refuse Heap	1922	1146050
Z	On site	Railway Sidings	1921	1148132
T	0m NW	Refuse Heap	1965	1123696
W	1m E	Cuttings	1915	1082902
G	1m NW	Unspecified Disused Tips	1979	1078703
G	1m NW	Unspecified Disused Tips	1988	1130456
M	2m NW	Unspecified Ground Workings	1938	1108754
W	2m E	Cuttings	1948	1128482
AA	2m SE	Unspecified Disused Workings	1988	1032165
Q	2m W	Refuse Heap	1915	1078179
Q	2m W	Refuse Heap	1938 - 1948	1067431
M	3m NW	Unspecified Ground Workings	1915	1115641
I	4m S	Refuse Heap	1901	1108349
Q	5m W	Refuse Heap	1921	1086223
R	5m NE	Cuttings	1901 - 1903	1143978
AA	5m SE	Unspecified Heap	1921	1101253
M	5m W	Unspecified Ground Workings	1921	1155965
Q	6m W	Unspecified Heap	1964 - 1969	1063738
R	6m NW	Cuttings	1965	1101162
AA	6m SE	Unspecified Disused Tip	1979	1005161
R	7m NW	Cuttings	1992	1034286
M	7m W	Unspecified Ground Workings	1901	1087268
AB	8m SW	Cuttings	1875	1087690
X	8m W	Refuse Heap	1948	1090500



ID	Location	Land use	Dates present	Group ID
AA	8m SE	Unspecified Heap	1922 - 1938	1134220
AA	9m SE	Unspecified Heap	1915	1072318
AA	9m SE	Unspecified Heap	1948	1070667
AB	9m SW	Cuttings	1948	1110337
AB	9m SW	Cuttings	1901	1130024
J	11m S	Unspecified Pit	1948	1057144
G	11m NW	Coal Shaft	1875	1021191
J	18m S	Unspecified Pit	1922	1049582
7	19m NE	Railway Sidings	1901 - 1903	1099240
R	19m NE	Cuttings	1948	1039592
K	19m SE	Unspecified Heap	1948	1082574
J	20m S	Unspecified Pit	1875	1102362
I	21m S	Refuse Heap	1901	1019516
O	22m NE	Ironstone Pit	1875	1000019
Y	24m NW	Unspecified Disused Tips	1979	1066356
Y	24m NW	Unspecified Disused Tips	1988	1114217
Y	24m NW	Unspecified Heaps	1964 - 1969	1147236
K	24m S	Unspecified Ground Workings	1901	996785
M	25m NW	Unspecified Ground Workings	1903	1143595
K	28m S	Unspecified Heap	1922	1103151
Y	28m NW	Refuse Heap	1921	1143593
K	31m S	Unspecified Disused Workings	1988	1032163
AC	31m NW	Unspecified Ground Workings	1938	1094353
Y	32m NW	Unspecified Heap	1938	1066299
O	32m NE	Unspecified Disused Pit	1948	1085717
AC	32m NW	Ground Workings and Refuse Heap	1915	1007277
AC	33m NW	Disused Pits	1921	1004672
AC	34m NW	Unspecified Disused Tip	1979	1111837



ID	Location	Land use	Dates present	Group ID
AC	34m NW	Unspecified Disused Tip	1988	1126772
8	34m NE	Unspecified Heap	1922 - 1938	1076026
Y	34m NW	Unspecified Heap	1915 - 1921	1127734
AD	34m NE	Railway Land	1922	1119885
Y	35m NW	Unspecified Heap	1948	1037887
AC	35m W	Unspecified Pit	1948	1028173
Y	36m NW	Unspecified Heap	1922	1129206
Y	36m NW	Unspecified Heap	1965	1120786
AC	36m NW	Refuse Heap	1922	1127337
AC	37m W	Unspecified Disused Pits	1922	1141697
AE	38m S	Disused Quarries and Tips	1979	1003946
AC	39m NW	Unspecified Heap	1964 - 1969	1101936
Q	40m W	Shale Tip	1922	1040516
Q	40m W	Shale Tip	1915	1071795
AF	41m E	Old Ironstone Level	1922	1096717
AF	41m E	Old Ironstone Level	1922	1154402
O	42m NE	Unspecified Disused Pit	1903	1125751
O	42m NE	Unspecified Disused Pit	1901	1087565
AE	43m S	Unspecified Ground Workings	1875	1139496
Y	44m NW	Unspecified Disused Tips	1988	1040232
Y	44m NW	Unspecified Disused Tips	1979	1056217
AG	47m NW	Old Coal Level	1915	1081065
AG	47m NW	Old Coal Level	1922	1132309
AG	47m NW	Unspecified Pit	1938	1144734
AG	48m NW	Old Coal Level	1948	1065571
AH	48m NE	Unspecified Pit	1875	1028169
AI	49m NE	Unspecified Heap	1938	1083279
AI	52m NE	Unspecified Heap	1915 - 1921	1067261



ID	Location	Land use	Dates present	Group ID
B	53m NE	Unspecified Ground Workings	1948	1132095
AI	53m NE	Unspecified Heap	1901	1151616
R	54m NW	Unspecified Ground Workings	1948	1126624
AI	54m NE	Unspecified Heap	1948	1061273
AI	54m NE	Unspecified Ground Workings	1922	1044044
AI	54m NE	Unspecified Ground Workings	1922	1153151
R	55m NW	Unspecified Ground Workings	1915	1142082
R	55m NW	Unspecified Ground Workings	1922 - 1938	1058669
AG	56m NW	Old Coal Level	1921	1137867
R	56m NW	Unspecified Ground Workings	1921	1136591
9	57m NW	Old Coal Level	1938	1091862
K	58m S	Railway Building	1948	1013038
B	58m NE	Unspecified Heaps	1922	1111091
AI	60m NE	Unspecified Pit	1964 - 1969	1147188
10	60m S	Tramway Sidings	1922 - 1948	1085211
O	64m NE	Unspecified Ground Workings	1965	996768
AH	65m NE	Railway Sidings	1875	1065269
AJ	66m W	Unspecified Disused Tip	1979	1059535
AK	67m W	Unspecified Old Quarries	1901 - 1903	1040580
R	67m NW	Unspecified Ground Workings	1965	1065459
AK	68m W	Old Quarries	1921	1018526
AH	68m NE	Unspecified Disused Tip	1976 - 1992	1040689
AK	69m W	Unspecified Disused Tip	1988	1112440
AK	70m W	Unspecified Old Quarries	1922	1103298
B	70m NE	Unspecified Heap	1964 - 1968	1082234
B	71m NE	Unspecified Ground Workings	1901	1083335
AK	71m W	Unspecified Old Quarries	1915	1110999
Y	71m NW	Unspecified Heap	1875	1099619



ID	Location	Land use	Dates present	Group ID
11	71m SW	Unspecified Disused Workings	1988	1032164
X	72m W	Refuse Heap	1915	1053952
AH	72m NE	Unspecified Heap	1915	1130160
AJ	73m W	Unspecified Old Quarries	1948	1098491
AK	73m W	Unspecified Old Quarries	1938	1063618
AH	73m NE	Unspecified Heap	1965	1115229
Y	74m NW	Coal Level	1901	1007515
AE	74m S	Unspecified Heap	1964 - 1969	1104636
AH	74m NE	Unspecified Heap	1948	1045692
AH	75m NE	Unspecified Heap	1922	1055353
Y	75m NW	Old Coal Drift	1921	1008426
AH	75m NE	Unspecified Heap	1921	1122578
AE	75m S	Unspecified Ground Workings	1922 - 1948	1138979
AE	76m S	Unspecified Ground Workings	1922	1126823
R	78m NW	Cuttings	1948	1131895
R	78m NW	Cuttings	1922	1134767
AK	78m W	Unspecified Ground Workings	1875	1065712
AE	79m S	Unspecified Heap	1988	1000286
AE	79m S	Unspecified Ground Workings	1901	1050638
R	82m NW	Cuttings	1921	1149278
U	82m NW	Railway Sidings	1901	1151632
AC	82m NW	Coal Level	1922 - 1938	1140192
AC	83m NW	Coal Level	1915 - 1921	1062391
AC	85m NW	Old Coal Level	1948	1032273
AK	85m NW	Unspecified Old Quarries	1948	1081609
AL	89m E	Unspecified Ground Workings	1922	1115558
AL	89m E	Unspecified Ground Workings	1921	1043796
Z	89m NW	Railway Sidings	1922	1042019



ID	Location	Land use	Dates present	Group ID
Z	89m NW	Railway Sidings	1922	1134725
12	91m NW	Railway Sidings	1915	1040352
AL	91m E	Unspecified Pit	1938	1080102
AL	91m E	Unspecified Pit	1948	1142608
AL	91m E	Unspecified Ground Workings	1915	1135175
AK	92m NW	Unspecified Ground Workings	1964	1060290
AK	92m NW	Unspecified Ground Workings	1969	1131396
AE	93m S	Unspecified Disused Tip	1979	1005156
R	94m NW	Cuttings	1875	1036589
I	94m S	Railway Sidings	1901	1117518
R	94m NW	Cuttings	1915	1128831
R	98m NW	Unspecified Ground Workings	1922	1044131
R	98m NW	Unspecified Ground Workings	1922	1102942
Z	100m NW	Railway Sidings	1901	1107057
AE	100m S	Unspecified Heap	1969	1000285
AE	100m S	Unspecified Heaps	1964	1021419
Q	102m S	Railway Sidings	1903	1066071
13	103m NW	Unspecified Heap	1965	1000216
Y	103m NW	Old Coal Drift	1915	1140554
Y	103m NW	Old Coal Drift	1938 - 1948	1036251
Y	104m NW	Old Coal Drift	1922	1093659
AM	105m SE	Unspecified Ground Workings	1968	1135647
Q	105m W	Railway Sidings	1901	1072484
Z	106m NW	Railway Sidings	1901	1114666
AM	107m SE	Unspecified Ground Workings	1964	1122173
14	111m NE	Disused Canal	1938 - 1948	1106578
AN	111m NE	Old Canal	1901	1004655
AE	111m S	Unspecified Heap	1969	1000284



ID	Location	Land use	Dates present	Group ID
AN	112m NE	Disused Canal	1915 - 1921	1054695
AM	113m SE	Unspecified Ground Workings	1901	1065867
AM	113m SE	Unspecified Heap	1964	1000287
AE	114m S	Unspecified Ground Workings	1901	1058430
AO	115m S	Unspecified Disused Tip	1979	1128391
AH	115m NE	Cuttings	1901	994293
I	116m SW	Unspecified Pit	1875	1103078
AP	117m SW	Old Ironstone Levels	1903	1084636
AP	119m SW	Unspecified Ground Workings	1921	1103864
AP	119m SW	Old Ironstone Levels	1922	1034946
AP	121m SW	Unspecified Disused Tip	1979	1005169
AE	122m S	Unspecified Pit	1964 - 1969	1040296
AP	122m SW	Old Ironstone Levels	1948	1151111
AP	123m SW	Unspecified Ground Workings	1969	1065270
AP	123m SW	Unspecified Heap	1964	1149090
AP	123m W	Unspecified Ground Workings	1921	1113494
Q	124m W	Refuse Heap	1915	1139052
M	125m NW	Unspecified Ground Workings	1965	1039498
AP	125m SW	Unspecified Heap	1901	1084889
15	126m W	Unspecified Old Quarries	1903	1077391
AP	127m W	Unspecified Old Quarries	1948	1100275
16	129m S	Railway Sidings	1948	1063682
AO	130m W	Unspecified Heaps	1948	1021418
Z	131m N	Unspecified Disused Pit	1922 - 1938	1097315
Z	131m N	Unspecified Disused Pit	1915	1119918
Z	131m N	Disused Pit	1921	993633
AQ	132m NE	Unspecified Pit	1976 - 1992	1094811
AR	132m NW	Unspecified Disused Tips	1976 - 1992	1046508



ID	Location	Land use	Dates present	Group ID
I	132m SW	Unspecified Disused Mine	1969 - 1979	1093159
AK	134m W	Unspecified Disused Quarries	1988	1100628
AK	134m W	Unspecified Disused Quarries	1979	1124891
I	135m SW	Railway Sidings	1875	1047572
AM	137m SE	Unspecified Heap	1948	1086810
AP	137m W	Unspecified Ground Workings	1875	1068136
AE	138m S	Unspecified Ground Workings	1901	1118673
AS	139m NW	Unspecified Heap	1965	1072408
AS	140m NW	Unspecified Ground Workings	1875	996783
17	140m NE	Unspecified Heap	1875	1000221
AR	141m NW	Unspecified Heap	1965	1000222
AS	141m NW	Unspecified Heap	1938 - 1948	1136495
AM	142m SE	Unspecified Heap	1922	1120722
AT	142m SW	Unspecified Pit	1922	1037093
U	142m NW	Railway Building	1901	1013436
AS	143m NW	Unspecified Heap	1915	1068686
AS	144m NW	Unspecified Heap	1922	1117869
Z	145m NW	Railway Sidings	1922	1063208
AS	148m NW	Unspecified Heap	1901	1104246
AU	150m SE	Unspecified Ground Workings	1968	1082735
AK	150m W	Unspecified Old Quarries	1948	1048051
AS	151m NW	Unspecified Heap	1921	1128542
I	153m SW	Unspecified Pit	1964	1130368
Z	153m N	Unspecified Ground Workings	1915	996769
AP	154m W	Unspecified Pit	1964 - 1969	1061112
AE	155m S	Unspecified Ground Workings	1901	1152630
AP	155m W	Unspecified Pit	1901 - 1903	1056835
AV	159m S	Rifle Range	1875	1039179



ID	Location	Land use	Dates present	Group ID
AM	160m SE	Coal Level	1922	1131272
AP	160m SW	Unspecified Pit	1875	1028181
18	161m S	Railway Sidings	1948	993782
Z	162m N	Engine House	1938	1019155
AM	162m SE	Unspecified Ground Workings	1901	996797
AT	163m SW	Railway Building	1901	1041388
AT	163m SW	Railway Building	1948	1068694
AS	164m NW	Coal Level	1903	1007516
AM	168m SE	Unspecified Heap	1964 - 1968	1099556
AE	168m S	Old Coal Shaft	1901	992175
AQ	173m NE	Railway Sidings	1921	1058826
AE	175m S	Old Coal Shaft	1922	992178
AU	176m E	Unspecified Ground Workings	1875	1130993
AE	178m S	Unspecified Ground Workings	1901	1143343
Z	180m NW	Refuse Heap	1938	1143827
AU	181m E	Railway Sidings	1901 - 1922	1059733
AW	181m E	Disused Canal	1922	1052971
19	184m N	Railway Sidings	1922	1095622
AX	184m NE	Unspecified Tip	1875	1018882
AY	188m SW	Railway Sidings	1875	993777
AY	188m SW	Ironstone Levels	1875	1003934
AZ	191m NE	Railway Sidings	1875	1048921
20	193m NW	Cuttings	1922	1082656
AU	194m SE	Tramway Sidings	1901	1014625
BA	194m NW	Unspecified Disused Tip	1992	1005167
21	194m SW	Unspecified Heap	1948 - 1964	1097666
BB	194m E	Disused Canal	1948	1153257
Z	194m N	Engine House	1875	1113222



ID	Location	Land use	Dates present	Group ID
I	195m SW	Railway Buildings	1901	1024166
Z	196m N	Engine House	1921	1035910
BA	196m NW	Unspecified Heaps	1965	1021409
AR	197m NW	Railway Building	1938	1013435
Z	197m N	Engine House	1915	1078427
Z	198m N	Engine House	1922	1086032
Z	198m N	Engine House	1922	1133708
BB	200m E	Disused Canal	1922	1090618
BC	200m SW	Cuttings	1988	1095043
BC	200m SW	Cuttings	1979	1103781
BD	201m NW	Unspecified Heap	1922	1088409
BD	201m NW	Unspecified Ground Workings	1938	1081565
AQ	201m NE	Unspecified Ground Workings	1975	1119321
AQ	201m NE	Unspecified Ground Workings	1982 - 1992	1139042
BD	201m NW	Old Coal Level	1948	1032265
BD	201m NW	Unspecified Heap	1875 - 1965	1080952
BD	202m NW	Unspecified Heap	1915	1050608
Z	203m N	Engine House	1901	1087326
BD	204m NW	Unspecified Pit	1875	1054426
AU	204m SE	Engine House	1875	1019123
AW	204m E	Disused Canal	1988	1063494
BD	205m NW	Unspecified Pit	1922	1044504
BD	205m NW	Unspecified Pit	1948	1079651
BD	206m NW	Unspecified Pit	1915	1094449
I	208m SW	Chimney	1964 - 1969	1137776
Z	209m N	Unspecified Heap	1938	1108220
AS	209m NW	Coal Level	1938	1074359
BC	209m SW	Cuttings	1922	1088116



ID	Location	Land use	Dates present	Group ID
BD	211m NW	Unspecified Heap	1921	1112171
AS	211m NW	Coal Level	1915	1111760
AS	212m NW	Coal Level	1922	1131959
BD	212m NW	Unspecified Pit	1921	1053826
22	213m SW	Cuttings	1964 - 1969	1111484
AU	214m SE	Tramway Sidings	1901	1014624
BE	216m NW	Unspecified Old Quarries	1901	1134536
AU	216m SE	Old Air Shaft	1922	1003774
Z	217m N	Engine House	1948	1130716
Z	217m N	Engine House	1903	1156822
AS	217m NW	Coal Level	1921	1108286
AU	220m E	Unspecified Heap	1875	1000288
BC	222m SW	Cuttings	1948	1035629
AE	229m S	Unspecified Heap	1875	1000283
BE	231m NW	Unspecified Old Quarries	1903	1111338
AE	231m S	Unspecified Disused Shaft	1964 - 1969	1136891
Z	232m N	Unspecified Heap	1915 - 1921	1132319
AE	232m S	Unspecified Disused Shaft	1988	1046067
AE	232m S	Unspecified Disused Shaft	1979	1090658
AY	233m SW	Old Ironstone Levels	1901 - 1903	1109356
Z	234m N	Unspecified Heap	1922 - 1938	1136604
Z	235m N	Unspecified Heap	1948	1044314
BC	235m SW	Cuttings	1875	1081927
BF	238m S	Unspecified Disused Tip	1979	1005159
BF	238m S	Unspecified Heap	1964 - 1969	1136105
BG	238m NW	Unspecified Disused Tips	1976 - 1992	1136357
BF	239m S	Unspecified Heap	1948	1131796
BG	239m NW	Unspecified Heap	1965	1110299



ID	Location	Land use	Dates present	Group ID
23	240m NW	Refuse Heap	1965	1019511
AY	243m SW	Old Ironstone Levels	1922	1052229
AY	244m SW	Unspecified Ground Workings	1915 - 1921	1082491
I	244m SW	Railway Building	1901	1013033
AY	246m SW	Old Ironstone Levels	1948	1083931
AY	247m SW	Old Ironstone Levels	1938	1129491
BG	248m NW	Refuse Heap	1922	1058889
BH	251m E	Unspecified Factory	1988	1078765
BA	253m NW	Unspecified Old Quarries	1903	1147692
AY	255m SW	Unspecified Ground Workings	1964 - 1969	1119255
AV	257m SW	Rifle Range	1901	1100764
AQ	257m NE	Unspecified Pit	1875	1139609
AQ	259m NE	Unspecified Pit	1901	1067163
I	259m SW	Railway Building	1901	1013032
BI	262m SW	Unspecified Pit	1901	1148515
AU	265m SE	Engine House	1875	1089555
AU	266m SE	Engine House	1922	1095387
BI	267m SW	Unspecified Pit	1948	1082099
24	280m SW	Unspecified Drift	1948	1081583
BJ	281m S	Unspecified Disused Tips	1988	1048289
BJ	281m S	Unspecified Disused Tips	1979	1093910
BK	284m NW	Unspecified Heap	1965	1046818
AY	284m SW	Old Ironstone Level	1915	1007776
BJ	285m S	Unspecified Old Quarries	1901	1112653
BJ	285m S	Unspecified Old Quarries	1948	1131664
AY	285m SW	Old Ironstone Levels	1921	1147256
25	286m E	Unspecified Factory	1988	1153714
BL	289m N	Railway Sidings	1875	1093098



ID	Location	Land use	Dates present	Group ID
BJ	289m S	Unspecified Ground Workings	1875	996795
BJ	290m S	Unspecified Old Quarries	1922	1153887
BM	291m N	Unspecified Heap	1921	1062975
AY	291m SW	Unspecified Disused Levels	1988	1004157
AY	291m SW	Unspecified Disused Level	1979	1046608
BG	293m NW	Unspecified Heap	1915	1062222
AD	293m N	Unspecified Pit	1965	1146355
AQ	293m NE	Junction Station	1901	1008289
BM	294m N	Unspecified Heap	1976 - 1992	1109320
AD	294m N	Unspecified Pit	1976	1090058
BM	295m N	Unspecified Heap	1915	1090795
BN	295m NE	Railway Sidings	1938	1043509
BM	296m N	Unspecified Heap	1965	1124933
BM	296m N	Unspecified Heap	1948	1085977
AY	296m SW	Unspecified Disused Level	1964 - 1969	1120513
BG	296m NW	Unspecified Heap	1948	1046170
26	297m SW	Unspecified Drift	1922	1140009
AY	297m SW	Old Ironstone Levels	1921	1048441
27	298m N	Railway Sidings	1901	1070631
BL	298m N	Disused Iron Works	1901	1090362
I	299m SW	Unspecified Ground Workings	1901	996787
AD	301m N	Refuse Heap	1901	1019510
BC	301m S	Cuttings	1964 - 1969	1076118
BM	301m N	Unspecified Pit	1915 - 1921	1152815
AQ	301m NE	Unspecified Heap	1948	1000218
BO	302m E	Unspecified Ground Workings	1915 - 1921	1132624
BM	303m N	Unspecified Pit	1938	1126058
BO	303m NE	Unspecified Ground Workings	1922	1041286



ID	Location	Land use	Dates present	Group ID
BO	303m E	Unspecified Heap	1903	1153316
BO	303m E	Unspecified Ground Workings	1938	1112327
I	304m SW	Unspecified Heap	1948	1000281
BO	304m NE	Unspecified Heap	1901	1146659
BO	304m E	Unspecified Ground Workings	1875	1095216
BM	305m N	Unspecified Pit	1948	1109773
BM	305m N	Unspecified Pit	1922	1109130
BK	306m NW	Refuse Heap	1915	1100241
28	306m NW	Railway Sidings	1875	993897
BH	309m E	Unspecified Factory	1964 - 1968	1140854
BK	309m NW	Refuse Heap	1922	1143927
BP	311m NW	Unspecified Old Quarries	1948	1035931
BP	311m NW	Unspecified Ground Workings	1965	1130283
BP	313m NW	Unspecified Ground Workings	1875	1122860
BM	316m N	Old Coal Level	1921	1032285
BK	316m NW	Old Canal	1901	1004657
BL	318m N	Old Gas Works	1948	1019102
BL	319m N	Railway Sidings	1901	1155827
BQ	321m E	Unspecified Ground Workings	1921	1101754
BK	324m NW	Railway Sidings	1922	1045216
BK	324m NW	Railway Sidings	1922	1098531
29	324m N	Unspecified Ground Workings	1901	996773
AD	324m N	Unspecified Pit	1921	1108590
AD	324m N	Old Coal Level	1938 - 1948	1093562
AV	324m SW	Unspecified Disused Mine	1964	1007736
AD	326m N	Old Coal Level	1915	1099019
AD	326m N	Old Coal Level	1922	1101742
BC	329m S	Cuttings	1901	1059841



ID	Location	Land use	Dates present	Group ID
BQ	331m E	Unspecified Heap	1922	1063078
BQ	331m E	Unspecified Heap	1922	1115001
BR	332m S	Unspecified Disused Tip	1979	1005157
BR	332m S	Refuse Heap	1964 - 1969	1101578
BJ	335m S	Unspecified Pit	1964 - 1969	1034867
BS	336m SW	Tunnel	1964 - 1969	1144393
BP	337m NW	Unspecified Old Quarries	1903	1044064
BT	339m SE	Unspecified Ground Workings	1875	996798
BQ	340m E	Disused Wire Works	1903	1022160
BQ	342m E	Wire Works	1901	993624
BS	343m S	Tunnel	1922	1098464
BS	344m SW	Tunnel	1948	1127139
BS	344m SW	Tunnel	1901	1131291
AQ	344m NE	Unspecified Ground Workings	1948	1151511
BK	345m NW	Coal Level	1901	1007523
AZ	345m NE	Railway Station	1903	1016056
BJ	345m S	Unspecified Disused Tips	1979	1052273
BJ	345m S	Unspecified Disused Tips	1988	1077460
BQ	345m NE	Gas Works	1938	1148777
BQ	346m NE	Unspecified Works	1964 - 1968	1119117
BS	346m SW	Tunnel	1875 - 1878	1126136
BQ	346m NE	Gas Works	1921 - 1922	1088206
BQ	347m NE	Gas Works	1915	1078041
31	352m NW	Cuttings	1915	1039895
32	353m NW	Cuttings	1875	1110154
BT	354m SE	Unspecified Pit	1922	1091995
BU	354m SE	Old Coal Shaft	1948	992171
BR	354m S	Unspecified Old Quarries	1948	1057882



ID	Location	Land use	Dates present	Group ID
BV	355m E	Railway Sidings	1922	1035040
BV	355m E	Railway Sidings	1922	1128475
BK	356m NW	Unspecified Heap	1903	1070229
BR	359m S	Unspecified Old Quarries	1901 - 1922	1066553
BK	359m NW	Coal Level	1903	1152492
BW	359m E	Unspecified Factory	1988	1049427
BQ	360m E	Dairy	1982	1131358
BV	360m E	Railway Sidings	1915	1109620
33	363m SE	Mineral Railway Sidings	1901	1024460
BQ	363m E	Unspecified Depot	1992	1012586
BX	363m NW	Unspecified Ground Workings	1938	1118153
BR	364m S	Unspecified Ground Workings	1875	996799
BY	364m SE	Old Dock	1948	1138051
BY	365m SE	Railway Sidings	1875	993783
BT	365m SE	Old Coal Shaft	1922	992174
BZ	366m E	Unspecified Ground Workings	1938	1056607
BZ	366m E	Unspecified Ground Workings	1938	1147908
BV	367m E	Railway Sidings	1901	1041212
CA	369m S	Unspecified Disused Tip	1979	1005151
BK	369m NW	Coal Drift	1922	1108079
CA	369m S	Coal Level	1948	1007492
BY	370m SE	Old Dock	1922	1044153
BZ	370m E	Unspecified Ground Workings	1922	1035343
BZ	370m E	Unspecified Ground Workings	1922	1097065
BZ	370m E	Ground Workings and Refuse Heap	1915 - 1921	1115187
BZ	370m E	Unspecified Heap	1968	1118423
BZ	370m E	Unspecified Heap	1964	1147021
BQ	371m E	Unspecified Tank	1921	1045928



ID	Location	Land use	Dates present	Group ID
BQ	374m E	Unspecified Tank	1922 - 1948	1139757
CA	375m S	Old Coal Level	1922	1083728
BQ	375m E	Railway Sidings	1922	1077814
BQ	375m E	Railway Sidings	1922	1118808
BQ	376m E	Unspecified Tank	1915	1057447
BL	377m N	Railway Sidings	1922	1041084
BO	377m E	Unspecified Pit	1948	1028168
BK	378m NW	Coal Drift	1938	1143307
BX	378m NW	Unspecified Disused Tips	1976 - 1992	1098142
BX	381m NW	Coal Level	1922 - 1938	1046970
BX	381m NW	Coal Level	1915	1134575
BX	385m NW	Coal Level	1921	1058037
BU	387m SE	Unspecified Heap	1948	1000292
BK	388m NW	Unspecified Disused Drift	1976 - 1992	1049432
BK	388m NW	Coal Drift	1915 - 1921	1097136
CB	392m SE	Railway Sidings	1901	1085460
BQ	393m E	Railway Sidings	1901	1111455
BK	394m NW	Coal Drift	1921	1027756
BX	396m NW	Unspecified Heaps	1965	1021407
34	397m S	Refuse Heap	1948	1118243
BR	397m S	Unspecified Pit	1964 - 1969	1089999
BQ	400m E	Dairy	1975	1124568
CC	401m E	Unspecified Heaps	1948	1021417
35	401m NW	Railway Sidings	1901	1143836
BQ	401m E	Railway Sidings	1921	1112415
BX	402m NW	Unspecified Disused Tips	1976 - 1992	1136218
BK	405m NW	Coal Drift	1922 - 1938	1135105
BK	406m NW	Coal Drift	1915	1050984



ID	Location	Land use	Dates present	Group ID
BY	406m SE	Dock	1875	1012556
BK	407m NW	Old Coal Drift	1948	1008429
BQ	407m E	Railway Sidings	1915	1051677
BX	409m NW	Unspecified Ground Workings	1901 - 1922	1069062
BU	409m SE	Old Air Shafts	1922	1010434
BK	410m NW	Coal Drift	1922	1071505
BX	411m NW	Unspecified Ground Workings	1948 - 1965	1075296
BX	411m NW	Unspecified Ground Workings	1875	1078234
BX	415m NW	Unspecified Ground Workings	1875	1095924
36	417m NW	Disused Air Shaft	1976 - 1992	1106969
CB	417m SE	Railway Sidings	1922	1114202
CC	418m E	Unspecified Heap	1922	1097034
CC	418m E	Unspecified Heap	1922	1152798
BX	418m NW	Unspecified Heap	1915 - 1921	1057452
BX	420m NW	Coal Level	1948	1007527
BK	420m NW	Disused Coal Drift	1948	1003944
CD	420m E	Unspecified Ground Workings	1901	1110573
CE	421m S	Unspecified Old Quarry	1922 - 1948	1117856
CD	422m E	Unspecified Heap	1903	1060640
CE	423m S	Unspecified Ground Workings	1964 - 1969	1064131
BK	425m NW	Old Coal Level	1948	1079051
CF	427m E	Unspecified Ground Workings	1875	1118814
37	428m N	Engine House	1875	1019153
CG	429m SW	Unspecified Disused Tip	1979	1005168
CG	429m SW	Unspecified Heap	1948	1123369
AX	429m NE	Railway Sidings	1901	1125503
BN	431m NE	Railway Sidings	1901	1138033
CE	432m S	Unspecified Old Quarry	1901	1042250



ID	Location	Land use	Dates present	Group ID
CG	433m SW	Unspecified Heap	1964	1107388
CG	434m SW	Unspecified Heap	1922	1042424
38	435m NW	Unspecified Pit	1875	1028180
CH	435m NE	Railway Sidings	1901	1072885
BN	439m NE	Railway Sidings	1922	1072560
BN	439m NE	Railway Sidings	1922	1122715
CE	439m S	Unspecified Heap	1875	1000282
CI	439m NE	Railway Sidings	1915	1149378
CJ	440m SE	Unspecified Pit	1948	1028158
CJ	442m SE	Unspecified Ground Workings	1875	1142951
CE	444m S	Unspecified Pit	1988	1054105
CE	444m S	Unspecified Pit	1979	1069966
CJ	444m SE	Unspecified Old Quarry	1922	1022758
CK	445m E	Railway Sidings	1901	1077181
39	445m SW	Unspecified Mill	1948	1006426
CD	447m E	Unspecified Heap	1901	1113406
40	448m NE	Railway Sidings	1921	1058827
41	449m S	Refuse Heap	1964 - 1968	1034438
CI	449m NE	Railway Sidings	1965	1035791
CL	449m W	Unspecified Old Quarry	1903 - 1915	1055916
BQ	450m E	Unspecified Tank	1921	1016568
CJ	450m SE	Old Coal Shaft	1948	992173
CI	451m NE	Unspecified Commercial/Industrial	1948	1045433
CI	452m NE	Unspecified Commercial/Industrial	1903 - 1915	1059225
BK	452m NW	Old Canal	1903	1004656
BK	452m NW	Coal Level	1938	1101472
BX	453m NW	Coal Level	1922 - 1938	1071146
BX	453m NW	Coal Level	1915	1038014



ID	Location	Land use	Dates present	Group ID
CH	453m NE	Railway Sidings	1922	1089749
CH	453m NE	Railway Sidings	1922	1090053
BQ	453m E	Gas Holder Station	1988	1006107
CJ	453m SE	Unspecified Ground Workings	1948	1095474
CL	454m W	Unspecified Old Quarry	1922	1096307
CL	455m W	Unspecified Pit	1988	1084815
CL	455m W	Unspecified Pit	1964 - 1969	1151823
CJ	455m SE	Old Air Shafts	1922	1010436
BQ	455m E	Unspecified Tanks	1964 - 1988	1148631
BQ	456m E	Gasometer	1922	1141690
CJ	456m SE	Unspecified Pit	1901	1028162
BQ	456m E	Unspecified Tank	1921	1016566
BQ	456m E	Unspecified Tank	1938	1121910
CL	456m W	Unspecified Old Quarry	1901	1093831
CL	456m W	Old Quarry	1921	1007869
CL	457m W	Unspecified Old Quarry	1938 - 1948	1132836
BQ	458m E	Gasometer	1922	1120778
CM	458m E	Cuttings	1938 - 1948	1130408
BX	458m NW	Coal Level	1921	1045462
BQ	458m E	Unspecified Tank	1915	1118158
BK	458m NW	Coal Level	1915	1128399
BQ	458m E	Gasometers	1938	1142083
BQ	458m E	Gasometers	1915 - 1921	1073226
CI	459m NE	Unspecified Commercial/Industrial	1938	1148530
BQ	459m E	Unspecified Tanks	1948	1009924
BQ	460m E	Unspecified Tanks	1948	1091755
BK	460m NW	Coal Level	1921	1155474
CK	460m E	Railway Sidings	1965	1033994



ID	Location	Land use	Dates present	Group ID
BK	462m NW	Coal Level	1922	1042457
BK	462m NW	Coal Level	1922	1060736
42	462m E	Cuttings	1948	994288
BW	469m E	Engine Houses	1901	1023913
CI	469m NE	Railway Sidings	1875	1137826
CM	469m E	Unspecified Ground Workings	1901	1077068
CC	470m E	Unspecified Heap	1901	1047935
CC	470m E	Unspecified Heap	1948	1102635
BQ	470m E	Unspecified Tank	1921	1128118
43	471m NW	Old Coal Level	1922 - 1938	1064811
BQ	471m E	Gasometer	1922	1074178
CN	471m NW	Coal Level	1875	1007528
BQ	471m E	Unspecified Tank	1938	1102073
44	471m NW	Unspecified Ground Workings	1965	1144166
CN	472m NW	Unspecified Ground Workings	1915	1117363
CF	472m NE	Unspecified Heap	1901	1065056
CN	472m NW	Unspecified Disused Tips	1976 - 1992	1091464
BQ	472m E	Gasometer	1915	1057691
CN	473m NW	Unspecified Ground Workings	1921 - 1938	1113763
BQ	473m E	Gasometer	1922	1137843
CO	475m E	Unspecified Heaps	1922	1050184
CI	477m NE	Railway Sidings	1921 - 1922	1058825
45	477m E	Unspecified Heaps	1964 - 1968	1122836
CN	481m NW	Unspecified Heap	1901 - 1903	1058989
CN	482m NW	Unspecified Ground Workings	1948	1136970
CP	484m SW	Unspecified Pit	1948	1085235
CI	484m NE	Unspecified Commercial/Industrial	1922	1069815
CP	484m SW	Unspecified Pit	1875	1095624



ID	Location	Land use	Dates present	Group ID
CQ	484m N	Old Gas Works	1915 - 1921	1060355
CI	485m NE	Railway Sidings	1901	1153434
CK	486m E	Railway Sidings	1901	1118353
CQ	486m NE	Gas Works	1938	1105116
CQ	486m N	Unspecified Commercial/Industrial	1915	1128473
CQ	486m N	Gas Works	1875	1128486
CO	487m E	Unspecified Heap	1948	1121737
BX	487m NW	Unspecified Heap	1875	1000206
CK	487m E	Railway Sidings	1915	1108636
CP	488m SW	Cuttings	1922	1141938
CQ	488m NE	Gas Works	1922	1055592
CM	488m E	Unspecified Ground Workings	1903	1126850
CF	489m NE	Cuttings	1938 - 1948	1156503
CP	491m SW	Cuttings	1964	1144229
CP	491m SW	Unspecified Pit	1969 - 1979	1157092
46	492m NW	Old Coal Level	1948	1154190
BW	493m E	Unspecified Old Shaft	1948	1064643
CQ	494m N	Unspecified Commercial/Industrial	1901	1116591
BW	497m E	Unspecified Old Shaft	1922	1041001
CJ	497m SE	Unspecified Heap	1948	1000289
47	499m NE	Railway Building	1901	1013440

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

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Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.



Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
Z	216m N	Unspecified Tank	1875	149702
V	272m NW	Unspecified Tank	1875	149710
30	334m NE	Unspecified Tank	1998	149666
BQ	342m NE	Gas Works	1919	158867
BQ	344m NE	Gas Works	1971	162383
BQ	345m NE	Gas Holder Station	1984	167846
BQ	371m E	Unspecified Tank	1919	149694
BQ	438m NE	Gas Works	1979	158805
CD	446m E	Unspecified Tank	1988 - 1992	165740
BQ	450m E	Gas Works	1984	166108
BQ	450m E	Gas Holder Station	1988 - 1992	167258
BQ	453m E	Gasometers	1919	168337
BQ	453m E	Gas Holder Station	1998	158552
BQ	454m E	Unspecified Tank	1919	149674
BQ	456m E	Unspecified Tank	1962	149675
BQ	456m E	Gasometer	1971	155801
BQ	456m E	Gas Holder	1984 - 1998	160835
BQ	459m E	Gasholders	1988 - 1992	158129
BQ	459m E	Tanks	1979	156234
BQ	459m E	Gasometers	1979 - 1984	166420
BQ	467m E	Gasometer	1919	155800
BQ	471m E	Unspecified Tank	1962	149676
BQ	471m E	Gasometer	1971	155799
BQ	471m E	Gas Holder	1984 - 1998	168061
BY	482m SE	Tanks	1984 - 1992	162846
BY	484m SE	Tanks	1998	161436
BY	484m SE	Tanks	1984	163886

ID	Location	Land use	Dates present	Group ID
CQ	495m N	Gas Works	1875 - 1900	166709

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	19
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Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
BQ	342m NE	Gas Works	1919	93005
BQ	344m NE	Gas Works	1971 - 1979	96102
BQ	345m NE	Gas Holder Station	1984	89850
BQ	363m E	Electricity Substation	1979 - 1984	91168
BQ	379m E	Electricity Substation	1984	85723
BQ	398m NE	Electricity Substation	1979 - 1984	94037
BQ	400m NE	Electricity Transformer	1971	87769
BQ	450m E	Gas Holder Station	1988 - 1998	91307
BQ	450m E	Gas Works	1984	95338
BQ	453m E	Gasometers	1919	91846
BQ	456m E	Gasometer	1971	87296
BQ	456m E	Gas Holder	1984 - 1998	89492
BQ	459m E	Gasholders	1988 - 1992	90201
BQ	459m E	Gasometers	1979 - 1984	94333
BQ	467m E	Gasometer	1919	87295
BQ	471m E	Gasometer	1971	87294
BQ	471m E	Gas Holder	1984 - 1998	95078



ID	Location	Land use	Dates present	Group ID
CQ	488m NE	Old Gas Works	1919	87504
CQ	495m N	Gas Works	1875 - 1900	91219

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m

0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

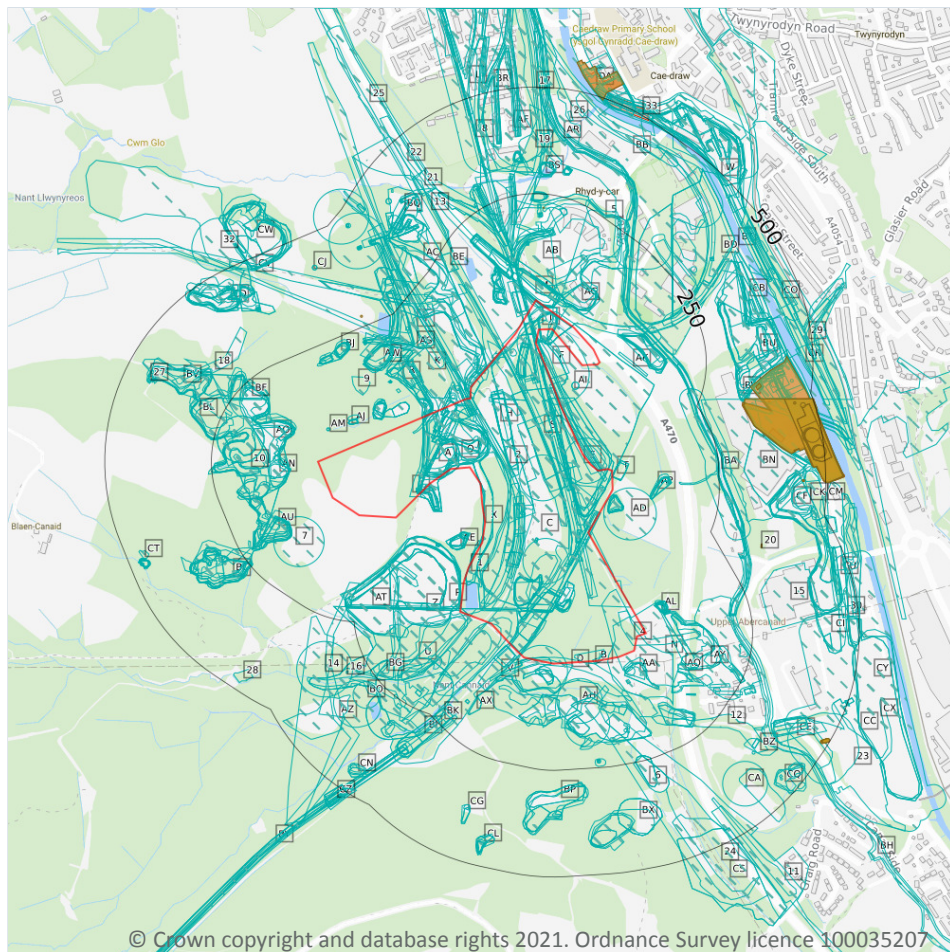
0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.



2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features

2.1 Historical industrial land uses

Records within 500m

1022

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 45**

ID	Location	Land Use	Date	Group ID
1	On site	Unspecified Disused Pit	1903	1015558
2	On site	Unspecified Pit	1979	1028172
3	On site	Railway Sidings	1875	1033899



ID	Location	Land Use	Date	Group ID
4	On site	Railway Sidings	1875	993781
A	On site	Unspecified Heap	1901	1090330
A	On site	Railway Sidings	1901	1152497
A	On site	Unspecified Disused Tip	1979	1044490
A	On site	Cuttings	1948	1076637
A	On site	Cuttings	1903	1104895
A	On site	Cuttings	1969	1034745
A	On site	Cuttings	1964	1034745
A	On site	Unspecified Heap	1921	1043908
A	On site	Refuse Heap	1921	1019513
A	On site	Drift	1921	1012105
A	On site	Coal Drift	1915	1044959
A	On site	Ground Workings and Refuse Heap	1915	1007275
A	On site	Cuttings	1915	1104895
A	On site	Cuttings	1965	1101787
A	On site	Coal Drift	1922	1085212
A	On site	Coal Drift	1922	1085212
A	On site	Tramway Sidings	1948	1128517
A	On site	Old Coal Drift	1948	1008428
A	On site	Unspecified Heap	1903	1042212
A	On site	Unspecified Disused Tips	1988	1064203
A	On site	Unspecified Disused Tip	1988	1046840
A	On site	Unspecified Disused Tips	1979	1122640
A	On site	Unspecified Heap	1969	1049359
A	On site	Unspecified Heaps	1969	1072298
A	On site	Unspecified Heaps	1964	1072298
A	On site	Unspecified Heap	1964	1049359
A	On site	Unspecified Heap	1875	1052252



ID	Location	Land Use	Date	Group ID
A	On site	Unspecified Heap	1875	1137363
A	On site	Unspecified Heap	1875	1000278
A	On site	Unspecified Pit	1875	1028174
A	On site	Coal Drift	1938	1085212
A	On site	Unspecified Ground Workings	1938	1039188
A	On site	Coal Drift	1938	1085212
A	On site	Unspecified Ground Workings	1938	1039188
B	On site	Unspecified Ground Workings	1901	996786
B	On site	Unspecified Pit	1988	1028164
C	On site	Unspecified Disused Pit	1901	1151278
C	On site	Railway Sidings	1901	1036848
C	On site	Railway Sidings	1901	1091710
C	On site	Railway Sidings	1901	1042451
C	On site	Unspecified Disused Tips	1979	1007175
C	On site	Unspecified Disused Tip	1979	1005153
C	On site	Cuttings	1948	1039665
C	On site	Cuttings	1903	1145203
C	On site	Cuttings	1979	1054716
C	On site	Cuttings	1969	1054716
C	On site	Cuttings	1964	1054716
C	On site	Cuttings	1948	1131785
C	On site	Unspecified Heap	1921	1152727
C	On site	Unspecified Ground Workings	1921	996784
C	On site	Unspecified Ground Workings	1921	1037110
C	On site	Cuttings	1921	1039665
C	On site	Railway Sidings	1921	1144925
C	On site	Ironstone Pit	1875	1000020
C	On site	Cuttings	1875	1080217



ID	Location	Land Use	Date	Group ID
C	On site	Unspecified Disused Pit	1915	1118061
C	On site	Unspecified Ground Workings	1915	1109769
C	On site	Cuttings	1915	1039665
C	On site	Unspecified Heap	1915	1152727
C	On site	Unspecified Heap	1915	1056034
C	On site	Cuttings	1915	1116337
C	On site	Cuttings	1915	1087226
C	On site	Railway Sidings	1915	1103307
C	On site	Railway Sidings	1915	1047287
C	On site	Railway Sidings	1915	1085105
C	On site	Railway Sidings	1922	1123439
C	On site	Unspecified Heap	1922	1089836
C	On site	Unspecified Ground Workings	1922	1037110
C	On site	Railway Sidings	1922	1104396
C	On site	Cuttings	1922	1039665
C	On site	Cuttings	1922	1059135
C	On site	Cuttings	1922	1116008
C	On site	Railway Sidings	1922	1043546
C	On site	Unspecified Heap	1922	1089836
C	On site	Unspecified Ground Workings	1922	1037110
C	On site	Railway Sidings	1922	1095333
C	On site	Cuttings	1922	1039665
C	On site	Cuttings	1922	1059135
C	On site	Cuttings	1922	1116008
C	On site	Unspecified Heap	1922	1103662
C	On site	Unspecified Heap	1948	1109398
C	On site	Unspecified Disused Pits	1948	1015867
C	On site	Unspecified Heap	1948	1060387



ID	Location	Land Use	Date	Group ID
C	On site	Railway Building	1948	1013034
C	On site	Railway Building	1948	1013036
C	On site	Railway Sidings	1903	1033891
C	On site	Railway Sidings	1903	1137091
C	On site	Railway Sidings	1903	1086041
C	On site	Railway Building	1903	1013035
C	On site	Refuse Heap	1903	1019512
C	On site	Unspecified Disused Tip	1988	1005152
C	On site	Unspecified Disused Tip	1988	1046349
C	On site	Unspecified Disused Tip	1979	1105577
C	On site	Unspecified Heap	1969	1056064
C	On site	Unspecified Ground Workings	1969	1081827
C	On site	Unspecified Heap	1948	1135709
C	On site	Smithy	1875	1032871
C	On site	Unspecified Heaps	1875	1021406
C	On site	Unspecified Heap	1875	1116017
C	On site	Unspecified Pit	1875	1028171
C	On site	Unspecified Disused Pit	1938	1073595
C	On site	Unspecified Heap	1938	1084830
C	On site	Unspecified Heap	1938	1044825
C	On site	Cuttings	1922	1154228
C	On site	Unspecified Heap	1922	1103662
C	On site	Cuttings	1901	1121045
C	On site	Cuttings	1901	1120167
C	On site	Unspecified Disused Pit	1938	1039038
C	On site	Cuttings	1938	1107707
C	On site	Unspecified Heap	1938	1084830
C	On site	Unspecified Heap	1938	1044825



ID	Location	Land Use	Date	Group ID
D	On site	Railway Sidings	1901	1126283
D	On site	Unspecified Disused Workings	1988	1032158
D	On site	Unspecified Disused Tip	1979	1005155
D	On site	Refuse Heap	1969	1071881
D	On site	Refuse Heap	1964	1071881
E	On site	Unspecified Disused Tip	1979	1005164
E	On site	Unspecified Heap	1969	1054370
E	On site	Unspecified Heap	1964	1084558
F	On site	Old Ironstone Level	1948	1130693
F	On site	Old Ironstone Level	1921	1134202
F	On site	Old Ironstone Level	1915	1102750
F	On site	Cuttings	1915	1147521
F	On site	Railway Sidings	1915	1059781
F	On site	Cuttings	1922	1149662
F	On site	Cuttings	1922	1149662
F	On site	Unspecified Ground Workings	1948	996782
F	On site	Unspecified Heaps	1875	1021408
F	On site	Unspecified Pit	1992	1065060
F	On site	Unspecified Pit	1976	1065060
F	On site	Unspecified Pit	1965	1065060
F	On site	Cuttings	1938	1066852
F	On site	Old Ironstone Level	1938	1055971
G	On site	Old Ironstone Level	1903	1086239
G	On site	Railway Sidings	1922	1114667
G	On site	Railway Land	1922	1034338
G	On site	Railway Sidings	1922	1114667
G	On site	Railway Land	1922	1034338
G	On site	Refuse Heap	1938	1068317



ID	Location	Land Use	Date	Group ID
G	On site	Old Ironstone Level	1901	1092266
G	On site	Refuse Heap	1938	1068317
H	On site	Cuttings	1969	1078168
H	On site	Cuttings	1964	1135317
H	On site	Cuttings	1915	1135443
H	On site	Cuttings	1922	1127303
H	On site	Cuttings	1922	1127303
H	On site	Unspecified Pit	1988	1055608
H	On site	Unspecified Pit	1979	1055190
H	On site	Railway Sidings	1875	1044359
H	On site	Unspecified Disused Tip	1992	1041228
H	On site	Unspecified Disused Tip	1976	1038024
H	On site	Unspecified Heap	1965	1000217
H	On site	Cuttings	1938	1105830
I	On site	Coal Level	1921	1093342
I	On site	Refuse Heap	1921	1019517
I	On site	Coal Level	1915	1121071
I	On site	Coal Level	1922	1052454
I	On site	Railway Sidings	1922	1049687
I	On site	Coal Level	1922	1052454
I	On site	Railway Sidings	1922	1125393
I	On site	Old Coal Level	1948	1032272
I	On site	Unspecified Disused Tip	1988	1110675
I	On site	Unspecified Disused Tip	1979	1048969
I	On site	Unspecified Heap	1969	1131412
I	On site	Unspecified Heap	1964	1131412
I	On site	Coal Level	1938	1068974
I	On site	Coal Level	1938	1068974



ID	Location	Land Use	Date	Group ID
J	On site	Unspecified Heap	1921	1130093
J	On site	Unspecified Heap	1915	1150461
J	On site	Cuttings	1965	994294
J	On site	Unspecified Heap	1922	1072959
J	On site	Unspecified Heap	1922	1072959
J	On site	Unspecified Heap	1948	1060988
J	On site	Unspecified Disused Tip	1992	1048476
J	On site	Unspecified Disused Tip	1976	1048476
K	On site	Tramway Sidings	1921	1110190
K	On site	Tramway Sidings	1915	1080646
L	On site	Railway Sidings	1921	1148132
M	On site	Cuttings	1921	1139704
M	On site	Cuttings	1992	1043912
M	On site	Cuttings	1976	1043912
M	On site	Cuttings	1976	1142556
M	On site	Cuttings	1965	1150367
M	On site	Railway Sidings	1938	1070413
M	On site	Cuttings	1938	1076223
N	On site	Ironstone Level	1875	992436
O	On site	Unspecified Ground Workings and Heaps	1922	1104141
O	On site	Unspecified Ground Workings and Heaps	1922	1104141
P	On site	Refuse Heap	1922	1039946
P	On site	Refuse Heap	1922	1039946
P	On site	Unspecified Disused Tip	1988	1152975
Q	On site	Tramway Sidings	1922	1110190
Q	On site	Tramway Sidings	1922	1110190
R	On site	Refuse Heap	1922	1146050
R	On site	Refuse Heap	1922	1146050



ID	Location	Land Use	Date	Group ID
S	On site	Cuttings	1922	1077917
S	On site	Cuttings	1922	1077917
S	On site	Refuse Heap	1903	1067553
T	On site	Cuttings	1922	1125692
T	On site	Cuttings	1922	1125692
U	On site	Unspecified Pit	1922	1063007
U	On site	Railway Sidings	1922	1058699
U	On site	Unspecified Disused Tip	1979	1005154
U	On site	Unspecified Heap	1948	1123875
U	On site	Unspecified Heap	1948	1000280
U	On site	Coal Pit	1875	1005027
U	On site	Unspecified Pit	1922	1063007
V	On site	Railway Sidings	1922	1126283
W	On site	Railway Sidings	1948	1124869
X	On site	Unspecified Heap	1948	1000279
X	On site	Old Canal	1901	1004658
Y	On site	Railway Sidings	1903	1086272
Z	On site	Unspecified Disused Tip	1979	1127944
AA	On site	Unspecified Disused Tip	1979	1005160
AB	On site	Railway Sidings	1875	1033887
AC	On site	Unspecified Disused Tip	1992	1005165
AC	On site	Unspecified Disused Tips	1976	1007176
M	0m NE	Cuttings	1915	1139704
M	0m NE	Cuttings	1922	1139704
M	0m NE	Cuttings	1922	1139704
M	0m NW	Refuse Heap	1965	1123696
T	1m E	Cuttings	1915	1082902
A	1m NW	Unspecified Disused Tips	1988	1130456



ID	Location	Land Use	Date	Group ID
A	1m NW	Unspecified Disused Tips	1979	1078703
T	2m E	Cuttings	1948	1128482
AC	2m NW	Unspecified Ground Workings	1938	1108754
AC	2m NW	Unspecified Ground Workings	1938	1108754
AD	2m SE	Unspecified Disused Workings	1988	1032165
P	2m W	Refuse Heap	1915	1078179
P	2m W	Refuse Heap	1938	1067431
P	2m W	Refuse Heap	1938	1067431
AC	3m NW	Unspecified Ground Workings	1915	1115641
U	4m S	Refuse Heap	1901	1108349
P	5m W	Refuse Heap	1921	1086223
M	5m NE	Cuttings	1901	1143978
AD	5m SE	Unspecified Heap	1921	1101253
AC	5m W	Unspecified Ground Workings	1921	1155965
P	6m W	Refuse Heap	1948	1067431
P	6m W	Unspecified Heap	1969	1063738
P	6m W	Unspecified Heap	1964	1063738
M	6m NW	Cuttings	1965	1101162
AD	6m SE	Unspecified Disused Tip	1979	1005161
M	7m NW	Cuttings	1992	1034286
AC	7m W	Unspecified Ground Workings	1901	1087268
V	8m SW	Cuttings	1875	1087690
Z	8m W	Refuse Heap	1948	1090500
AD	8m SE	Unspecified Heap	1922	1134220
AD	8m SE	Unspecified Heap	1922	1134220
AD	9m SE	Unspecified Heap	1915	1072318
AD	9m SE	Unspecified Heap	1948	1070667
AD	9m SE	Unspecified Heap	1938	1134220



ID	Location	Land Use	Date	Group ID
AD	9m SE	Unspecified Heap	1938	1134220
V	9m SW	Cuttings	1948	1110337
V	9m SW	Cuttings	1901	1130024
D	11m S	Unspecified Pit	1948	1057144
A	11m NW	Coal Shaft	1875	1021191
D	18m S	Unspecified Pit	1922	1049582
D	18m S	Unspecified Pit	1922	1049582
5	19m NE	Railway Sidings	1903	1099240
M	19m NE	Cuttings	1948	1039592
M	19m NE	Cuttings	1903	1143978
AA	19m SE	Unspecified Heap	1948	1082574
D	20m S	Unspecified Pit	1875	1102362
U	21m S	Refuse Heap	1901	1019516
AB	22m NE	Ironstone Pit	1875	1000019
R	24m NW	Unspecified Disused Tips	1988	1114217
R	24m NW	Unspecified Disused Tips	1979	1066356
R	24m NW	Unspecified Heaps	1969	1147236
R	24m NW	Unspecified Heaps	1964	1147236
AA	24m S	Unspecified Ground Workings	1901	996785
AC	25m NW	Unspecified Ground Workings	1903	1143595
AA	28m S	Unspecified Heap	1922	1103151
AA	28m S	Unspecified Heap	1922	1103151
R	28m NW	Refuse Heap	1921	1143593
AA	31m S	Unspecified Disused Workings	1988	1032163
AE	31m NW	Unspecified Ground Workings	1938	1094353
AE	31m NW	Unspecified Ground Workings	1938	1094353
R	32m NW	Unspecified Heap	1938	1066299
R	32m NW	Unspecified Heap	1938	1066299



ID	Location	Land Use	Date	Group ID
AB	32m NE	Unspecified Disused Pit	1948	1085717
AE	32m NW	Ground Workings and Refuse Heap	1915	1007277
AE	33m NW	Disused Pits	1921	1004672
AE	34m NW	Unspecified Disused Tip	1988	1126772
AE	34m NW	Unspecified Disused Tip	1979	1111837
R	34m NW	Unspecified Heap	1915	1127734
AF	34m NE	Railway Land	1922	1119885
AF	34m NE	Railway Land	1922	1119885
AG	34m NE	Unspecified Heap	1922	1076026
AG	34m NE	Unspecified Heap	1922	1076026
R	35m NW	Unspecified Heap	1948	1037887
AE	35m W	Unspecified Pit	1948	1028173
R	36m NW	Unspecified Heap	1922	1129206
R	36m NW	Unspecified Heap	1922	1129206
AG	36m NE	Unspecified Heap	1938	1076026
AG	36m NE	Unspecified Heap	1938	1076026
R	36m NW	Unspecified Heap	1965	1120786
AE	36m NW	Refuse Heap	1922	1127337
AE	36m NW	Refuse Heap	1922	1127337
AE	37m W	Unspecified Disused Pits	1922	1141697
AE	37m W	Unspecified Disused Pits	1922	1141697
AH	38m S	Disused Quarries and Tips	1979	1003946
AE	39m NW	Unspecified Heap	1969	1101936
AE	39m NW	Unspecified Heap	1964	1101936
P	40m W	Shale Tip	1922	1040516
P	40m W	Shale Tip	1922	1040516
P	40m W	Shale Tip	1915	1071795
AI	41m E	Old Ironstone Level	1922	1096717



ID	Location	Land Use	Date	Group ID
AI	41m E	Old Ironstone Level	1922	1154402
AB	42m NE	Unspecified Disused Pit	1903	1125751
AB	42m NE	Unspecified Disused Pit	1901	1087565
AH	43m S	Unspecified Ground Workings	1875	1139496
R	44m NW	Unspecified Heap	1921	1127734
R	44m NW	Unspecified Disused Tips	1988	1040232
R	44m NW	Unspecified Disused Tips	1979	1056217
AJ	47m NW	Old Coal Level	1915	1081065
AJ	47m NW	Old Coal Level	1922	1132309
AJ	47m NW	Old Coal Level	1922	1132309
AJ	47m NW	Unspecified Pit	1938	1144734
AJ	47m NW	Unspecified Pit	1938	1144734
AJ	48m NW	Old Coal Level	1948	1065571
AK	48m NE	Unspecified Pit	1875	1028169
AL	49m NE	Unspecified Heap	1938	1083279
AL	49m NE	Unspecified Heap	1938	1083279
AL	52m NE	Unspecified Heap	1921	1067261
N	53m NE	Unspecified Ground Workings	1948	1132095
AL	53m NE	Unspecified Heap	1901	1151616
AL	54m NE	Unspecified Heap	1915	1067261
M	54m NW	Unspecified Ground Workings	1948	1126624
AL	54m NE	Unspecified Heap	1948	1061273
AL	54m NE	Unspecified Ground Workings	1922	1044044
AL	54m NE	Unspecified Ground Workings	1922	1153151
M	55m NW	Unspecified Ground Workings	1915	1142082
M	55m NW	Unspecified Ground Workings	1938	1058669
M	55m NW	Unspecified Ground Workings	1938	1058669
AJ	56m NW	Old Coal Level	1921	1137867



ID	Location	Land Use	Date	Group ID
M	56m NW	Unspecified Ground Workings	1921	1136591
M	57m NW	Unspecified Ground Workings	1922	1058669
M	57m NW	Unspecified Ground Workings	1922	1058669
AM	57m NW	Old Coal Level	1938	1091862
AM	57m NW	Old Coal Level	1938	1091862
AA	58m S	Railway Building	1948	1013038
N	58m NE	Unspecified Heaps	1922	1111091
N	58m NE	Unspecified Heaps	1922	1111091
AL	60m NE	Unspecified Pit	1969	1147188
AL	60m NE	Unspecified Pit	1964	1147188
6	60m S	Tramway Sidings	1948	1085211
AB	64m NE	Unspecified Ground Workings	1965	996768
AK	65m NE	Railway Sidings	1875	1065269
AN	66m W	Unspecified Disused Tip	1979	1059535
AO	67m W	Unspecified Old Quarries	1901	1040580
M	67m NW	Unspecified Ground Workings	1965	1065459
AO	68m W	Old Quarries	1921	1018526
AK	68m NE	Unspecified Disused Tip	1992	1040689
AK	68m NE	Unspecified Disused Tip	1976	1040689
AO	69m W	Unspecified Disused Tip	1988	1112440
AO	69m W	Unspecified Old Quarries	1903	1040580
AO	70m W	Unspecified Old Quarries	1922	1103298
AO	70m W	Unspecified Old Quarries	1922	1103298
N	70m NE	Unspecified Heap	1968	1082234
N	70m NE	Unspecified Heap	1964	1082234
N	71m NE	Unspecified Ground Workings	1901	1083335
AO	71m W	Unspecified Old Quarries	1915	1110999
R	71m NW	Unspecified Heap	1875	1099619



ID	Location	Land Use	Date	Group ID
7	71m SW	Unspecified Disused Workings	1988	1032164
Z	72m W	Refuse Heap	1915	1053952
AK	72m NE	Unspecified Heap	1915	1130160
AN	73m W	Unspecified Old Quarries	1948	1098491
AO	73m W	Unspecified Old Quarries	1938	1063618
AK	73m NE	Unspecified Heap	1965	1115229
R	74m NW	Coal Level	1901	1007515
AH	74m S	Unspecified Heap	1969	1104636
AH	74m S	Unspecified Heap	1964	1104636
AK	74m NE	Unspecified Heap	1948	1045692
AK	75m NE	Unspecified Heap	1922	1055353
AK	75m NE	Unspecified Heap	1922	1055353
R	75m NW	Old Coal Drift	1921	1008426
AK	75m NE	Unspecified Heap	1921	1122578
AH	75m S	Unspecified Ground Workings	1948	1138979
AH	76m S	Unspecified Ground Workings	1922	1126823
AH	76m S	Unspecified Ground Workings	1922	1126823
M	78m NW	Cuttings	1948	1131895
M	78m NW	Cuttings	1922	1134767
M	78m NW	Cuttings	1922	1134767
AO	78m W	Unspecified Ground Workings	1875	1065712
AH	79m S	Unspecified Heap	1988	1000286
AH	79m S	Unspecified Ground Workings	1901	1050638
K	82m NW	Railway Sidings	1901	1151632
M	82m NW	Cuttings	1921	1149278
AE	82m NW	Coal Level	1922	1140192
AE	82m NW	Coal Level	1922	1140192
AE	83m NW	Coal Level	1921	1062391



ID	Location	Land Use	Date	Group ID
AE	85m NW	Coal Level	1938	1140192
AE	85m NW	Coal Level	1938	1140192
AH	85m S	Unspecified Ground Workings	1922	1138979
AH	85m S	Unspecified Ground Workings	1922	1138979
AE	85m NW	Old Coal Level	1948	1032273
AO	85m NW	Unspecified Old Quarries	1948	1081609
AE	85m NW	Coal Level	1915	1062391
AP	89m E	Unspecified Ground Workings	1922	1115558
AP	89m E	Unspecified Ground Workings	1922	1115558
AP	89m E	Unspecified Ground Workings	1921	1043796
L	89m NW	Railway Sidings	1922	1042019
L	89m NW	Railway Sidings	1922	1134725
8	91m NW	Railway Sidings	1915	1040352
AP	91m E	Unspecified Pit	1938	1080102
AP	91m E	Unspecified Pit	1938	1080102
AP	91m E	Unspecified Pit	1948	1142608
AP	91m E	Unspecified Ground Workings	1915	1135175
AO	92m NW	Unspecified Ground Workings	1969	1131396
AO	92m NW	Unspecified Ground Workings	1964	1060290
AH	93m S	Unspecified Disused Tip	1979	1005156
M	94m NW	Cuttings	1875	1036589
M	94m NW	Cuttings	1915	1128831
U	94m S	Railway Sidings	1901	1117518
M	98m NW	Unspecified Ground Workings	1922	1102942
M	98m NW	Unspecified Ground Workings	1922	1044131
L	100m NW	Railway Sidings	1901	1107057
AH	100m S	Unspecified Heap	1969	1000285
AH	100m S	Unspecified Heaps	1964	1021419



ID	Location	Land Use	Date	Group ID
P	102m S	Railway Sidings	1903	1066071
9	103m NW	Unspecified Heap	1965	1000216
R	103m NW	Old Coal Drift	1915	1140554
R	103m NW	Old Coal Drift	1948	1036251
R	104m NW	Old Coal Drift	1922	1093659
R	104m NW	Old Coal Drift	1922	1093659
R	104m NW	Old Coal Drift	1938	1036251
R	104m NW	Old Coal Drift	1938	1036251
AQ	105m SE	Unspecified Ground Workings	1968	1135647
P	105m W	Railway Sidings	1901	1072484
L	106m NW	Railway Sidings	1901	1114666
AQ	107m SE	Unspecified Ground Workings	1964	1122173
W	111m NE	Disused Canal	1938	1106578
AK	111m NE	Old Canal	1901	1004655
AH	111m S	Unspecified Heap	1969	1000284
AK	112m NE	Disused Canal	1921	1054695
AK	112m NE	Disused Canal	1915	1054695
AR	112m NE	Disused Canal	1948	1106578
AQ	113m SE	Unspecified Ground Workings	1901	1065867
AQ	113m SE	Unspecified Heap	1964	1000287
AS	113m NW	Railway Sidings	1901	1086272
AH	114m S	Unspecified Ground Workings	1901	1058430
AT	115m S	Unspecified Disused Tip	1979	1128391
AK	115m NE	Cuttings	1901	994293
U	116m SW	Unspecified Pit	1875	1103078
AU	117m SW	Old Ironstone Levels	1903	1084636
AU	119m SW	Unspecified Ground Workings	1921	1103864
AU	119m SW	Old Ironstone Levels	1922	1034946



ID	Location	Land Use	Date	Group ID
AU	119m SW	Old Ironstone Levels	1922	1034946
AU	121m SW	Unspecified Disused Tip	1979	1005169
AH	122m S	Unspecified Pit	1969	1040296
AH	122m S	Unspecified Pit	1964	1040296
AU	122m SW	Old Ironstone Levels	1948	1151111
AU	123m SW	Unspecified Ground Workings	1969	1065270
AU	123m SW	Unspecified Heap	1964	1149090
AU	123m W	Unspecified Ground Workings	1921	1113494
P	124m W	Refuse Heap	1915	1139052
AC	125m NW	Unspecified Ground Workings	1965	1039498
AU	125m SW	Unspecified Heap	1901	1084889
L	125m NW	Railway Sidings	1901	1114666
10	126m W	Unspecified Old Quarries	1903	1077391
AU	127m W	Unspecified Old Quarries	1948	1100275
11	129m S	Railway Sidings	1948	1063682
AT	130m W	Unspecified Heaps	1948	1021418
L	131m N	Unspecified Disused Pit	1938	1097315
L	131m N	Unspecified Disused Pit	1938	1097315
L	131m N	Unspecified Disused Pit	1915	1119918
L	131m N	Disused Pit	1921	993633
AR	132m NE	Unspecified Pit	1992	1094811
AR	132m NE	Unspecified Pit	1976	1094811
AV	132m NW	Unspecified Disused Tips	1992	1046508
AV	132m NW	Unspecified Disused Tips	1976	1046508
U	132m SW	Unspecified Disused Mine	1979	1093159
U	132m SW	Unspecified Disused Mine	1969	1093159
L	133m N	Unspecified Disused Pit	1922	1097315
L	133m N	Unspecified Disused Pit	1922	1097315



ID	Location	Land Use	Date	Group ID
AO	134m W	Unspecified Disused Quarries	1988	1100628
AO	134m W	Unspecified Disused Quarries	1979	1124891
U	135m SW	Railway Sidings	1875	1047572
AQ	137m SE	Unspecified Heap	1948	1086810
AU	137m W	Unspecified Ground Workings	1875	1068136
AH	138m S	Unspecified Ground Workings	1901	1118673
AW	139m NW	Unspecified Heap	1965	1072408
AW	140m NW	Unspecified Ground Workings	1875	996783
AK	140m NE	Unspecified Heap	1875	1000221
AV	141m NW	Unspecified Heap	1965	1000222
AW	141m NW	Unspecified Heap	1938	1136495
AW	141m NW	Unspecified Heap	1938	1136495
AQ	142m SE	Unspecified Heap	1922	1120722
AQ	142m SE	Unspecified Heap	1922	1120722
AX	142m SW	Unspecified Pit	1922	1037093
AX	142m SW	Unspecified Pit	1922	1037093
K	142m NW	Railway Building	1901	1013436
AW	143m NW	Unspecified Heap	1948	1136495
AW	143m NW	Unspecified Heap	1915	1068686
AW	144m NW	Unspecified Heap	1922	1117869
AW	144m NW	Unspecified Heap	1922	1117869
L	145m NW	Railway Sidings	1922	1063208
L	145m NW	Railway Sidings	1922	1063208
AW	148m NW	Unspecified Heap	1901	1104246
AY	150m SE	Unspecified Ground Workings	1968	1082735
AO	150m W	Unspecified Old Quarries	1948	1048051
AW	151m NW	Unspecified Heap	1921	1128542
U	153m SW	Unspecified Pit	1964	1130368



ID	Location	Land Use	Date	Group ID
L	153m N	Unspecified Ground Workings	1915	996769
AU	154m W	Unspecified Pit	1969	1061112
AU	154m W	Unspecified Pit	1964	1061112
AH	155m S	Unspecified Ground Workings	1901	1152630
AU	155m W	Unspecified Pit	1903	1056835
AU	159m W	Unspecified Pit	1901	1056835
AZ	159m S	Rifle Range	1875	1039179
AQ	160m SE	Coal Level	1922	1131272
AQ	160m SE	Coal Level	1922	1131272
AU	160m SW	Unspecified Pit	1875	1028181
12	161m S	Railway Sidings	1948	993782
L	162m N	Engine House	1938	1019155
AQ	162m SE	Unspecified Ground Workings	1901	996797
AX	163m SW	Railway Building	1901	1041388
AX	163m SW	Railway Building	1948	1068694
AW	164m NW	Coal Level	1903	1007516
AQ	168m SE	Unspecified Heap	1968	1099556
AH	168m S	Old Coal Shaft	1901	992175
AR	173m NE	Railway Sidings	1921	1058826
AH	175m S	Old Coal Shaft	1922	992178
AY	176m E	Unspecified Ground Workings	1875	1130993
AH	178m S	Unspecified Ground Workings	1901	1143343
L	180m NW	Refuse Heap	1938	1143827
L	180m NW	Refuse Heap	1938	1143827
AY	181m E	Railway Sidings	1901	1059733
BA	181m E	Disused Canal	1922	1052971
BA	181m E	Disused Canal	1922	1052971
L	184m N	Railway Sidings	1922	1095622



ID	Location	Land Use	Date	Group ID
L	184m N	Railway Sidings	1922	1095622
BB	184m NE	Unspecified Tip	1875	1018882
AQ	186m SE	Unspecified Heap	1964	1099556
BC	188m SW	Railway Sidings	1875	993777
BC	188m SW	Ironstone Levels	1875	1003934
BD	191m NE	Railway Sidings	1875	1048921
BE	193m NW	Cuttings	1922	1082656
BE	193m NW	Cuttings	1922	1082656
AY	194m SE	Tramway Sidings	1901	1014625
BF	194m NW	Unspecified Disused Tip	1992	1005167
BG	194m SW	Unspecified Heap	1948	1097666
BH	194m E	Disused Canal	1948	1153257
L	194m N	Engine House	1875	1113222
U	195m SW	Railway Buildings	1901	1024166
L	196m N	Engine House	1921	1035910
BF	196m NW	Unspecified Heaps	1965	1021409
AV	197m NW	Railway Building	1938	1013435
L	197m N	Engine House	1915	1078427
L	198m N	Engine House	1922	1133708
L	198m N	Engine House	1922	1086032
BH	200m E	Disused Canal	1922	1090618
BI	200m SW	Cuttings	1988	1095043
BI	200m SW	Cuttings	1979	1103781
BJ	201m NW	Unspecified Heap	1922	1088409
BJ	201m NW	Unspecified Heap	1922	1088409
BJ	201m NW	Unspecified Ground Workings	1938	1081565
BJ	201m NW	Unspecified Ground Workings	1938	1081565
AR	201m NE	Unspecified Ground Workings	1975	1119321



ID	Location	Land Use	Date	Group ID
AR	201m NE	Unspecified Ground Workings	1982	1139042
AR	201m NE	Unspecified Ground Workings	1992	1139042
BJ	201m NW	Old Coal Level	1948	1032265
BJ	201m NW	Unspecified Heap	1965	1080952
BJ	202m NW	Unspecified Heap	1915	1050608
L	203m N	Engine House	1901	1087326
BG	203m SW	Unspecified Heap	1964	1097666
BJ	204m NW	Unspecified Pit	1875	1054426
BA	204m E	Disused Canal	1988	1063494
AY	204m SE	Engine House	1875	1019123
BJ	205m NW	Unspecified Pit	1922	1044504
BJ	205m NW	Unspecified Pit	1922	1044504
BJ	205m NW	Unspecified Pit	1948	1079651
BJ	206m NW	Unspecified Pit	1915	1094449
BJ	206m NW	Unspecified Heap	1875	1080952
U	208m SW	Chimney	1969	1137776
U	208m SW	Chimney	1964	1137776
L	209m N	Unspecified Heap	1938	1108220
L	209m N	Unspecified Heap	1938	1108220
AW	209m NW	Coal Level	1938	1074359
AW	209m NW	Coal Level	1938	1074359
AY	209m E	Railway Sidings	1922	1059733
BI	209m SW	Cuttings	1922	1088116
BJ	211m NW	Unspecified Heap	1921	1112171
AW	211m NW	Coal Level	1915	1111760
AW	212m NW	Coal Level	1922	1131959
AW	212m NW	Coal Level	1922	1131959
BJ	212m NW	Unspecified Pit	1921	1053826



ID	Location	Land Use	Date	Group ID
BK	213m SW	Cuttings	1969	1111484
BK	213m SW	Cuttings	1964	1111484
AY	214m SE	Tramway Sidings	1901	1014624
BL	216m NW	Unspecified Old Quarries	1901	1134536
AY	216m SE	Old Air Shaft	1922	1003774
L	217m N	Engine House	1948	1130716
L	217m N	Engine House	1903	1156822
AW	217m NW	Coal Level	1921	1108286
AY	220m E	Unspecified Heap	1875	1000288
BI	222m SW	Cuttings	1948	1035629
AH	229m S	Unspecified Heap	1875	1000283
BL	231m NW	Unspecified Old Quarries	1903	1111338
AH	231m S	Unspecified Disused Shaft	1969	1136891
AH	231m S	Unspecified Disused Shaft	1964	1136891
L	232m N	Unspecified Heap	1921	1132319
AH	232m S	Unspecified Disused Shaft	1988	1046067
AH	232m S	Unspecified Disused Shaft	1979	1090658
BC	233m SW	Old Ironstone Levels	1903	1109356
L	234m N	Unspecified Heap	1938	1136604
L	234m N	Unspecified Heap	1938	1136604
L	235m N	Unspecified Heap	1915	1132319
L	235m N	Unspecified Heap	1948	1044314
L	235m N	Unspecified Heap	1922	1136604
L	235m N	Unspecified Heap	1922	1136604
BI	235m SW	Cuttings	1875	1081927
BM	238m S	Unspecified Disused Tip	1979	1005159
BM	238m S	Unspecified Heap	1969	1136105
BM	238m S	Unspecified Heap	1964	1136105



ID	Location	Land Use	Date	Group ID
AS	238m NW	Unspecified Disused Tips	1992	1136357
AS	238m NW	Unspecified Disused Tips	1976	1136357
BM	239m S	Unspecified Heap	1948	1131796
AS	239m NW	Unspecified Heap	1965	1110299
BC	240m SW	Old Ironstone Levels	1901	1109356
13	240m NW	Refuse Heap	1965	1019511
BC	243m SW	Old Ironstone Levels	1922	1052229
BC	243m SW	Old Ironstone Levels	1922	1052229
BC	244m SW	Unspecified Ground Workings	1921	1082491
U	244m SW	Railway Building	1901	1013033
BC	245m SW	Unspecified Ground Workings	1915	1082491
BC	246m SW	Old Ironstone Levels	1948	1083931
BC	247m SW	Old Ironstone Levels	1938	1129491
AS	248m NW	Refuse Heap	1922	1058889
AS	248m NW	Refuse Heap	1922	1058889
BN	251m E	Unspecified Factory	1988	1078765
BF	253m NW	Unspecified Old Quarries	1903	1147692
BC	255m SW	Unspecified Ground Workings	1969	1119255
BC	255m SW	Unspecified Ground Workings	1964	1119255
AZ	257m SW	Rifle Range	1901	1100764
AR	257m NE	Unspecified Pit	1875	1139609
AR	259m NE	Unspecified Pit	1901	1067163
U	259m SW	Railway Building	1901	1013032
BO	262m SW	Unspecified Pit	1901	1148515
AY	265m SE	Engine House	1875	1089555
AY	266m SE	Engine House	1922	1095387
BO	267m SW	Unspecified Pit	1948	1082099
14	280m SW	Unspecified Drift	1948	1081583

ID	Location	Land Use	Date	Group ID
BP	281m S	Unspecified Disused Tips	1988	1048289
BP	281m S	Unspecified Disused Tips	1979	1093910
BQ	284m NW	Unspecified Heap	1965	1046818
BC	284m SW	Old Ironstone Level	1915	1007776
BP	285m S	Unspecified Old Quarries	1948	1131664
BP	285m S	Unspecified Old Quarries	1901	1112653
BC	285m SW	Old Ironstone Levels	1921	1147256
15	286m E	Unspecified Factory	1988	1153714
BR	289m N	Railway Sidings	1875	1093098
BP	289m S	Unspecified Ground Workings	1875	996795
BP	290m S	Unspecified Old Quarries	1922	1153887
BC	291m SW	Unspecified Disused Levels	1988	1004157
BC	291m SW	Unspecified Disused Level	1979	1046608
BS	291m N	Unspecified Heap	1921	1062975
AS	293m NW	Unspecified Heap	1915	1062222
AF	293m N	Unspecified Pit	1965	1146355
AR	293m NE	Junction Station	1901	1008289
BS	294m N	Unspecified Heap	1992	1109320
BS	294m N	Unspecified Heap	1976	1109320
AF	294m N	Unspecified Pit	1976	1090058
BS	295m N	Unspecified Heap	1915	1090795
BT	295m NE	Railway Sidings	1938	1043509
BS	296m N	Unspecified Heap	1965	1124933
BS	296m N	Unspecified Heap	1948	1085977
BC	296m SW	Unspecified Disused Level	1969	1120513
BC	296m SW	Unspecified Disused Level	1964	1120513
AS	296m NW	Unspecified Heap	1948	1046170
16	297m SW	Unspecified Drift	1922	1140009



ID	Location	Land Use	Date	Group ID
BC	297m SW	Old Ironstone Levels	1921	1048441
17	298m N	Railway Sidings	1901	1070631
BR	298m N	Disused Iron Works	1901	1090362
U	299m SW	Unspecified Ground Workings	1901	996787
AF	301m N	Refuse Heap	1901	1019510
BI	301m S	Cuttings	1969	1076118
BI	301m S	Cuttings	1964	1076118
BS	301m N	Unspecified Pit	1921	1152815
AR	301m NE	Unspecified Heap	1948	1000218
BU	302m E	Unspecified Ground Workings	1921	1132624
BS	303m N	Unspecified Pit	1938	1126058
BS	303m N	Unspecified Pit	1938	1126058
BU	303m NE	Unspecified Ground Workings	1922	1041286
BU	303m NE	Unspecified Ground Workings	1922	1041286
BU	303m NE	Unspecified Ground Workings	1915	1132624
BU	303m E	Unspecified Heap	1903	1153316
BS	303m N	Unspecified Pit	1915	1152815
BU	303m E	Unspecified Ground Workings	1938	1112327
BU	303m E	Unspecified Ground Workings	1938	1112327
U	304m SW	Unspecified Heap	1948	1000281
BU	304m NE	Unspecified Heap	1901	1146659
BU	304m E	Unspecified Ground Workings	1875	1095216
BS	305m N	Unspecified Pit	1948	1109773
BS	305m N	Unspecified Pit	1922	1109130
BS	305m N	Unspecified Pit	1922	1109130
BQ	306m NW	Refuse Heap	1915	1100241
18	306m NW	Railway Sidings	1875	993897
BN	309m E	Unspecified Factory	1968	1140854



ID	Location	Land Use	Date	Group ID
BN	309m E	Unspecified Factory	1964	1140854
BQ	309m NW	Refuse Heap	1922	1143927
BQ	309m NW	Refuse Heap	1922	1143927
BV	311m NW	Unspecified Old Quarries	1948	1035931
BV	311m NW	Unspecified Ground Workings	1965	1130283
BV	313m NW	Unspecified Ground Workings	1875	1122860
BS	316m N	Old Coal Level	1921	1032285
BQ	316m NW	Old Canal	1901	1004657
BR	318m N	Old Gas Works	1948	1019102
BR	319m N	Railway Sidings	1901	1155827
BW	321m E	Unspecified Ground Workings	1921	1101754
BQ	324m NW	Railway Sidings	1922	1045216
BQ	324m NW	Railway Sidings	1922	1098531
19	324m N	Unspecified Ground Workings	1901	996773
AF	324m N	Unspecified Pit	1921	1108590
AF	324m N	Old Coal Level	1938	1093562
AF	324m N	Old Coal Level	1938	1093562
AZ	324m SW	Unspecified Disused Mine	1964	1007736
AF	326m N	Old Coal Level	1915	1099019
AF	326m N	Old Coal Level	1948	1093562
AF	326m N	Old Coal Level	1922	1101742
AF	326m N	Old Coal Level	1922	1101742
BI	329m S	Cuttings	1901	1059841
BW	331m E	Unspecified Heap	1922	1115001
BW	331m E	Unspecified Heap	1922	1063078
BX	332m S	Unspecified Disused Tip	1979	1005157
BX	332m S	Refuse Heap	1969	1101578
BX	332m S	Refuse Heap	1964	1101578



ID	Location	Land Use	Date	Group ID
BP	335m S	Unspecified Pit	1969	1034867
BP	335m S	Unspecified Pit	1964	1034867
BY	336m SW	Tunnel	1969	1144393
BY	336m SW	Tunnel	1969	1144393
BY	336m SW	Tunnel	1964	1144393
BV	337m NW	Unspecified Old Quarries	1903	1044064
BZ	339m SE	Unspecified Ground Workings	1875	996798
BW	340m E	Disused Wire Works	1903	1022160
BW	342m E	Wire Works	1901	993624
BY	343m S	Tunnel	1922	1098464
BY	344m SW	Tunnel	1948	1127139
BY	344m SW	Tunnel	1901	1131291
AR	344m NE	Unspecified Ground Workings	1948	1151511
BQ	345m NW	Coal Level	1901	1007523
BD	345m NE	Railway Station	1903	1016056
BP	345m S	Unspecified Disused Tips	1988	1077460
BP	345m S	Unspecified Disused Tips	1979	1052273
BW	345m NE	Gas Works	1938	1148777
BW	346m NE	Unspecified Works	1968	1119117
BW	346m NE	Unspecified Works	1964	1119117
BY	346m SW	Tunnel	1875	1126136
BW	346m NE	Gas Works	1922	1088206
BW	346m NE	Gas Works	1922	1088206
BW	347m NE	Gas Works	1915	1078041
BW	349m NE	Gas Works	1921	1088206
21	352m NW	Cuttings	1915	1039895
22	353m NW	Cuttings	1875	1110154
CA	354m SE	Old Coal Shaft	1948	992171



ID	Location	Land Use	Date	Group ID
BZ	354m SE	Unspecified Pit	1922	1091995
BZ	354m SE	Unspecified Pit	1922	1091995
BX	354m S	Unspecified Old Quarries	1948	1057882
CB	355m E	Railway Sidings	1922	1035040
CB	355m E	Railway Sidings	1922	1128475
BQ	356m NW	Unspecified Heap	1903	1070229
BX	359m S	Unspecified Old Quarries	1901	1066553
CC	359m E	Unspecified Factory	1988	1049427
BQ	359m NW	Coal Level	1903	1152492
BW	360m E	Dairy	1982	1131358
CB	360m E	Railway Sidings	1915	1109620
BX	361m S	Unspecified Old Quarries	1922	1066553
23	363m SE	Mineral Railway Sidings	1901	1024460
BW	363m E	Unspecified Depot	1992	1012586
CD	363m NW	Unspecified Ground Workings	1938	1118153
CD	363m NW	Unspecified Ground Workings	1938	1118153
BX	364m S	Unspecified Ground Workings	1875	996799
CE	364m SE	Old Dock	1948	1138051
CE	365m SE	Railway Sidings	1875	993783
BZ	365m SE	Old Coal Shaft	1922	992174
CF	366m E	Unspecified Ground Workings	1938	1056607
CF	366m E	Unspecified Ground Workings	1938	1147908
CB	367m E	Railway Sidings	1901	1041212
CG	369m S	Unspecified Disused Tip	1979	1005151
BQ	369m NW	Coal Drift	1922	1108079
BQ	369m NW	Coal Drift	1922	1108079
CG	369m S	Coal Level	1948	1007492
CE	370m SE	Old Dock	1922	1044153



ID	Location	Land Use	Date	Group ID
CE	370m SE	Old Dock	1922	1044153
CF	370m E	Ground Workings and Refuse Heap	1915	1115187
CF	370m E	Unspecified Ground Workings	1922	1097065
CF	370m E	Unspecified Ground Workings	1922	1035343
CF	370m E	Ground Workings and Refuse Heap	1921	1115187
CF	370m E	Unspecified Heap	1968	1118423
CF	370m E	Unspecified Heap	1964	1147021
BW	371m E	Unspecified Tank	1921	1045928
BW	374m E	Unspecified Tank	1922	1139757
BW	374m E	Unspecified Tank	1922	1139757
CG	375m S	Old Coal Level	1922	1083728
CG	375m S	Old Coal Level	1922	1083728
BW	375m E	Unspecified Tank	1948	1139757
BW	375m E	Railway Sidings	1922	1077814
BW	375m E	Railway Sidings	1922	1118808
BW	376m E	Unspecified Tank	1915	1057447
BW	376m E	Unspecified Tank	1938	1139757
BR	377m N	Railway Sidings	1922	1041084
BR	377m N	Railway Sidings	1922	1041084
BU	377m E	Unspecified Pit	1948	1028168
BQ	378m NW	Coal Drift	1938	1143307
BQ	378m NW	Coal Drift	1938	1143307
CD	378m NW	Unspecified Disused Tips	1992	1098142
CD	378m NW	Unspecified Disused Tips	1976	1098142
CD	381m NW	Coal Level	1938	1046970
CD	381m NW	Coal Level	1938	1046970
CD	381m NW	Coal Level	1915	1134575
CD	382m NW	Coal Level	1922	1046970



ID	Location	Land Use	Date	Group ID
CD	382m NW	Coal Level	1922	1046970
CD	385m NW	Coal Level	1921	1058037
CA	387m SE	Unspecified Heap	1948	1000292
BQ	388m NW	Unspecified Disused Drift	1992	1049432
BQ	388m NW	Unspecified Disused Drift	1976	1049432
BQ	388m NW	Coal Drift	1915	1097136
BQ	388m NW	Coal Drift	1921	1097136
CH	392m SE	Railway Sidings	1901	1085460
BW	393m E	Railway Sidings	1901	1111455
BQ	394m NW	Coal Drift	1921	1027756
CD	396m NW	Unspecified Heaps	1965	1021407
24	397m S	Refuse Heap	1948	1118243
BX	397m S	Unspecified Pit	1969	1089999
BX	397m S	Unspecified Pit	1964	1089999
BW	400m E	Dairy	1975	1124568
CI	401m E	Unspecified Heaps	1948	1021417
25	401m NW	Railway Sidings	1901	1143836
BW	401m E	Railway Sidings	1921	1112415
CD	402m NW	Unspecified Disused Tips	1992	1136218
CD	402m NW	Unspecified Disused Tips	1976	1136218
BQ	405m NW	Coal Drift	1922	1135105
BQ	405m NW	Coal Drift	1922	1135105
BQ	405m NW	Coal Drift	1938	1135105
BQ	405m NW	Coal Drift	1938	1135105
BQ	406m NW	Coal Drift	1915	1050984
CE	406m SE	Dock	1875	1012556
BQ	407m NW	Old Coal Drift	1948	1008429
BW	407m E	Railway Sidings	1915	1051677



ID	Location	Land Use	Date	Group ID
CD	409m NW	Unspecified Ground Workings	1922	1069062
CD	409m NW	Unspecified Ground Workings	1922	1069062
CA	409m SE	Old Air Shafts	1922	1010434
BQ	410m NW	Coal Drift	1922	1071505
BQ	410m NW	Coal Drift	1922	1071505
CD	411m NW	Unspecified Ground Workings	1965	1075296
CD	411m NW	Unspecified Ground Workings	1948	1075296
CD	411m NW	Unspecified Ground Workings	1875	1078234
CD	412m NW	Unspecified Ground Workings	1915	1069062
CD	415m NW	Unspecified Ground Workings	1875	1095924
CD	416m NW	Unspecified Ground Workings	1921	1069062
CJ	417m NW	Disused Air Shaft	1992	1106969
CJ	417m NW	Disused Air Shaft	1976	1106969
CH	417m SE	Railway Sidings	1922	1114202
CI	418m E	Unspecified Heap	1922	1152798
CI	418m E	Unspecified Heap	1922	1097034
CD	418m NW	Unspecified Heap	1915	1057452
CD	419m NW	Unspecified Ground Workings	1901	1069062
CD	420m NW	Coal Level	1948	1007527
BQ	420m NW	Disused Coal Drift	1948	1003944
CK	420m E	Unspecified Ground Workings	1901	1110573
CL	421m S	Unspecified Old Quarry	1948	1117856
CK	422m E	Unspecified Heap	1903	1060640
CD	423m NW	Unspecified Heap	1921	1057452
CL	423m S	Unspecified Ground Workings	1969	1064131
CL	423m S	Unspecified Ground Workings	1964	1064131
BQ	425m NW	Old Coal Level	1948	1079051
CL	425m S	Unspecified Old Quarry	1922	1117856



ID	Location	Land Use	Date	Group ID
CM	427m E	Unspecified Ground Workings	1875	1118814
26	428m N	Engine House	1875	1019153
CN	429m SW	Unspecified Disused Tip	1979	1005168
CN	429m SW	Unspecified Heap	1948	1123369
BB	429m NE	Railway Sidings	1901	1125503
BT	431m NE	Railway Sidings	1901	1138033
CL	432m S	Unspecified Old Quarry	1901	1042250
CN	433m SW	Unspecified Heap	1964	1107388
CN	434m SW	Unspecified Heap	1922	1042424
CN	434m SW	Unspecified Heap	1922	1042424
27	435m NW	Unspecified Pit	1875	1028180
CO	435m NE	Railway Sidings	1901	1072885
BT	439m NE	Railway Sidings	1922	1122715
BT	439m NE	Railway Sidings	1922	1072560
CL	439m S	Unspecified Heap	1875	1000282
CP	439m NE	Railway Sidings	1915	1149378
CD	440m NW	Unspecified Ground Workings	1903	1069062
CQ	440m SE	Unspecified Pit	1948	1028158
CQ	442m SE	Unspecified Ground Workings	1875	1142951
CL	444m S	Unspecified Pit	1988	1054105
CL	444m S	Unspecified Pit	1979	1069966
CQ	444m SE	Unspecified Old Quarry	1922	1022758
CR	445m E	Railway Sidings	1901	1077181
28	445m SW	Unspecified Mill	1948	1006426
CK	447m E	Unspecified Heap	1901	1113406
29	448m NE	Railway Sidings	1921	1058827
CP	449m NE	Railway Sidings	1965	1035791
CS	449m S	Refuse Heap	1968	1034438



ID	Location	Land Use	Date	Group ID
CS	449m S	Refuse Heap	1964	1034438
CT	449m W	Unspecified Old Quarry	1903	1055916
BW	450m E	Unspecified Tank	1921	1016568
CQ	450m SE	Old Coal Shaft	1948	992173
CP	451m NE	Unspecified Commercial/Industrial	1948	1045433
CP	452m NE	Unspecified Commercial/Industrial	1915	1059225
BQ	452m NW	Old Canal	1903	1004656
BQ	452m NW	Coal Level	1938	1101472
BQ	452m NW	Coal Level	1938	1101472
CD	453m NW	Coal Level	1938	1071146
CD	453m NW	Coal Level	1938	1071146
CD	453m NW	Coal Level	1915	1038014
CO	453m NE	Railway Sidings	1922	1090053
CO	453m NE	Railway Sidings	1922	1089749
BW	453m E	Gas Holder Station	1988	1006107
CQ	453m SE	Unspecified Ground Workings	1948	1095474
CT	454m W	Unspecified Old Quarry	1922	1096307
CT	454m W	Unspecified Old Quarry	1922	1096307
CD	455m NW	Coal Level	1922	1071146
CD	455m NW	Coal Level	1922	1071146
CT	455m W	Unspecified Pit	1988	1084815
CT	455m W	Unspecified Pit	1969	1151823
CT	455m W	Unspecified Pit	1964	1151823
CQ	455m SE	Old Air Shafts	1922	1010436
BW	455m E	Unspecified Tanks	1988	1148631
BW	455m E	Unspecified Tanks	1968	1148631
BW	455m E	Unspecified Tanks	1964	1148631
CT	456m W	Unspecified Old Quarry	1915	1055916



ID	Location	Land Use	Date	Group ID
BW	456m E	Gasometer	1922	1141690
BW	456m E	Gasometer	1922	1141690
CQ	456m SE	Unspecified Pit	1901	1028162
BW	456m E	Unspecified Tank	1921	1016566
BW	456m E	Unspecified Tank	1938	1121910
CT	456m W	Unspecified Old Quarry	1901	1093831
CT	456m W	Old Quarry	1921	1007869
CT	457m W	Unspecified Old Quarry	1948	1132836
CT	457m W	Unspecified Old Quarry	1938	1132836
BW	458m E	Gasometer	1922	1120778
BW	458m E	Gasometer	1922	1120778
CD	458m NW	Coal Level	1921	1045462
CU	458m E	Cuttings	1948	1130408
BW	458m E	Unspecified Tank	1915	1118158
BQ	458m NW	Coal Level	1915	1128399
BW	458m E	Gasometers	1938	1142083
BW	458m E	Gasometers	1921	1073226
CP	459m NE	Unspecified Commercial/Industrial	1938	1148530
BW	459m E	Unspecified Tanks	1948	1009924
BW	459m E	Gasometers	1915	1073226
BW	460m E	Unspecified Tanks	1948	1091755
BQ	460m NW	Coal Level	1921	1155474
CR	460m E	Railway Sidings	1965	1033994
BQ	462m NW	Coal Level	1922	1060736
BQ	462m NW	Coal Level	1922	1042457
30	462m E	Cuttings	1948	994288
CU	464m E	Cuttings	1938	1130408
CC	469m E	Engine Houses	1901	1023913



ID	Location	Land Use	Date	Group ID
CP	469m NE	Railway Sidings	1875	1137826
CU	469m E	Unspecified Ground Workings	1901	1077068
CI	470m E	Unspecified Heap	1901	1047935
CI	470m E	Unspecified Heap	1948	1102635
BW	470m E	Unspecified Tank	1921	1128118
CV	471m NW	Old Coal Level	1938	1064811
CV	471m NW	Old Coal Level	1938	1064811
BW	471m E	Gasometer	1922	1074178
BW	471m E	Gasometer	1922	1074178
CW	471m NW	Coal Level	1875	1007528
CV	471m NW	Old Coal Level	1922	1064811
CV	471m NW	Old Coal Level	1922	1064811
BW	471m E	Unspecified Tank	1938	1102073
31	471m NW	Unspecified Ground Workings	1965	1144166
CW	472m NW	Unspecified Ground Workings	1915	1117363
CM	472m NE	Unspecified Heap	1901	1065056
CW	472m NW	Unspecified Disused Tips	1992	1091464
CW	472m NW	Unspecified Disused Tips	1976	1091464
BW	472m E	Gasometer	1915	1057691
BW	473m E	Gasometer	1922	1137843
BW	473m E	Gasometer	1922	1137843
CW	473m NW	Unspecified Ground Workings	1938	1113763
CW	473m NW	Unspecified Ground Workings	1938	1113763
CX	475m E	Unspecified Heaps	1922	1050184
CX	475m E	Unspecified Heaps	1922	1050184
CW	475m NW	Unspecified Ground Workings	1921	1113763
CP	477m NE	Railway Sidings	1922	1058825
CP	477m NE	Railway Sidings	1922	1058825



ID	Location	Land Use	Date	Group ID
CY	477m E	Unspecified Heaps	1968	1122836
CY	477m E	Unspecified Heaps	1964	1122836
CW	480m NW	Unspecified Ground Workings	1922	1113763
CW	480m NW	Unspecified Ground Workings	1922	1113763
CW	481m NW	Unspecified Heap	1901	1058989
CW	482m NW	Unspecified Ground Workings	1948	1136970
CZ	484m SW	Unspecified Pit	1948	1085235
CP	484m NE	Unspecified Commercial/Industrial	1922	1069815
CP	484m NE	Unspecified Commercial/Industrial	1922	1069815
DA	484m N	Old Gas Works	1921	1060355
CZ	484m SW	Unspecified Pit	1875	1095624
CP	485m NE	Railway Sidings	1901	1153434
DA	486m NE	Gas Works	1938	1105116
CR	486m E	Railway Sidings	1901	1118353
DA	486m N	Unspecified Commercial/Industrial	1915	1128473
DA	486m N	Gas Works	1875	1128486
CX	487m E	Unspecified Heap	1948	1121737
CD	487m NW	Unspecified Heap	1875	1000206
CR	487m E	Railway Sidings	1915	1108636
DA	488m NE	Gas Works	1922	1055592
DA	488m NE	Gas Works	1922	1055592
CZ	488m SW	Cuttings	1922	1141938
CU	488m E	Unspecified Ground Workings	1903	1126850
CM	489m NE	Cuttings	1938	1156503
CM	490m NE	Cuttings	1948	1156503
CZ	491m SW	Cuttings	1964	1144229
CZ	491m SW	Unspecified Pit	1979	1157092
CZ	491m SW	Unspecified Pit	1969	1157092



ID	Location	Land Use	Date	Group ID
32	492m NW	Old Coal Level	1948	1154190
DA	492m N	Old Gas Works	1915	1060355
CP	493m NE	Unspecified Commercial/Industrial	1903	1059225
CC	493m E	Unspecified Old Shaft	1948	1064643
DA	494m N	Unspecified Commercial/Industrial	1901	1116591
CP	495m NE	Railway Sidings	1921	1058825
CC	497m E	Unspecified Old Shaft	1922	1041001
CC	497m E	Unspecified Old Shaft	1922	1041001
CQ	497m SE	Unspecified Heap	1948	1000289
CW	498m NW	Unspecified Heap	1903	1058989
33	499m NE	Railway Building	1901	1013440

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	43
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Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 45**

ID	Location	Land Use	Date	Group ID
L	216m N	Unspecified Tank	1875	149702
Y	272m NW	Unspecified Tank	1875	149710
20	334m NE	Unspecified Tank	1998	149666
BW	342m NE	Gas Works	1919	158867
BW	344m NE	Gas Works	1971	162383
BW	345m NE	Gas Holder Station	1984	167846
BW	371m E	Unspecified Tank	1919	149694
BW	438m NE	Gas Works	1979	158805
BW	438m NE	Gas Works	1979	158805



ID	Location	Land Use	Date	Group ID
CK	446m E	Unspecified Tank	1988	165740
CK	446m E	Unspecified Tank	1988	165740
CK	446m E	Unspecified Tank	1992	165740
BW	450m E	Gas Works	1984	166108
BW	450m E	Gas Holder Station	1988	167258
BW	450m E	Gas Holder Station	1988	167258
BW	450m E	Gas Holder Station	1992	167258
BW	453m E	Gasometers	1919	168337
BW	453m E	Gas Holder Station	1998	158552
BW	454m E	Unspecified Tank	1919	149674
BW	456m E	Gas Holder	1984	160835
BW	456m E	Gasometer	1971	155801
BW	456m E	Unspecified Tank	1962	149675
BW	459m E	Gasometers	1979	166420
BW	459m E	Gasometers	1979	166420
BW	459m E	Tanks	1979	156234
BW	459m E	Gasometers	1984	166420
BW	459m E	Gasholders	1988	158129
BW	459m E	Gasholders	1988	158129
BW	459m E	Gasholders	1992	158129
BW	460m E	Gas Holder	1998	160835
BW	467m E	Gasometer	1919	155800
BW	471m E	Gas Holder	1984	168061
BW	471m E	Gasometer	1971	155799
BW	471m E	Unspecified Tank	1962	149676
BW	474m E	Gas Holder	1998	168061
CE	482m SE	Tanks	1984	162846
CE	482m SE	Tanks	1988	162846



ID	Location	Land Use	Date	Group ID
CE	482m SE	Tanks	1988	162846
CE	482m SE	Tanks	1992	162846
CE	484m SE	Tanks	1998	161436
CE	484m SE	Tanks	1998	161436
CE	484m SE	Tanks	1984	163886
DA	495m N	Gas Works	1900	166709

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m

36

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 45**

ID	Location	Land Use	Date	Group ID
BW	342m NE	Gas Works	1919	93005
BW	344m NE	Gas Works	1971	96102
BW	345m NE	Gas Holder Station	1984	89850
BW	363m E	Electricity Substation	1979	91168
BW	363m E	Electricity Substation	1979	91168
BW	363m E	Electricity Substation	1979	91168
BW	363m E	Electricity Substation	1984	91168
BW	379m E	Electricity Substation	1984	85723
BW	398m NE	Electricity Substation	1979	94037
BW	398m NE	Electricity Substation	1979	94037
BW	398m NE	Electricity Substation	1979	94037
BW	398m NE	Electricity Substation	1984	94037
BW	400m NE	Electricity Transformer	1971	87769
BW	438m NE	Gas Works	1979	96102



ID	Location	Land Use	Date	Group ID
BW	438m NE	Gas Works	1979	96102
BW	450m E	Gas Works	1984	95338
BW	450m E	Gas Holder Station	1988	91307
BW	450m E	Gas Holder Station	1988	91307
BW	450m E	Gas Holder Station	1992	91307
BW	453m E	Gasometers	1919	91846
BW	453m E	Gas Holder Station	1998	91307
BW	456m E	Gas Holder	1984	89492
BW	456m E	Gasometer	1971	87296
BW	459m E	Gasometers	1979	94333
BW	459m E	Gasometers	1979	94333
BW	459m E	Gasometers	1984	94333
BW	459m E	Gasholders	1988	90201
BW	459m E	Gasholders	1988	90201
BW	459m E	Gasholders	1992	90201
BW	460m E	Gas Holder	1998	89492
BW	467m E	Gasometer	1919	87295
BW	471m E	Gas Holder	1984	95078
BW	471m E	Gasometer	1971	87294
BW	474m E	Gas Holder	1998	95078
DA	488m NE	Old Gas Works	1919	87504
DA	495m N	Gas Works	1900	91219

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.



This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m

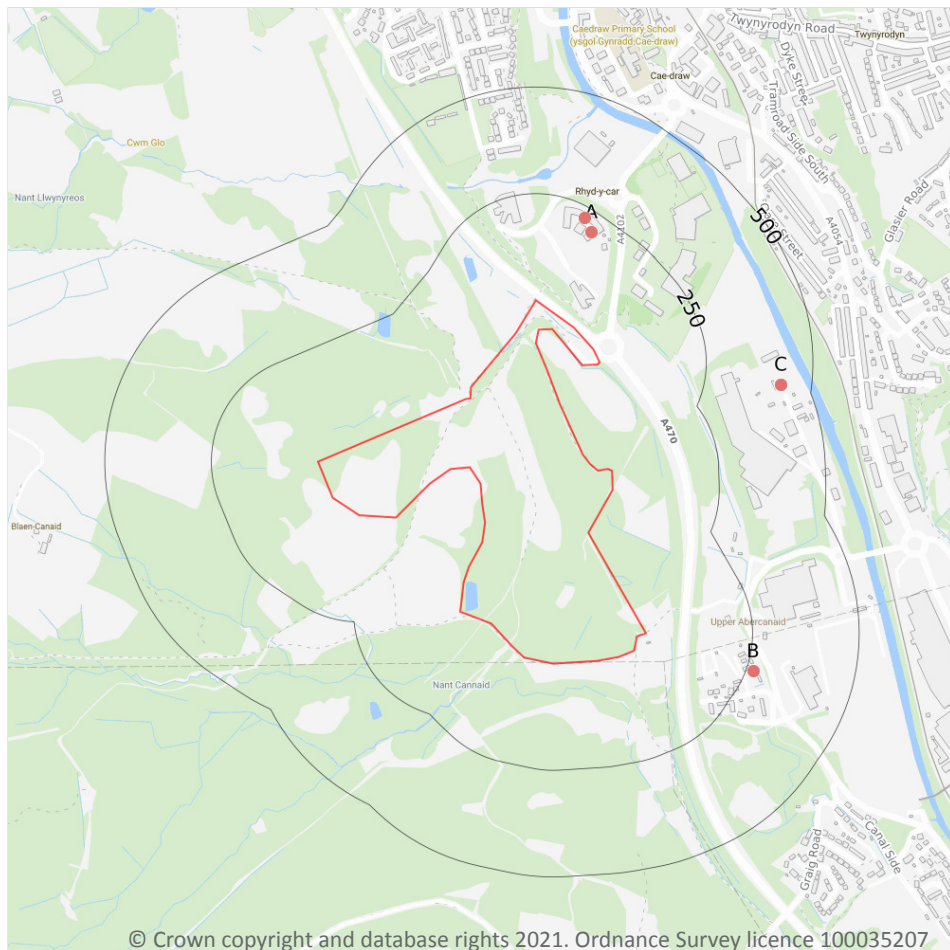
0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.



3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- Waste exemptions

3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m**0**

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m**0**

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m**0**

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m**0**

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m**15**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 87**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	205m NE	Mitie Technical Facilities Management Ltd, Welsh Government, Rhyd-y-Car, Merthyr Tydfil, Merthyr Tydfil, CF481UZ	NRW-WME025207	Storing waste exemption	Not on a farm	Storage of waste in secure containers
A	205m NE	Mitie Technical Facilities Management Ltd, Welsh Government, Rhyd-y-Car, Merthyr Tydfil, Merthyr Tydfil, CF481UZ	NRW-WME025207	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	223m NE	Mitie Technical Facilities Management Ltd, Welsh Government, Rhyd-y-Car, Merthyr Tydfil, Merthyr Tydfil, CF48 1UZ	NRW-WME054341	Storing waste exemption	Not on a farm	Storage of waste in secure containers
A	223m NE	Mitie Technical Facilities Management Ltd, Welsh Government, Rhyd-y-Car, Merthyr Tydfil, Merthyr Tydfil, CF48 1UZ	NRW-WME054341	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	267m E	Glynderus Farm Abercanaid Merthyr Tydfil Merthyr Tydfil CF481YL	NRW-WME024877	Using waste exemption	Not on a farm	Use of waste in construction
B	267m E	Glynderus Farm Abercanaid Merthyr Tydfil Merthyr Tydfil CF481YL	NRW-WME024877	Using waste exemption	Not on a farm	Use of baled end-of-life tyres in construction
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Storing waste exemption	Not on a farm	Storage of waste in a secure place
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Treating waste exemption	Not on a farm	Sorting mixed waste
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Treating waste exemption	Not on a farm	Manual treatment of waste
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)

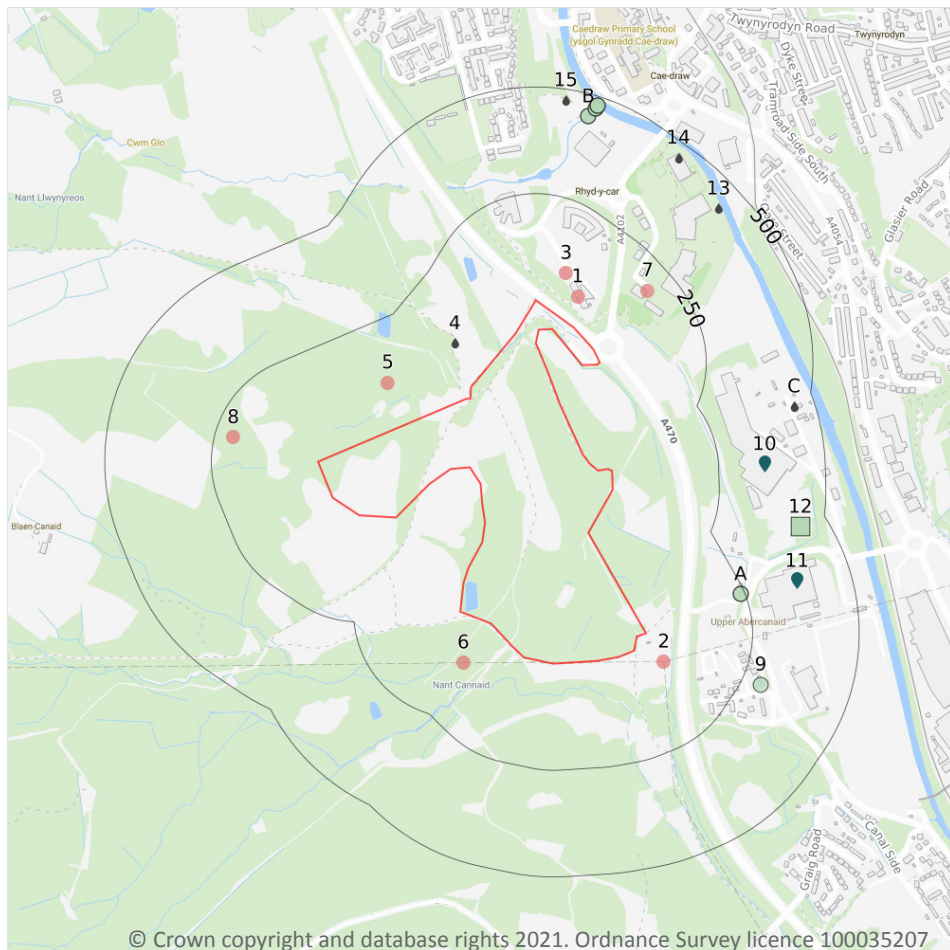


ID	Location	Site	Reference	Category	Sub-Category	Description
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Treating waste exemption	Not on a farm	Screening and blending of waste
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Treating waste exemption	Not on a farm	Recovery of scrap metal
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Using waste exemption	Not on a farm	Use of waste in construction
C	428m E	THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YF	WEX089880	Using waste exemption	Not on a farm	Use of waste to manufacture finished goods

This data is sourced from the Environment Agency and Natural Resources Wales.



4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- List 2 Dangerous Substances
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m

7

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 91**

ID	Location	Company	Address	Activity	Category
1	64m NE	Orbit Business Centre	Rhydycar Business Park, Merthyr Tydfil, Mid Glamorgan, CF48 1DL	Business Parks and Industrial Estates	Industrial Features
2	74m E	Pylon	Mid Glamorgan, CF48	Electrical Features	Infrastructure and Facilities



ID	Location	Company	Address	Activity	Category
3	93m NE	Electricity Sub Station	Mid Glamorgan, CF48	Electrical Features	Infrastructure and Facilities
5	107m NW	Adit (Dis)	Mid Glamorgan, CF48	Unspecified Quarries Or Mines	Extractive Industries
6	109m S	Pylon	Mid Glamorgan, CF48	Electrical Features	Infrastructure and Facilities
7	187m NE	Electricity Sub Station	Mid Glamorgan, CF48	Electrical Features	Infrastructure and Facilities
8	207m W	Quarries (Disused)	Mid Glamorgan, CF48	Unspecified Quarries Or Mines	Extractive Industries

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0
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Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0
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High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0
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High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m**0**

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m**0**

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m**0**

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m**0**

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m**0**

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m

0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m

2

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 91**

ID	Location	Address	Details	
10	357m E	Triumph Business Systems, TBS (South Wales) Ltd., The Willows, Abercanaid, Merthyr Tydfil, Mid Glamorgan, CF47 0YD	Process: Coating Processes Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
11	374m E	Amnitec Ltd, Abercanaid, Merthyr Tydfil, Mid Glamorgan, CF48 1UX	Process: Surface Cleaning Status: Pending Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m

6

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 91**

ID	Location	Address	Details	
4	94m NW	GLYNDYRIS DISUSED MINE SHAFT	Effluent Type: UNSPECIFIED Permit Number: AN0016201 Permit Version: 1 Receiving Water: TAFF RIVER	Status: CONSENT EXPIRED - TIME LIMIT Issue date: 12/09/1986 Effective Date: 12/09/1986 Revocation Date: 18/09/1986
13	438m NE	RHYD-Y-CAR LEISURE CENTRE MT, RHYD-Y-CAR LEISURE CENTRE, RHYD-Y-CAR, Merthyr Tydfil, CF48 1UT	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - NOT WATER COMPANY Permit Number: AN0413101 Permit Version: 2 Receiving Water: RIVER TAFF	Status: Effective Issue date: 28/11/2016 Effective Date: 12/12/2016 Revocation Date: -
C	452m E	GROUNDWATER REMEDIATION TREATMENT @, FORMER WILLOWS GASWORKS, THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YH	Effluent Type: GROUNDWATER - BOREHOLE Permit Number: EPRNB3735AW Permit Version: 1 Receiving Water: GROUNDWATER	Status: SURRENDERED UNDER EPR 2010 Issue date: 15/04/2013 Effective Date: 15/04/2013 Revocation Date: 23/12/2013
C	452m E	GROUNDWATER REMEDIATION TREATMENT @, FORMER WILLOWS GASWORKS, THE WILLOWS, ABERCANAID INDUSTRIAL ESTATE, MERTHYR TYDFIL, CF48 1YH	Effluent Type: GROUNDWATER - BOREHOLE Permit Number: EPRNB3735AW Permit Version: 1 Receiving Water: GROUNDWATER	Status: SURRENDERED UNDER EPR 2010 Issue date: 15/04/2013 Effective Date: 15/04/2013 Revocation Date: 23/12/2013
14	465m NE	RHYDYCAR SPORTS COMPLEX MERTHYR T, RHYDYCAR SPORTS COMPLEX MERTHY, MERTHYR TYDFIL	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: AF3031901 Permit Version: 1 Receiving Water: TAFF	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 02/10/1972 Effective Date: 02/10/1972 Revocation Date: 06/05/2004
15	474m N	MERTHYR - REAR OF EASTFIELD TE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AE2025309 Permit Version: 1 Receiving Water: TAFF	Status: Surrendered Issue date: 15/04/1964 Effective Date: 15/04/1964 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m

0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.



4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m

1

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 91**

ID	Location	Name	Status	Receiving Water	Authorised Substances
12	438m NE	Triumph Business Systems, The Willows, Abercanaid, Merthyr	Not Active	River Taff	Chromium, Copper, Lead, Nickel, Zinc

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m

9

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 91**

ID	Location	Details	
A	240m E	Incident Date: 04/05/2016 Incident Identification: 1602160 Pollutant: Oils and Fuels Pollutant Description: Unidentified Oil	Water Impact: Category 3 (Minor) Land Impact: No Details Air Impact: No Details

ID	Location	Details	
A	240m E	Incident Date: 04/05/2016 Incident Identification: 1602160 Pollutant: - Pollutant Description: -	Water Impact: Category 3 (Minor) Land Impact: No Details Air Impact: No Details
9	294m SE	Incident Date: 26/11/2002 Incident Identification: 123260 Pollutant: Inert Materials and Wastes Pollutant Description: Rocks and Gravel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
B	448m N	Incident Date: 10/03/2017 Incident Identification: 1701236 Pollutant: - Pollutant Description: -	Water Impact: Category 3 (Minor) Land Impact: Other Air Impact: Other
B	448m N	Incident Date: 10/03/2017 Incident Identification: 1701236 Pollutant: Inert Materials and Waste Pollutant Description: Soils and Clay	Water Impact: Category 3 (Minor) Land Impact: Other Air Impact: Other
B	470m N	Incident Date: 01/03/2017 Incident Identification: 1701047 Pollutant: - Pollutant Description: -	Water Impact: Category 3 (Minor) Land Impact: Other Air Impact: Other
B	470m N	Incident Date: 01/03/2017 Incident Identification: 1701047 Pollutant: Inert Materials and Waste Pollutant Description: Soils and Clay	Water Impact: Category 3 (Minor) Land Impact: Other Air Impact: Other
B	478m N	Incident Date: 30/01/2017 Incident Identification: 1700454 Pollutant: - Pollutant Description: -	Water Impact: Category 3 (Minor) Land Impact: Other Air Impact: Other
B	478m N	Incident Date: 30/01/2017 Incident Identification: 1700454 Pollutant: Inert Materials and Waste Pollutant Description: Soils and Clay	Water Impact: Category 3 (Minor) Land Impact: Other Air Impact: Other

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m

0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.



4.20 Pollution inventory waste transfers

Records within 500m

0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

Records within 500m

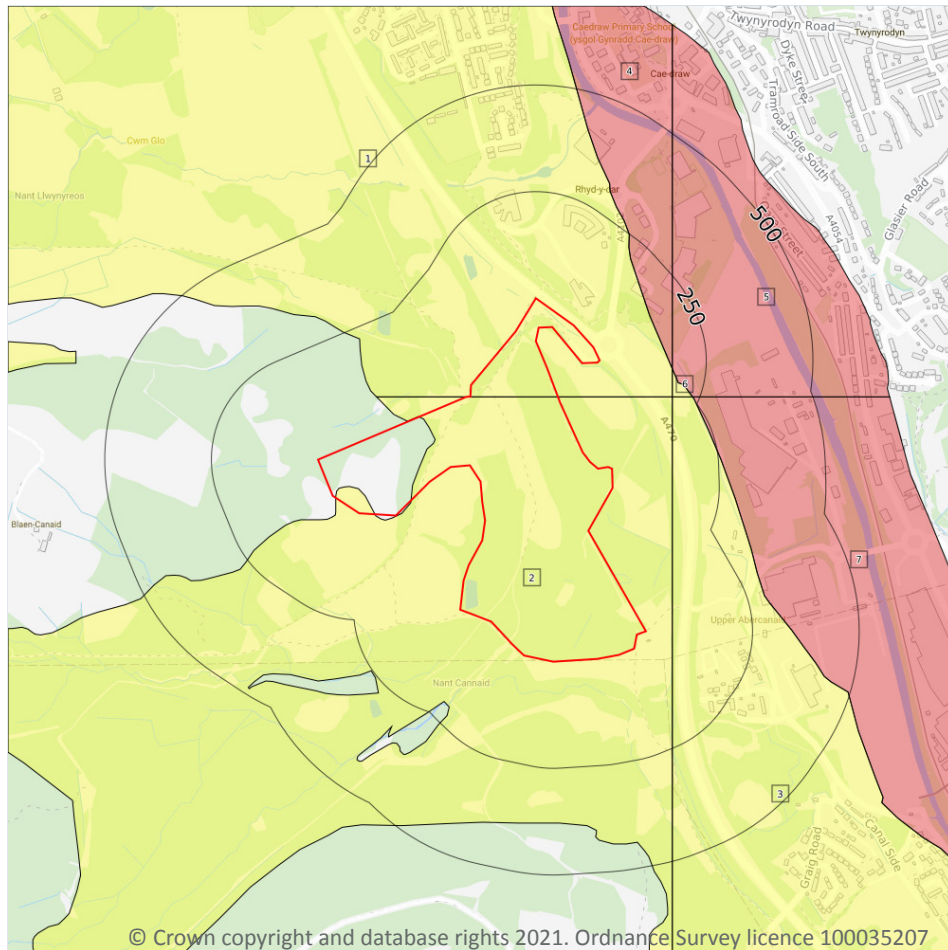
0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.



5 Hydrogeology - Superficial aquifer



- Site Outline**
- Search buffers in metres (m)**
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive
 - Unknown

5.1 Superficial aquifer

Records within 500m

7

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 99**

ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

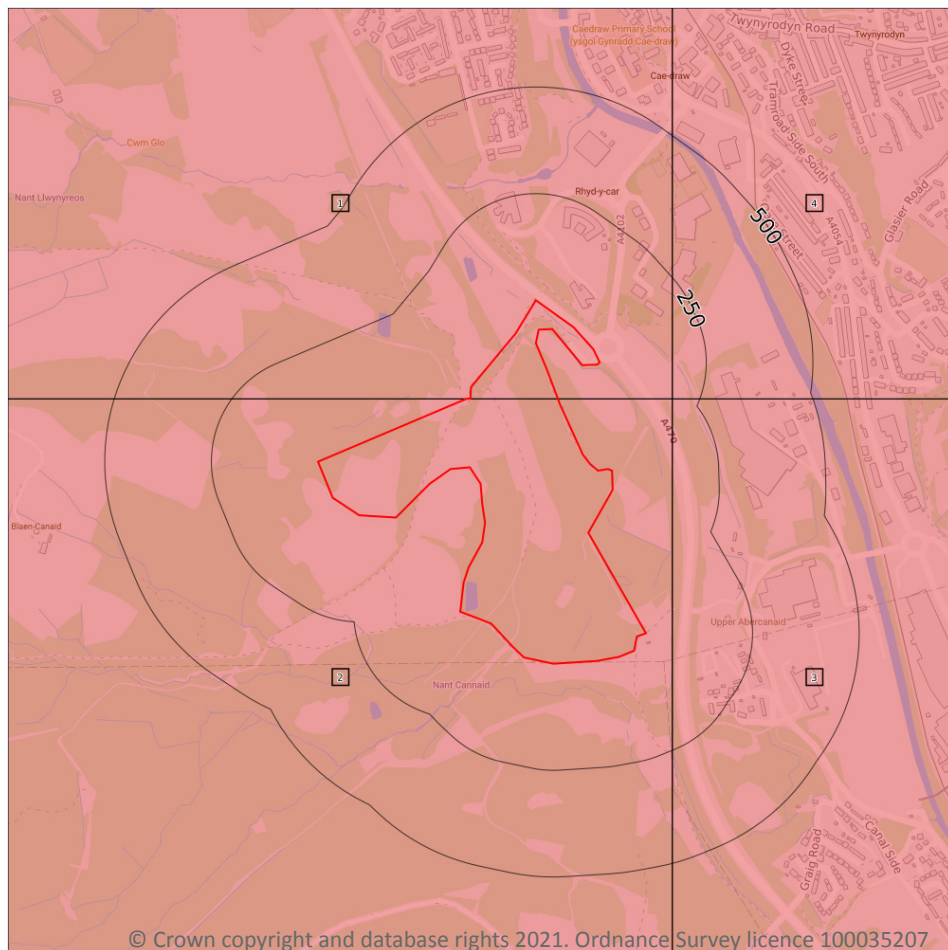


ID	Location	Designation	Description
3	62m E	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	149m NE	Secondary A	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
5	170m E	Secondary A	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
6	172m E	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
7	234m E	Secondary A	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

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Bedrock aquifer



- Site Outline**
- Search buffers in metres (m)**
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

4

Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 101**

ID	Location	Designation	Description
1	On site	Secondary A	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
2	On site	Secondary A	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

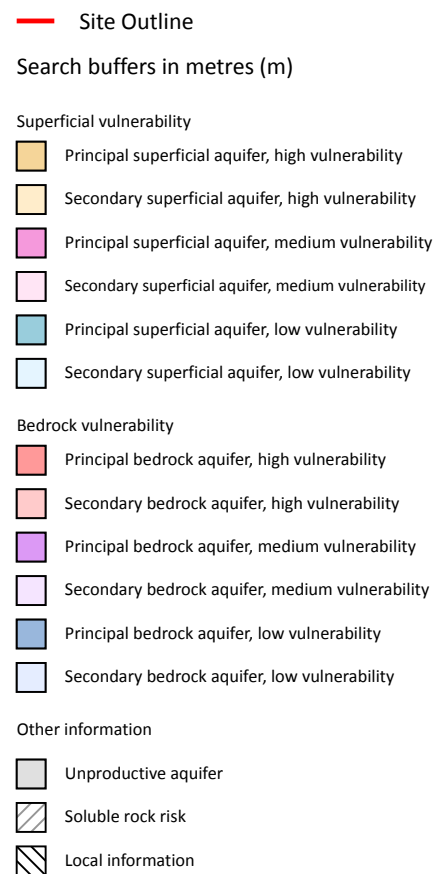
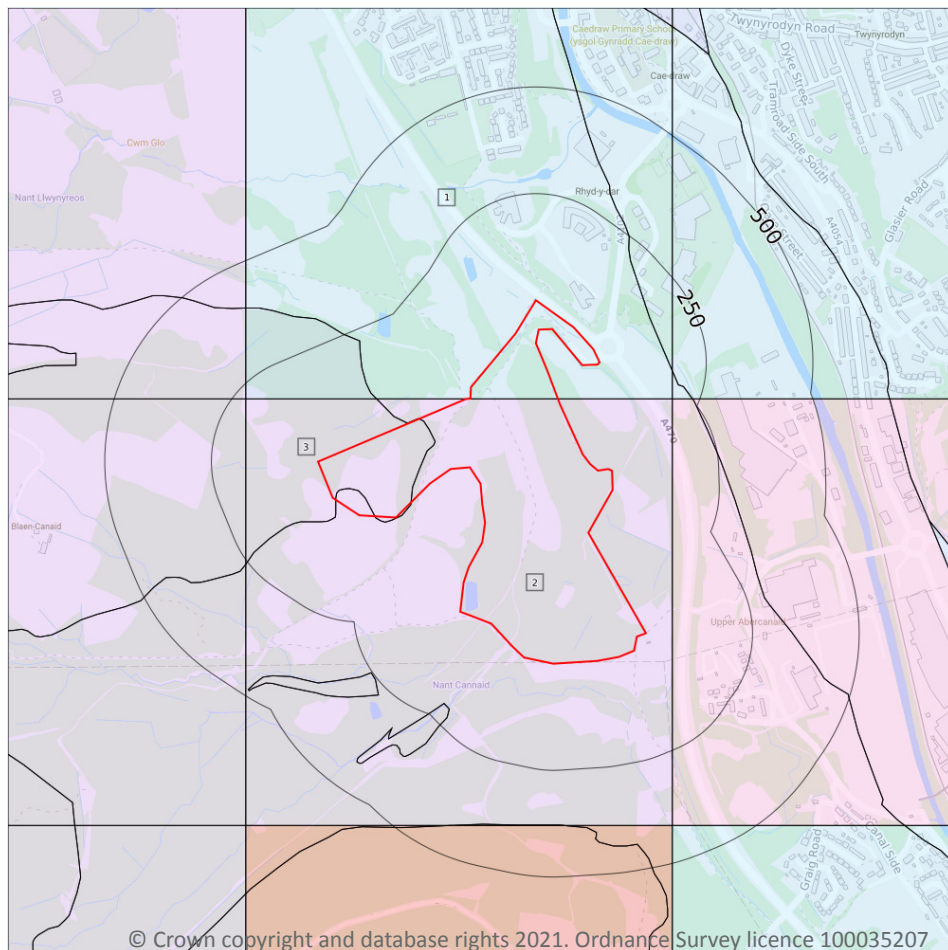


ID	Location	Designation	Description
3	62m E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	170m E	Secondary A	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

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

3

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 103**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures
2	On site	Summary Classification: Secondary bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: <3m Patchiness value: <90% Recharge potential: Low	Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures
3	On site	Summary Classification: Secondary bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: Low	Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site

0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site

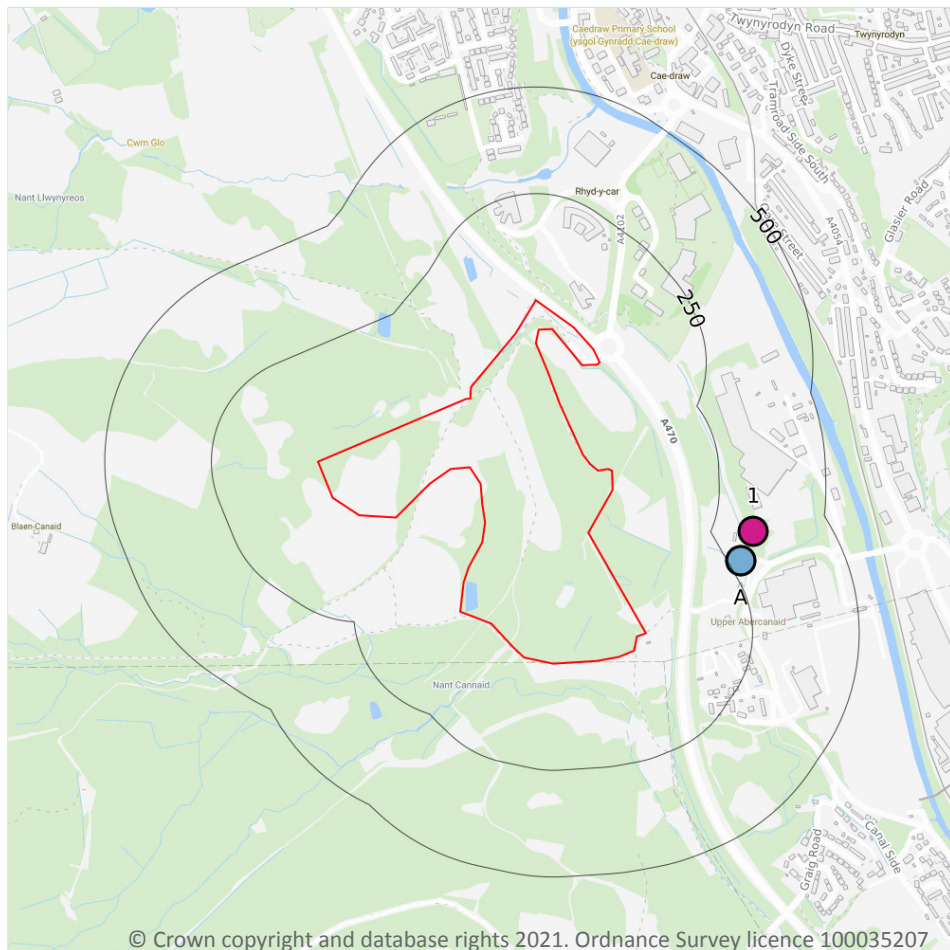
0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.



Abstractions and Source Protection Zones



- Site Outline
- Search buffers in metres (m)**
- Source Protection Zone 1
Inner catchment
- Source Protection Zone 2
Outer catchment
- Source Protection Zone 3
Total catchment
- Source Protection Zone 4
Zone of Special Interest
- Source Protection Zone 1c
Inner catchment - confined aquifer
- Source Protection Zone 2c
Outer catchment - confined aquifer
- Source Protection Zone 3c
Total catchment - confined aquifer
- Drinking water abstraction licences
Polygon features
- Drinking water abstraction licences
Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m

1

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 105**

ID	Location	Details	
1	337m NE	Status: Historical Licence No: 21/57/22/0035 Details: General Washing/Process Washing Direct Source: EAW Groundwater Point: BOREHOLE AT TBS (SOUTH WALES) LTD Data Type: Point Name: TBS (South Wales) Ltd Easting: 305190 Northing: 204690	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 08/06/1994 Expiry Date: - Issue No: 100 Version Start Date: 14/10/1999 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	2
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Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 105**

ID	Location	Details	
A	276m NE	Status: Historical Licence No: 21/57/22/0025 Details: General Use Relating To Secondary Category (Low Loss) Direct Source: EAW Surface Water Point: NANT CANAID AT GLYN-DYRYS Data Type: Point Name: Hoover Plc Easting: 305160 Northing: 204620	Annual Volume (m ³): 509152 Max Daily Volume (m ³): 1818.4 Original Application No: - Original Start Date: 25/07/1979 Expiry Date: - Issue No: 100 Version Start Date: 30/10/2003 Version End Date: -
A	276m NE	Status: Historical Licence No: 21/57/22/0025 Details: Non-Evaporative Cooling Direct Source: EAW Surface Water Point: NANT CANAID AT GLYN-DYRYS Data Type: Point Name: Hoover Plc Easting: 305160 Northing: 204620	Annual Volume (m ³): 509152 Max Daily Volume (m ³): 1818.4 Original Application No: - Original Start Date: 25/07/1979 Expiry Date: - Issue No: 100 Version Start Date: 30/10/2003 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.



5.8 Potable abstractions

Records within 2000m

0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m

0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m

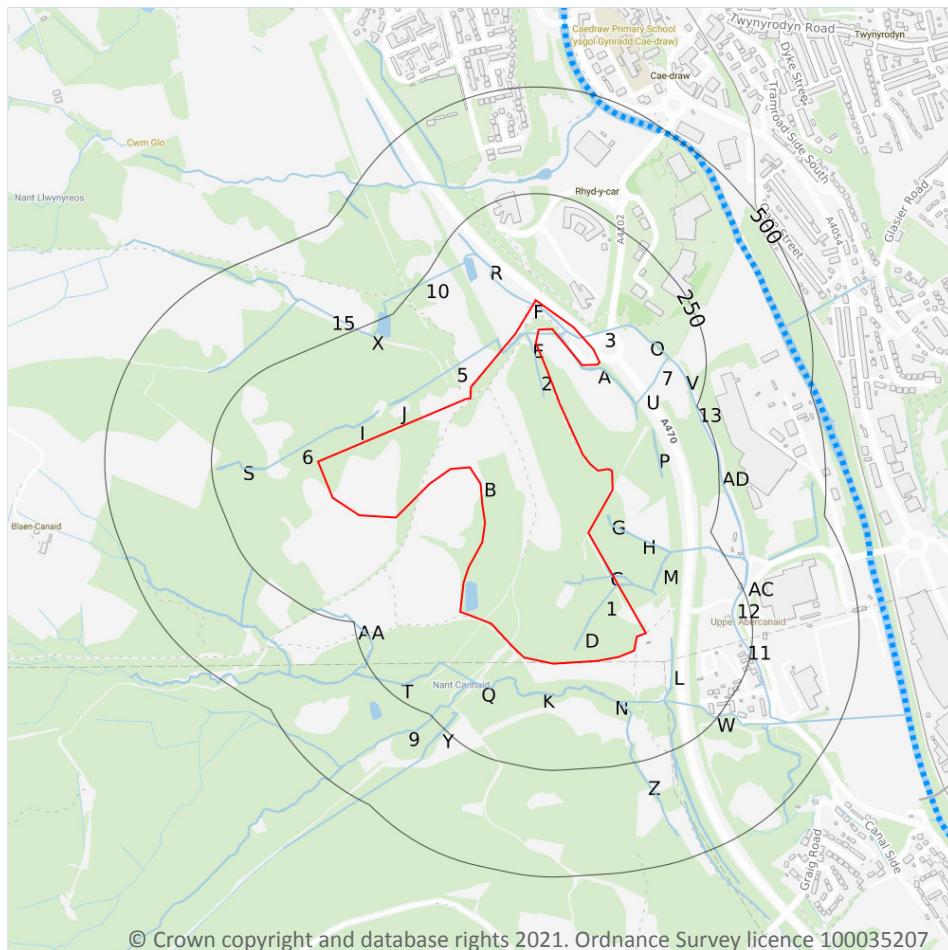
0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.



6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

91

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 108**

ID	Location	Type of water feature	Ground level	Permanence	Name
1	On site	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
2	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
3	On site	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-
A	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
C	On site	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
F	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
G	17m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
5	20m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	26m NE	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
C	30m NE	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
C	31m NE	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
G	32m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	36m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	37m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	41m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
6	47m NW	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-
C	52m NE	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
J	54m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
K	55m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
L	60m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	61m NE	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	61m NE	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
M	68m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	68m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	85m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
O	95m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	104m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	104m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
N	105m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
P	111m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Q	112m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Nant Cannaid



ID	Location	Type of water feature	Ground level	Permanence	Name
R	120m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Q	121m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
S	122m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Q	123m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
Q	123m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	125m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
T	127m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
U	128m SE	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
U	129m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
U	130m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
7	133m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	136m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
N	136m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
M	144m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	144m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
Q	145m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
M	147m NE	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-
9	155m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid
V	162m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
R	172m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
R	172m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
R	172m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
R	187m NW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
10	188m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	194m S	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
W	201m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant Cannaid



ID	Location	Type of water feature	Ground level	Permanence	Name
Y	203m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
11	206m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Z	208m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
12	216m E	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
AA	219m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
X	220m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AC	223m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AC	226m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
X	228m NW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
13	233m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AD	239m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
15	243m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.



6.2 Surface water features

Records within 250m

33

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 108**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site

1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 108**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
B	On site	River WB catchment	Taff - conf Taf Fechan to conf R Cynon	GB109057033100	Taff u s Cynon	South East Valleys

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified

1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site.

Features are displayed on the Hydrology map on **page 108**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
27	424m NE	River	Taff - conf Taf Fechan to conf R Cynon	GB109057033100	Moderate	Good	Moderate	2016



This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site

1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place.

Features are displayed on the Hydrology map on **page 108**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
B	On site	SE Valleys Carboniferous Coal Measures	GB40902G201900	Poor	Poor	Good	2016

This data is sourced from the Environment Agency and Natural Resources Wales.



7 River and coastal flooding

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m

0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m

0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m

0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m

0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



7.5 Flood Storage Areas

Records within 250m

0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.



River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m

0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m

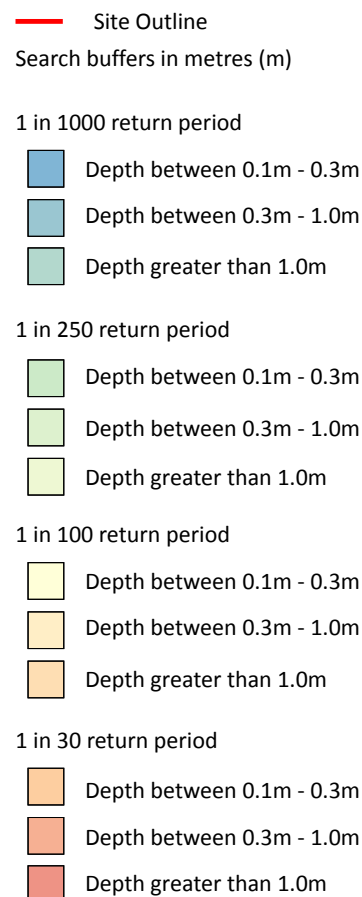
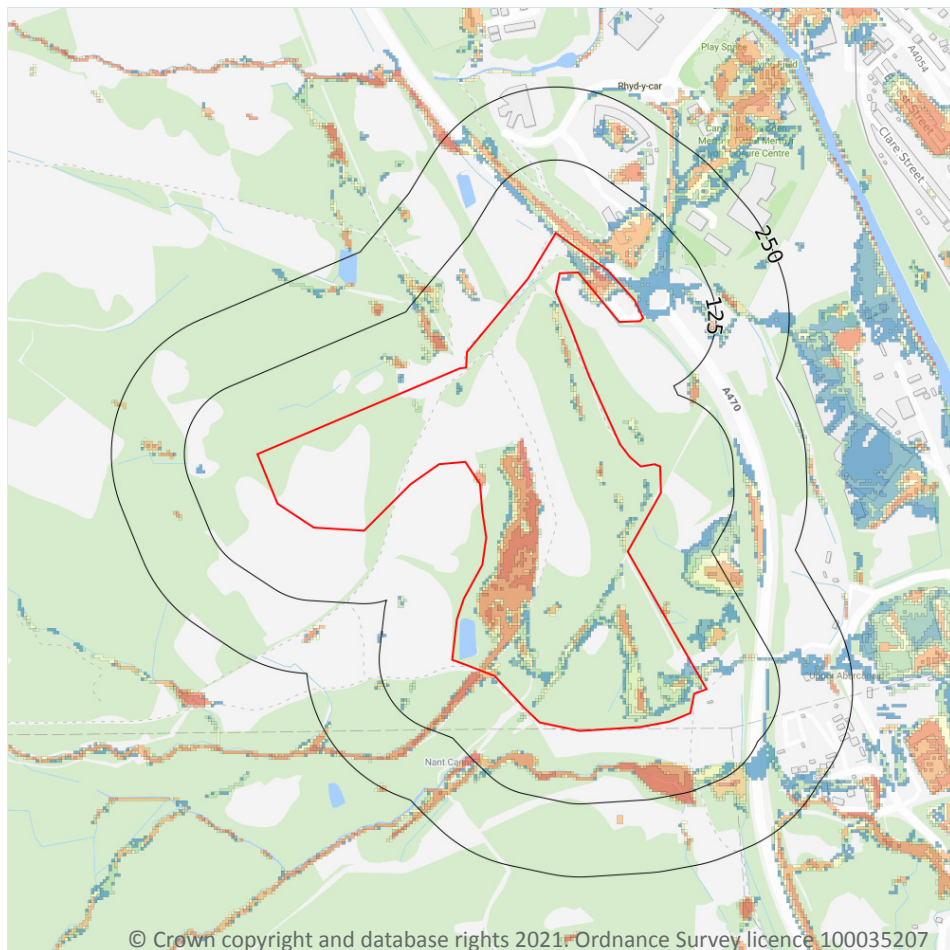
0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



8 Surface water flooding



8.1 Surface water flooding

Highest risk on site

1 in 30 year, Greater than 1.0m

Highest risk within 50m

1 in 30 year, Greater than 1.0m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 121**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

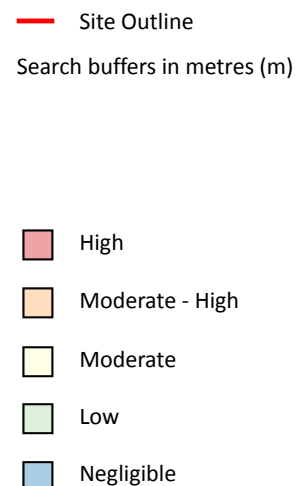
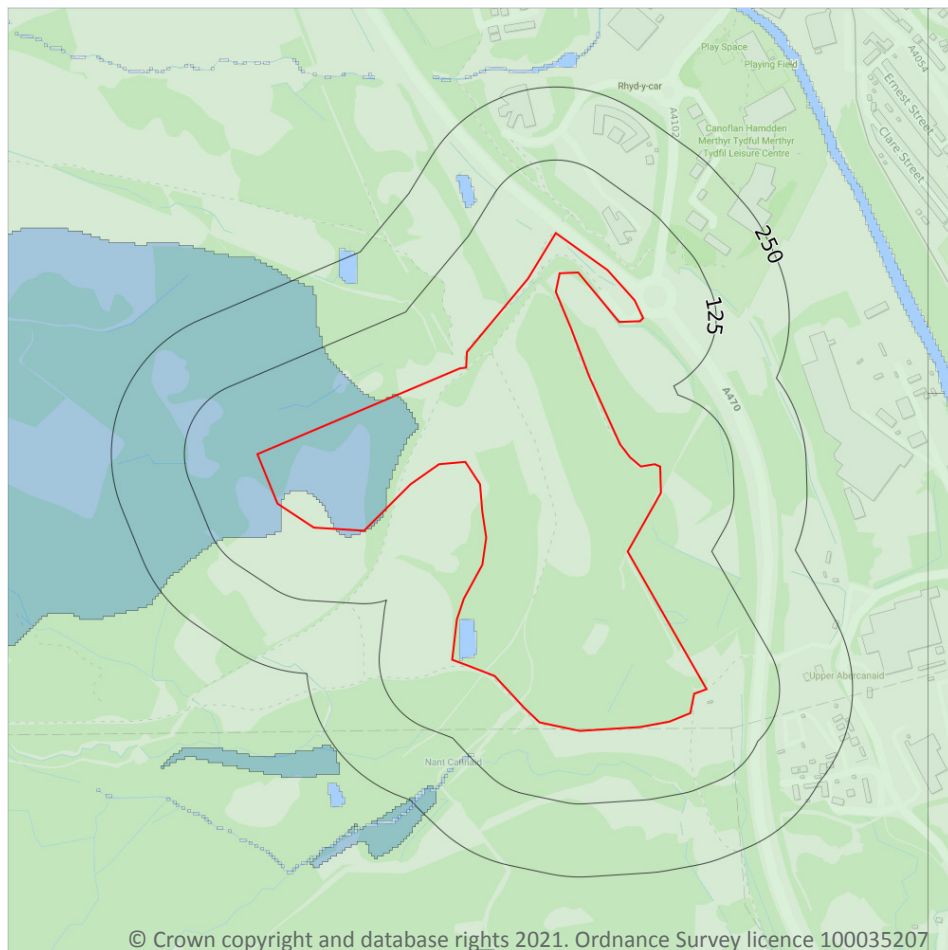
The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

This data is sourced from Ambiantal Risk Analytics.



9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site

Low

Highest risk within 50m

Low

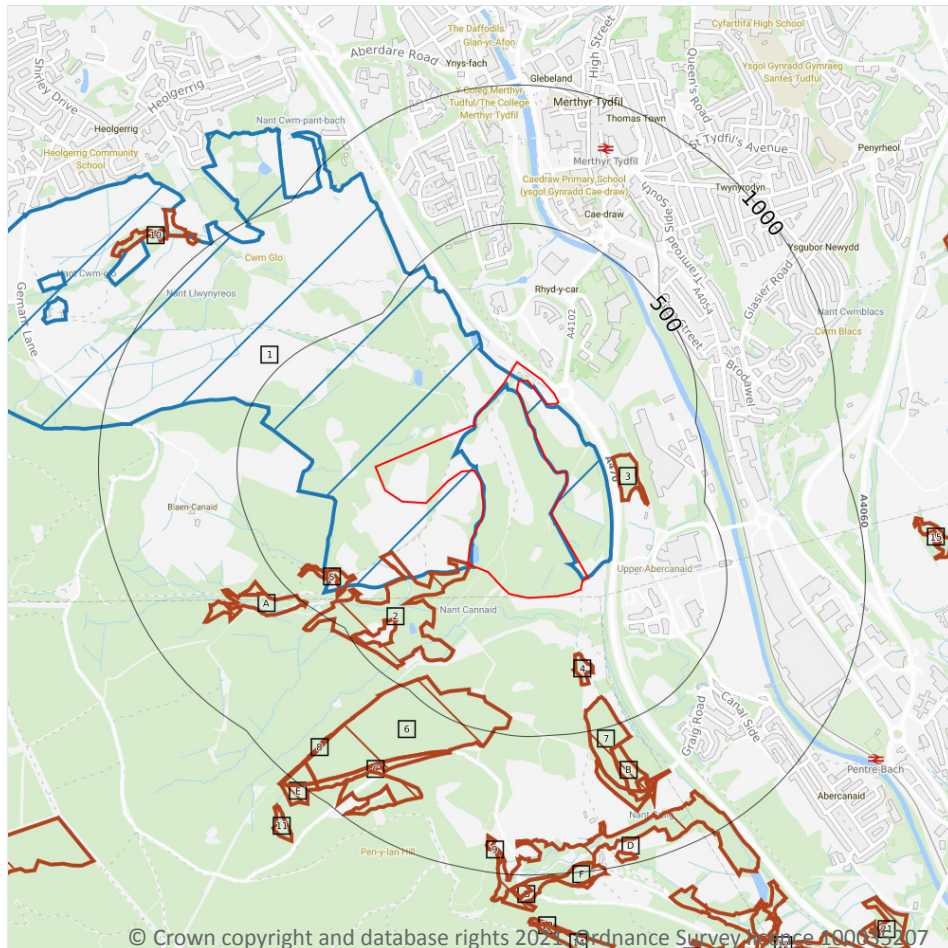
Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 123**

This data is sourced from Ambient Risk Analytics.



10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Sites of Special Scientific Interest (SSSI)
- Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

1

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 124**

ID	Location	Name	Data source
1	On site	Cwm Glo A Glydyrys	Natural Resources Wales



This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m

0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m

0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m

0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.



10.6 Local Nature Reserves (LNR)

Records within 2000m

0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m

54

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 124**

ID	Location	Name	Woodland Type
2	On site	Unknown	Ancient Semi Natural Woodland
3	176m E	Unknown	Ancient Semi Natural Woodland
4	219m S	Unknown	Ancient Semi Natural Woodland
5	321m SW	Unknown	Ancient Semi Natural Woodland
6	374m SW	Unknown	Ancient Semi Natural Woodland
7	389m S	Unknown	Ancient Semi Natural Woodland
A	494m SW	Unknown	Ancient Semi Natural Woodland
B	572m S	Unknown	Ancient Semi Natural Woodland
A	572m SW	Unknown	Plantation on Ancient Woodland Site
B	604m S	Unknown	Ancient Semi Natural Woodland
C	607m S	Unknown	Ancient Semi Natural Woodland
A	663m SW	Unknown	Plantation on Ancient Woodland Site
A	676m SW	Unknown	Ancient Woodland Site of Unknown Category
B	716m S	Unknown	Ancient Semi Natural Woodland
8	758m SW	Unknown	Ancient Semi Natural Woodland
C	776m SW	Unknown	Plantation on Ancient Woodland Site



ID	Location	Name	Woodland Type
C	824m SW	Unknown	Ancient Semi Natural Woodland
D	834m S	Unknown	Ancient Semi Natural Woodland
9	871m S	Unknown	Plantation on Ancient Woodland Site
E	923m SW	Unknown	Plantation on Ancient Woodland Site
E	924m SW	Unknown	Plantation on Ancient Woodland Site
D	948m S	Unknown	Restored Ancient Woodland Site
F	969m S	Unknown	Restored Ancient Woodland Site
G	1008m S	Unknown	Ancient Woodland Site of Unknown Category
F	1024m S	Unknown	Plantation on Ancient Woodland Site
G	1030m S	Unknown	Ancient Woodland Site of Unknown Category
10	1038m NW	Unknown	Ancient Semi Natural Woodland
11	1110m SW	Unknown	Plantation on Ancient Woodland Site
12	1141m S	Unknown	Ancient Semi Natural Woodland
13	1158m S	Unknown	Ancient Woodland Site of Unknown Category
14	1171m S	Unknown	Plantation on Ancient Woodland Site
15	1193m E	Unknown	Ancient Semi Natural Woodland
16	1329m S	Unknown	Ancient Semi Natural Woodland
17	1387m S	Unknown	Ancient Semi Natural Woodland
-	1424m E	Unknown	Ancient Semi Natural Woodland
-	1493m E	Unknown	Ancient Semi Natural Woodland
20	1514m NE	Unknown	Restored Ancient Woodland Site
21	1525m SE	Unknown	Ancient Semi Natural Woodland
-	1557m E	Unknown	Ancient Semi Natural Woodland
-	1590m E	Unknown	Ancient Semi Natural Woodland
-	1610m S	Unknown	Ancient Semi Natural Woodland
-	1621m E	Unknown	Ancient Semi Natural Woodland
25	1670m SW	Unknown	Plantation on Ancient Woodland Site
-	1713m SE	Unknown	Restored Ancient Woodland Site

ID	Location	Name	Woodland Type
-	1726m S	Unknown	Plantation on Ancient Woodland Site
-	1760m E	Unknown	Ancient Semi Natural Woodland
-	1770m NE	Unknown	Ancient Semi Natural Woodland
29	1794m SE	Unknown	Ancient Semi Natural Woodland
-	1868m S	Unknown	Plantation on Ancient Woodland Site
-	1873m SE	Unknown	Ancient Semi Natural Woodland
-	1891m SE	Unknown	Ancient Semi Natural Woodland
-	1935m SE	Unknown	Ancient Semi Natural Woodland
-	1955m E	Unknown	Restored Ancient Woodland Site
-	1960m N	Unknown	Restored Ancient Woodland Site

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m

0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m

0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.



10.10 Marine Conservation Zones

Records within 2000m**0**

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m**0**

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m**0**

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m**0**

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m**0**

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.



10.15 Nitrate Sensitive Areas

Records within 2000m

0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.



SSSI Impact Zones and Units

10.17 SSSI Impact Risk Zones

Records on site

0

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m

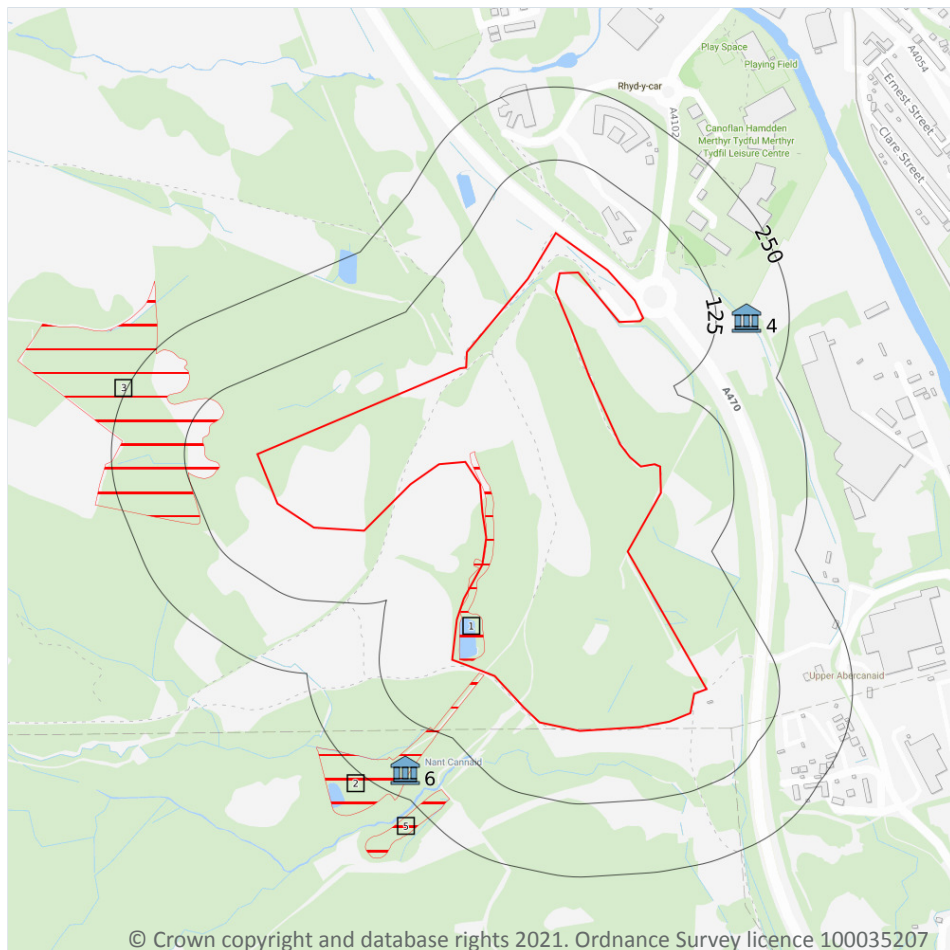
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Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.



11 Visual and cultural designations



- Site Outline
- Search buffers in metres (m)
- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

2

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 132**

ID	Location	Name	Grade	Reference Number	Listed date
4	177m E	Rhydycar Skew Bridge, Located S Of Rhydycar Leisure Centre And Crossing The Line Of The Former Glamorganshire Canal Beneath A Tall Embankment	II	15676	14/02/1995
6	206m SW	Base Of Chimney At Cwm Pit, In Forestry On The W Side Of The Taf Valley Reached By A Track Some 1Km NW From The Gethin Forest Picnic Site	II	81752	29/07/2003

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



11.5 Conservation Areas

Records within 250m

0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m

4

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

Features are displayed on the Visual and cultural designations map on **page 132**

ID	Location	Ancient monument name	Reference number
1	On site	Cyfarthfa balance pond and leat	4338
2	5m S	Cwm Pit and head of railway	4336
3	68m W	Black Pins early ironstone workings	4339
5	199m SW	Vale of Neath railway cutting and tunnel portal	4337

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m

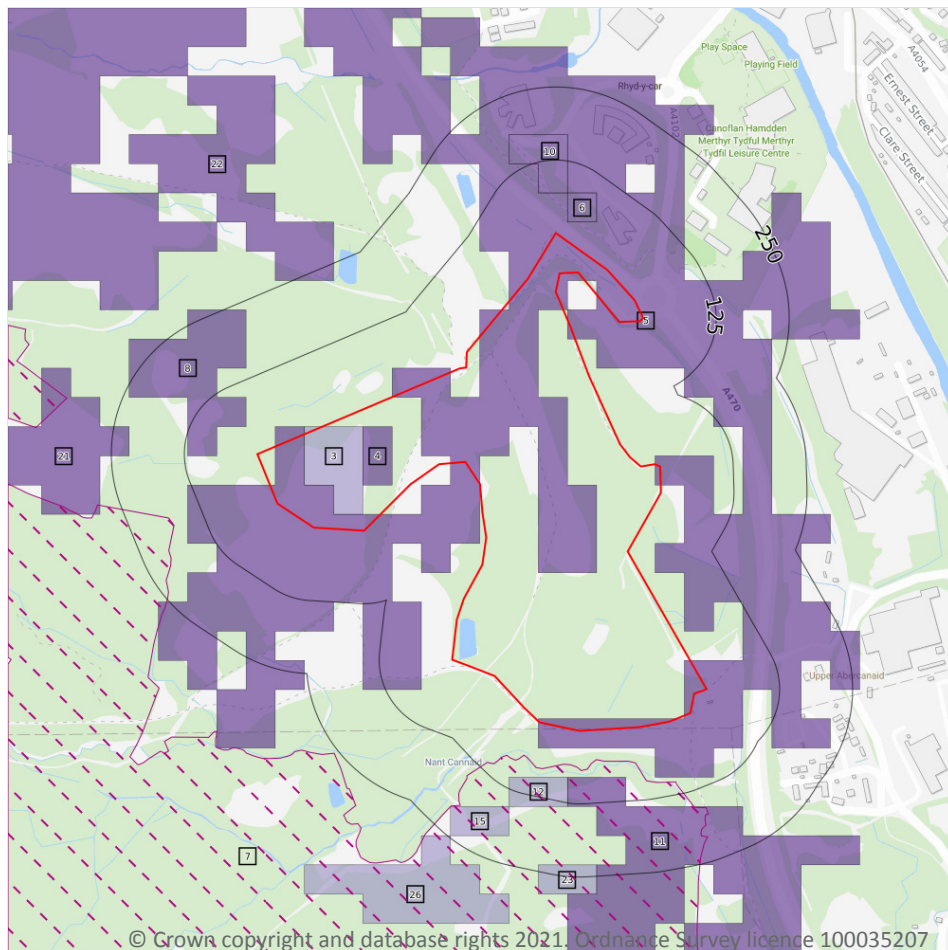
0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



12 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Timber felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m

13

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 135**

ID	Location	Classification	Description
3	On site	Grade 4	Poor quality agricultural land
4	On site	Grade 5	Very poor quality agricultural land
5	On site	Grade 5	Very poor quality agricultural land



ID	Location	Classification	Description
6	27m NE	Grade 5	Very poor quality agricultural land
8	51m NW	Grade 5	Very poor quality agricultural land
10	69m N	Grade 5	Very poor quality agricultural land
11	79m S	Grade 5	Very poor quality agricultural land
12	82m S	Grade 4	Poor quality agricultural land
15	153m S	Grade 4	Poor quality agricultural land
21	219m W	Grade 5	Very poor quality agricultural land
22	223m NW	Grade 5	Very poor quality agricultural land
23	229m S	Grade 4	Poor quality agricultural land
26	247m SW	Grade 4	Poor quality agricultural land

This data is sourced from Natural Resources Wales.

12.2 Open Access Land

Records within 250m

1

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

Features are displayed on the Agricultural designations map on **page 135**

ID	Location	Name	Classification	Other relevant legislation
7	51m S	-	NRW Public Forest 2014	-

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m

0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.



12.4 Environmental Stewardship Schemes

Records within 250m

0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m

0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.



13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m

0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m

0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.



14 Geology 1:10,000 scale - Availability



— Site Outline
Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m

1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 139**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	No coverage	No coverage	No coverage	NoCov

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Artificial and made ground

14.2 Artificial and made ground (10k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial

14.3 Superficial geology (10k)

Records within 500m

0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock

14.5 Bedrock geology (10k)

Records within 500m

0

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



— Site Outline
Search buffers in metres (m)

☐ Geological map tile

15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme. Where 50k data is not available, this area has been filled in with 625k scale data.

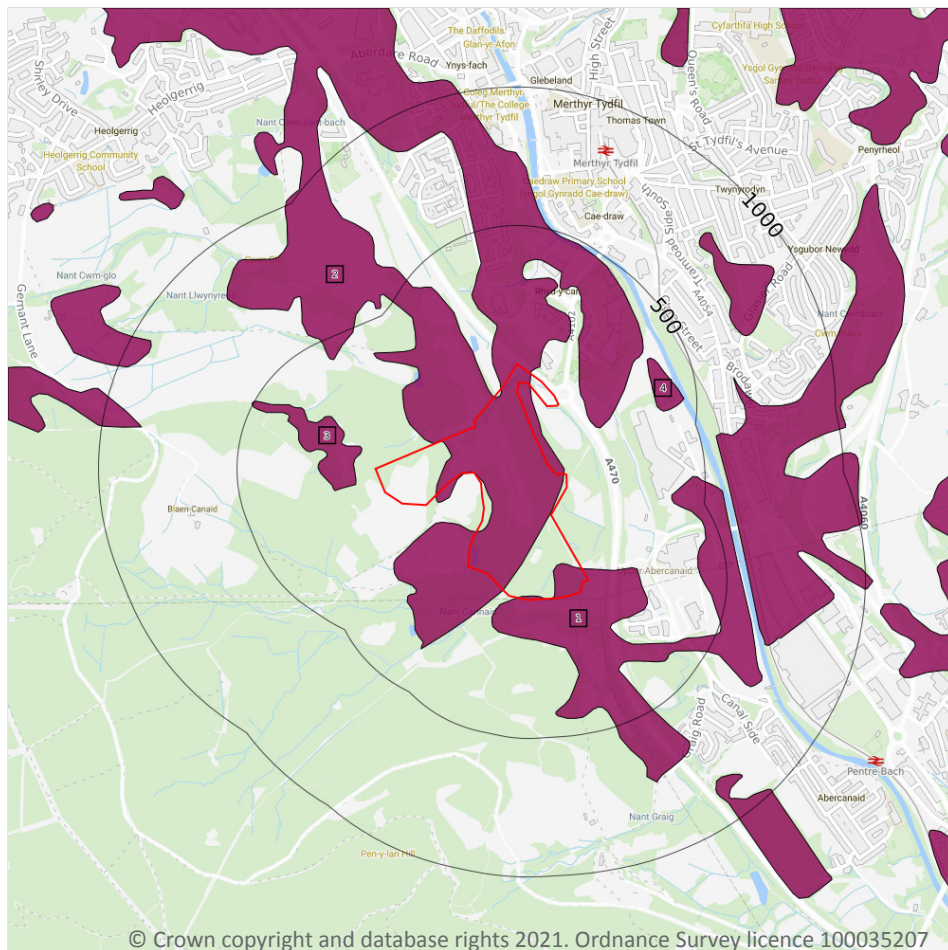
Features are displayed on the Geology 1:50,000 scale - Availability map on **page 143**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	EW231_merthyr_v4

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Artificial and made ground



- Site Outline
- Search buffers in metres (m)
- Made ground
 - Worked ground
 - Infilled ground
 - Disturbed ground
 - Landscaped ground

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15.2 Artificial and made ground (50k)

Records within 500m

4

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 144**

ID	Location	LEX Code	Description	Rock description
1	On site	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	On site	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	75m W	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
4	344m E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT



This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

3

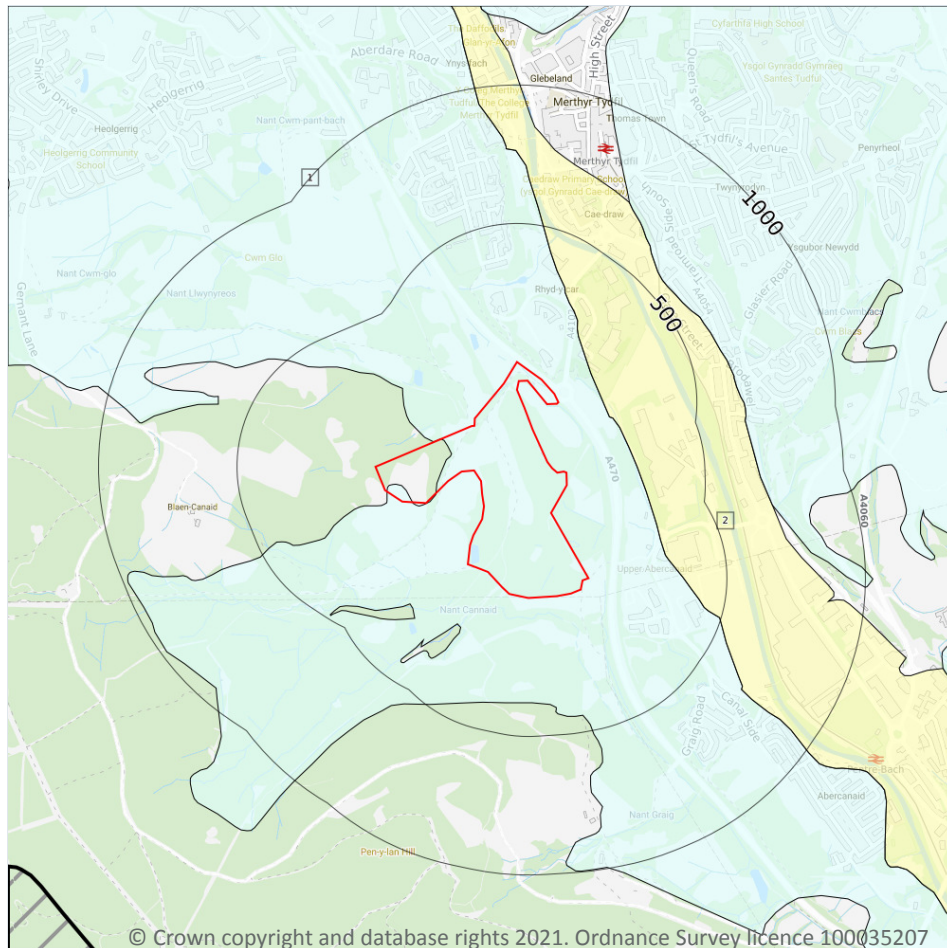
A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	Very High	Low
On site	Mixed	Very High	Low
On site	Mixed	Very High	Low

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m

2

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 146**

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	TILL, DEVANSIAN	DIAMICTON
2	149m NE	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.



15.5 Superficial permeability (50k)

Records within 50m**2**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	Low
On site	Mixed	High	Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

Records within 50m**0**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



This is a detailed topographic map of Merthyr Tydfil and its surrounding areas. The map features contour lines indicating elevation, with labels for 500 and 1000 feet. A red-outlined area is highlighted in the center, representing a specific site of interest. The map includes various roads, such as Aberdare Road, Merthyr Tydfil Road, and Tydfil's Avenue. It also shows the locations of several schools, including Heolgering Community School and Merthyr Tydfil Primary School. The map is overlaid with a grid of numbers, likely representing a coordinate system. The bottom of the map contains a copyright notice: "© Crown copyright and database rights 2021. Ordnance Survey Licence 100035207".

15.8 Bedrock geology (50k)

4

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 148**

ID	Location	LEX Code	Description	Rock age
2	On site	SWMCM-MDSS	SOUTH WALES MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
5	On site	SWLCM-MDSS	SOUTH WALES LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

ID	Location	LEX Code	Description	Rock age
23	344m NE	SWLCM-SDST	SOUTH WALES LOWER COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
25	350m NE	SWLCM-MDSS	SOUTH WALES LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m

4

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Moderate	Low
On site	Fracture	Moderate	Low
On site	Fracture	Moderate	Low
On site	Fracture	Moderate	Low

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m

25

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 148**

ID	Location	Category	Description
1	On site	ROCK	Coal seam, inferred
3	On site	ROCK	Coal seam, observed
4	On site	ROCK	Coal seam, observed
6	On site	ROCK	Coal seam, observed
7	On site	ROCK	Coal seam, inferred

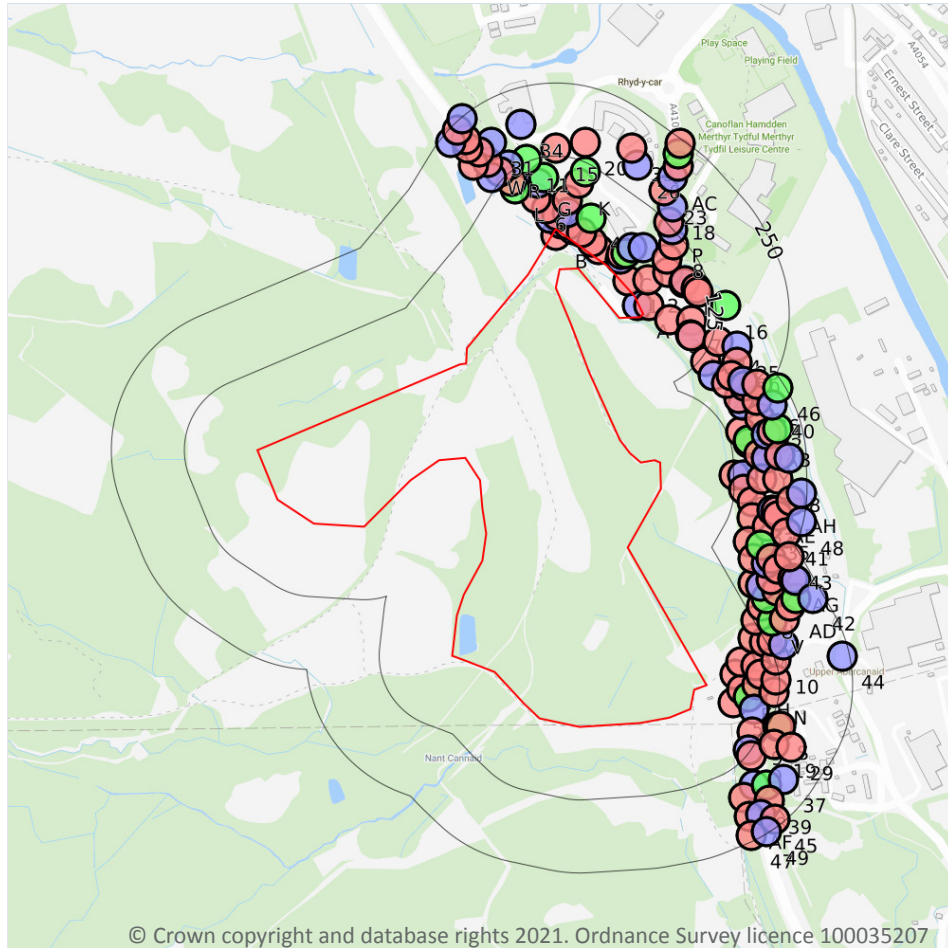


ID	Location	Category	Description
8	On site	ROCK	Coal seam, observed
9	On site	ROCK	Coal seam, observed
10	On site	ROCK	Coal seam, inferred
11	On site	ROCK	Coal seam, observed
12	On site	ROCK	Coal seam, inferred
13	On site	FOSSIL_HORIZON	Marine band
14	24m NE	ROCK	Coal seam, inferred
15	59m SE	ROCK	Coal seam, inferred
16	96m NW	ROCK	Coal seam, inferred
17	123m W	ROCK	Coal seam, inferred
18	133m NE	ROCK	Coal seam, inferred
19	173m S	ROCK	Coal seam, inferred
20	182m W	ROCK	Coal seam, observed
21	278m NW	ROCK	Coal seam, observed
22	291m N	ROCK	Coal seam, inferred
24	344m NE	FAULT	Fault, inferred, displacement unknown
26	396m S	ROCK	Coal seam, inferred
27	440m W	ROCK	Coal seam, observed
28	449m S	ROCK	Coal seam, inferred
29	468m SW	ROCK	Coal seam, inferred

This data is sourced from the British Geological Survey.



16 Boreholes



Site Outline
Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

16.1 BGS Boreholes

Records within 250m

163

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

Features are displayed on the Boreholes map on **page 151**

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	On site	304820 205100	A470 PENTREBACH/CEFN COED P113	4.5	N	260288
B	On site	304680 205220	A470 PENTREBACH CEFNCOED B41	48.6	N	260140
1	10m NE	304804 205143	A470 PENTREBACH PB 162	42.0	N	260359



ID	Location	Grid reference	Name	Length	Confidential	Web link
B	13m NE	304690 205240	A470 PENTREBACH/CEFN COED P42	4.5	N	260223
B	14m NE	304754 205196	A470 PENTREBACH PB 180	45.0	N	260376
A	16m NE	304840 205100	A470 PENTREBACH CEFNCOED B34	53.0	N	260133
B	16m NE	304710 205230	TAFF VALLEY TRUNK ROAD. TP.633A	4.7	N	259990
B	18m NE	304742 205209	A470 PENTREBACH PB 181	44.0	N	260377
B	18m NE	304702 205238	A470 PENTREBACH PB 183	42.0	N	260379
B	21m NE	304724 205226	A470 PENTREBACH PB 182	44.0	N	260378
B	21m NW	304670 205250	TAFF VALLEY TRUNK ROAD. TP.634A	4.6	N	259991
B	23m N	304682 205254	A470 PENTREBACH PB 184	44.5	N	260380
C	24m NE	304790 205180	A470 PENTREBACH/CEFN COED P41	4.5	N	260222
C	32m NE	304793 205188	A470 PENTREBACH PB 167	43.0	N	260364
B	35m NE	304700 205260	A470 PENTREBACH/CEFN COED P43	2.5	N	260224
2	36m NE	304838 205144	A470 PENTREBACH PB 163	42.0	N	260360
C	38m NE	304800 205190	TAFF VALLEY T.K. TP.631, BH'S.271,271A	29.35	N	259986
B	38m NW	304664 205266	A470 PENTREBACH PB 185	42.0	N	260381
3	46m E	304875 205076	A470 PENTREBACH PB 172	42.0	N	260369
4	50m NE	304740 205250	TAFF VALLEY TRUNK ROAD. 278	21.5	N	259989
C	52m NE	304810 205200	TAFF VALLEY TRUNK ROAD. TP.632	3.85	N	259988
D	53m E	304987 204470	A470 PENTREBACH-CEFNCOED PB 69	37.9	N	261196
B	53m N	304700 205280	TAFF VALLEY TRUNK ROAD. 274,274A	31.1	N	259992
5	54m SE	304983 204421	A470 PENTREBACH-CEFNCOED PB 65	41.5	N	261194
E	60m E	304998 204444	A470 PENTREBACH-CEFNCOED PB 66	41.5	N	261195
6	63m NW	304646 205284	A470 PENTREBACH PB 186	42.5	N	260382
C	67m NE	304830 205200	TAFF VALLEY T.K. TP.631, 272	8.47	N	259987
F	70m NE	304872 205157	A470 PENTREBACH PB 164	42.0	N	260361
D	71m NE	304997 204491	A470 PENTREBACH-CEFNCOED PB 76	42.0	N	261197
E	75m E	305010 204430	A470 PENTREBACH-CEFNCOED B23	13.9	N	260814
7	83m E	304912 205075	A470 PENTREBACH PB 165	42.0	N	260362



ID	Location	Grid reference	Name	Length	Confidential	Web link
F	84m NE	304870 205180	A470 PENTREBACH CEFNCOED B35	37.3	N	260134
G	84m N	304650 205310	A470 PENTREBACH/CEFN COED P44	2.6	N	260225
H	87m E	305025 204452	A470 PENTREBACH-CEFNCOED PB 68	39.0	N	260980
I	87m NE	304900 205140	A470 PENTREBACH/CEFN COED P33	4.5	N	260214
J	88m SE	304910 205050	A470 PENTREBACH/CEFN COED P32	4.5	N	260213
K	88m NE	304720 205310	TAFF VALLEY TRUNK ROAD. 184,184A	35.05	N	259993
I	89m NE	304901 205142	A470 PENTREBACH PB 171	42.0	N	260368
J	91m SE	304912 205048	A470 PENTREBACH PB 145	42.0	N	260343
G	91m N	304660 205320	TAFF VALLEY TRUNK ROAD. 277	17.0	N	259997
H	91m E	305023 204484	A470 PENTREBACH-CEFNCOED PB 75	38.0	N	260986
E	92m SE	305020 204410	A470 PENTREBACH-CEFNCOED P21	4.5	N	260845
H	94m E	305030 204470	A470 PENTREBACH-CEFNCOED B24	39.3	N	260815
L	98m NW	304610 205300	TAFF VALLEY TRUNK ROAD. 275, TP.635A	18.0	N	259998
I	101m NE	304920 205130	TAFF VALLEY T.K. TP.631, BH'S.183,183A,183B	31.7	N	259985
I	102m E	304924 205123	A470 PENTREBACH PB 166	33.0	N	260363
8	108m NE	304881 205204	A470 PENTREBACH PB 168	42.0	N	260365
M	109m NE	305018 204531	A470 PENTREBACH PB 226	42.0	N	261035
K	111m NE	304730 205330	TAFF VALLEY TRUNK ROAD. 185	10.8	N	259994
9	112m SE	305016 204371	A470 PENTREBACH-CEFNCOED PB 67	42.0	N	260979
L	112m NW	304604 205313	A470 PENTREBACH PB 187	45.0	N	260383
N	117m E	305054 204439	A470 PENTREBACH-CEFNCOED PB 63	42.0	N	260977
N	119m E	305057 204459	A470 PENTREBACH-CEFNCOED PB 77	38.0	N	260987
O	122m SE	305010 204340	A470 PENTREBACH-CEFNCOED P20	4.3	N	260844
M	124m NE	305038 204525	A470 PENTREBACH-CEFNCOED PB 78	36.0	N	260988
P	124m NE	304880 205230	A470 PENTREBACH/CEFN COED P34	4.5	N	260215
10	126m E	305057 204493	A470 PENTREBACH-CEFNCOED PB 79	33.0	N	260989
Q	127m E	304986 204810	A470 PENTREBACH PB 173	40.5	N	261200
P	129m NE	304873 205244	A470 PENTREBACH PB 169	42.0	N	260366



ID	Location	Grid reference	Name	Length	Confidential	Web link
11	129m NW	304630 205350	TAFF VALLEY TRUNK ROAD. 276	14.2	N	259999
12	129m NE	305023 204562	A470 PENTREBACH-CEFNCOED PB 88	36.0	N	260998
O	131m SE	305014 204330	A470 PENTREBACH-CEFNCOED PB 60	41.5	N	260974
13	134m SE	304937 205005	A470 PENTREBACH PB 161	42.0	N	260358
M	135m NE	305050 204526	A470 PENTREBACH-CEFNCOED PB 86	36.2	N	260996
R	135m NW	304600 205340	TAFF VALLEY TRUNK ROAD. TP.636A	5.0	N	260001
14	137m E	304958 205039	A470 PENTREBACH PB 144	42.35	N	260342
R	138m NW	304584 205330	A470 PENTREBACH PB 188	42.0	N	260384
15	139m N	304680 205370	TAFF VALLEY TRUNK ROAD. 187	30.1	N	259996
Q	141m E	305000 204810	A470 PENTREBACH-CEFNCOED TP112	4.5	N	260859
S	141m SE	305060 204380	A470 PENTREBACH-CEFNCOED B22	18.0	N	260813
16	141m E	304970 205100	TAFF VALLEY T.K. 182	18.4	N	259984
R	141m NW	304570 205320	A470 PENTREBACH/CEFN COED P45	4.5	N	260226
17	142m E	305002 204785	A470 PENTREBACH PB 127	40.0	N	261024
S	145m SE	305065 204381	A470 PENTREBACH-CEFNCOED PB 64	42.0	N	260978
T	147m E	304996 204885	A470 PENTREBACH PB 225	42.0	N	261201
M	149m NE	305070 204520	A470 PENTREBACH-CEFNCOED P22	4.8	N	260846
U	149m NE	305032 204587	A470 PENTREBACH-CEFNCOED PB 87	42.0	N	260997
18	151m NE	304880 205270	A470 PENTREBACH CEFNCOED B36	9.65	N	260135
V	152m NE	305050 204560	A470 PENTREBACH-CEFNCOED B25	29.2	N	260816
19	154m SE	305053 204349	A470 PENTREBACH PB 227	42.0	N	261036
T	154m E	305009 204866	A470 PENTREBACH PB 130	42.0	N	261027
U	156m NE	305018 204625	A470 PENTREBACH PB 139	37.0	N	261033
T	156m E	305010 204870	A470 PENTREBACH-CEFNCOED B31	25.0	N	260822
20	157m N	304730 205380	TAFF VALLEY TRUNK ROAD. 186	35.1	N	259995
21	158m E	305016 204764	A470 PENTREBACH PB 126	42.0	N	261023
22	160m SE	304950 204980	A470 PENTREBACH/CEFN COED B31	4.5	N	261161
23	161m NE	304866 205296	A470 PENTREBACH PB 170	42.0	N	260367



ID	Location	Grid reference	Name	Length	Confidential	Web link
U	163m NE	305040 204600	A470 PENTREBACH-CEFNCOED B26	25.0	N	260817
W	163m NW	304564 205346	A470 PENTREBACH PB 189	44.0	N	260385
24	164m E	305016 204737	A470 PENTREBACH PB 125	42.0	N	261022
U	164m NE	305030 204620	A470 PENTREBACH-CEFNCOED P25	4.1	N	260849
25	170m E	304990 205030	TAFF VALLEY T.K. TP.630	5.12	N	259983
26	170m NE	304820 205340	A470 PENTREBACH/CEFN COED P36	2.5	N	260217
X	170m SE	305020 204280	A470 PENTREBACH-CEFNCOED TP111	3.2	N	260858
Y	170m E	305028 204846	A470 PENTREBACH PB 122	42.0	N	261019
V	172m NE	305071 204564	A470 PENTREBACH-CEFNCOED PB 89	36.0	N	260999
Z	172m NE	305000 204930	A470 PENTREBACH-CEFNCOED P29	4.3	N	260853
27	173m E	305033 204804	A470 PENTREBACH-CEFNCOED PB 81	42.0	N	260991
Z	174m NE	304994 204941	A470 PENTREBACH PB 134	42.0	N	261198
AA	174m SE	305009 204697	A470 PENTREBACH-CEFNCOED PB105	42.2	N	261016
U	177m NE	305018 204667	A470 PENTREBACH-CEFNCOED PB104	42.2	N	261015
Z	177m NE	304972 204968	A470 PENTREBACH PB 135	42.0	N	261199
28	177m SE	305002 204258	A470 PENTREBACH-CEFNCOED PB 53	41.0	N	260967
W	177m NW	304540 205340	A470 PENTREBACH CEFNCOED B42	35.0	N	260141
29	179m SE	305082 204345	A470 PENTREBACH-CEFNCOED PB 62	42.0	N	260976
30	181m SE	304991 205003	A470 PENTREBACH PB 136	42.0	N	260338
Y	182m E	305040 204840	A470 PENTREBACH-CEFNCOED P27	4.5	N	260851
X	183m SE	305040 204280	A470 PENTREBACH-CEFNCOED B21	15.0	N	260812
Z	184m SE	304980 204980	A470 PENTREBACH/CEFN COED B33	40.4	N	261160
U	184m NE	305058 204612	A470 PENTREBACH PB 140	42.0	N	261034
U	185m NE	305048 204631	A470 PENTREBACH PB 138	41.5	N	261032
31	185m NW	304570 205380	TAFF VALLEY TRUNK ROAD. TP.637	3.8	N	260002
W	186m NW	304549 205363	A470 PENTREBACH PB 190	32.0	N	260386
32	186m NE	305029 204907	A470 PENTREBACH PB 137	42.0	N	261031
AB	188m E	305040 204880	A470 PENTREBACH-CEFNCOED P28	4.5	N	260852



ID	Location	Grid reference	Name	Length	Confidential	Web link
33	189m NE	304810 205370	A470 PENTREBACH CEFNCOED B38/38A	34.4	N	260137
34	189m N	304620 205410	TAFF VALLEY TRUNK ROAD. 188,188A	7.6	N	260000
AC	189m NE	304880 205320	A470 PENTREBACH/CEFN COED P35	3.5	N	260216
AD	192m NE	305081 204587	A470 PENTREBACH-CEFNCOED PB 85	42.0	N	260995
U	193m NE	305040 204660	A470 PENTREBACH-CEFNCOED P26	4.5	N	260850
35	193m E	305042 204722	A470 PENTREBACH PB 124	43.5	N	261021
AE	194m E	305050 204750	A470 PENTREBACH-CEFNCOED TT7	4.8	N	260866
Z	195m NE	305003 204963	A470 PENTREBACH PB 132	42.0	N	261029
AA	196m SE	305030 204690	A470 PENTREBACH-CEFNCOED B29	12.35	N	260820
36	197m NE	305024 204939	A470 PENTREBACH PB 133	42.0	N	261030
Z	198m NE	305000 204970	A470 PENTREBACH-CEFNCOED P30	4.5	N	260854
AB	199m E	305050 204885	A470 PENTREBACH PB 128	42.0	N	261025
37	200m SE	305070 204290	A470 PENTREBACH-CEFNCOED P19	4.5	N	260843
38	200m E	305060 204804	A470 PENTREBACH PB 129	43.0	N	261026
AE	201m E	305057 204749	A470 PENTREBACH-CEFNCOED PB 99	42.0	N	261010
U	204m NE	305049 204667	A470 PENTREBACH-CEFNCOED PB103	41.8	N	261014
W	204m NW	304530 205370	A470 PENTREBACH CEFNCOED B43	30.6	N	260142
Y	205m E	305063 204844	A470 PENTREBACH PB 123	42.0	N	261020
U	205m NE	305060 204650	A470 PENTREBACH-CEFNCOED B28	42.8	N	260819
AE	205m E	305060 204740	A470 PENTREBACH-CEFNCOED B30	41.6	N	260821
AD	206m NE	305090 204600	A470 PENTREBACH-CEFNCOED B27	23.87	N	260818
39	207m SE	305045 204253	A470 PENTREBACH-CEFNCOED PB 54	39.0	N	260968
AB	210m E	305060 204890	A470 PENTREBACH-CEFNCOED B32	25.6	N	260823
AC	210m NE	304890 205339	A470 PENTREBACH PB 174	42.0	N	260370
AF	210m SE	305012 204226	A470 PENTREBACH-CEFNCOED PB 51	42.0	N	260965
Z	214m NE	305025 204966	A470 PENTREBACH PB 131	42.0	N	261028
40	215m NE	305050 204930	TAFF VALE TRUNK ROAD, ABERFAN. TP.629	3.2	N	260689
AF	216m SE	305030 204230	A470 PENTREBACH-CEFNCOED P18	4.5	N	260842

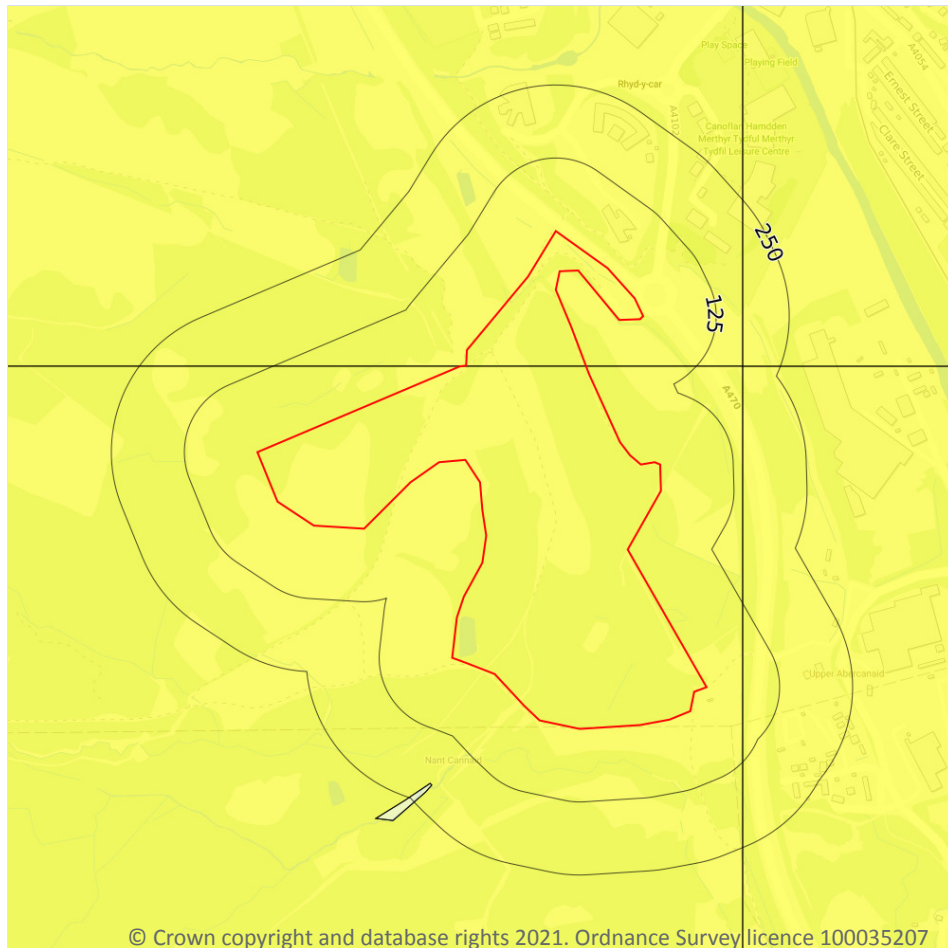


ID	Location	Grid reference	Name	Length	Confidential	Web link
W	218m NW	304526 205385	A470 PENTREBACH PB 191	42.5	N	260387
AG	219m NE	305086 204633	A470 PENTREBACH-CEFNCOED PB 84	42.0	N	260994
AG	221m NE	305090 204630	A470 PENTREBACH-CEFNCOED P24	4.0	N	260848
Y	222m E	305080 204840	TAFF VALE TRUNK ROAD, ABERFAN. TP.525A	2.9	N	260688
AH	223m E	305082 204767	A470 PENTREBACH-CEFNCOED PB100	42.0	N	261011
AC	227m NE	304890 205360	A470 PENTREBACH CEFNCOED B37	24.43	N	260136
41	227m E	305074 204711	A470 PENTREBACH-CEFNCOED PB101	42.0	N	261012
42	232m NE	305120 204600	A470 PENTREBACH-CEFNCOED P23	4.5	N	260847
43	233m NE	305080 204671	A470 PENTREBACH-CEFNCOED PB 83	42.0	N	260993
W	234m NW	304500 205380	A470 PENTREBACH/CEFN COED P46	4.5	N	260227
44	237m E	305170 204500	TAFF VALE TRUNK ROAD, ABERFAN. TP.520	2.75	N	260683
45	238m SE	305055 204221	A470 PENTREBACH-CEFNCOED PB 50	42.0	N	260964
46	239m NE	305060 204960	TAFF VALE TRUNK ROAD, ABERFAN. 181	16.7	N	260690
W	239m NW	304512 205401	A470 PENTREBACH PB 192	42.0	N	260388
AH	240m E	305100 204780	TAFF VALE TRUNK ROAD, ABERFAN. TP.524	2.7	N	260687
47	240m SE	305014 204193	A470 PENTREBACH-CEFNCOED PB112	45.0	N	261018
AC	243m NE	304893 205378	A470 PENTREBACH PB 175	42.0	N	260371
48	247m E	305100 204730	TAFF VALE TRUNK ROAD, ABERFAN. TP.523	3.7	N	260686
49	247m SE	305040 204200	A470 PENTREBACH-CEFNCOED P17	4.5	N	260841
W	248m NW	304520 205420	TAFF VALLEY TRUNK ROAD. TP.638	4.9	N	260003

This data is sourced from the British Geological Survey.



17 Natural ground subsidence - Shrink swell clays



- Site Outline**
- Search buffers in metres (m)**
- ☐ No data
 - ☐ Negligible
 - ☒ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.1 Shrink swell clays

Records within 50m

1

The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

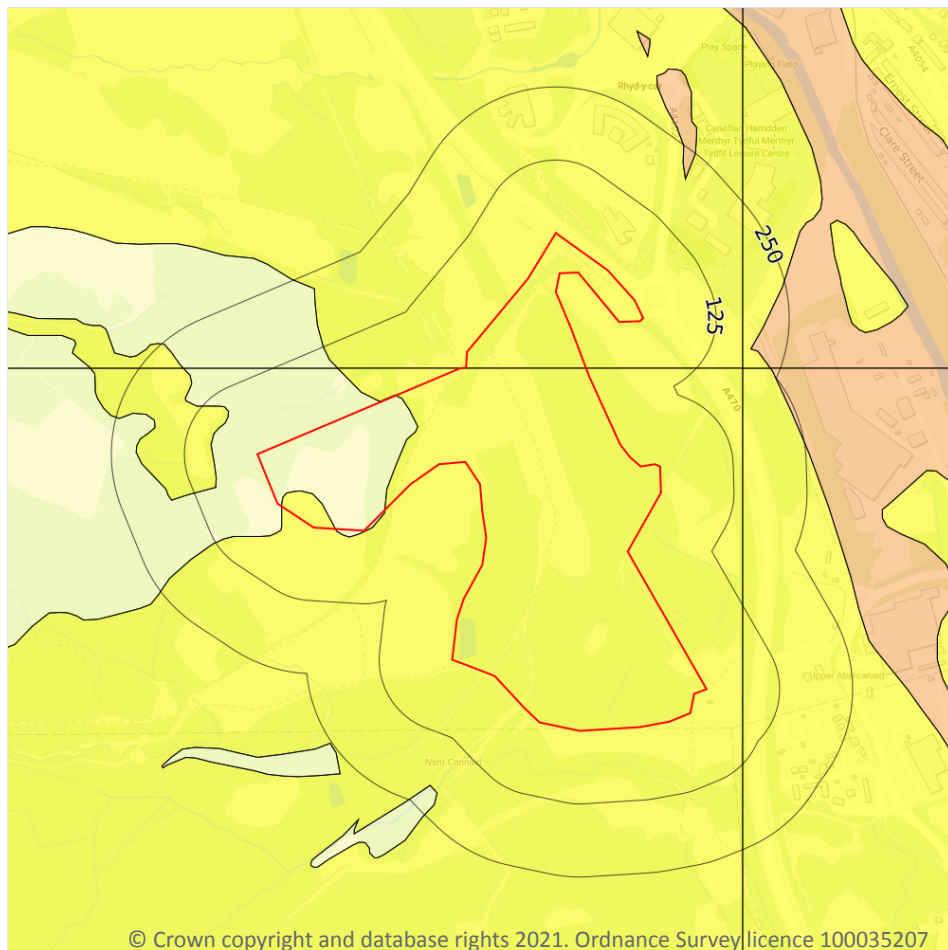
Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 158**

Location	Hazard rating	Details
On site	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Running sands



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.2 Running sands

Records within 50m

2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 159**

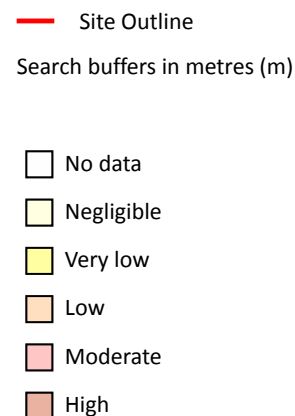
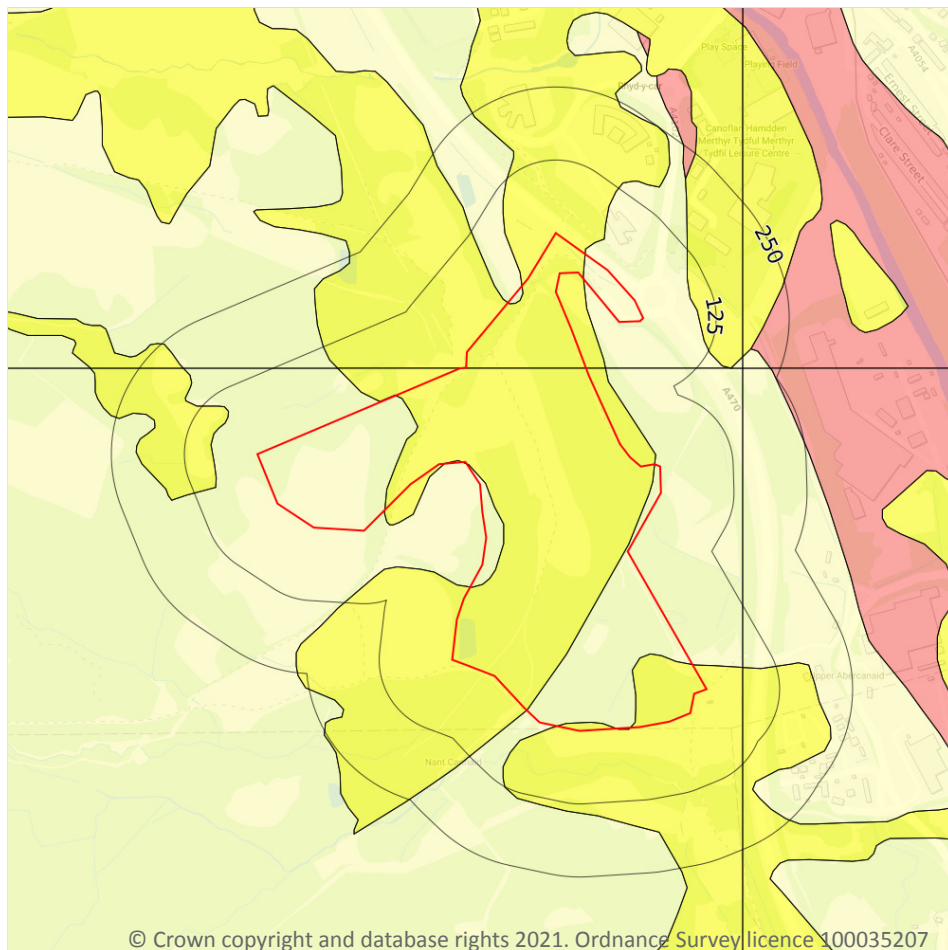
Location	Hazard rating	Details
On site	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m

2

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 161**

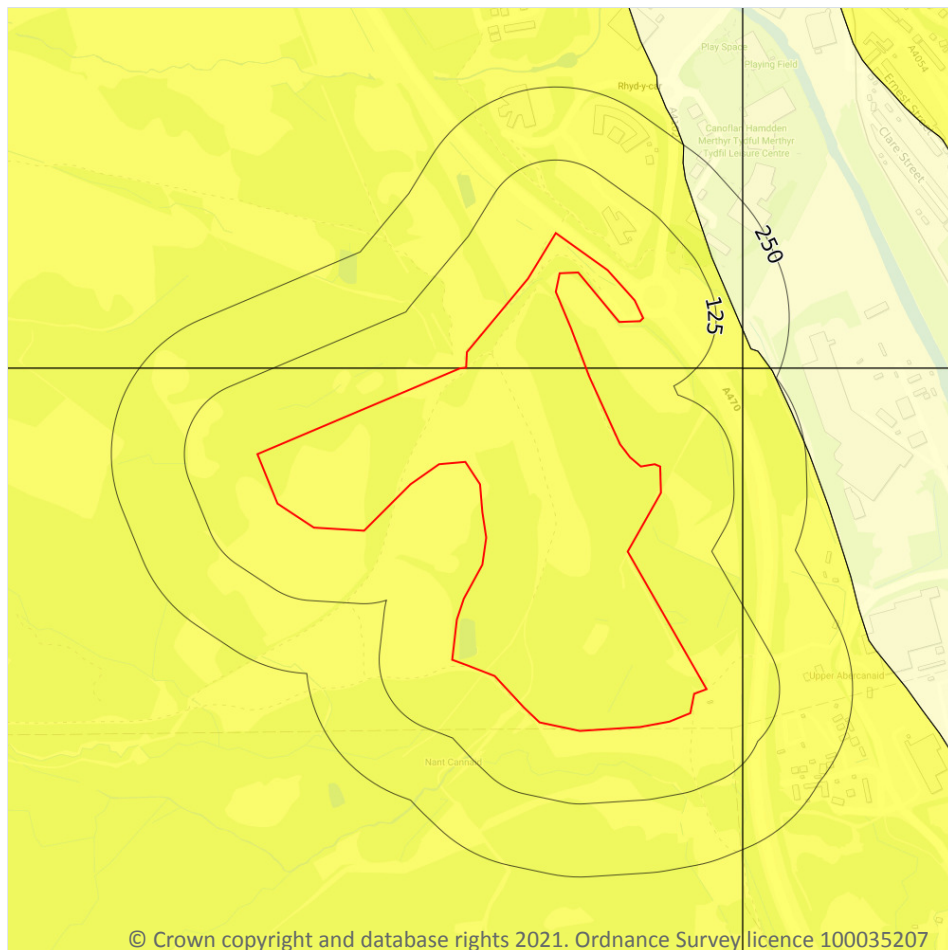
Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.
On site	Very low	Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.



This data is sourced from the British Geological Survey.



Natural ground subsidence - Collapsible deposits



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.4 Collapsible deposits

Records within 50m

1

The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

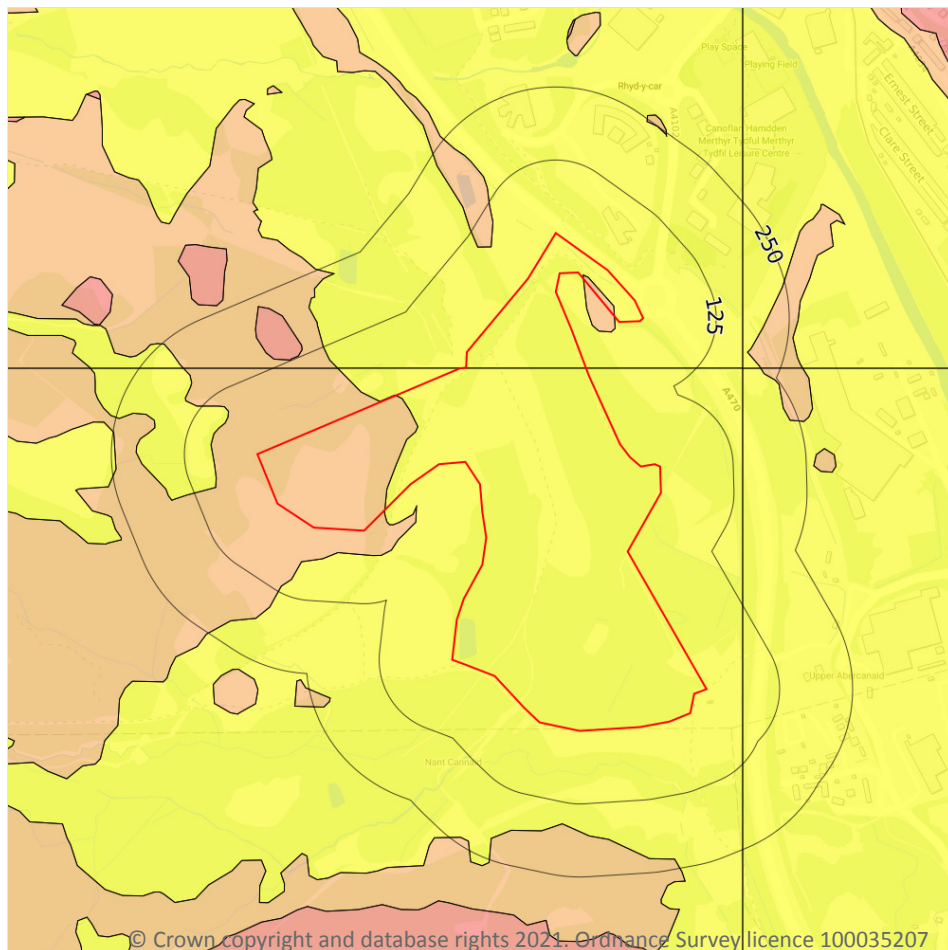
Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 163**

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Landslides



- Site Outline**
- Search buffers in metres (m)**
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.5 Landslides

Records within 50m

2

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 164**

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

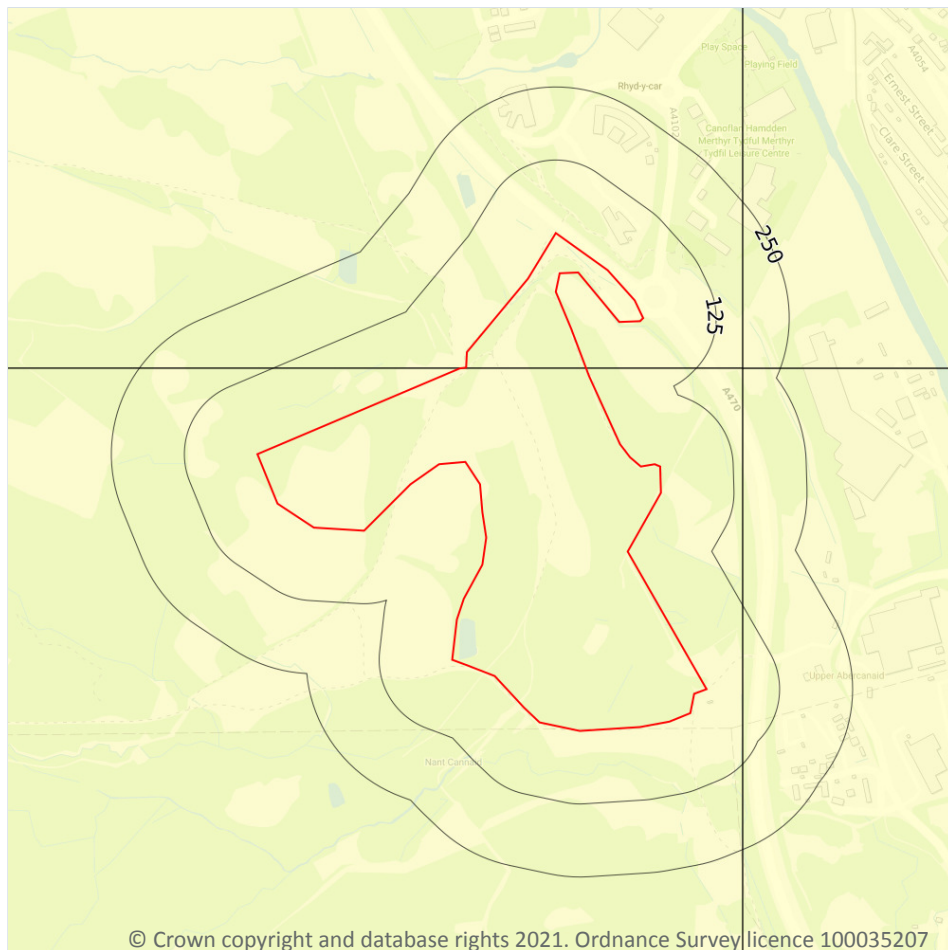


Location	Hazard rating	Details
On site	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Ground dissolution of soluble rocks



- Site Outline**
- Search buffers in metres (m)**
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.6 Ground dissolution of soluble rocks

Records within 50m

1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 166**

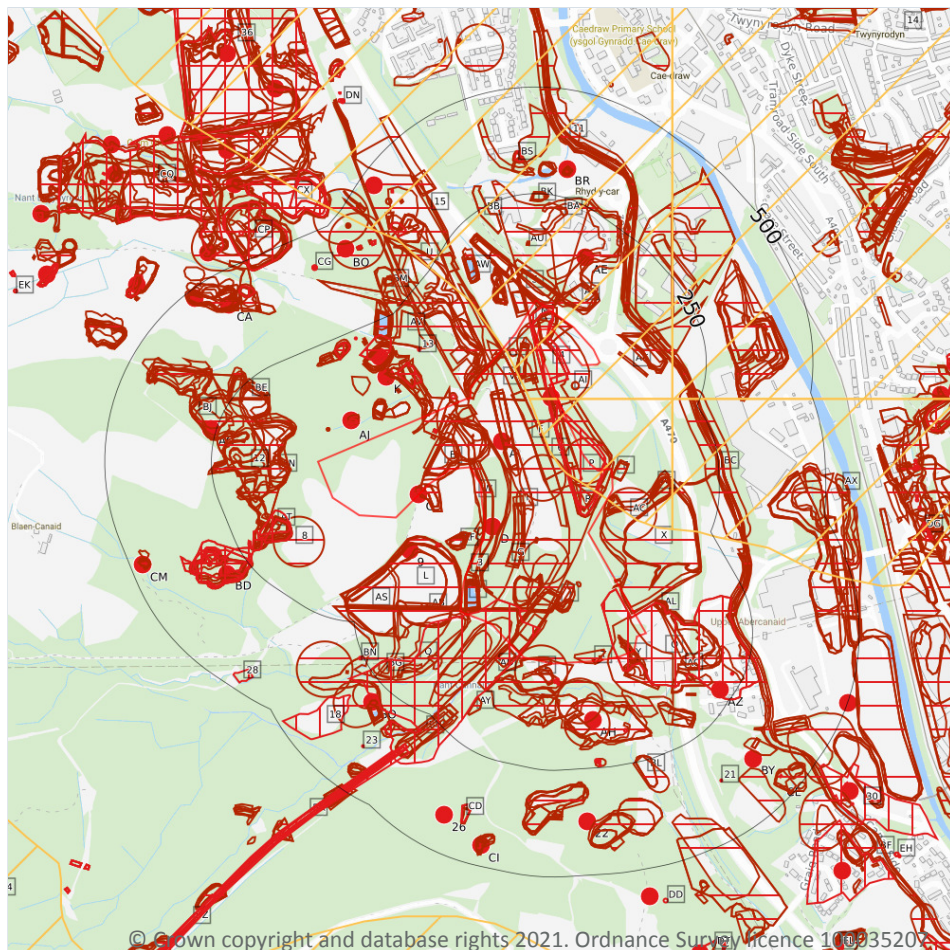
Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.



This data is sourced from the British Geological Survey.



18 Mining, ground workings and natural cavities



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities
- Non Coal Mining
- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m

26

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 168**

ID	Location	Details	Description
1	On site	Name: The Willows Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Ironstone Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
A	On site	Name: Lower Colliers Row Tips Address: Abercanaid, MERTHYR TYDFIL, Glamorgan Commodity: Coal, Surface Mined Status: Ceased	Type: Tip at a mine, quarry or other location from which mineral is being extracted. Working may be termed Slate Waste Tip, Shale Bing, Coal Tip or Coal Bing Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
C	On site	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
D	On site	Name: Glyn-dyrys Pit Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority



ID	Location	Details	Description
AJ	57m NW	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
9	82m SE	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
K	120m NW	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
AH	137m S	Name: Upper Aber-canaid Address: Pentrebach, MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
AE	148m NE	Name: Rhyd-y-car Pit Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority



ID	Location	Details	Description
K	169m NW	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
AZ	218m SE	Name: Upper Aber-canaid Address: Pentrebach, MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
AO	263m W	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
BO	295m SW	Name: Cwm Pit Address: Abercanaid, MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
BD	304m SW	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Ironstone Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority



ID	Location	Details	Description
BR	316m N	Name: Rhyd-y-car Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
22	373m S	Name: Upper Aber-canaid Address: Pentrebach, MERTHYR TYDFIL, Mid Glamorgan Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
BY	377m SE	Name: Upper Aber-canaid Address: Pentrebach, MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
BY	379m SE	Name: Lucy No 4 Level Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
26	413m SW	Name: Waunwylt Address: Abercanaid, MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority



ID	Location	Details	Description
CA	423m NW	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
BQ	434m NW	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
CI	452m S	Name: Waunwylt Address: Abercanaid, MERTHYR TYDFIL, Mid Glamorgan Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
CE	455m SE	Name: Upper Aber-canaid Address: Pentrebach, MERTHYR TYDFIL, Mid Glamorgan Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
BQ	465m NW	Name: Lucy Thomas No.5 Mine Address: Rhyd-y-Car, MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority



ID	Location	Details	Description
CM	472m W	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
CA	480m NW	Name: Pen-cae Address: MERTHYR TYDFIL, Mid Glamorgan Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	577
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Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 168**

ID	Location	Land Use	Year of mapping	Mapping scale
3	On site	Unspecified Disused Pit	1903	1:10560
4	On site	Old Ironstone Level	1948	1:10560
5	On site	Unspecified Pit	1979	1:10000
6	On site	Cuttings	1915	1:10560
A	On site	Cuttings	1969	1:10560
A	On site	Cuttings	1964	1:10560
A	On site	Cuttings	1938	1:10560
A	On site	Unspecified Pit	1988	1:10000
A	On site	Unspecified Pit	1979	1:10000
A	On site	Cuttings	1915	1:10560
A	On site	Cuttings	1922	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
A	On site	Cuttings	1922	1:10560
B	On site	Unspecified Heap	1875	1:10560
B	On site	Unspecified Heap	1875	1:10560
B	On site	Unspecified Heap	1875	1:10560
B	On site	Unspecified Pit	1875	1:10560
B	On site	Cuttings	1965	1:10560
B	On site	Unspecified Heap	1901	1:10560
B	On site	Coal Drift	1938	1:10560
B	On site	Unspecified Ground Workings	1938	1:10560
B	On site	Cuttings	1948	1:10560
B	On site	Cuttings	1903	1:10560
B	On site	Cuttings	1969	1:10560
B	On site	Cuttings	1964	1:10560
B	On site	Coal Drift	1938	1:10560
B	On site	Unspecified Ground Workings	1938	1:10560
B	On site	Unspecified Disused Tip	1979	1:10000
B	On site	Old Coal Drift	1948	1:10560
B	On site	Unspecified Heap	1903	1:10560
B	On site	Unspecified Disused Tips	1988	1:10000
B	On site	Unspecified Disused Tip	1988	1:10000
B	On site	Unspecified Disused Tips	1979	1:10000
B	On site	Unspecified Heap	1969	1:10560
B	On site	Unspecified Heaps	1969	1:10560
B	On site	Unspecified Heaps	1964	1:10560
B	On site	Unspecified Heap	1964	1:10560
B	On site	Unspecified Heap	1921	1:10560
B	On site	Refuse Heap	1921	1:10560
B	On site	Drift	1921	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
B	On site	Coal Drift	1915	1:10560
B	On site	Cuttings	1915	1:10560
B	On site	Coal Drift	1922	1:10560
B	On site	Coal Drift	1922	1:10560
C	On site	Coal Level	1938	1:10560
C	On site	Coal Level	1938	1:10560
C	On site	Old Coal Level	1948	1:10560
C	On site	Unspecified Disused Tip	1988	1:10000
C	On site	Unspecified Disused Tip	1979	1:10000
C	On site	Unspecified Heap	1969	1:10560
C	On site	Unspecified Heap	1964	1:10560
C	On site	Coal Level	1921	1:10560
C	On site	Refuse Heap	1921	1:10560
C	On site	Coal Level	1915	1:10560
C	On site	Coal Level	1922	1:10560
C	On site	Coal Level	1922	1:10560
D	On site	Old Canal	1901	1:10560
D	On site	Unspecified Heap	1948	1:10560
E	On site	Cuttings	1922	1:10560
E	On site	Cuttings	1922	1:10560
F	On site	Refuse Heap	1903	1:10560
F	On site	Cuttings	1922	1:10560
F	On site	Cuttings	1922	1:10560
G	On site	Cuttings	1922	1:10560
G	On site	Cuttings	1922	1:10560
H	On site	Unspecified Pit	1875	1:10560
H	On site	Unspecified Disused Pit	1901	1:10560
H	On site	Unspecified Disused Pit	1938	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
H	On site	Unspecified Disused Pit	1938	1:10560
H	On site	Cuttings	1938	1:10560
H	On site	Ironstone Pit	1875	1:10560
H	On site	Unspecified Disused Tips	1979	1:10000
H	On site	Unspecified Disused Pits	1948	1:10560
H	On site	Unspecified Disused Tip	1988	1:10000
H	On site	Unspecified Disused Pit	1915	1:10560
H	On site	Cuttings	1915	1:10560
H	On site	Cuttings	1922	1:10560
H	On site	Cuttings	1922	1:10560
I	On site	Unspecified Heaps	1875	1:10560
I	On site	Unspecified Pit	1992	1:10000
I	On site	Unspecified Pit	1976	1:10000
I	On site	Unspecified Pit	1965	1:10560
I	On site	Cuttings	1938	1:10560
I	On site	Old Ironstone Level	1938	1:10560
I	On site	Unspecified Ground Workings	1948	1:10560
I	On site	Old Ironstone Level	1921	1:10560
I	On site	Old Ironstone Level	1915	1:10560
I	On site	Cuttings	1915	1:10560
I	On site	Cuttings	1922	1:10560
I	On site	Cuttings	1922	1:10560
J	On site	Unspecified Heap	1875	1:10560
J	On site	Unspecified Heap	1922	1:10560
J	On site	Cuttings	1901	1:10560
J	On site	Pond	1901	1:10560
J	On site	Cuttings	1901	1:10560
J	On site	Unspecified Heap	1938	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
J	On site	Unspecified Heap	1938	1:10560
J	On site	Cuttings	1922	1:10560
J	On site	Unspecified Heap	1922	1:10560
J	On site	Cuttings	1948	1:10560
J	On site	Cuttings	1903	1:10560
J	On site	Cuttings	1979	1:10000
J	On site	Cuttings	1969	1:10560
J	On site	Cuttings	1964	1:10560
J	On site	Unspecified Heap	1938	1:10560
J	On site	Unspecified Heap	1938	1:10560
J	On site	Cuttings	1948	1:10560
J	On site	Cuttings	1875	1:10560
J	On site	Unspecified Disused Tip	1979	1:10000
J	On site	Unspecified Heap	1948	1:10560
J	On site	Unspecified Heap	1948	1:10560
J	On site	Refuse Heap	1903	1:10560
J	On site	Unspecified Disused Tip	1988	1:10000
J	On site	Unspecified Disused Tip	1979	1:10000
J	On site	Unspecified Heap	1969	1:10560
J	On site	Unspecified Ground Workings	1969	1:10560
J	On site	Unspecified Heap	1921	1:10560
J	On site	Unspecified Ground Workings	1921	1:10560
J	On site	Cuttings	1921	1:10560
J	On site	Unspecified Ground Workings	1915	1:10560
J	On site	Cuttings	1915	1:10560
J	On site	Unspecified Heap	1915	1:10560
J	On site	Unspecified Heap	1948	1:10560
J	On site	Unspecified Heap	1922	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
J	On site	Unspecified Ground Workings	1922	1:10560
J	On site	Cuttings	1922	1:10560
J	On site	Unspecified Heap	1922	1:10560
J	On site	Unspecified Ground Workings	1922	1:10560
J	On site	Cuttings	1922	1:10560
K	On site	Refuse Heap	1922	1:10560
K	On site	Refuse Heap	1922	1:10560
L	On site	Unspecified Disused Tip	1988	1:10000
L	On site	Refuse Heap	1922	1:10560
L	On site	Refuse Heap	1922	1:10560
M	On site	Cuttings	1965	1:10560
M	On site	Unspecified Disused Tip	1992	1:10000
M	On site	Unspecified Disused Tip	1976	1:10000
M	On site	Unspecified Heap	1948	1:10560
M	On site	Unspecified Heap	1921	1:10560
M	On site	Unspecified Heap	1915	1:10560
M	On site	Unspecified Heap	1922	1:10560
M	On site	Unspecified Heap	1922	1:10560
N	On site	Reservoir	1901	1:10560
N	On site	Disused Reservoir	1948	1:10560
N	On site	Reservoir	1903	1:10560
N	On site	Pond	1988	1:10000
N	On site	Pond	1979	1:10000
N	On site	Reservoir	1938	1:10560
N	On site	Reservoir	1875	1:10560
N	On site	Reservoir	1921	1:10560
N	On site	Reservoir	1915	1:10560
N	On site	Reservoir	1922	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
N	On site	Reservoir	1922	1:10560
O	On site	Ironstone Level	1875	1:10560
P	On site	Old Ironstone Level	1901	1:10560
P	On site	Refuse Heap	1938	1:10560
P	On site	Old Ironstone Level	1903	1:10560
P	On site	Refuse Heap	1938	1:10560
Q	On site	Unspecified Pit	1922	1:10560
Q	On site	Unspecified Pit	1922	1:10560
Q	On site	Unspecified Disused Tip	1979	1:10000
Q	On site	Unspecified Heap	1948	1:10560
Q	On site	Unspecified Heap	1948	1:10560
R	On site	Unspecified Heaps	1875	1:10560
R	On site	Unspecified Ground Workings	1921	1:10560
R	On site	Unspecified Heap	1915	1:10560
S	On site	Cuttings	1992	1:10000
S	On site	Cuttings	1976	1:10000
S	On site	Cuttings	1976	1:10000
S	On site	Cuttings	1965	1:10560
S	On site	Cuttings	1938	1:10560
S	On site	Cuttings	1921	1:10560
T	On site	Unspecified Ground Workings	1901	1:10560
T	On site	Unspecified Pit	1988	1:10000
U	On site	Unspecified Disused Tip	1992	1:10000
U	On site	Unspecified Disused Tips	1976	1:10000
V	On site	Unspecified Disused Tip	1992	1:10000
V	On site	Unspecified Disused Tip	1976	1:10000
V	On site	Unspecified Heap	1965	1:10560
W	On site	Pond	1901	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
W	On site	Water Body	1903	1:10560
X	On site	Pond	1901	1:10560
X	On site	Pool	1903	1:10560
X	On site	Pond	1875	1:10560
Y	On site	Pond	1901	1:10560
Y	On site	Pond	1922	1:10560
Y	On site	Pond	1948	1:10560
Y	On site	Pond	1875	1:10560
Y	On site	Unspecified Disused Tip	1979	1:10000
Z	On site	Unspecified Disused Workings	1988	1:10000
Z	On site	Unspecified Disused Tip	1979	1:10000
Z	On site	Refuse Heap	1969	1:10560
Z	On site	Refuse Heap	1964	1:10560
AA	On site	Unspecified Disused Tip	1979	1:10000
AA	On site	Unspecified Heap	1969	1:10560
AA	On site	Unspecified Heap	1964	1:10560
AB	On site	Unspecified Disused Tip	1979	1:10000
S	0m NE	Cuttings	1915	1:10560
S	0m NE	Cuttings	1922	1:10560
S	0m NE	Cuttings	1922	1:10560
U	0m NW	Refuse Heap	1965	1:10560
E	1m E	Cuttings	1915	1:10560
B	1m NW	Unspecified Disused Tips	1988	1:10000
B	1m NW	Unspecified Disused Tips	1979	1:10000
E	2m E	Cuttings	1948	1:10560
U	2m NW	Unspecified Ground Workings	1938	1:10560
U	2m NW	Unspecified Ground Workings	1938	1:10560
AC	2m SE	Unspecified Disused Workings	1988	1:10000



ID	Location	Land Use	Year of mapping	Mapping scale
L	2m W	Refuse Heap	1915	1:10560
L	2m W	Refuse Heap	1938	1:10560
L	2m W	Refuse Heap	1938	1:10560
U	3m NW	Unspecified Ground Workings	1915	1:10560
Q	4m S	Refuse Heap	1901	1:10560
L	5m W	Refuse Heap	1921	1:10560
S	5m NE	Cuttings	1901	1:10560
AC	5m SE	Unspecified Heap	1921	1:10560
U	5m W	Unspecified Ground Workings	1921	1:10560
L	6m W	Refuse Heap	1948	1:10560
L	6m W	Unspecified Heap	1969	1:10560
L	6m W	Unspecified Heap	1964	1:10560
S	6m NW	Cuttings	1965	1:10560
AC	6m SE	Unspecified Disused Tip	1979	1:10000
S	7m NW	Cuttings	1992	1:10000
U	7m W	Unspecified Ground Workings	1901	1:10560
AD	8m SW	Cuttings	1875	1:10560
AB	8m W	Refuse Heap	1948	1:10560
AC	8m SE	Unspecified Heap	1922	1:10560
AC	8m SE	Unspecified Heap	1922	1:10560
AC	9m SE	Unspecified Heap	1915	1:10560
AC	9m SE	Unspecified Heap	1948	1:10560
AC	9m SE	Unspecified Heap	1938	1:10560
AC	9m SE	Unspecified Heap	1938	1:10560
AD	9m SW	Cuttings	1901	1:10560
AD	9m SW	Cuttings	1948	1:10560
Z	11m S	Unspecified Pit	1948	1:10560
Z	18m S	Unspecified Pit	1922	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
Z	18m S	Unspecified Pit	1922	1:10560
S	19m NE	Cuttings	1948	1:10560
S	19m NE	Cuttings	1903	1:10560
Y	19m SE	Unspecified Heap	1948	1:10560
Z	20m S	Unspecified Pit	1875	1:10560
Q	21m S	Refuse Heap	1901	1:10560
AE	22m NE	Ironstone Pit	1875	1:10560
K	24m NW	Unspecified Disused Tips	1988	1:10000
K	24m NW	Unspecified Disused Tips	1979	1:10000
K	24m NW	Unspecified Heaps	1969	1:10560
K	24m NW	Unspecified Heaps	1964	1:10560
Y	24m S	Unspecified Ground Workings	1901	1:10560
U	25m NW	Unspecified Ground Workings	1903	1:10560
Y	28m S	Unspecified Heap	1922	1:10560
Y	28m S	Unspecified Heap	1922	1:10560
K	28m NW	Refuse Heap	1921	1:10560
Y	31m S	Unspecified Disused Workings	1988	1:10000
AF	31m NW	Unspecified Ground Workings	1938	1:10560
AF	31m NW	Unspecified Ground Workings	1938	1:10560
K	32m NW	Unspecified Heap	1938	1:10560
K	32m NW	Unspecified Heap	1938	1:10560
AE	32m NE	Unspecified Disused Pit	1948	1:10560
AF	34m NW	Unspecified Disused Tip	1988	1:10000
AF	34m NW	Unspecified Disused Tip	1979	1:10000
U	34m NW	Pond	1965	1:10560
K	34m NW	Unspecified Heap	1915	1:10560
AG	34m NE	Unspecified Heap	1922	1:10560
AG	34m NE	Unspecified Heap	1922	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
K	35m NW	Unspecified Heap	1948	1:10560
AF	35m W	Unspecified Pit	1948	1:10560
K	36m NW	Unspecified Heap	1922	1:10560
K	36m NW	Unspecified Heap	1922	1:10560
AG	36m NE	Unspecified Heap	1938	1:10560
AG	36m NE	Unspecified Heap	1938	1:10560
K	36m NW	Unspecified Heap	1965	1:10560
AF	36m NW	Refuse Heap	1922	1:10560
AF	36m NW	Refuse Heap	1922	1:10560
AF	37m W	Unspecified Disused Pits	1922	1:10560
AF	37m W	Unspecified Disused Pits	1922	1:10560
AH	38m S	Disused Quarries and Tips	1979	1:10000
AF	39m NW	Unspecified Heap	1969	1:10560
AF	39m NW	Unspecified Heap	1964	1:10560
AI	41m E	Old Ironstone Level	1922	1:10560
AI	41m E	Old Ironstone Level	1922	1:10560
U	41m NW	Pond	1992	1:10000
U	41m NW	Pond	1976	1:10000
AE	42m NE	Unspecified Disused Pit	1903	1:10560
AE	42m NE	Unspecified Disused Pit	1901	1:10560
AH	43m S	Unspecified Ground Workings	1875	1:10560
K	44m NW	Unspecified Heap	1921	1:10560
K	44m NW	Unspecified Disused Tips	1988	1:10000
K	44m NW	Unspecified Disused Tips	1979	1:10000
AJ	47m NW	Unspecified Pit	1938	1:10560
AJ	47m NW	Unspecified Pit	1938	1:10560
AJ	47m NW	Old Coal Level	1915	1:10560
AJ	47m NW	Old Coal Level	1922	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
AJ	47m NW	Old Coal Level	1922	1:10560
AJ	48m NW	Old Coal Level	1948	1:10560
AK	48m NE	Unspecified Pit	1875	1:10560
AL	49m NE	Unspecified Heap	1938	1:10560
AL	49m NE	Unspecified Heap	1938	1:10560
X	51m NE	Pond	1921	1:10560
X	51m NE	Pond	1938	1:10560
AL	52m NE	Unspecified Heap	1921	1:10560
X	52m NE	Pond	1915	1:10560
X	52m NE	Pond	1922	1:10560
X	52m NE	Pond	1922	1:10560
O	53m NE	Unspecified Ground Workings	1948	1:10560
AL	53m NE	Unspecified Heap	1901	1:10560
AL	54m NE	Unspecified Heap	1915	1:10560
S	54m NW	Unspecified Ground Workings	1948	1:10560
U	54m NW	Pond	1921	1:10560
AL	54m NE	Unspecified Heap	1948	1:10560
AL	54m NE	Unspecified Ground Workings	1922	1:10560
AL	54m NE	Unspecified Ground Workings	1922	1:10560
S	55m NW	Unspecified Ground Workings	1915	1:10560
S	55m NW	Unspecified Ground Workings	1938	1:10560
S	55m NW	Unspecified Ground Workings	1938	1:10560
AJ	56m NW	Old Coal Level	1921	1:10560
S	56m NW	Unspecified Ground Workings	1921	1:10560
S	57m NW	Unspecified Ground Workings	1922	1:10560
S	57m NW	Unspecified Ground Workings	1922	1:10560
AM	57m NW	Old Coal Level	1938	1:10560
AM	57m NW	Old Coal Level	1938	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
O	58m NE	Unspecified Heaps	1922	1:10560
O	58m NE	Unspecified Heaps	1922	1:10560
AL	60m NE	Unspecified Pit	1969	1:10560
AL	60m NE	Unspecified Pit	1964	1:10560
7	64m NE	Unspecified Ground Workings	1965	1:10560
AN	66m W	Unspecified Disused Tip	1979	1:10000
AO	67m W	Unspecified Old Quarries	1901	1:10560
S	67m NW	Unspecified Ground Workings	1965	1:10560
AO	68m W	Old Quarries	1921	1:10560
AK	68m NE	Unspecified Disused Tip	1992	1:10000
AK	68m NE	Unspecified Disused Tip	1976	1:10000
AO	69m W	Unspecified Disused Tip	1988	1:10000
AO	69m W	Unspecified Old Quarries	1903	1:10560
AO	70m W	Unspecified Old Quarries	1922	1:10560
AO	70m W	Unspecified Old Quarries	1922	1:10560
O	70m NE	Unspecified Heap	1968	1:10560
O	70m NE	Unspecified Heap	1964	1:10560
O	71m NE	Unspecified Ground Workings	1901	1:10560
AO	71m W	Unspecified Old Quarries	1915	1:10560
K	71m NW	Unspecified Heap	1875	1:10560
8	71m SW	Unspecified Disused Workings	1988	1:10000
AB	72m W	Refuse Heap	1915	1:10560
AK	72m NE	Unspecified Heap	1915	1:10560
AN	73m W	Unspecified Old Quarries	1948	1:10560
AO	73m W	Unspecified Old Quarries	1938	1:10560
AK	73m NE	Unspecified Heap	1965	1:10560
K	74m NW	Coal Level	1901	1:10560
AH	74m S	Unspecified Heap	1969	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
AH	74m S	Unspecified Heap	1964	1:10560
AK	74m NE	Unspecified Heap	1948	1:10560
AK	75m NE	Unspecified Heap	1922	1:10560
AK	75m NE	Unspecified Heap	1922	1:10560
K	75m NW	Old Coal Drift	1921	1:10560
AK	75m NE	Unspecified Heap	1921	1:10560
AH	75m S	Unspecified Ground Workings	1948	1:10560
AH	76m S	Unspecified Ground Workings	1922	1:10560
AH	76m S	Unspecified Ground Workings	1922	1:10560
S	78m NW	Cuttings	1948	1:10560
S	78m NW	Cuttings	1922	1:10560
S	78m NW	Cuttings	1922	1:10560
AO	78m W	Unspecified Ground Workings	1875	1:10560
AH	79m S	Unspecified Heap	1988	1:10000
AH	79m S	Unspecified Ground Workings	1901	1:10560
S	82m NW	Cuttings	1921	1:10560
AF	82m NW	Coal Level	1922	1:10560
AF	82m NW	Coal Level	1922	1:10560
AF	83m NW	Coal Level	1921	1:10560
AF	85m NW	Coal Level	1938	1:10560
AF	85m NW	Coal Level	1938	1:10560
AH	85m S	Unspecified Ground Workings	1922	1:10560
AH	85m S	Unspecified Ground Workings	1922	1:10560
AF	85m NW	Old Coal Level	1948	1:10560
AO	85m NW	Unspecified Old Quarries	1948	1:10560
AF	85m NW	Coal Level	1915	1:10560
AP	89m E	Unspecified Ground Workings	1922	1:10560
AP	89m E	Unspecified Ground Workings	1922	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
AP	89m E	Unspecified Ground Workings	1921	1:10560
AP	91m E	Unspecified Pit	1938	1:10560
AP	91m E	Unspecified Pit	1938	1:10560
AP	91m E	Unspecified Pit	1948	1:10560
AP	91m E	Unspecified Ground Workings	1915	1:10560
AO	92m NW	Unspecified Ground Workings	1969	1:10560
AO	92m NW	Unspecified Ground Workings	1964	1:10560
AH	93m S	Unspecified Disused Tip	1979	1:10000
S	94m NW	Cuttings	1875	1:10560
S	94m NW	Cuttings	1915	1:10560
S	98m NW	Unspecified Ground Workings	1922	1:10560
S	98m NW	Unspecified Ground Workings	1922	1:10560
AH	100m S	Unspecified Heap	1969	1:10560
AH	100m S	Unspecified Heaps	1964	1:10560
10	103m NW	Unspecified Heap	1965	1:10560
K	103m NW	Old Coal Drift	1915	1:10560
K	103m NW	Old Coal Drift	1948	1:10560
K	104m NW	Old Coal Drift	1922	1:10560
K	104m NW	Old Coal Drift	1922	1:10560
K	104m NW	Old Coal Drift	1938	1:10560
K	104m NW	Old Coal Drift	1938	1:10560
AQ	105m SE	Unspecified Ground Workings	1968	1:10560
AQ	107m SE	Unspecified Ground Workings	1964	1:10560
11	111m NE	Disused Canal	1938	1:10560
AK	111m NE	Old Canal	1901	1:10560
AH	111m S	Unspecified Heap	1969	1:10560
AK	112m NE	Disused Canal	1921	1:10560
AK	112m NE	Disused Canal	1915	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
AR	112m NE	Disused Canal	1948	1:10560
AQ	113m SE	Unspecified Ground Workings	1901	1:10560
AQ	113m SE	Unspecified Heap	1964	1:10560
AH	114m S	Unspecified Ground Workings	1901	1:10560
AS	115m S	Unspecified Disused Tip	1979	1:10000
AK	115m NE	Cuttings	1901	1:10560
Q	116m SW	Unspecified Pit	1875	1:10560
AT	117m SW	Old Ironstone Levels	1903	1:10560
AT	119m SW	Unspecified Ground Workings	1921	1:10560
AT	119m SW	Old Ironstone Levels	1922	1:10560
AT	119m SW	Old Ironstone Levels	1922	1:10560
AT	121m SW	Unspecified Disused Tip	1979	1:10000
AH	122m S	Unspecified Pit	1969	1:10560
AH	122m S	Unspecified Pit	1964	1:10560
AK	122m NE	Canal	1903	1:10560
AT	122m SW	Old Ironstone Levels	1948	1:10560
AT	123m SW	Unspecified Ground Workings	1969	1:10560
AT	123m SW	Unspecified Heap	1964	1:10560
AT	123m W	Unspecified Ground Workings	1921	1:10560
L	124m W	Refuse Heap	1915	1:10560
U	125m NW	Unspecified Ground Workings	1965	1:10560
AT	125m SW	Unspecified Heap	1901	1:10560
12	126m W	Unspecified Old Quarries	1903	1:10560
AT	127m W	Unspecified Old Quarries	1948	1:10560
AS	130m W	Unspecified Heaps	1948	1:10560
AU	131m N	Unspecified Disused Pit	1938	1:10560
AU	131m N	Unspecified Disused Pit	1938	1:10560
AU	131m N	Unspecified Disused Pit	1915	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
AR	132m NE	Unspecified Pit	1992	1:10000
AR	132m NE	Unspecified Pit	1976	1:10000
AV	132m NW	Unspecified Disused Tips	1992	1:10000
AV	132m NW	Unspecified Disused Tips	1976	1:10000
AU	133m N	Unspecified Disused Pit	1922	1:10560
AU	133m N	Unspecified Disused Pit	1922	1:10560
AO	134m W	Unspecified Disused Quarries	1988	1:10000
AO	134m W	Unspecified Disused Quarries	1979	1:10000
AQ	137m SE	Unspecified Heap	1948	1:10560
AT	137m W	Unspecified Ground Workings	1875	1:10560
AH	138m S	Unspecified Ground Workings	1901	1:10560
K	139m NW	Unspecified Heap	1965	1:10560
AW	139m NW	Reservoir	1875	1:10560
K	140m NW	Unspecified Ground Workings	1875	1:10560
AK	140m NE	Unspecified Heap	1875	1:10560
AW	140m NW	Reservoir	1915	1:10560
AW	141m NW	Reservoir	1938	1:10560
AV	141m NW	Unspecified Heap	1965	1:10560
AW	141m NW	Reservoir	1922	1:10560
AW	141m NW	Reservoir	1922	1:10560
K	141m NW	Unspecified Heap	1938	1:10560
K	141m NW	Unspecified Heap	1938	1:10560
AQ	142m SE	Unspecified Heap	1922	1:10560
AQ	142m SE	Unspecified Heap	1922	1:10560
AW	142m NW	Reservoir	1948	1:10560
AY	142m SW	Unspecified Pit	1922	1:10560
AY	142m SW	Unspecified Pit	1922	1:10560
K	143m NW	Unspecified Heap	1948	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
K	143m NW	Unspecified Heap	1915	1:10560
AW	144m NW	Reservoir	1921	1:10560
K	144m NW	Unspecified Heap	1922	1:10560
K	144m NW	Unspecified Heap	1922	1:10560
AW	146m NW	Pond	1992	1:10000
AW	146m NW	Pond	1976	1:10000
AW	146m NW	Pond	1965	1:10560
K	148m NW	Unspecified Heap	1901	1:10560
AW	150m NW	Reservoir	1901	1:10560
AZ	150m SE	Unspecified Ground Workings	1968	1:10560
AO	150m W	Unspecified Old Quarries	1948	1:10560
K	151m NW	Unspecified Heap	1921	1:10560
Q	153m SW	Unspecified Pit	1964	1:10560
BA	153m N	Unspecified Ground Workings	1915	1:10560
AT	154m W	Unspecified Pit	1969	1:10560
AT	154m W	Unspecified Pit	1964	1:10560
AH	155m S	Unspecified Ground Workings	1901	1:10560
AT	155m W	Unspecified Pit	1903	1:10560
AW	156m NW	Reservoir	1903	1:10560
AT	159m W	Unspecified Pit	1901	1:10560
AQ	160m SE	Coal Level	1922	1:10560
AQ	160m SE	Coal Level	1922	1:10560
AT	160m SW	Unspecified Pit	1875	1:10560
AQ	162m SE	Unspecified Ground Workings	1901	1:10560
K	164m NW	Coal Level	1903	1:10560
AQ	168m SE	Unspecified Heap	1968	1:10560
AZ	176m E	Unspecified Ground Workings	1875	1:10560
AH	178m S	Unspecified Ground Workings	1901	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
BB	180m NW	Refuse Heap	1938	1:10560
BB	180m NW	Refuse Heap	1938	1:10560
BC	181m E	Disused Canal	1922	1:10560
BC	181m E	Disused Canal	1922	1:10560
AQ	186m SE	Unspecified Heap	1964	1:10560
BD	188m SW	Ironstone Levels	1875	1:10560
AW	193m NW	Cuttings	1922	1:10560
AW	193m NW	Cuttings	1922	1:10560
BE	194m NW	Unspecified Disused Tip	1992	1:10000
BF	194m E	Canal	1901	1:10560
BF	194m E	Disused Canal	1948	1:10560
BG	194m SW	Unspecified Heap	1948	1:10560
BE	196m NW	Unspecified Heaps	1965	1:10560
BF	200m E	Disused Canal	1922	1:10560
BH	200m SW	Cuttings	1988	1:10000
BH	200m SW	Cuttings	1979	1:10000
K	201m NW	Unspecified Heap	1922	1:10560
K	201m NW	Unspecified Heap	1922	1:10560
K	201m NW	Unspecified Ground Workings	1938	1:10560
K	201m NW	Unspecified Ground Workings	1938	1:10560
AR	201m NE	Unspecified Ground Workings	1992	1:10000
AR	201m NE	Unspecified Ground Workings	1975	1:10000
AR	201m NE	Unspecified Ground Workings	1982	1:10000
K	201m NW	Reservoir	1875	1:10560
K	201m NW	Old Coal Level	1948	1:10560
K	201m NW	Unspecified Heap	1965	1:10560
K	202m NW	Reservoir	1938	1:10560
K	202m NW	Pond	1965	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
K	202m NW	Unspecified Heap	1915	1:10560
K	203m NW	Pond	1976	1:10000
K	203m NW	Reservoir	1915	1:10560
BG	203m SW	Unspecified Heap	1964	1:10560
K	204m NW	Ponds	1992	1:10000
K	204m NW	Reservoir	1922	1:10560
K	204m NW	Reservoir	1922	1:10560
K	204m NW	Unspecified Pit	1875	1:10560
K	204m NW	Reservoir	1948	1:10560
BC	204m E	Disused Canal	1988	1:10000
K	205m NW	Unspecified Pit	1922	1:10560
K	205m NW	Unspecified Pit	1922	1:10560
K	205m NW	Unspecified Pit	1948	1:10560
K	206m NW	Unspecified Pit	1915	1:10560
K	206m NW	Unspecified Heap	1875	1:10560
K	208m NW	Reservoir	1921	1:10560
BA	209m N	Unspecified Heap	1938	1:10560
BA	209m N	Unspecified Heap	1938	1:10560
K	209m NW	Coal Level	1938	1:10560
K	209m NW	Coal Level	1938	1:10560
K	209m NW	Reservoir	1901	1:10560
BH	209m SW	Cuttings	1922	1:10560
K	211m NW	Unspecified Heap	1921	1:10560
K	211m NW	Coal Level	1915	1:10560
K	212m NW	Coal Level	1922	1:10560
K	212m NW	Coal Level	1922	1:10560
K	212m NW	Unspecified Pit	1921	1:10560
BI	213m SW	Cuttings	1969	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
BI	213m SW	Cuttings	1964	1:10560
BJ	216m NW	Unspecified Old Quarries	1901	1:10560
K	217m NW	Coal Level	1921	1:10560
AZ	220m E	Unspecified Heap	1875	1:10560
BH	222m SW	Cuttings	1948	1:10560
K	226m NW	Reservoir	1903	1:10560
AH	229m S	Unspecified Heap	1875	1:10560
BJ	231m NW	Unspecified Old Quarries	1903	1:10560
BK	232m N	Unspecified Heap	1921	1:10560
BD	233m SW	Old Ironstone Levels	1903	1:10560
BK	234m N	Unspecified Heap	1938	1:10560
BK	234m N	Unspecified Heap	1938	1:10560
BK	235m N	Unspecified Heap	1915	1:10560
BK	235m N	Unspecified Heap	1948	1:10560
BK	235m N	Unspecified Heap	1922	1:10560
BK	235m N	Unspecified Heap	1922	1:10560
BH	235m SW	Cuttings	1875	1:10560
BL	238m S	Unspecified Disused Tip	1979	1:10000
BL	238m S	Unspecified Heap	1969	1:10560
BL	238m S	Unspecified Heap	1964	1:10560
BM	238m NW	Unspecified Disused Tips	1992	1:10000
BM	238m NW	Unspecified Disused Tips	1976	1:10000
BL	239m S	Unspecified Heap	1948	1:10560
BM	239m NW	Unspecified Heap	1965	1:10560
BD	240m SW	Old Ironstone Levels	1901	1:10560
15	240m NW	Refuse Heap	1965	1:10560
BD	243m SW	Old Ironstone Levels	1922	1:10560
BD	243m SW	Old Ironstone Levels	1922	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
BD	244m SW	Unspecified Ground Workings	1921	1:10560
BD	245m SW	Unspecified Ground Workings	1915	1:10560
BD	246m SW	Old Ironstone Levels	1948	1:10560
BD	247m SW	Old Ironstone Levels	1938	1:10560
BM	248m NW	Refuse Heap	1922	1:10560
BM	248m NW	Refuse Heap	1922	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m

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Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining, ground workings and natural cavities map on **page 168**

ID	Location	Land Use	Year of mapping	Mapping scale
B	On site	Old Coal Drift	1948	1:10560
C	On site	Old Coal Level	1948	1:10560
O	On site	Ironstone Level	1875	1:10560
P	On site	Old Ironstone Level	1901	1:10560
P	On site	Old Ironstone Level	1903	1:10560
Q	On site	Coal Pit	1875	1:10560
B	11m NW	Coal Shaft	1875	1:10560
Z	35m S	Air Shaft	1915	1:10560
Z	38m S	Air Shaft	1901	1:10560
Z	45m S	Air Shaft	1875	1:10560
AJ	48m NW	Old Coal Level	1948	1:10560
K	74m NW	Coal Level	1901	1:10560
AF	85m NW	Old Coal Level	1948	1:10560
K	103m NW	Old Coal Drift	1948	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
AT	117m SW	Old Ironstone Levels	1903	1:10560
AT	122m SW	Old Ironstone Levels	1948	1:10560
13	146m NW	Air Shaft	1875	1:10560
K	164m NW	Coal Level	1903	1:10560
AH	168m S	Old Coal Shaft	1901	1:10560
BD	188m SW	Ironstone Levels	1875	1:10560
K	201m NW	Old Coal Level	1948	1:10560
AZ	221m SE	Air Shaft	1875	1:10560
K	229m NW	Air Shaft	1875	1:10560
AH	230m S	Air Shaft	1915	1:10560
AH	231m S	Unspecified Disused Shaft	1969	1:10560
AH	231m S	Unspecified Disused Shaft	1964	1:10560
AH	232m S	Unspecified Disused Shaft	1988	1:10000
AH	232m S	Unspecified Disused Shaft	1979	1:10000
BD	233m SW	Old Ironstone Levels	1903	1:10560
AH	234m S	Air Shaft	1901	1:10560
BD	240m SW	Old Ironstone Levels	1901	1:10560
AH	243m S	Air Shaft	1875	1:10560
BD	246m SW	Old Ironstone Levels	1948	1:10560
BN	255m SW	Air Shaft	1915	1:10560
BD	291m SW	Unspecified Disused Levels	1988	1:10000
BD	291m SW	Unspecified Disused Level	1979	1:10000
BD	296m SW	Unspecified Disused Level	1969	1:10560
BD	296m SW	Unspecified Disused Level	1964	1:10560
18	324m SW	Unspecified Disused Mine	1964	1:10560
BS	326m N	Old Coal Level	1948	1:10560
BX	336m SW	Tunnel	1969	1:10560
BX	336m SW	Tunnel	1969	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
BX	336m SW	Tunnel	1964	1:10560
BZ	344m SW	Tunnel	1901	1:10560
BZ	344m SW	Tunnel	1915	1:10560
BQ	345m NW	Coal Level	1901	1:10560
BZ	346m SW	Tunnel	1875	1:10560
BX	363m SW	Disused Tunnel	1988	1:10000
21	364m SE	Air Shaft	1875	1:10560
CD	369m S	Coal Level	1915	1:10560
23	387m SW	Air Shaft	1875	1:10560
BQ	388m NW	Unspecified Disused Drift	1992	1:10000
BQ	388m NW	Unspecified Disused Drift	1976	1:10000
BQ	407m NW	Old Coal Drift	1948	1:10560
CG	417m NW	Disused Air Shaft	1992	1:10000
CG	417m NW	Disused Air Shaft	1976	1:10000
CA	420m NW	Coal Level	1948	1:10560
BQ	420m NW	Disused Coal Drift	1948	1:10560
CG	420m NW	Air Shaft	1948	1:10560
28	445m SW	Unspecified Melin	1915	1:10560
CE	450m SE	Old Coal Shaft	1915	1:10560
CP	471m NW	Coal Level	1875	1:10560
CV	493m E	Unspecified Old Shaft	1915	1:10560
30	514m SE	Coal Pit	1875	1:10560
CX	519m NW	Old Coal Level	1948	1:10560
CX	528m NW	Old Coal Level	1901	1:10560
CX	539m NW	Old Coal Level	1903	1:10560
CQ	539m NW	Coal and Ironstone Pit	1875	1:10560
CP	559m NW	Air Shaft	1875	1:10560
DD	577m S	Unspecified Disused Shaft	1979	1:10000



ID	Location	Land Use	Year of mapping	Mapping scale
DF	579m NW	Old Coal Level	1948	1:10560
BF	585m SE	Unspecified Old Shafts	1915	1:10560
BF	590m SE	Unspecified Old Shafts	1915	1:10560
DJ	615m SE	Coal Pit	1875	1:10560
BF	624m SE	Air Shaft	1875	1:10560
DN	646m NW	Disused Air Shaft	1976	1:10000
DN	646m NW	Disused Air Shaft	1965	1:10560
DN	647m NW	Air Shaft	1948	1:10560
DN	650m NW	Air Shaft	1875	1:10560
DN	652m NW	Air Shaft	1901	1:10560
DN	667m NW	Air Shaft	1903	1:10560
DG	690m E	Unspecified Disused Shafts	1968	1:10560
DG	690m E	Unspecified Disused Shafts	1964	1:10560
DG	692m E	Unspecified Disused Shafts	1968	1:10560
DG	692m E	Unspecified Disused Shafts	1964	1:10560
DG	692m E	Air Shaft	1875	1:10560
DG	696m E	Air Shaft	1901	1:10560
DN	697m NW	Unspecified Disused Drift	1976	1:10000
DG	699m E	Air Shaft	1901	1:10560
DG	699m E	Air Shafts	1903	1:10560
DG	699m E	Air Shafts	1948	1:10560
DT	701m S	Old Coal Level	1915	1:10560
DG	701m E	Air Shafts	1903	1:10560
DG	702m E	Air Shafts	1948	1:10560
DG	703m NE	Air Shaft	1875	1:10560
DN	704m NW	Old Coal Drift	1948	1:10560
DG	705m NE	Air Shaft	1901	1:10560
36	705m NW	Colliery	1875	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
DG	706m E	Unspecified Disused Shaft	1988	1:10000
DG	706m E	Unspecified Disused Shaft	1968	1:10560
DG	706m E	Unspecified Disused Shaft	1964	1:10560
DG	708m E	Air Shaft	1901	1:10560
DG	709m NE	Air Shafts	1903	1:10560
DG	709m E	Air Shafts	1903	1:10560
DG	713m E	Air Shaft	1875	1:10560
DG	714m E	Air Shaft	1948	1:10560
-	736m S	Old Air Shaft	1915	1:10560
-	739m S	Disused Air Shaft	1979	1:10000
-	739m S	Disused Air Shaft	1969	1:10560
DX	746m E	Old Coal Level	1948	1:10560
EB	757m NW	Unspecified Disused Level	1992	1:10000
EB	757m NW	Unspecified Disused Level	1976	1:10000
EB	761m NW	Old Coal Level	1948	1:10560
EB	761m NW	Old Coal Level	1901	1:10560
EB	763m NW	Old Coal Level	1903	1:10560
EH	775m SE	Unspecified Disused Shaft	1988	1:10000
EH	775m SE	Unspecified Disused Shaft	1968	1:10560
EH	775m SE	Unspecified Disused Shaft	1964	1:10560
-	777m E	Unspecified Old Shafts	1948	1:10560
-	778m E	Coal Level	1901	1:10560
-	778m N	Old Ironstone Level	1948	1:10560
-	779m E	Unspecified Old Shafts	1901	1:10560
-	779m E	Unspecified Old Shafts	1903	1:10560
-	781m N	Old Ironstone Level	1901	1:10560
EH	784m SE	Air Shaft	1875	1:10560
-	785m E	Unspecified Old Shafts	1901	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
-	794m N	Old Ironstone Level	1903	1:10560
DX	810m E	Coal Level	1903	1:10560
EK	811m NW	Old Coal Level	1903	1:10560
DX	812m E	Coal Level	1901	1:10560
-	818m W	Old Coal Level	1948	1:10560
DZ	820m NW	Old Air Shaft	1901	1:10560
-	826m NE	Coal and Ironstone Pit	1875	1:10560
EK	833m NW	Air Shaft	1948	1:10560
EK	835m NW	Disused Air Shafts	1992	1:10000
EK	835m NW	Disused Air Shafts	1976	1:10000
EK	835m NW	Disused Air Shaft	1965	1:10560
DZ	838m NW	Old Air Shaft	1903	1:10560
CQ	839m NW	Unspecified Disused Shaft	1992	1:10000
CQ	839m NW	Unspecified Disused Shaft	1976	1:10000
CQ	839m NW	Unspecified Disused Shaft	1965	1:10560
EL	841m SE	Unspecified Disused Shaft	1968	1:10560
EL	841m SE	Unspecified Disused Shaft	1964	1:10560
EL	843m SE	Old Air Shaft	1915	1:10560
EL	847m SE	Air Shaft	1875	1:10560
-	853m W	Old Coal Level	1901	1:10560
-	854m W	Old Coal Level	1903	1:10560
-	854m E	Disused Drift	1948	1:10560
-	858m W	Unspecified Disused Level	1992	1:10000
-	858m W	Unspecified Disused Level	1976	1:10000
-	862m E	Unspecified Old Shaft	1901	1:10560
EB	862m NW	Coal Levels	1948	1:10560
-	865m NW	Unspecified Old Shaft	1948	1:10560
-	865m E	Unspecified Old Shaft	1903	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
-	865m E	Unspecified Old Shaft	1948	1:10560
-	870m E	Coal Level	1903	1:10560
-	874m E	Coal Level	1948	1:10560
-	879m E	Coal Level	1875	1:10560
-	887m S	Disused Air Shaft	1988	1:10000
-	887m S	Disused Air Shaft	1979	1:10000
-	887m N	Ironstone Level	1948	1:10560
EU	889m NW	Old Coal Levels	1948	1:10560
-	891m NW	Air Shaft	1948	1:10560
-	892m NW	Disused Air Shafts	1992	1:10000
-	892m NW	Disused Air Shafts	1976	1:10000
-	892m NW	Disused Air Shaft	1965	1:10560
-	902m S	Air Shaft	1915	1:10560
-	912m N	Old Ironstone Level	1903	1:10560
-	916m E	Air Shaft	1901	1:10560
-	917m E	Unspecified Disused Shaft	1988	1:10000
-	917m E	Unspecified Disused Shaft	1968	1:10560
-	917m E	Unspecified Disused Shaft	1964	1:10560
-	918m E	Air Shaft	1903	1:10560
-	920m E	Air Shaft	1875	1:10560
-	925m E	Air Shaft	1948	1:10560
-	934m S	Unspecified Disused Level	1969	1:10560
-	934m S	Unspecified Disused Level	1964	1:10560
-	938m W	Unspecified Old Levels	1901	1:10560
-	940m S	Unspecified Disused Level	1988	1:10000
-	940m S	Unspecified Disused Level	1979	1:10000
-	940m W	Unspecified Old Levels	1903	1:10560
-	941m W	Unspecified Disused Level	1969	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
-	941m W	Unspecified Disused Level	1964	1:10560
-	944m W	Unspecified Disused Levels	1988	1:10000
-	944m W	Unspecified Disused Level	1979	1:10000
-	946m S	Unspecified Old Level	1915	1:10560
44	959m SE	Coal Pit	1875	1:10560
-	960m NW	Old Ironstone Level	1901	1:10560
-	960m W	Unspecified Old Levels	1901	1:10560
-	967m W	Unspecified Old Levels	1948	1:10560
-	991m E	Air Shaft	1875	1:10560

This data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

5

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 168**

ID	Location	Name	Commodity	Class	Likelihood
2	On site	Not available	Iron Ore (Bedded)	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered



ID	Location	Name	Commodity	Class	Likelihood
E	On site	Not available	Iron Ore (Bedded)	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
AX	140m E	Not available	Iron Ore (Bedded)	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
14	170m E	Not available	Iron Ore (Bedded)	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
34	624m S	Not available	Iron Ore (Bedded)	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m **0**

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site **0**

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site **1**

Areas which could be affected by past, current or future coal mining.



Location	Details
On site	The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0
-----------------	---

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0
-----------------	---

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0
-----------------	---

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

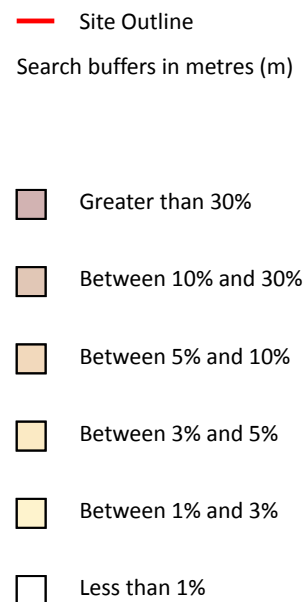
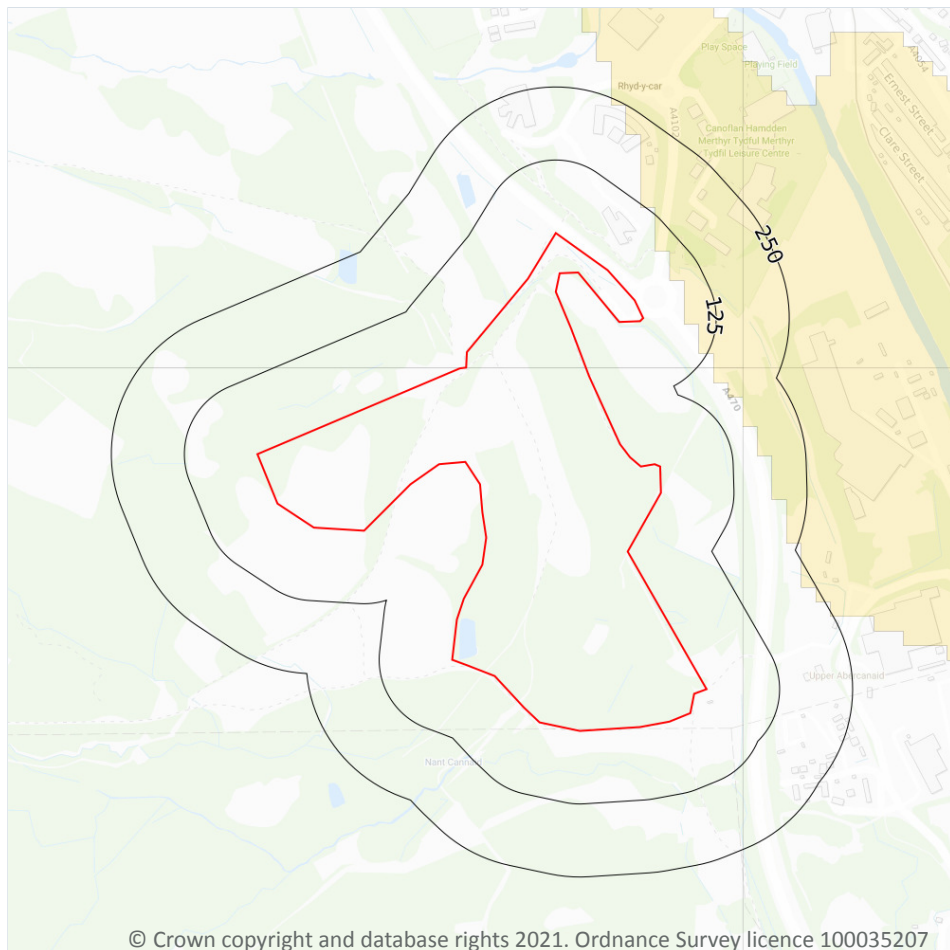
18.13 Clay mining

Records on site	0
-----------------	---

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



19.1 Radon

Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 205**

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None**

This data is sourced from the British Geological Survey and Public Health England.



20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

12

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
3m SW	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
7m NW	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
7m NW	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg



This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m

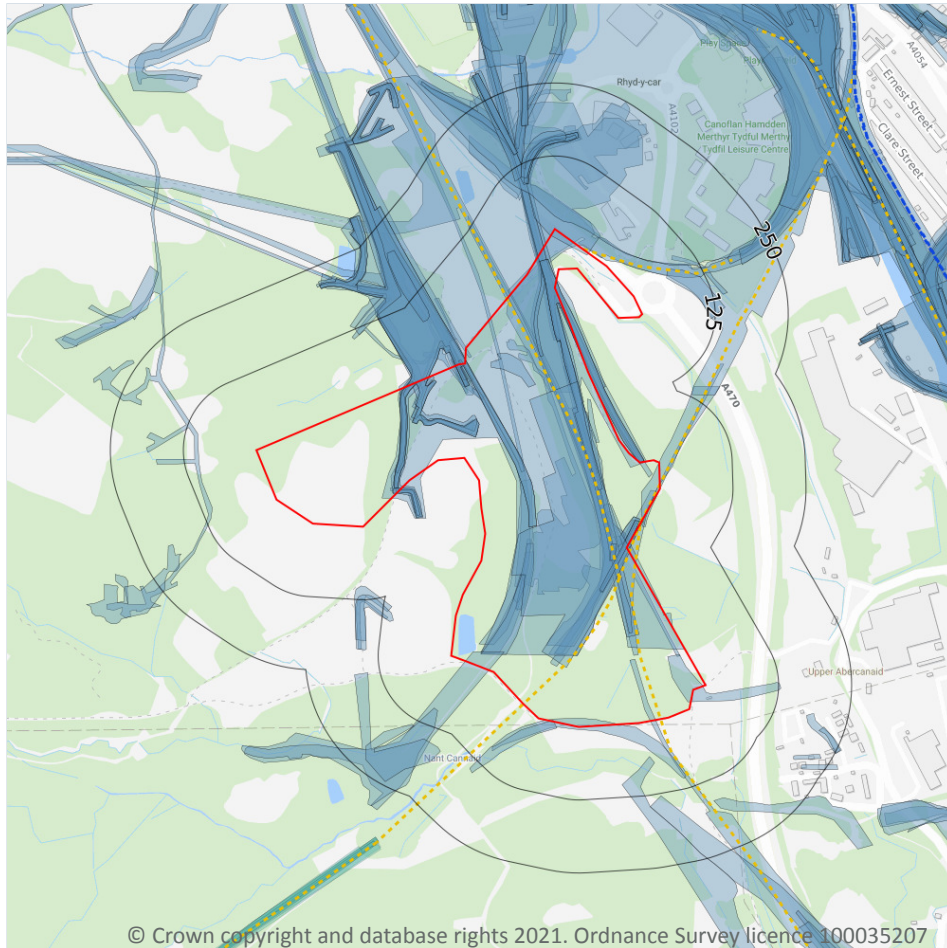
0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.



21 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)**
- C1 Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 1 Worksites
- C2 Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

21.1 Underground railways (London)

Records within 250m

0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m

0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.



This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m

50

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 208**

Location	Land Use	Year of mapping	Mapping scale
On site	Railway Sidings	1962	2500
On site	Railway Sidings	1900	2500
On site	Railway Sidings	1919	2500
On site	Tramway Sidings	1919	2500
On site	Railway	1875	-
On site	Railway	1873	-
On site	Railway Sidings	1875	2500
On site	Railway Sidings	1948	10560
On site	Railway Sidings	1903	10560
On site	Railway Sidings	1901	10560
On site	Railway Sidings	1938	10560
On site	Railway Sidings	1915	10560
On site	Railway Sidings	1921	10560
On site	Railway Sidings	1922	10560
On site	Tramway Sidings	1948	10560
On site	Tramway Sidings	1915	10560
On site	Tramway Sidings	1922	10560



Location	Land Use	Year of mapping	Mapping scale
On site	Tramway Sidings	1921	10560
On site	Railway Sidings	1875	10560
19m NE	Railway Sidings	1903	10560
60m S	Tramway Sidings	1948	10560
65m NE	Railway Sidings	1875	10560
82m NW	Railway Sidings	1901	10560
86m NE	Railway Sidings	1875	2500
89m NW	Railway Sidings	1922	10560
90m NE	Railway Sidings	1875	2500
91m NW	Railway Sidings	1915	10560
94m S	Railway Sidings	1901	10560
99m W	Railway Sidings	1875	2500
100m NW	Railway Sidings	1901	10560
102m S	Railway Sidings	1903	10560
105m W	Railway Sidings	1901	10560
106m NW	Railway Sidings	1901	10560
113m NW	Railway Sidings	1901	10560
115m W	Railway Sidings	1900	2500
125m NW	Railway Sidings	1901	10560
129m S	Railway Sidings	1948	10560
135m SW	Railway Sidings	1875	10560
145m NW	Railway Sidings	1922	10560
161m S	Railway Sidings	1948	10560
173m NE	Railway Sidings	1921	10560
181m E	Railway Sidings	1901	10560
184m N	Railway Sidings	1922	10560
188m SW	Railway Sidings	1875	10560
191m NE	Railway Sidings	1875	10560



Location	Land Use	Year of mapping	Mapping scale
194m SE	Tramway Sidings	1901	10560
196m NE	Railway Sidings	1956	1250
197m NE	Railway Sidings	1956	2500
209m E	Railway Sidings	1922	10560
214m SE	Tramway Sidings	1901	10560

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m

0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m

8

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

Features are displayed on the Railway infrastructure and projects map on **page 208**

Location	Description
On site	Abandoned
On site	Abandoned
On site	Abandoned
On site	Abandoned
On site	Abandoned
1m NE	Dismantled
166m E	Abandoned
190m E	Abandoned

This data is sourced from OpenStreetMap.



21.7 Railways

Records within 250m

0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m

0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m

0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m

0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 Ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see <https://www.groundsure.com/sources-reference>.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: <https://www.groundsure.com/terms-and-conditions-jan-2020/>.



APPENDIX C – COUNCIL AND NRW RESPONSES

Roberts, Huw

From: Coughlan, Gerald
Sent: 11 June 2021 10:59
To: Roberts, Huw
Cc: Morris, Carwyn
Subject: FW: Proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil - EIA Scoping Request [NOT PROTECTIVELY MARKED]
Attachments: RHDR-HMA-LE-XX-DR-A-91-003-EIA Scoping Area-S0-P2.pdf; 210427 B023905 Rhydycar West EIA Scoping Request FINAL.pdf; RHDR-HMA-LE-XX-DR-A-SK0005-Masterplan - Land use Plan (1 in 6)-S0-P1.pdf; Scoping letter 2 Rhydycar West.pdf

Classification: NOT PROTECTIVELY MARKED

Huw – apologies for late response .

Looking at the original letter of the 27th April 2021 sent to Judith Jones, there are three particular sections of the listed appendices that I am would like to comment on

- a) Appendix 3 – Ground Conditions
- b) Appendix 5 – Transportation and Movement
- c) Appendix 7 – Hydrology and Hydrogeology

Appendix 3 – Ground Conditions

The third paragraph states 'No consultation or agreement has been undertaken with MTCBC or its consultees with regard to ground conditions on site'. Also suggested mitigation measures are outlined but are not limited to those indicated .

Due to the past history of the area initial investigations and surveys, as indicated, could suggest future solutions to site problems that may be revealed and could require further works.

The geology of the area is paramount in the future proposals for this site and any adjacent sites. Ground contamination needs to be investigated also

Appendix 5 – Transport and Movement

Considerations for this aspect of the proposal need to include acknowledgement of the existing highway network. The adjacent highway is the A470 which is administered by the WG, these links with the A465 Heads of the Valley to the north and the Abercynon roundabout to the south/eventually Cardiff.

Detailed discussions with the WG, and the agents, is strongly advised at the earliest opportunity.

Concerns with the local network and the impact of the proposals, in particular the A4102 into the town and then the roundabout serving A4054 in both north and south directions. Discussion is required with MTCBC with regards the affects on the local network .

Appendix 7 - Hydrology and Hydrogeology

The topography and mining history of the area present a unique challenge to future development. Future proposals are to comply with new legislation in place since January 2019.

Baseline information from a previous report of January 2018, this is to be updated. Works affecting existing watercourses will require relevant approval. Contact with MTCBC SAB Officer is advised at earliest opportunity.

Initial comments based on info supplied so far , as and when detail more becomes available relevant officer needs to comment .

Gerald

From: Roberts, Huw <Huw.Roberts@merthyr.gov.uk>
Sent: 10 June 2021 13:52

To: Morris, Carwyn <Carwyn.Morris@merthyr.gov.uk>; Coughlan, Gerald <Gerald.Coughlan@merthyr.gov.uk>
Subject: FW: Proposed mixed leisure development on land at Rhydyar West, Merthyr Tydfil - EIA Scoping Request

Hi both, I don't think I have received a response to this. I would be grateful if I could have one urgently as I need to send a response by next Tuesday.

Thanks

Huw

From: Roberts, Huw

Sent: 30 April 2021 13:58

To: 'cadwplanning@gov.wales' <cadwplanning@gov.wales>; 'planadmin@caerphilly.gov.uk' <planadmin@caerphilly.gov.uk>; 'david.j.bailey@rctcbc.gov.uk' <david.j.bailey@rctcbc.gov.uk>; 'southeastplanning@naturalresourceswales.gov.uk' <southeastplanning@naturalresourceswales.gov.uk>; 'planningconsultation@coal.gov.uk' <planningconsultation@coal.gov.uk>; 'judith@ggat.org.uk' <judith@ggat.org.uk>; 'lupenquiries@hse.gov.uk' <lupenquiries@hse.gov.uk>; 'planning.enquiries@beacons-mpa.gov.uk' <planning.enquiries@beacons-mpa.gov.uk>; Morris, Carwyn <Carwyn.Morris@merthyr.gov.uk>; Davies, Matthew (Planning) <Matthew.Davies3@merthyr.gov.uk>; Bramley, Tom <Tom.Bramley@merthyr.gov.uk>; Long, Chris <Chris.Long@merthyr.gov.uk>; Gow, Susan <Susan.Gow@merthyr.gov.uk>; Watkins, Craig <Craig.Watkins@merthyr.gov.uk>; Jones, Beth (Rights of Way) <Beth.Jones@merthyr.gov.uk>; 'developer.services@dwrcymru.com' <developer.services@dwrcymru.com>; 'enquiries@southwales-tra.gov.uk' <enquiries@southwales-tra.gov.uk>

Subject: Proposed mixed leisure development on land at Rhydyar West, Merthyr Tydfil - EIA Scoping Request

Dear all, please find attached consultation letter and documents/plans regarding the Scoping Opinion.

Regards,

Huw Roberts
Planning Group Leader

Roberts, Huw

From: Eldred, Garin
Sent: 04 May 2021 10:57
To: Roberts, Huw
Subject: FW: Proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil - EIA Scoping Request [NOT PROTECTIVELY MARKED]
Attachments: RHDR-HMA-LE-XX-DR-A-91-003-EIA Scoping Area-S0-P2.pdf; 210427 B023905 Rhydycar West EIA Scoping Request FINAL.pdf; RHDR-HMA-LE-XX-DR-A-SK0005-Masterplan - Land use Plan (1 in 6)-S0-P1.pdf; Scoping letter 2 Rhydycar West.pdf

Morning Huw,

The EIA scoping report appears to covers all the area Environmental Health would consider a potential problem for the proposed site. Specifically the Geoenvironmental Assessment, Air Quality Assessment, Noise Impact Assessment and the Lighting Report. I shall wait on this information for further comments.

Kind regards

From: Gow, Susan <Susan.Gow@merthyr.gov.uk>
Sent: 30 April 2021 14:12
To: Public Health <PublicHealth@merthyr.gov.uk>; Eldred, Garin <Garin.Eldred@merthyr.gov.uk>
Subject: FW: Proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil - EIA Scoping Request [NOT PROTECTIVELY MARKED]

Classification: NOT PROTECTIVELY MARKED

Susan Gow
Rheolwr Iechyd yr Amgylchedd / Environmental Health Manager

Cyngor Bwrdeistref Sirol Merthyr Tudful / Merthyr Tydfil County Borough Council
Canolfan Ddinesig / Civic Centre
Stryd Y Castell / Castle Street
Merthyr Tudful / Merthyr Tydfil
CF47 8AN

From: Roberts, Huw <Huw.Roberts@merthyr.gov.uk>
Sent: 30 April 2021 13:58
To: cadwplanning@gov.wales; planadmin@caerphilly.gov.uk; david.j.bailey@rctcbc.gov.uk; southeastplanning@naturalresourceswales.gov.uk; planningconsultation@coal.gov.uk; judith@ggat.org.uk; lupenquiries@hse.gov.uk; planning.enquiries@beacons-mpa.gov.uk; Morris, Carwyn <Carwyn.Morris@merthyr.gov.uk>; Davies, Matthew (Planning) <Matthew.Davies3@merthyr.gov.uk>; Bramley, Tom <Tom.Bramley@merthyr.gov.uk>; Long, Chris <Chris.Long@merthyr.gov.uk>; Gow, Susan <Susan.Gow@merthyr.gov.uk>; Watkins, Craig <Craig.Watkins@merthyr.gov.uk>; Jones, Beth (Rights of Way) <Beth.Jones@merthyr.gov.uk>; developer.services@dwrcymru.com; enquiries@southwales-tra.gov.uk
Subject: Proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil - EIA Scoping Request

Dear all, please find attached consultation letter and documents/plans regarding the Scoping Opinion.

Regards,

Huw Roberts

Planning Group Leader

(by email only)
Merthyr Tydfil Council
Civic Centre
Castle Street
Merthyr Tydfil
CF47 8AN

Science Division

Kathryn Deakin

Statutory and Commercial
Land Use Planning Advice
HSE, Harpur Hill,
Buxton,
Derbyshire,
SK17 9JN

lupenquiries@hse.gov.uk

<http://www.hse.gov.uk/>

Head of Team
Stuart Reston

Your Ref: Scoping Opinion/2021

Date: 6 May 2021

Dear Sir/Madam

Thank you for your EIA Scoping request for any comments dated 30 April 2021 for a proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil.

Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, Regulation 4(3)(b) - the vulnerability of the proposed development to major accidents relevant to the development.

- HSE's response is limited to our role in the land use planning system on the control of major industrial hazards involving dangerous substances.
- HSE is not responding in our regulatory role in the health and safety system.

1. The proposed development does not appear to be of a type that would store or process hazardous substances in quantities relevant to the potential for industrial major accidents with respect to Directive 2012/18/EU [see *The Planning (Hazardous Substances) (Wales) Regulations 2015*].

2. The development is not located within a safeguarding zone of an Explosives site licensed under the Explosives regulations 2014 or the Dangerous goods in harbour area regulations 2016.

3. The development is not located within HSE's land-use-planning consultation zones for major-accident-hazard pipelines and hazardous substances consented sites (licensed explosives sites are covered in the previous paragraph).

Due to the above 3 points, there was no need to consult HSE.

4. General health and safety at work

HSE realises that Environmental Risk Assessments are not expected to include general health and safety at work however we take this opportunity to point out that it may be beneficial for employer(s) to undertake a risk assessment as early as possible to satisfy themselves that their design and operation will meet requirements of relevant health and safety legislation as the project progresses.

Yours sincerely

Kathryn Deakin
Statutory and Commercial Land Use Planning Advice



**The Coal
Authority**



INVESTOR IN PEOPLE



RTPI

Learning Partner

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Nottinghamshire
NG18 4RG**

Tel: 01623 637 119 (Planning Enquiries)

Email: planningconsultation@coal.gov.uk

Web: www.gov.uk/coalauthority

For the Attention of: Mr H. Roberts – Case Officer
Merthyr Tydfil County Borough Council

[By Email: planning@merthyr.gov.uk]

17 May 2021

Dear Mr Roberts

SCOPING OPINION REQUEST: Rhydycar West

Proposed mixed leisure development at Land at Rhydycar West, Merthyr Tydfil

Thank you for your consultation letter of 30 April 2021 seeking the views of the Coal Authority regarding the above matter.

The Coal Authority is a non-departmental public body sponsored by the Department of Business, Energy & Industrial Strategy. As a statutory consultee, the Coal Authority has a duty to respond to planning applications and development plans in order to protect the public and the environment in mining areas.

The Coal Authority Response:

The site of the proposed EIA development is located largely within the defined Development High Risk Area. The following provides a summary of the Coal Authority's information relating to the significant coal mining legacy affecting the site:

- The site is within the potential zone of influence of former mine workings in 11 coal seams, including workings at shallow depth.
- There are parts of the site where historic unrecorded coal mining activity is likely to have taken place at shallow depth.
- There are 34 recorded mine entries (shafts and adits) and their associated zones of influence present within the site or within 20m of its boundary. We hold limited treatment details for four shafts and no information relating to past treatment of the remaining mining entries. Due to potential plotting

inaccuracies, the actual positions of the mine entries could deviate from their plotted positions by several metres.

Consideration of Coal Mining issues in the Environmental Statement

We note that Appendix 3 of the Scoping Opinion request letter from Peter Waldren of Tetra Tech Planning (dated 27 April 2021) considers the potential impacts of the proposed development on the ground conditions at the site.

The Appendix acknowledges that the site has been subject to extensive coal and ironstone mining activity in the past. As such, the Coal Authority is pleased to note that it indicates that a Mining Risk Assessment is to be produced to support the development proposal, which will identify potential remedial works required to stabilise former mining legacy including mine workings, mine entries and spoil tips.

We wish to advise that any Coal Mining Risk Assessment, or equivalent report, prepared in relation to the proposed development should utilise up-to-date coal mining and geological information to assess the extent to which past mining activity poses any risk to the development proposal and, where necessary, propose mitigation measures to address any issues of land instability. This should include further intrusive investigations to establish the exact situation regarding coal mining legacy affecting the site, as necessary.

Additional Information for the Applicant

It would appear from the Masterplan that built development is proposed over recorded mine entries, with the footprint of the snow centre encompassing the plotted positions of a number of mine shafts and adits.

The Coal Authority takes this opportunity to highlight that any form of development over or within the influencing distance of a mine entry can be dangerous and raises significant safety and engineering risks and exposes all parties to potential financial liabilities. The Coal Authority has adopted a policy where, as a general precautionary principle, the building over or within the influencing distance of a mine entry should wherever possible be avoided. Our adopted policy on this matter can be found at:

www.gov.uk/government/publications/building-on-or-within-the-influencing-distance-of-mine-entries

Notwithstanding the above policy, the Coal Authority acknowledges that there are occasionally exceptional situations where large scale development cannot feasibly be designed to avoid being located over mine entries, such as the snow centre element of the proposal. Nevertheless, in these cases we would expect a thorough justification for the layout proposed and a robust solution

for addressing the risks posed by the mine entries to be provided to the LPA to support the submission.

We note that Appendix 3 indicates that there are a number of spoil tips present within the site which may require stabilisation. We take this opportunity to highlight that the Coal Authority does not provide comment upon matters relating to tips in our role as a statutory consultee. As such, in its consideration of any future planning application, the LPA would need to seek its own technical advice regarding the matter.

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. 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

I trust the above comments are acceptable, however, please do not hesitate to contact me if you require any additional information or would like to discuss this matter further.

Yours sincerely

James Smith

James Smith *BSc. (Hons), Dip.URP, MRTPI*
Planning and Development Manager

Disclaimer

The above consultation response is provided by The Coal Authority as a Statutory Consultee and is based upon the latest available coal mining data on the date of the response, and electronic consultation records held by The Coal Authority since 1 April 2013. The comments made are also based upon only the information provided to The Coal Authority and/or has been published on the relevant website for consultation purposes in relation to this specific matter. The views and conclusions contained in this response may be subject to review and amendment by The Coal Authority if additional or new data/information is provided for consultation purposes.



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Welsh Water

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Merthyr Tydfil County Council
The Planning Division
Unit 5 Triangle Business Park
PENTREBACH
Merthyr Tydfil
CF48 4TQ

Date: 17/05/2021
Our Ref: PLA0056860
Your Ref: Scoping Opinion/2021

Dear Sir

Grid Ref: SO042048 304650 204737
Site: Land at Rhydycar West, Merthyr Tydfil
Development: Scoping Opinion - Proposed mixed leisure development

We refer to your planning consultation relating to the above site, and we can provide the following comments in respect to the proposed development.

We have examined the Scoping Opinion letter in respect of the above development, and on the basis that the Environmental Statement has regard to the impact of the proposed development on the foul, surface water, and combined sewer network, together with the potable water supply network, we have no comments to offer at this stage.

Our response is based on the information provided by your application. Should the proposal alter during the course of the application process we kindly request that we are re-consulted and reserve the right to make new representation.

If you have any queries, please contact the undersigned on 0800 917 2652 or via email at developer.services@dwrcymru.com

Please quote our reference number in all communications and correspondence.

Yours faithfully,

Maria Evans
Development Control Officer
Developer Services

glas
Glas Cymru Cyfyngedig

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We welcome correspondence in
Welsh and English

Dŵr Cymru Cyf, a limited company registered in
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Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

MEMORANDUM

To : Huw Roberts
From : Landscape Architect
Ask for : Tom Bramley
Ext. : 6276

Date : 18th May 2021

SUBJECT: Proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil
Environmental Impact Assessment (Wales) Regulations 2017
Regulation 14: Request for a Scoping Opinion

With regard to the above proposed scoping opinion the following additional areas are require reference:

- Landscape and Visual Impact
- Special Landscape Area SLA3: Merthyr West Flank
- Landscape Management

Tom Bramley – Landscape Architect

INTERNAL MEMORANDUM

To: Huw Roberts
From: Matt Davies (Ecologist)
Ext: 5278
Memo number: 1
Date of Memo #1: -
Date: 18/05/2021

**SUBJECT: PROPOSED MIXED LEISURE DEVELOPMENT ON LAND AT RHYDYCAR WEST,
MERTHYR TYDFIL - EIA SCOPING REQUEST**

Part of the proposed land use area is within the Cwm Glo a Glyndyrys Site of Special Scientific Interest (SSSI).

Planning Policy Wales, Edition 11, February 2021

SSSIs are statutory designations and of national importance and there is a legal duty¹ on, e.g., planning authorities to take reasonable steps to further the conservation and enhancement of the special interest features of these sites. There is a presumption against development likely to damage a SSSI. Natural Resources Wales must be consulted and their advice taken into account.

The SSSI notification and the 'Your Special Site and its Future' document for Cwm Glo a Glyndyrys outlines the special interest features of the site and describes typical, significant and uncommon onsite species. Many of these onsite habitats and species feature in Section 7 of the Environment (Wales) Act 2016. For example, Lowland Acid Grassland, big blue pinkgill, olive earthtongue and dark purple earthtongue, marsh fritillary butterfly, European nightjar, common cuckoo, tree pipit, great crested newt.

Merthyr Tydfil County Borough Council Replacement Local Development Plan

Policy EnW2: Internationally and Nationally Protected Sites and Species

Development likely to have a direct or indirect adverse effect on the conservation value of a nationally designated site (e.g., SSSI), will only be permitted where it is demonstrated that:

- There is no suitable alternative to the proposed development; and
- It can be demonstrated that the benefits from the development clearly outweigh the special interest of the site; and
- Appropriate compensatory measures are secured; or
- The proposal contributes to the protection, enhancement and positive management of the site.

Development proposals likely to affect protected species will only be permitted where it is demonstrated that:

- The population size, range, distribution and long-term prospects of the species will not be significantly adversely impacted;
- There is no suitable alternative to the proposed development;
- The benefits of the development clearly outweigh the adverse impacts on the protected species; and
- Appropriate, avoidance, minimisation, mitigation, compensation and enhancement measures are provided.

¹ Wildlife and Countryside Act 1981 (as amended)

Protected species include those detailed within Schedules 2 and 4 of the Conservation of Habitats and Species Regulations 2017, Section 7 Environment (Wales) Act 2016, the Wildlife and Countryside Act 1981 (as amended) and species specific legislation e.g. the Protection of Badgers Act 1992. The Council is required to comply with legislation regarding the protection and conservation of protected species in the exercise of its duties and the presence of a protected species is a material consideration in the determination of planning applications.

There will always be a presumption against development, which is likely to harm a protected site or species. However, there may be instances when the importance of a development proposal will outweigh the conservation value and there are no suitable alternatives. In such instances, the objective will always be to ensure that the nature conservation value of the site or protected species is preserved and enhanced wherever possible. Proposals will also be required to promote wider ecosystem resilience in accordance with Policy EnW1.

Where development is permitted, appropriate conditions or agreed planning obligations will be used to secure adequate compensation or mitigation measures.

The proposed development land use area is also entirely within the Rhydycar West Site of Importance for Nature Conservation (SINC) and would impact a significant proportion of the designated site (approximately 1/3).

Planning Policy Wales, Edition 11, February 2021

SINC's are non-statutory designations, of local importance and carry less weight than statutory designations. However, their contribution to delivering ecological networks for biodiversity and resilient ecosystems can be significant, and therefore they should be afforded adequate protection in development plans. Before authorising development likely to damage a SINC, planning authorities should consult the County Ecologist and third sector environmental organisations.

Assessments should consider the presence of protected and priority species and habitats including those on the Section 7 list and appropriate weight attached to their protection. Policies for non-statutory sites should make it clear that such designations do not preclude appropriate developments, where there are no adverse impacts on the features for which a site is designated.

Planning decisions must be based on up-to-date ecological, survey data and local biological records information.

Merthyr Tydfil County Borough Council Replacement Local Development Plan

Policy EnW3: Regionally Important Geological Sites, Sites of Importance for Nature Conservation, Local Nature Reserves and Priority Habitats and Species

Development proposals likely to have an adverse impact on Regionally Important Geological Sites, Sites of Importance for Nature Conservation, Local Nature Reserves, or Priority Habitats and Species will only be permitted where it can be demonstrated that:

- The need for the development clearly outweighs the conservation value of the site;
- Adverse impacts on nature conservation features or geological features can be avoided;
- Appropriate and proportionate mitigation and compensation measures can be provided; and
- The development maintains and where possible enhances biodiversity and geodiversity interests.

The previous survey programme scoped with both Rolf Brown (the previous Countryside Officer/Ecology at MTCBC) in 2015, and with NRW and in 2015, 2016 and 2017 was reasonable

and appropriate for that time. NB the agreement made in 2015 with Rolf Brown was prior to both The Environment (Wales) Act 2016 and the Bat Conservation Trust Bat Surveys for Professional Ecologists Good Practice Guidelines (Collins, 2016).

I note from the Ecology Appendix (#4) in the Rhydyar West EIA Scoping Request document that, whilst some of the survey work in the programme has been undertaken relatively recently or is due to be updated in 2021, most of the extant ecological survey work is approximately 3 years old if not older, being undertaken in 2015, 2016 and 2018. This survey work is therefore considered to be out-of-date and will need to be updated for inclusion within the EIA ecology chapter. See below in bold:

1. **Habitat verification/condition surveys (Phase 1, Phase 2, NVC, including ground 'truthing' and updating results of Bosanquet and Stevens work for CCW and mapping Priority habitats) (2015, 2018)**
2. **Targeted botanical work (e.g. searches for nationally scarce plants) (2015 and 2016)**
3. Mycological surveys (focused on 'CHG'² fungi) (2015, some work in 2018 and full re-survey in 2020)
4. **General invertebrate surveys (including standing water aquatics, and overnight moth trapping) (2015, 2018)**
5. Butterfly surveys (including marsh fritillary larval web surveys) (2015, 2020)
6. **Great crested newt surveys (spring 2015, 2018)**
7. **Bat surveys (including transect and static surveys of bat activity, swarming surveys and detailed examination of built structures for winter and summer roosts) (2015, 2016, 2018)**
8. **Breeding bird surveys (2015 and 2018)**
9. Wintering bird surveys (2015/16, refresher 2021)
10. **Dormouse surveys (2015)**
11. **Badger surveys (2015 and 2016)**
12. Desk survey and data trawl (including review of on-line data repositories, work by previous consultants and file information held by NRW).

To re-iterate, all survey work from 2018 or earlier will need to be updated. In addition, an up-to-date Aderyn biological data search will need to be undertaken.

Specifically, in response to the proposed survey programme to inform EIA as seen also on page 20 of the Rhydyar West EIA Scoping Request document:

GCN - eDNA surveys are proposed for all ponds within 250m of the proposed application site. This is not acceptable. Best practice guidance refers to a distance from ponds of 500m and will be used. Population assessments will then required for any ponds that return a positive eDNA result.

Bats – Updated manual bat activity transect surveys and automated/static activity surveys are required. The habitat is of high suitability for bats and this will dictate the number of bat activity surveys required for reasonable effort as per the BCT Bat Surveys for Professional Ecologists Good Practice Guidelines (Collins 2016). Bat activity surveys of any structures that would be impacted by the proposed development will be undertaken. Where trees are to be removed or have major works, they must be subject to a Preliminary Ground Level Roost Assessment to inform whether further survey work is required (e.g., PRF Inspection surveys or bat activity/roost characterisation surveys).

² Clavariaceae, Hygrocybe spp and Geoglossaceae

Dormouse – Updated Dormouse nest tube surveys are required. NB NRW normally request the use of wooden nest boxes for surveys in woodland areas rather than nest tubes.

Reptiles – The Scoping Request Document states that adder, grass snake and common lizard have all been noted within the landholding, including in quite good numbers in the more open grasslands in the south-west of the site (including and in parts of the proposed application site). Full details of these results are required to determine whether specific reptile survey work will be required.

Breeding birds – Methodologies such as the CBC were designed to monitor long-term trends in bird populations at a national level. As such, they are unsuitable for fine-scale applications, such as ecological impact assessments. New guidelines (for breeding birds) have been designed to address this issue. These new Bird Survey Guidelines must therefore be followed – www.birdsurveyguidelines.org . Reasonable justification (for consideration by the LPA ecologist) must be offered for any departure from the guidelines.

Habitats, botany and terrestrial mammals – with no detail of the exact methodologies employed or areas surveyed during the previous Phase 1 and Phase 2 survey work, it is difficult for this continued approach to be endorsed as acceptable.

Updated otter, water vole and badger survey work will be required.

Invertebrates – Repeat surveys are planned for 2021. This will be acceptable insofar as they will qualify as up-to-date surveys. However, details (for example) of areas surveyed, methodologies used and definitions of ‘scarce and notable invertebrates’ are required for full endorsement and acceptability in terms of survey effort/suitability.

Grassland fungi and marsh fritillary larval web surveys were completed in 2020. This is again acceptable insofar as they will qualify as up-to-date surveys. However, details (for example) of timings, areas surveyed and methodologies used are required for full endorsement and acceptability in terms of survey effort/suitability.

NB as already outlined, full details of the methodology for all survey work already undertaken or to be undertaken will be required in order for full endorsement and acceptability in terms of survey effort/suitability.



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Merthyr Tydfil County Borough Council

Eich cyfeirnod
Your reference

By email

Ein cyfeirnod
Our reference

DH

Dyddiad
Date

18 May 2021

Llinell uniongyrchol
Direct line

0300 0256004

Ebost
Email:

Cadwplanning@gov.wales

Dear Mr Roberts

**PROPOSED DEVELOPMENT: MIXED USE DEVELOPMENT
LOCATION: LAND AT RHYDYCAR WEST, MERTHYR TYDFIL**

Thank you for your letter of 30 April 2021 asking for Cadw to provide a scoping opinion in order to inform the production of the Environmental Statement.

We consider that additional information is required. Full details of the additional information that is required are explained below.

These views are provided without prejudice to the Welsh Government's consideration of the matter, should it come before it formally for determination.

Advice

This advice is given in response to scoping opinion as to the contents of an Environmental Impact Assessment (EIA) that will be submitted in support of an application for a proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil

A letter explaining the proposed development outlining the approach that the EIA will take has been submitted by Tetra Tech. This letter includes an appendix outlining the works that have already been undertaken to identify the heritage assets of the site and how the impact of the proposed development on them will be assessed.

The heritage assets of the site have been identified by the production of an Archaeology and Heritage Baseline Assessment that has been carried out in accordance with appropriate standards and guidance, along with an Assessment of the Impact of Development on the Historic Landscape produced in line with the guidance given in the "Guide to Good Practice on Using the Register of Landscapes of

Mae'r Gwasanaeth Amgylchedd Hanesyddol Llywodraeth Cymru (Cadw) yn hyrwyddo gwaith cadwraeth ar gyfer amgylchedd hanesyddol Cymru a gwerthfawrogiad ohono.

The Welsh Government Historic Environment Service (Cadw) promotes the conservation and appreciation of Wales's historic environment.

Rydym yn croesawu goheblaeth yn Gymraeg ac yn Saesneg.
We welcome correspondence in both English and Welsh.



BUDDSODDWR MEWN POBL
INVESTOR IN PEOPLE



Historic Interest in Wales in the Planning and Development Process" (2007). These are appropriate assessments to identify the historic assets that will be affected by the proposed development and provide a current baseline for assessing the impact of the proposed development on them.

It is noted that the Tetra Tech document suggests that the impact of the proposed development on the heritage assets will be considered against a 'future baseline scenario', whereby development does not proceed and the condition of the historic environment within the site continues to deteriorate. It is normal practice for the impact of the development to be considered against the current situation and there should be more explanation why this approach is being taken, especially as a normal EIA would include an assessment of the "do nothing situation" which would be the same as a 'future baseline scenario'

Whilst a 'future baseline scenario' could be appropriate in this case, there is a need for agreement in regard to what date this future scenario is set. Is this perhaps some 10 years in the future, when the standing remains have suffered more deterioration and possible collapse or a much later date when the upstanding remains have completely disappeared? Will the legal requirements of section 54 of the Listed Building and Conservation Areas Act requiring the owner of the assets to carry out urgent repairs be considered and/or the possibility that works may be carried out by the Welsh Government on the assets under section 5 of the Ancient Monuments and Archaeological Areas Act on 1979?

It is therefore our opinion that before the scope of the heritage section of the EIA can be agreed that the applicant should provide more detail on the 'future baseline scenario'.

Yours sincerely

Denise Harris
Diogelu a Pholisi/ Protection and Policy

Roberts, Huw

From: Powell, Carwyn <POWELC2@CAERPHILLY.GOV.UK>
Sent: 01 June 2021 13:38
To: Roberts, Huw
Cc: Thomas, Ryan; Kyte, Rhian
Subject: Scoping Opinion/2021 - Proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil

Huw,

I write in reply to your consultation in accordance with Paragraph 4 of The Town and Country Planning (Environmental Impact Assessment)(Wales) Regulations 2017 and apologise for not replying sooner.

I note the content of the submitted documents and would advise you that I am concerned that they do not appear to have any regard for the impact of the development on the wider area of South Wales and in particular the population of Caerphilly. The benefits and effects referred to in the documents only seems to consider the area immediately surrounding the application site and the Town Centre of Merthyr and has no regard for the impacts on the wider highway network or on retail and tourism within this County Borough. As such I would expect any Environmental Statement submitted to support any subsequent planning application to make reference to these issues.

I hope the above information is of assistance.

Regards

Carwyn Powell

Prif Gynllunydd | Principal Planner

Cyngor Bwrdeistref Sirol Caerffili | Caerphilly County Borough Council

☎ 01443 864424

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Gallwch ohebu mewn unrhyw iaith neu fformat.Ni fydd gohebu yn Gymraeg yn creu unrhyw oedi.

Correspondence may be in any language or format. Corresponding in Welsh will not lead to any delay.

Mae'r e-bost hwn ac unrhyw ffeiliau sy'n atodol yn gyfrinachol a dim ond ar gyfer defnydd yr unigolyn neu'r sefydliad y cyfeiriwyd atynt. Os ydych wedi derbyn yr e-bost hwn ar gam rhwch wybod i reolwr eich system. Nodwch fod unrhyw sylwadau neu farn o fewn testun yr e-bost yw sylwadau a barn yr awdur yn unig ac nid yn angenrheidiol yn cynrychioli barn Cyngor Bwrdeistref Sirol Caerffili. I orffen, dylai'r person sy'n derbyn yr e-bost sicrhau nad oes firws ynghlwm

nac mewn unrhyw ddogfen atodol i'r e-bost. Nid yw'r Cyngor yn derbyn unrhyw gyfrifoldeb am unrhyw ddifrod achoswyd gan unrhyw firws sy'n cael ei drosglwyddo gan yr e-bost hwn.

Rydym yn croesawu gohebiaeth yn Gymraeg, Saesneg neu'n ddwyieithog (yn unol ?'ch dewis), ac mewn ieithoedd a fformatau eraill. Cewch ymateb yn unol ?'ch dewis iaith os nodwch hynny i ni, ac ni fydd cyfathrebu ? ni yn Gymraeg yn arwain at oedi.

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We welcome correspondence in English, Welsh or bilingually (according to your choice) or in other languages and formats. We will respond in your declared chosen language, and corresponding with us in Welsh will not lead to any delay.

Roberts, Huw

From: Davies, Gareth (Planning) <Gareth.Davies@rctcbc.gov.uk>
Sent: 24 May 2021 12:23
To: Roberts, Huw
Subject: proposed mixed leisure development on land at Rhydycar West, Merthyr Tydfil

Dear Mr Roberts

**The Town & Country Planning (Environmental Impact Assessment)(Wales) Regulations
2017**

Scoping Opinion

I write in response to your consultation letter and accompanying correspondence relating to the scoping opinion sought in respect of a mixed leisure development on land at Rhydycar West, Merthyr Tydfil.

Having considered the detail that accompanied your correspondence, I can confirm that Rhondda Cynon Taf County Borough Council considers the scope of the detail sufficient to inform and environmental statement for the development proposed.

Yours faithfully

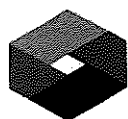
Gareth Davies
Team Leader Development Management

Croesawn ohebu yn Gymraeg a fydd gohebu yn y Gymraeg ddim yn arwain at oedi. Rhowch wybod inni beth yw'ch dewis iaith e.e. Cymraeg neu'n ddwyieithog

Mae'r neges ar gyfer y person / pobl enwedig yn unig. Gall gynnwys gwybodaeth personol, sensitif neu gyfrinachol. Os nad chi yw'r person a enwyd (neu os nad oes gyda chi'r awdurdod i'w derbyn ar ran y person a enwyd) chewch chi ddim ei chopio neu'i defnyddio, neu'i datgelu i berson arall. Os ydych chi wedi derbyn y neges ar gam, rhowch wybod i'r sawl sy wedi anfon y neges ar unwaith. Mae'n bosibl y bydd holl negeseuon yn cael eu cofnodi a/neu fonitro unol â'r ddeddfwriaeth berthnasol. I ddarllen yr ymwadiad llawn, ewch i <http://www.rctcbc.gov.uk/ymwadiad>

We welcome correspondence in Welsh and corresponding with us in Welsh will not lead to a delay. Let us know your language choice if Welsh or bilingual

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**Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales**

Ein cyf/Our ref: CAS-147696-Q3X1
Eich cyf/Your ref: Scoping Opinion/2021

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southeastplanning@cyfoethnaturiolcymru.gov.uk

21/05/2021

Annwyl Syr/Madam / Dear Sir/Madam,

BWRIAD / PROPOSAL: PROPOSED MIXED LEISURE DEVELOPMENT COMPRISED ON BUILT LEISURE AND LOW DENSITY LEISURE, WHICH WILL INCLUDE: INDOOR SNOE CENTRE, INDOOR WATERPARK, SPA HOTEL, SPORT HOTEL, INDOOR ADVENTURE CENTRE, OUTDOOR ADVENTURE CENTRE, ASSOCIATED ROADS, PARKING AND LANDSCAPING.

LLEOLIAD / LOCATION: LAND AT RHYDYCAR WEST, MERTHYR TYDFIL

We have considered the information contained within the following documents:

- Letter from Peter Waldren (Tetra Tech Planning) to Judith Jones (Head of Planning at Merthyr Tydfil CCBC) dated 27/4/21;
- Drawing RHDR-HMA-LE-XX-DR-A-SK0005 (Rev P1) entitled '*Rhydycar West, Merthyr Tydfil. Marvel Ltd. Masterplan – Land Use Plan*' by Holder Mathias Architects (undated);
- Drawing RHDR-HMA-LE-XX-DR-A-91-003 (Rev P2) entitled '*Rhydycar West, Merthyr Tydfil. Marvel Ltd. EIA Scoping Area*' by Holder Mathias Architects (undated).

Ecology

Key Habitats

Any habitat surveys should accord with the NCC Phase 1 survey guidelines (NCC (1990) Handbook for Phase 1 habitat survey. NCC, Peterborough). We advise that Phase 1 surveys are undertaken and completed during the summer to ensure the best chance of identifying the habitats present.

Protected Species

Site Surveys

We advise the site is subject to assessment to determine the likelihood of protected species being present in the area and likely to be affected by the proposals. Targeted species surveys should be undertaken for all species scoped in and:

- i. Be undertaken by qualified, experienced and where necessary, licensed ecologist; and
- ii. comply with current best practice guidelines. In the event that the surveys deviate from published guidance, or there are good reasons for deviation, full justification for this should be included within the EIA.

Should protected species be found during the surveys, information must be provided identifying the species specific impacts in the short, medium and long term together with any mitigation and compensation measures proposed to offset the impacts identified.

Where proposals implicate protected species, which are also notified features of designated sites (Eg. SAC, SSSI), we advise that the EIA considers the impacts on those species from both perspectives.

We advise that the EIA sets out how the long term site security of any mitigation or compensation will be assured, including management and monitoring information and long term financial and management responsibility. Where the potential for significant impacts on protected species is identified, we advise that a Conservation Plan is prepared for the relevant species and included as an Annex to the EA.

Great Crested Newt

This area of Merthyr is significant for great crested newts and, as such, we welcome that this species is scoped into the EIA.

With reference to Appendix 4 (Ecology) of the Tetra Tech letter we note the proposals to survey ponds within 250m of the site boundary using eDNA methodology only, and using the results in combination with extant survey information for the species in the area, or alternatively full population assessment surveys using three techniques applied over six visits in accordance with standard methodology for all ponds returning a positive eDNA result.

Regarding the survey area, we advise that it should be extended to include all ponds/waterbodies within a minimum of 500m from the proposed planning application boundary.

We also advise that each waterbody within this extended survey area is scored using the High Suitability Index (HSI) methodology. It will not be sufficient to rely on eDNA surveys and historic survey data alone to assess population size. We advise that each waterbody within the survey is the subject of traditional surveys in accordance with published guidance for this purpose (ie. at least two methods (torch survey and bottle trapping) over 6 visits in

suitable weather conditions between mid-March and mid-June, with at least 3 visits between mid-April to mid-May). Further, that all waterbodies should be subject to traditional surveys regardless of any eDNA survey results.

We take this opportunity to highlight that given the timing of this consultation, it will be too late this year to complete the required traditional surveys.

Bats

Appendix 4 of the Tetra Tech letter proposes an assessment of the likely impacts of the scheme on bats based on reference to historic bat survey data (the most recent being 2018) alongside 2021 roost inspection surveys of built structures only.

We advise that bat surveys 2 years old or older are updated if they are to support a planning application or EPS (bat) licence application. This is necessary to determine current use of the site by bats, including any changes in use of the site from that identified by previous surveys. Therefore, the site should be subject to comprehensive bat surveys in accordance with published best practice (BCT's 2016 'Bat Surveys for Ecologists. Good Practice Guidelines'). This should include:

- i. activity surveys across the site utilising a combination of static and transect survey methodologies;
- ii. surveys of all built structures, including above-ground (eg. buildings) and below-ground structures (eg. mine adits);
- iii. surveys of all trees that may need to be felled or pruned to accommodate the proposals. The process outlined in Figure 6.1 of BCT's 2016 'Bat Surveys for Ecologists. Good Practice Guidelines' should be followed.

Dormice

We note from Appendix 4 of the Tetra Tech letter that no surveys for dormice are planned given negative results for the species in 2015.

In view of the recent (2019) positive records for the species at the heads of the valleys west of the site, the presence of potentially suitable habitat for the species on site and potential connectivity of habitat through the wider landscape between the two areas, we advise that surveys for dormice are undertaken to inform the EIA.

Otters and Water Voles

We are aware of records of otters principally along the River Taff, with some along the A470 corridor. In addition, there appears to be a water vole record close to the proposed site. We therefore welcome that these species are scoped into the EIA.

Appendix 4 of Tetra Tech's letter indicates surveys of watercourses for field signs of these species is proposed to take place in May-June 2021 as update botanical (Phase 1 and 2) surveys are undertaken.

Whilst an Extended Phase 1 update survey would be suitable to flag the requirement for further species-specific surveys, it is not a substitute for them. Therefore should the updated Phase 1 survey identify that species-specific surveys are required please note that otters should be surveyed across the seasons, and surveys for water voles should include a survey in the early part of the season (mid-April to June) and another later in the season (July to September).

Schedule 1 Birds

We advise that consideration is given to the presence and likely impacts of the proposals on Schedule 1 birds in the area.

Reptiles

Tetra Tech's letter seeks our view on their approach to reptiles. However, with the exception of European Protected Species of reptiles, we defer this matter to the local authority ecologist to advise. We have no comment to make with regards to European Protected Species of reptiles.

EPS Licence

Where a European Protected Species is identified and the development proposal will contravene the legal protection they are afforded, a licence should be sought from NRW. The EIA must include consideration of the requirements for a licence and set out how the works will satisfy the three requirements as set out in the Conservation of Habitats and Species Regulations 2017 (as amended). One of these requires that the development authorised will 'not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status (FCS) in their natural range'. These requirements are also translated into planning policy through Planning Policy Wales (PPW) December 2018, section 6.4.22 and 6.4.23 and Technical Advice Note (TAN) 5, Nature Conservation and Planning (September 2009). The local planning authority will take them into account when considering the EIA where a European Protected Species is present.

Biodiversity

Mitigation

Welcome the reference to compensation and mitigation through design and Construction Environmental Management Plan but the ES and supporting documents should explicitly outline the means of delivery and maintenance of these commitments through the lifetime of the development – for example through a standalone Habitat Management Plan. Therefore, we recommend these are scoped into the ES.

Local Biodiversity Interests

We recommend that the applicant consults the local authority Ecologist on the scope of the work to ensure that regional and local biodiversity issues are adequately considered, particularly those habitats and species listed in the relevant Local Biodiversity Action Plan, and are that are considered important for the conservation of biological diversity in Wales.

We would expect the applicant to contact other relevant people/organisations for biological information/records relevant to the site and its surrounds. These include the relevant Local Records Centre and any local ecological interest groups (eg. bat groups, mammal groups).

We advise that the development incorporates robust green infrastructure that gives connectivity across the site and that will remain unlit to allow protected species to continue to inhabit the site and move through it.

Securing Biodiversity Enhancement

We also advise that, in accordance with the Environment (Wales) Act 2016 and Planning Policy Wales, the application demonstrates how it can deliver biodiversity enhancements and thus contribute to promoting ecological resilience. This is reaffirmed in the Welsh Government letter of 23/10/19 to all Chief Planning Officers.

Designated Sites

We note that parts of the proposed development site will be partially within the Cwm Glo a Glyndrys SSSI. We welcome the level of survey detail outlined in the scoping report, however we have concerns about the potential loss of SSSI land and impact on the remaining habitats and species within the protected site.

We note the need for the entire scheme to be described in detail. This description should cover construction, operation and decommissioning phases and include detailed, scaled maps and drawings as appropriate.

We would require the further details on the impacts to the protected site with a local context be scoped in:

- The area of SSSI land that would be lost to the development
- The potential impacts on the habitats and species on the remaining protected site.
- Habitat connectivity, including suitable remaining marshy grassland habitat for marsh fritillary.
- Further detail on robust long-term compensation and mitigation strategies.

As well as an assessment of direct loss of habitat, full assessments of both the hydrological changes and subsequent consequences of those changes on the SSSI need to be included.

Evaluation of the impacts of the scheme should include:

- direct and indirect
- secondary

- cumulative
- short medium and long term
- permanent and temporary
- positive and negative, and construction (including impacts of construction site access) operation and decommissioning phase impacts on the nature conservation resource.

Hydrology and Hydrogeology

Due to the proximity of the Cwm Glo a Glyndrys SSSI and Rhydyar West SINC we have concerns to the degree to which these sensitive areas are hydrologically and hydrogeologically dependent as areas defined as wet woodlands in Appendix 4: Ecology and Appendix 8: Arboriculture. The EIA should therefore include a baseline assessment of these sensitive areas with respect to local hydrodynamics and assess whether or not the proposed scheme could interact with/disrupt these hydrodynamics. This assessment should form part of a wider Groundwater Monitoring Strategy which should also focus on:

- The hydrogeology of the Made Ground, Superficial Deposits and the bedrock of the Middle Coal Measures which underlie parts or all of the site respectively.
- Assess if any degree of groundwater rebound is occurring notably as shafts, adits, disused workings and coal seams are present on the site.
- Assess groundwater interactions/baseflow associated with the streams that cross the site.

A Groundwater Monitoring Strategy and Plan should be developed that shows the proposed locations for groundwater monitoring boreholes and a summary rationale for why these locations have been chosen. Groundwater monitoring should ideally occur through the use of dataloggers as these provide 'real time' and 'complete data sets' and ideally across at least one year so that seasonal variation can be assessed. It would also be useful to have a designated rain gauge on site.

We also advise that the following should be scoped in:

- Design of a Geo-Environmental Investigation to assess the baseline land quality conditions of the proposed development site with a focus on ground contamination, notably the Made Ground that underlies much of the site, and geotechnical properties of the range of ground materials present at the site.
- Information, albeit high level at this stage, on the degree to which the proposed development site will require ground reprofiling, ground stripping and excavation as these 'interim' site conditions can result in environmental risks and impacts. Estimates of the duration of these interim conditions should also be provided as a combination of wet conditions and denuded ground can generate sediment and contaminant risks which can impact upon the wider environment.
- The Scoping Letter makes no mention of how site Stormwater will be managed either during the construction phase or what the operational stormwater management design will consist of albeit conceptual design. The adoption of SuDs for the site will require groundwater level data that reflects worst-case groundwater levels; i.e. the highest groundwater levels. The Scoping should also include assessment of the

capacity of site ground materials for stormwater infiltration as such testing should be performed when the soil moisture content is at its highest typically between October and March (over winter).

- Further information on how foul water notably from the 90 proposed Forest Lodges will be managed for the site. This detail should include foul disposal methods and consider their potential impacts to the surrounding environment.

Arboriculture

It should be ensured that any trees to be felled are done so under appropriate planning permission and not prior to this being granted. There are some areas of Ancient Semi Natural Woodland along the southern boundary of the plan and ideally this would be retained.

Landscape

Advice in this section relates to the potential impacts on the Brecon Beacons National Park which lies approximately 3km from the boundary of the proposed site at its closest point.

We would advise further information on the zones of theoretical visibility (ZTV) and preliminary viewpoint locations is included in order for us to complete future reviews review.

We have reviewed the submitted information, including Appendix 9: Townscape & Landscape, of the Scoping Report and offer the following advice.

- We note that a Full LVIA will be carried out in accordance with GLVIA3, including a review of LANDMAP information. We agree with this approach and advise that all 5 layers of LANDMAP should be considered in the Assessment. We have recently updated our guidance regarding LVIA and LANDMAP. The updated guidance note will be included on our website in due course.
- We note that lightness and darkness assessment will be carried out (Night-time Assessment), including whether the proposal would affect the Dark Skies Reserve designation in the National Park. We advise reference to the National Park's SPG 'Light Pollution & Obtrusive Lighting' (2015). The result of the assessment should then be used to influence the final lighting scheme.
- The preliminary site and viewpoint visits Study Area for the LVIA is proposed to be 3km. The selection of viewpoints has been carried out in liaison with Merthyr Tydfil Council's Landscape Officer, Tom Bramley. The preliminary ZTV and agreed viewpoints are not included with the information, therefore it is unclear whether any viewpoints within the National Park have been included. It is stated that visual receptors including visitors to the National Park would be included in the assessment. We require information on the ZTV and preliminary viewpoints in order to advise on this aspect.

The location of the development on the western valley sides means that there is potential visibility from within the valley and the opposing valley slopes to the east, with views beyond restricted by enclosing ridges. There is potential visibility from high ground to the north, within the National Park e.g. Cefn Sil Sanws (460m). This viewpoint and others from high ground

to the north, looking down the valley, are over 5km from the development. However, we note that the relatively recent Trago Mills development is visible from the National Park, although this is closer to the Park. We therefore recommend that the above be scoped in for consideration.

Air Quality

We note that a nitrogen deposition/habitat assessment will be completed due to the development's proximity to Cwm Glo a Glyndryrys SSSI. We would also advise that nitrogen oxide (NOx), sulphur dioxide (SO2) and the other traffic pollutant and impact on sensitive habitats be scoped in to the ES. When doing so, we also recommend that specific details relating to guidance used to inform these tests is made clear.

Cwm Glo a Glyndryrys SSSI is a particularly sensitive SSSI with a mosaic of habitats. The most sensitive habitat is the U4 *Festuca ovina* – *Agrostis capillaris* – *Gallium saxatile* acid grassland. There is also diverse assemblage of sensitive grassland fungi, including 32 species of waxcap *Hygrocybe* spp. These sensitive habitats should be assessed against the following critical loads:

- Nutrient Nitrogen critical load = 8 – 15kgN/ha/yr.
- Ammonia critical level = 1µg/m3 (due to the presence of the fungi)
- NOx critical level = 30µg/m3,
- SO2 critical level = 20µg/m3

If you have any queries on the above, please do not hesitate to contact us.

Yn gywir / Yours faithfully

Lindy Marshall

Cynghorydd - Cynllunio Datblygu / Advisor - Development Planning
Cyfoeth Naturiol Cymru / Natural Resources Wales

cc'd Matt Davies: matthew.davies3@merthyr.gov.uk Merthyr Tydfil.

ATI-13156a Information Request
Rhydycar West Merthyr Tydfil (NRW:02950780)

External Information Request

Hydrogeological and Hydrological Assessment of land situated at Rhydycar West, Merthyr Tydfil at NGR: SO0386305467.

Details for licence numbers: 21/57/22/0035 and 21/57/22/0025. Abstraction quantities, construction details and licence active.

Results

Groundwater licence number: 21/57/22/0035

Licence originally issued in 1994 to TBS (South Wales Ltd)

NGR: SO 0519 0469

Borehole 93metres deep

4 cubic metres / hour

4 cubic metres / day

1464 cubic metres / year

This licence was deregulated in March 2005. Deregulated licences include any abstraction of less than 20 cubic metres per day from a surface water source (e.g. stream or drain) or from underground strata (via borehole or well) for any particular purpose. Deregulated licence data will not be actively investigated or updated on internal systems.

Surface water licence number: 21/57/22/0025

Hoover Plc ceased trading in 2009 and this licence was revoked in August 2014.

Please note

Information provided on live water abstraction licences is based on that available at the time of preparation 04/07/14. Timing of licence renewals and updates to the dataset may mean at any one point in time not all live licences are listed.

Sarah Bloomfield
Natural Resources Planning
Date: 04/07/17

adam.james

From: Rapson, Sian <sian.rapson@merthyr.gov.uk>
Sent: 30 June 2017 12:39
To: adam.james
Cc: Customer Care
Subject: Private Water Supplies in Rhydycar, Merthyr Tydfil

Good afternoon,

I write in response to your query regarding private water supplies near Rhydycar, Merthyr Tydfil.

There are two private water supplies in the area that you have outlined, Blaencanaid Farm and Bike Park Wales.

Blaencanaid Farm

Location of supply: 303511 204690
Date supply was installed: No information
Construction details: Borehole, depth unknown
Water levels recorded: -
Any water quality information: None in the last 10 years

Bike Park Wales

Location of supply: 304977 203456
Date supply was installed: April 2013
Construction details: Bore hole, depth unknown
Water levels recorded: -
Any water quality information: Satisfactory

If you require any further information please do not hesitate to contact me.

Regards,

Sian Rapson
Swyddog Iechyd Yr Amgylchedd / Environmental Health Officer
MTCBC
Canolfan Ddinesig / Civic Centre
Stryd y Castell / Castle Street
Merthyr Tudful / Merthyr Tydfil
CF47 8AN

01685 725338

Croesawn ohebu yn Gymraeg a fydd hyn ddim yn arwain at oedi.

We welcome correspondence in Welsh and this will not lead to a delay.

Mae'r e-bost hwn ac unrhyw ffeiliau a drosglwyddir gydag ef yn gyfrinachol ac wedi'u bwriadu ar gyfer pwy bynnag y cyfeirir ef ato neu atynt. Mae cynnwys yr e-bost hwn cynrychioli barn y sawl a enwir uchod, felly nid ydyw'n dilyn ei fod yn cynrychioli barn Cyngor Bwrdeistref Sirol Merthyr Tudful.

Cyngor Bwrdeistref Sirol Merthyr Tudful
Canolfan Dinesig
Stryd Y Castell
Merthyr Tudful
CF47 8AN

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Merthyr Tydfil County Borough Council
Civic Centre
Castle Street
Merthyr Tydfil
CF47 8AN

Teleffon\Telephone: 01685 725000

Station name	NGR	Station	nur	Date/Time (sampling)	0162 / Alky		0162 / Alky		0061 / pH		0061 / pH		0050 / Lear		0062 / Con		0076 / Terr		0077 / Con		0077 / Con		0081 / O		D 0081 / O		D 0082 / O		D 0082 / O		D 0085 / BOI		0085 / BOI		0088 / BOI		0105 / Mer	
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					0.12		1.3		1.29				0.01		0.00095	0.0009				11			104.602	105				83.0752	21.5267	
					0.02		0.7		0.691		0.691		0.009		0.00027	0.0003				< 5			110.135	110				89.1429	20.9916	
					0.02		1.23		1.214		1.21		0.016		0.00045	0.0005				< 5			114.407	114				95.8848	18.522	
					0.01		1.44		1.424		1.42		0.016		0.00021	0.0003				< 5			97.0924	97.1				78.4058	18.6866	
					0.03		1.07		1.066		1.07		0.004		0.00073	0.0014				< 5			114.209	114				96.6339	17.5753	
			< 0.01		0.73		< 0.728		0.728				< 0.002		< 0.00038					5			113.408	113				94.886	18.522	
					0.02		0.89		0.883		0.883		0.007		0.00049					< 5			107.687	108				87.395	20.2919	
					0.04		0.8		0.795		0.795		0.005		0.00073					5			121.813	122				103.126	18.6866	
					0.02		0.56		0.553		0.553		0.007		0.00016	0.0002				11			69.6725	69.7				58.23	11.4425	
			< 0.01		1.17		1.166		1.17				0.004		< 0.00014	0.0002				< 5			135.297	135				116.61	18.6866	
			< 0.01		1.04		1.038		1.04				0.002		< 5e-005	0.0001				< 5			99.9022	99.9				83.1501	16.7521	
					0.01		1.18		1.17		1.17		0.01		7.00E-05	0.0001				4			136.334	136				113.614	22.7203	
					0.02		0.83		0.823		0.823		0.007		0.00023	0.0002				3			78.3868	78.4				65.4214	12.9654	
			< 0.01		0.7		0.697		0.697		0.697		0.003		< 4e-005	0				3			75.1763	75.2				65.4214	9.75492	
			< 0.01		0.75		0.746		0.746		0.746		0.004		< 0.00018	0.0007				< 3			147.655	148				125.1	22.5557	
					0.01		0.93		0.918		0.918		0.012		0.00017	0.0002				6			118.547	119				98.1321	20.4154	
					0.04		0.75		0.746		0.746		0.004		0.00072	0.0007				7			110.027	110				94.3866	15.6408	
			< 0.01		0.81		0.807		0.807		0.807		0.003		< 0.00024	0.0006				< 3			126.329	126				105.873	20.4565	
			< 0.01		0.98		< 0.978		0.978				< 0.002		< 0.00023	0.0003				6			97.8306	97.8				78.1561	19.6745	
			< 0.01		1.07		1.064		1.06				0.006		< 0.00018	0.0002				5			140.227	140				119.606	20.6212	
			< 0.01		0.91		0.908		0.908				0.002		< 6e-005	0.0001				8			82.9116	82.9				68.9172	13.9944	
					0.04		1.26		1.256		1.26		0.004		0.0005	0.0005				3			141.385	141				116.36	25.0253	
			< 0.01		0.94		0.936	0.936					0.004	< 0.0001	< 0.0001				9			87.6		87.6				70.0658	17.5342	
					0.01		0.75		0.742	0.742			0.008	< 0.0001	5.00E-05				14			66.4278		66.5				55.1088	11.319	
					0.014		0.92		0.918	0.918			0.002	0.0001	0.00013				4			122.666		123				98.3818	24.2844	
					0.02		0.88		0.876	0.876			0.004	0.0004	0.00032				11			107.808		108				87.9693	19.8391	
					0.22		1.14		1.128	1.13			0.012	0.0014	0.00145				8			117.302		117				97.1333	20.1684	
					0.01		0.54		0.534	0.534			0.006	0.0002	0.00016				4			119.016		119				98.8063	20.2096	
			< 0.01		0.66		0.657	0.657					0.003	0.0001	< 0.00011				5			86.2318		86.3				71.4142	14.8176	
			< 0.01		0.79		0.785	0.785					0.005	0.0005	< 0.0003				9			125.177		125				102.127	23.0496	
			< 0.01		0.64		0.638	0.638					0.002	0.0003	< 0.00025				< 3			96.6314		96.7				81.4022	15.2292	
			< 0.01		0.69		0.688	0.688					0.002	0.0004	< 0.00028				3			110.338		110				92.6387	17.6988	
					0.03		0.63		0.628	0.628			0.002	0.0004	0.00043				8			102.934		103				85.6471	17.2872	
					0.01									0.0002	0.00016				< 3			140.968		141				115.861	25.1076	
			< 0.01											0.0002	< 0.00016				4			118.369		118				96.8836	21.4855	
			< 0.01											< 0.0001	< 5e-005				10			59.1132		59.1				49.4406	9.6726	
			< 0.01											< 0.0001	< 7e-005				7			103.406		103				83.6495	19.7568	
					0.02									0.0001	0.00013				5			75.6813		75.7				62.6747	13.0066	
			< 0.01											0.0001	< 0.0001				6			104.866		105				85.3974	19.4687	
			< 0.01																23			40.1332		40.1				33.9592	6.174	
					0.46									0.0002	< 0.00018															
					0.023									0.0034	0.00336															
					0.011									0.0005	0.00052															
					0.04									0.0003	0.00027															
					0.04									0.0005	0.00054															
														0.0003	0.00025															
					0.02									0.0005	0.00036															
					0.03									0.0004	0.00037															
					0.04									0.0006	0.00058															
			0.019		0.99		0.983	0.983					0.007	0.0002	0.00018					8										
					0.05		0.74		0.729	0.729			0.011	0.0002	0.00023					32										
					0.02		0.41		0.402	0.402			0.008	< 0.0001	7.00E-05					7										
					0.28		0.47		0.451	0.451			0.019	0.0092	0.00709					4										
					0.02		0.72		0.713	0.713			0.007	0.0005	0.00045					6										
					0.07		0.43		0.419	0.419			0.011	0.0032	0.00184					4										
					0.03		0.79		0.781	0.781			0.009	0.0009	0.0008					8										
					0.01		0.84		0.832	0.832			0.008	0.0003	0.00021					5										
					0.028		1.118		1.114	1.11			0.004	0.0011	0.00059					2										
					0.02		0.84		0.827	0.827			0.013	0.0003	0.00027					24										
					0.08		1.25		1.243	1.24			0.007	0.0006	0.0006															

[illegible]

[illegible]

6841 / Phe 7198 / Met 7199 / CdC 7201 / Met 7204 / CrCi 7216 / Tot 7273 / Con 7274 / HH 7274 / HH 7375 / SILI 7605 / HH 7833 / CrCi 7996 / Met 7999 / Met 8000 / Met 8387 / CrCi 9584 / Bica 9901 / O D 9901 / O D 9901 / O D 9901 / O D 9921 / pH I 9924 / Oxy 9924 / Oxy 9924 / Oxy 9924 / Oxy 9933 / ColformsPre
--- µg/l µg/l µg/l µg/l µg/l mS/cm --- --- mg/l --- µg/l µg/l µg/l µg/l µg/l mg/l % % % % --- mg/l mg/l mg/l mg/l NO/100ml
Unknown r wqValue(0 wqValue(0 wqValue(0 wqValue(0 wqValue(0 Unknown r Unknown r Field Unknown r Unknown r wqValue(3 wqValue(0 wqValue(0 wqValue(0 wqValue(0 wqValue(0 9901_25 Field Unknown r Calculated Unknown r Field Calculated Unknown r 9924_25 Unknown method

86.62
68.32
43.92
111.02
113.46
122
112.24 110.4 8.28 10.71
106.14 107.7 8.36 11.22
142.74 99.7 8.52 10.64
92.72
139.08
142.74
68.32
124.44
67.1
123.22
117.12
114.68
119.56

0.268 774 0
0.302 783 0
0.312 340 0
0
0

Station name	NGR	Station	nur	Date/Time (sampling)	0162 / Alky0162 / Alky0162 / Alky0061 / pH				0061 / pH	0061 / pH	0050 / Lear0062 / Con	0076 / Terr	0076 / Terr	0077 / Con	0077 / Con	0081 / O D	0081 / O D	0081 / O D	0082 / O D	0082 / O D	0085 / BOE	0085 / BOE	0088 / BOE	0105 / Mer	
					mg/l	mg/l	mg/l	---																	
					Low	Unknown	r	Low																	
R TAFF AT ABERCANAID/17012	SO0546104637		17012	28/08/1996 10:25		102					8.23														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	04/10/1996 15:05		84					8.2														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	17/12/1996 12:02		103					7.56														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	18/12/1996 13:00		99					8.07														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	23/01/1997 13:45		87					8														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	25/02/1997 12:34		45					7.63														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	04/04/1997 11:15		100					8.35														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	09/05/1997 12:05		78					8.14														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	14/07/1997 12:20		102					8.85														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	28/07/1997 12:20		102					8.44														1.8
R TAFF AT ABERCANAID/17012	SO0546104637		17012	01/08/1997 11:15		100					8.09														0.9
R TAFF AT ABERCANAID/17012	SO0546104637		17012	13/08/1997 12:05		100					7.77														11.1
R TAFF AT ABERCANAID/17012	SO0546104637		17012	15/09/1997 12:05							8.34														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	22/10/1997 11:44							8.2														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	02/12/1997 10:30							8														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	27/01/1998 10:20							8														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	11/02/1998 10:45							8.2														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	30/03/1998 12:20							7.9														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	21/04/1998 12:00							8														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	29/05/1998 11:50							8.4														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	01/07/1998 14:10							8.1														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	14/08/1998 12:10							8.6														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	28/08/1998 11:55							8.2														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	09/09/1998 13:25							7.8														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	29/09/1998 16:30							8.3														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	15/10/1998 11:00							8														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	05/11/1998 11:15							7.9														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	18/11/1998 13:10							7.9														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	01/12/1998 13:50							8.1														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	15/01/1999 12:35							7.8														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	16/02/1999 14:15							8.5														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	16/03/1999 11:05							8.3														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	28/04/1999 12:45							8.2														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	21/05/1999 11:00							8.1														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	05/07/1999 14:10							8.5														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	27/07/1999 13:35							9														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	18/08/1999 10:45							8.1														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	09/09/1999 12:40							8.5														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	04/10/1999 10:40							8														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	27/10/1999 11:05							8.2														
R TAFF AT ABERCANAID/17012	SO0546104637		17012	12/11/1999 12:45						8.17															
R TAFF AT ABERCANAID/17012	SO0546104637		17012	24/11/1999 12:05						8															
R TAFF AT ABERCANAID/17012	SO0546104637		17012	13/01/2000 11:25						7.7															
R TAFF AT ABERCANAID/17012	SO0546104637		17012	29/02/2000 11:05						7.6															
R TAFF AT ABERCANAID/17012	SO0546104637		17012	13/04/2000 11:05																					

0108 / Cad 0111 / Amr0111 / Amr0111 / Amr0116 / N O 0116 / N O 0116 / N O 0117 / Nitr 0117 / Nitr 0117 / Nitr 0117 / Nitr 0118 / Nitr 0118 / Nitr 0118 / Nitr 0119 / NH30119 / NH30119 / NH30119 / NH30135 / Sld '0135 / Sld '0138 / Sld l0143 / Sld l0144 / Sld '0158 / Har0158 / Har0158 / Har0158 / Har0163 / Hdn0164 / Hdn0172 / Chlc																														
µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Unknown r	Low	Additi	Low	Unknown r	Low	Additi	wqValue(0	Calculated,	Unknown r	Calculated	Low	Low	Additi	Unknown r	Calculated,	0119_25	Unknown r	Calculated	Low	Unknown r	wqValue(0	Unknown r	wqValue(0	0158_25	Unknown r	Calculated,	Calculated	0163_25	0164_25	Unknown r
	< 0.01				1.12		1.118	1.12					0.002	0.0004	< 0.00024						3									
	< 0.01				0.94		0.937	0.937					0.003								3									
		0.03			1.13		< 1.128	1.13					< 0.002	0.0002	0.00016						2									
		0.05			1.1		1.094	1.09					0.006	0.0009	0.00076						11									
		0.03			1.16		1.158	1.16					0.002	0.0004	0.00038						4									
		0.03			0.82		0.818	0.818					0.002	0.0002	0.00018						8									
	< 0.01				0.6		0.594	0.594					0.006	0.0004	< 0.00017					< 1.5										
		0.04			0.79		0.785	0.785					0.005	0.001	0.00076						4									
		0.02			4.35		4.324	4.32					0.026	0.0032	0.00052						5			131.504		132		108.62	22.885	
		0.01			0.75		0.743	0.743					0.007	0.0004	0.00015						6			126.173		126		102.876	23.2966	
	< 0.01				0.8		0.794	0.794					0.006	0.0003	< 0.00025						7			129.211		129		105.873	23.3377	
		0.56			1.39		1.35	1.35					0.04	0.009	0.00889						21			131.504		132		108.62	22.885	
		0.01			1		0.998	0.998					0.002	0.0005	0.00022					< 1.5				143.411		143		117.109	26.3012	
		0.01			1.16		1.156	1.16					0.004	0.0003	0.00017					< 1.5				143.238		143		116.36	26.8775	
		0.02			1.39		1.381	1.38					0.009	0.0003	0.00027						6			134.364		134		106.622	27.7418	
		0.01			1.41		1.407	1.41					0.003	0.0001	0.00013					< 1.5				196.729		197		156.063	40.6661	
	< 0.01				1.18		1.174	1.17					0.006	0.0003	< 0.00017					< 1.5				162.168		162		131.093	31.0758	
		0.02			0.79		0.786	0.786					0.004	0.0003	0.00027						2			74.3065		74.3		61.1765	13.13	
	< 0.01				0.72		0.713	0.713					0.007	0.0002	< 0.00016						3			83.7211		83.7		67.6687	16.0524	
	< 0.01				0.98		0.974	0.974					0.006	0.0005	< 0.0002						4			129.109		129		104.125	24.9841	
		0.01			0.8		0.795	0.795					0.005	0.0003	0.00024						2			105.645		106		88.8932	16.7521	
	< 0.01				0.77		0.763	0.763					0.007	0.0009	< 0.00024						2			135.999		136		113.114	22.885	
		0.02			0.77		0.766	0.766					0.004	0.0007	0.00045					< 1.5				122.921		123		102.876	20.0449	
		0.07			0.38		0.365	0.365					0.015	0.0012	0.00117						22			45.0367		45.1		38.2041	6.83256	
	< 0.01				1.05		1.045	1.04					0.005	0.0004	< 0.00023						2			134.095		134		112.115	21.9794	
	< 0.01				0.68		0.675	0.675					0.005	0.0002	< 0.0002						2			82.725		82.8		70.6651	12.0599	
		0.03			0.72		0.709	0.709					0.011	0.0005	0.00047						9			97.1061		97.1		79.6543	17.4518	
		0.01			1.27		1.267	1.27					0.003	0.0001	0.00013					< 1.5				158.67		159		127.347	31.3228	
		0.03			0.87		0.865	0.865					0.005	0.0005	0.00044					< 1.5				145.191		145		118.108	27.0833	
		0.01			0.63		0.627	0.627					0.003	< 0.0001	9.00E-05						4			58.9074		58.9		49.4406	9.4668	
	< 0.01				0.71			0.705					0.005	0.0005						< 1.5							145			
	< 0.01				0.78			0.776					0.004	0.0003						< 1.5							144			
		0.02			0.69		0.687	0.687					0.003	0.0007	0.00045						8			120.847		121		97.6327	23.2142	
		0.02			0.97		0.966	0.966					0.004	0.0005	0.00039						2			143.85		144		115.861	27.9888	
		0.02			0.81			0.804					0.006	0.0017							6						131			
	< 0.01				0.55		0.542	0.542					0.008	0.0023	< 0.00028						3			122.359		122		100.379	21.9794	
		0.02			0.55			0.546					0.004	0.0006							3						110			
		0.06			0.79		0.781						0.009	0.0048	0.00158						2			131.76		132		109.369	22.391	
		0.03			0.77			0.762					0.008	0.0006							3					99.2				
		0.01			0.88			0.876					0.004	0.0003							6					129				
< 0.01						0.962	0.96				0.96	0.002			< 0.00018		< 0.0002	< 1.5					150.331			150	121.354	28.9766		
	0.01					0.83				0.823	0.007						0.0002				5					113				
	0.03					0.511	0.506			0.506	0.005				0.00021		0.0002				3			57.0717		57.1	47.1933	9.8784		
	0.03					0.451	0.444			0.444	0.007				0.00018		0.0002				10			42.8744		42.9	36.2065	6.66792		
< 0.01						0.382	0.376			0.376	0.006			< 0.00016		< 0.0002					7			74.5096		74.5	60.9268	13.5828		
	0.02					0.869	0.862			0.862	0.007			0.00039		0.0004					5			114.336		114	93.1381	21.1974		
< 0.01						0.673	0.665			0.665	0.008			< 0.00033		< 0.0003					3			76.1779		76.2	62.9244	13.2535		
	0.03					0.748	0.743			0.743	0.005			0.00091		0.0009					4			123.075		123	101.878	21.1974		
	0.05					0.802	0.795			0.795	0.007			0.00152		0.0015					7			115.238		115	96.6339	18.6043		
< 0.01						0.622	0.615			0.615	0.007			< 0.0002		< 0.0002					7			95.4405		95.4	81.6519	13.7886		
	0.02					0.647	0.641			0.641	0.006			0.00022		0.0002					6			78.8121		78.8	66.6699	12.1422		
	0.02					0.38	0.374			0.374	0.006			0.00012		0.0001					6			51.4795		51.5	43.9472	7.53228		
	0.02					0.327	0.314			0.314	0.013			0.00018		0.0002					46			40.553		40.6	34.7083	5.84472		
	0.02					0.283	0.278			0.278	0.005			0.00016		0.0002					12			38.0505		38.1	31.7119	6.33864		
	0.04					0.714	0.711			0.711	0.003			0.00054		0.0005					2			110.228		110	90.1417	20.0861		
	0.01					0.706	0.701			0.701	0.005			0.00024		0.0002					4			123.588		124	99.88	23.7082		
	0.03					0.62	0.614			0.614	0.006										4			133.573		134	109.618	23.9551		
	0.01					0.46	0.456			0.456	0.004			0.0003		0.0003					3			98.7662		98.8	84.6483	14.1179		
< 0.01						0.453	0.45			0.45	0.003			< 0.00022		< 0.0002					6									

[illegible]

[illegible]

6841 / Phe 7198 / Met 7199 / CdC 7201 / Met 7204 / CrCi 7216 / Tot 7273 / Con 7274 / HH 7274 / HH 7375 / SILI 7605 / HH 7833 / CrCi 7996 / Met 7999 / Met 8000 / Met 8387 / CrCi 9584 / Bica 9901 / O D 9901 / O D 9901 / O D 9901 / O D 9921 / pH I 9924 / Oxy 9924 / Oxy 9924 / Oxy 9924 / Oxy 9933 / ColformsPre
--- µg/l µg/l µg/l µg/l µg/l mS/cm --- --- mg/l --- µg/l µg/l µg/l µg/l µg/l mg/l % % % % --- mg/l mg/l mg/l mg/l NO/100ml
Unknown r wqValue(0 wqValue(0 wqValue(0 wqValue(0 wqValue(0 Unknown r Unknown r Field Unknown r Unknown r wqValue(3 wqValue(0 wqValue(0 wqValue(0 wqValue(0 wqValue(0 9901_25 Field Unknown r Calculated Unknown r Field Calculated Unknown r 9924_25 Unknown method

124.44
102.48
125.66
120.78
106.14
54.9
122
95.16
124.44
124.44
122
122

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1	98.9393	98.9	12.3
60	100.655	101	10.4
1			10.44
60	98.9872	99	9.62
121	98.5387	98.5	10.27
53	104.284	104	12.22
75	58.7745	58.8	6.95
65	96.6656	96.7	11.04
84	99.7459	99.7	12.01
75	95.8323	95.8	10.69
84	115.536	116	12.18
53	102.648	103	10.78
75	98.2121	98.2	9.72
84	99.3311	99.3	10.72
	98.9507	99	11.32

Station name	NGR	Station nur	Date/Time (sampling)	0162 / Alky	0162 / Alky	0162 / Alky	0061 / pH	0061 / pH	0061 / pH	0050 / Lear	0062 / Con	0076 / Terr	0076 / Terr	0077 / Con	0077 / Con	0081 / O D	0081 / O D	0081 / O D	0082 / O D	0082 / O D	0085 / BOI	0085 / BOI	0088 / BOI	0105 / Mer
				mg/l	mg/l	mg/l	---	---	---	µg/l	µS/cm	°C	°C	µS/cm	µS/cm	%	%	%	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l
				Low	Unknown r	Low	Additi	Field	Low	Unknown r	Unknown r	Low	Field	Unknown r	Field	Low	Calculated	Unknown r	Calculated,	Unknown r	Low	Unknown r	Low	Unknown r
R TAFF AT ABERCANAID/17012	SO0546104637	17012	25/11/2002 13:35					7.86					9.14										0.5	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	11/12/2002 00:01					7.55					4.06										0.7	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	08/01/2003 11:50			135		7.74					3.86										0.9	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	04/02/2003 12:00			72		7.67					4.45										0.9	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	12/03/2003 11:55			64		8.07					6.93										0.6	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	02/04/2003 11:35			110		8.94					8.18										1.2	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	08/05/2003 13:25			95		8.17					12.42										1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	05/06/2003 14:55			99		8.2					12.84										0.8	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	03/07/2003 13:20			88		8.7					13.7										1.2	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	13/08/2003 12:55																					
R TAFF AT ABERCANAID/17012	SO0546104637	17012	12/09/2003 11:30																					
R TAFF AT ABERCANAID/17012	SO0546104637	17012	08/10/2003 12:30			255		8.15					12.37										0.7	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	18/11/2003 12:20			97		8.01					10.54								< 1			
R TAFF AT ABERCANAID/17012	SO0546104637	17012	12/12/2003 12:30			76		7.44					7.69										3.1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	22/01/2004 12:40					7.66					7.68										3.9	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	19/02/2004 12:10					7.7					6.98										1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	18/03/2004 10:40					8.09					8.12										0.5	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	19/04/2004 10:25					8.05					7.95										1.8	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	17/05/2004 13:40					8.36					15.07										1.5	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	25/06/2004 09:06					7.78					11.54										1.6	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	30/07/2004 11:10					8.37					15.8										1.7	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	04/08/2004 11:19					8.1					15.05										3.2	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	11/08/2004 10:30					8.18					15.75										2.1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	29/09/2004 11:25					8.02					12.82										1.2	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	20/10/2004 10:40					7.82					10.22										2	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	07/11/2004 10:15					7.9					10.84										1.1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	23/01/2005 10:40					7.59					5.97										1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	03/03/2005 10:35					8.27					4.33										0.7	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	04/04/2005 10:25					9.29					9.56								< 1			
R TAFF AT ABERCANAID/17012	SO0546104637	17012	22/04/2005 13:15					8.95					11.02										0.9	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	13/05/2005 12:30					8.68					12.01									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	17/06/2005 10:46					8.08					13.45										1.4	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	15/07/2005 11:13					8.21					16.3									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	17/08/2005 11:00					8.35					15.97									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	25/09/2005 10:45					8.2					13.66									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	31/10/2005 10:25					7.97					11.93									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	23/11/2005 09:54					7.65					6.28									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	07/12/2005 11:10					7.16					5.58									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	17/01/2006 11:25					7.97					6.63									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	05/02/2006 12:10					7.64					5.47									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	12/03/2006 13:40					8.07					4.59										5.5	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	25/04/2006 13:00					8.93					11.19										1.2	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	31/05/2006 14:40					8.47					13.55								< 1			
R TAFF AT ABERCANAID/17012	SO0546104637	17012	13/07/2006 14:10					7.6					18.34										4.1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	24/08/2006 13:50					8.49					15.74									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	27/09/2006 14:30					8.52					13.75									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	11/10/2006 14:30					8.12					12.84										2.1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	29/10/2006 13:40					7.44					11.7										1	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	19/11/2006 12:25					8.08					8.49									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	05/12/2006 10:45					7.87					8.99									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	19/01/2007 11:20	47.1				7.48			133		8.31									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	12/03/2007 11:10	107				8.02			287		9.09									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	02/04/2007 14:30	92				8.9			262		10.58									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	02/05/2007 14:45			81.4		8.55			219		14.39									< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	10/05/2007 11:10			78.9		7.92			223		10.88										1.5	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	07/06/2007 09:55			67		8.08					12.69				281					< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	10/07/2007 11:20			83		7.72					13.15				234					< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	14/08/2007 11:25			93		7.89					14.58				282						6.4	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	21/09/2007 10:20			100		7.93					13.38				266						1.8	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	17/10/2007 11:45			94		8.03					11.03				247						1.7	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	21/11/2007 10:40			107		7.84					8.7				313						5.7	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	06/12/2007 10:20			55		7.64					9.76				149						3.2	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	30/01/2008 11:20			73		7.65					6.87				220						1.6	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	21/02/2008 11:25			107		7.79					7.32				301						1.2	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	17/03/2008 15:05			77		7.65					7.5				192					< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	18/04/2008 10:15			106		8.4					7.5				292					< 1		
R TAFF AT ABERCANAID/17012	SO0546104637	17012	23/05/2008 13:30			82		8.83					13.47				254						2.3	
R TAFF AT ABERCANAID/17012	SO0546104637	17012	29/06/2008 09:35			96		8.06					12.52				262		</					

0108 / Cad 0111 / Amr0111 / Amr0111 / Amr0116 / N O 0116 / N O 0116 / N O 0117 / Nitr 0117 / Nitr 0117 / Nitr 0118 / Nitr 0118 / Nitr 0119 / NH30119 / NH30119 / NH30119 / NH30135 / Sld 0135 / Sld 0138 / Sld 0143 / Sld 0144 / Sld 0158 / Har0158 / Har0158 / Har0158 / Har0158 / Har0163 / Hdn0164 / Hdn0172 / Chlc																																
µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l			
Unknown r	Low	Additi	Low	Unknown r	Low	Unknown r	Low	Additi	wqValue(0	Calculated,	Unknown r	Calculated	Low	Low	Additi	Unknown r	Calculated,	0119_25	Unknown r	Calculated	Low	Unknown r	wqValue(0	Unknown r	wqValue(0	0158_25	Unknown r	Calculated,	Calculated	0163_25	0164_25	Unknown r
	0.03							0.838 < 0.836				0.836	< 0.002		0.00037		0.00037 < 1.5								114.473			114	94.3866	20.0861		
< 0.01								0.49 < 0.488				0.488	< 0.002		< 4e-005		< 4e-005 < 1.5								130.481		130	105.373	25.1076			
	0.03							1.106 < 1.104				1.1	< 0.002		0.00019		0.00019	2								149.365		149	119.606	29.7587		
	0.03							0.669	0.667			0.667	0.002		0.00017		0.00017	2								100.558		101	82.9004	17.6576		
< 0.01								0.618	0.615			0.615	0.003		< 0.00015		< 0.00015 < 1.5									83.4851		83.5	68.6675	14.8176		
< 0.01								0.711	0.708			0.708	0.003		< 0.00016		< 0.00016	2								125.926		126	102.876	23.0496		
	0.04							0.95	0.944			0.944	0.006		0.00087		0.00087	2								128.464		128	105.373	23.0908		
	0.06							0.986	0.978			0.978	0.008		0.00135		0.00135	2								124.28		124	102.876	21.4032		
	0.03							0.579	0.575			0.575	0.004		0.00072		0.00072	2								114.432		114	94.3866	20.0449		
< 0.01								0.384	0.377			0.377	0.007		< 0.00022		< 0.00022 < 1.5									98.4397		98.4	81.1525	17.2872		
	0.11							0.97	0.956			0.956	0.014		0.00209		0.00209 < 1.5									116.635		117	96.3842	20.2507		
	0.16							1.204	1.185			1.19	0.019		0.00069		0.00069	20								94.5048		94.5	78.9052	15.5996		
	0.14							1.453	1.433			1.43	0.02		0.00099		0.00099	15														
	0.01							0.917	0.911			0.911	0.006		7.00E-05		7.00E-05 < 1.5															
	0.02							0.624	0.62			0.62	0.004		0.00032		0.00032 < 1.5															
	0.03							0.821	0.816			0.816	0.005		0.00047		0.00047 < 1.5															
	0.02							0.848	0.838			0.838	0.01		0.00053		0.00053	4														
	0.02							0.689	0.678			0.678	0.011		0.00025		0.00025	4														
	0.09							0.586	0.576			0.576	0.01		0.00251		0.00251	4														
	0.05							0.825	0.816			0.816	0.009		0.00132		0.00132	2														
	0.03							0.856	0.844			0.844	0.012		0.00083		0.00083	43														
	0.03							0.68	0.672			0.672	0.008		0.00067		0.00067	4														
	0.03							0.651	0.641			0.641	0.01		0.00037		0.00037	12														
< 0.01								0.899	0.893			0.893	0.006		< 0.00015		< 0.00015	2														
< 0.01								0.629	0.624			0.624	0.005		< 5e-005		< 5e-005	5														
	0.01							0.67 < 0.668				0.668	< 0.002		0.00012		0.00012	4														
< 0.01								0.569	0.565			0.565	0.004		< 0.00018		< 0.00018 < 3															
	< 0.03				0.57			0.561				0.561	0.009		< 0.00059		< 0.00059	4														
	< 0.03				0.55			< 0.546				0.546 < 0.004			< 0.00063		< 0.00063 < 3															
	< 0.03				1.35			1.344				1.34	0.006		< 0.0007		< 0.0007 < 3															
	< 0.03				0.62			< 0.616				0.616 < 0.004			< 0.00087		< 0.00087	3														
	0.099				0.57			< 0.566				0.566 < 0.004			0.00279		0.00279 < 3															
	< 0.03				0.48			0.476				0.476	0.004		< 0.00071		< 0.00071	4														
	< 0.03				1.35			< 1.346				1.35 < 0.004			< 0.00059		< 0.00059	4														
	< 0.03				0.78			< 0.776				0.776 < 0.004			< 0.00019		< 0.00019 < 3															
	< 0.03				0.86			< 0.856				0.856 < 0.004																				

[illegible]

0664 / Oil {0664 / Oil {0749 / Phe 0753 / PCB 1109 / End 2328 / Tot 2345 / E.cc3164 / Chri3169 / pH i3267 / Typ3267 / Typ3461 / F Cc3683 / N In3970 / Amr3976 / Turf5884 / Ca:f6030 / Silve6046 / Arse6050 / Mar6051 / Iron6450 / Cu F6450 / Cu F6452 / Cop 6455 / Zinc6455 / Zinc6460 / Fe- i6461 / Fe - 6462 / Nick6512 / Visit6841 / Phe																													
---	---	mg/l	µg/l	µg/l	NO/ml	NO/ml	µg/l	---	---	---	NO/100ml	mg/l	mg/l	FTU	---	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	---	---	
Unknown r	Field	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	Unknown r	Unknown r	Field	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	Unknown r	Unknown r	Low	Unknown r	Unknown r	Low	Unknown r	Unknown r	wqValue(6	Unknown r	Field	Field
	0								0			0.868								< 1				4.65				0	
	0								0			< 0.5								< 1				11.9				0	
												1.136			6.62517					< 1				5.9					
												0.699			7.73893					1.11				7.77					
												< 0.628			7.63889					< 1				4.21					
												< 0.721			7.35714					< 1				3.54					
												0.99			7.52228					< 1				7.9					
												1.046			7.92308					< 1				5.09					
												0.609			7.76181					1.14				5.91					
									0																		1		
												< 0.394			7.7381					< 1				2.22				0	
												1.08			7.84553					< 1				3.81					
												1.364			8.33773					1.99				32.2					
												1.593								1.86				40.8					
												0.927								< 1				23.2					
												0.644								< 1				15.9					
												0.851								1.5				14.8					
												0.868								1.4				4.9					
												0.709								1.53				12.7					
												0.676								1.34				5.22					
												0.875								1.3				8.93					
												0.886								1.28				7.04					
												0.71								1.8				16.7					
												0.681								2.01				15.5					
												< 0.909								1.35				7.93					
												< 0.639								1.02				7.45					
												0.68								1.26				4					
												< 0.579								1.11				3.15					
												< 0.6								1.21				3.58					
												< 0.58								1.04				4.57					
												< 1.38								1.4				6.31					
												< 0.65								1.56				4.58					
												0.669								1.04				4.07					
												< 0.51								1.26				7.61					
												< 1.38								2.09				6.46					
												< 0.81								1.16				3.89					
												< 0.89								1.71				15.9					
												0.683								1.58				7.83					
												< 0.91								< 1				9.7					
												0.991								1.56				15.1					
												0.762								< 1				7.51					
												< 1.06								1.03				23.9					
												< 0.51								2.1				13.3					
												< 0.96								1.4				52.7					
												< 0.58								< 1			< 5						
												< 1.36								2.3				17.1					
												< 0.66								1.3				10					
												< 0.79								1.4				10.6					
												< 0.23								1.4				15.1					
												< 0.51								1.1				10.3					
												< 0.43								1.7				6.8					
												< 0.51								1				5.3					
												< 0.52								1.5				7.2					
												< 0.77								2.1				14.7					
												< 0.67								1.7				8.8					
												0.668								1.6				11.4					
												2.029								2.7				142					
												< 0.65								1.9				15.9					
												0.802								2.3				9.6					
												1.96								2.4				15.3					
												< 0.7								2.5				28.5					
												0.706								1.9				7.5					
												0.98								1.8			< 5						
												< 0.58																	

6841 / Phe 7198 / Met 7199 / CdC 7201 / Met 7204 / CrCi 7216 / Tot 7273 / Con 7274 / HH 7274 / HH 7375 / SILI 7605 / HH 7833 / CrCi 7996 / Met 7999 / Met 8000 / Met 8387 / CrCi 9584 / Bica 9901 / O D 9901 / O D 9901 / O D 9901 / O D 9921 / pH I 9924 / Oxy 9924 / Oxy 9924 / Oxy 9924 / Oxy 9933 / ColformsPre																											
---	µg/l	µg/l	µg/l	µg/l	µg/l	mS/cm	---	---	---	mg/l	---	µg/l	µg/l	µg/l	µg/l	µg/l	mg/l	%	%	%	%	---	mg/l	mg/l	mg/l	mg/l	NO/100ml
Unknown r	wqValue(0	wqValue(0	wqValue(0	wqValue(0	wqValue(0	Unknown r	Unknown r	Field	Unknown r	Unknown r	wqValue(3	wqValue(0	wqValue(0	wqValue(0	wqValue(0	wqValue(0	wqValue(0	9901_25	Field	Unknown r	Calculated	Unknown r	Field	Calculated	Unknown r	9924_25	Unknown method
								65										106.775				107		12.28			
								52										80.7922				80.8		10.56			
								59									164.7	92.0898				92.1		12.1			
								65									87.84	98.3919				98.4		12.73			
								65									78.08	97.9138				97.9		11.89			
								65									134.2	105.668				106		12.44			
								87									115.9	95.4921				95.5		10.17			
								59									120.78	102.092				102		10.77			
								84									107.36	117.12				117		12.12			
								84									311.1	105.888				106		11.29			
								94									118.34	101.677				102		11.31			
								84									92.72	98.6096				98.6		11.75			
								84										101.606				102		12.11			
								84										99.6856				99.7		12.09			
								84										106.955				107		12.61			
								76										113.772				114		13.47			
								94										108.837				109		10.93			
								70										101.684				102		11.05			
								52										108.533				109		10.73			
								70										108.093				108		10.86			
								94										102.355				102		10.13			
								94										98.7296				98.7		10.42			
								52										97.3434				97.3		10.91			
								94										104.478				104		11.54			
								52										118.476				118		14.74			
								52										108.563				109		14.09			
								94										115.324				115		13.13			
								94										107.555				108		11.83			
								71										118.417				118		12.73			
								56										108.687				109		11.31			
								104										110.202				110		10.78			
								94										107.505				108		10.59			
								77										101.955				102		10.56			
								77										97.3081				97.3		10.48			
								69										105.154				105		12.98			
								72										105.285				105		13.23			
								56										97.669				97.7		11.95			
								94										99.0372				99		12.48			
								77										103.173				103		13.3			
								94										114.189				114		12.51			
								97										99.5868				99.6		10.34			
								77										107.069				107		10.04			
								77										104.353				104		10.33			
								94										103.416				103		10.69			
								77										99.3429				99.3		10.48			
								94										99.2888				99.3		10.75			
								77										105.617				106		12.34			
								94										93.48				93.5		10.79			
								66									57.462	101.234				101		11.88			
								66									130.54	106.386				106		12.25			
								0.066									112.24	115.541				116		12.84			
								66									99.308	115.382				115		11.76			
								66									96.258	103.579				104		11.43			
								114									81.74	102.502				103		10.85			
								112									101.26	81.9965				82		8.59			
								112									113.46	97.5374				97.5		9.9			
								112									122	102.952				103		10.73			
								112									114.68	106.398				106		11.7			
								112									130.54	96.3518				96.4		11.2			
								112									67.1	103.345				103		11.71			
								108									89.06	106.647				107		12.97			
								114									130.54	105.691				106		12.71			
								114									93.94	102.657				103		12.29			
								112									129.32	104.578				105		12.52			
								112									100.04	114.888				115		11.95			
								112									117.12	102.203				102		10.86			
								124									141.52		112.6					11.5		11.451.	

Station name	NGR	Station number	Date/Time (sampling)	0162 / Alky 0162 / Alky 0162 / Alky 0061 / pH		0061 / pH	0061 / pH	0050 / Lead	0062 / Conductivity	0076 / Temperature	0077 / Conductivity	0077 / Conductivity	Con 0081 / O D 0081 / O D 0081 / O D 0082 / O D 0082 / O D 0085 / BOI 0085 / BOI 0088 / BOI 0105 / Mer											
				mg/l	mg/l	mg/l	---	---	---	μg/l	μS/cm	°C	°C	μS/cm	μS/cm	%	%	%	mg/l	mg/l	mg/l	mg/l	mg/l	μg/l
				Low	Unknown r	Low	Additi	Field	Low	Unknown r	Unknown r	Low	Field	Unknown r	Field	Low	Calculated	Unknown r	Calculated,	Unknown r	Low	Unknown r	Low	Unknown r
R TAFF AT ABERCANAID/17012	SO0546104637	17012	21/09/2008 09:55	147		8.06				11.21		391						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	20/10/2008 11:35	95		7.46				11.89		256								2.6				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	09/11/2008 13:00	54			7.92			8.69		149								2				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	04/12/2008 10:20	66		7.73				5.77		238								2.3				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	20/01/2009 10:15	67		7.23				4.97		219								1.4				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	11/02/2009 10:40	112		7.07				5.28		388								1.2				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	26/02/2009 10:20	92		7.74				6.93		297						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	26/04/2009 11:45	95			8.32			9.8		280						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	14/05/2009 11:10	94		8.1				10.86		277						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	14/06/2009 10:00	129		8.31				12.74		298						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	21/07/2009 10:05	78		7.74				14.14		227								4.3				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	16/08/2009 10:10	126		8.08				13.63		303						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	23/09/2009 10:20	122		8.19				12.54		295								1.2				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	25/10/2009 10:10	108		7.88				11.29		278								5.6				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	10/11/2009 10:50	113		7.77				9.25		292						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	01/12/2009 10:30	87		7.57				7.11		242						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	20/01/2010 11:05	70		7.84				4.28		255								2.7				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	14/02/2010 10:20	106		7.39				5.31		313						< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	16/03/2010 11:00	110		8.34				6.1		302.5								1.4				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	21/04/2010 10:50	102		8.73				8.39		297								2.8				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	11/05/2010 10:30			8.05				8.96										1.3				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	24/06/2010 10:05			7.49				14.39								< 1						
R TAFF AT ABERCANAID/17012	SO0546104637	17012	23/07/2010 10:50			7.74				14.16										1.3				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	20/08/2010 10:40			7.97				14.58										4.3				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	29/09/2010 15:25			8.23				13										1.8				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	27/10/2010 12:50			8.43				11.1										1.5				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	03/12/2010 12:50			8.3				3.7										1.3				
R TAFF AT ABERCANAID/17012	SO0546104637	17012	13/12/2010 11:10			7.99				5.14										1.5				
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	09/01/1990 10:20					7.9				8				106				12.5	1.8			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	09/02/1990 12:55					7.8				8				111				13.1	1.1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/03/1990 10:15					7.7				8				87.1				10.3	4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/04/1990 10:25					8.2				6				94.1				11.7	0.8			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	15/05/1990 09:50					8			12.5					99.7				10.6	1.5			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/06/1990 09:45					8.2				12				96.7				10.4	1.2			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	20/07/1990 11:10					8.5				16				101				9.9	0.6			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	03/08/1990 07:55					8.2				15				101				10.2	0.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/09/1990 09:20					8.4				13				86.6				9.1	0.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	22/10/1990 09:20					8				10				90.5				10.2	1.1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	20/11/1990 10:35					7.8				8				89.6				10.6	2.2			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/12/1990 10:00					8.1				5				93.3				11.9	1.1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	03/01/1991 09:30					7.7				6				92.5				11.5	1.9			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/02/1991 10:00					7.8				2				93.4				12.9	1.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	06/03/1991 09:10					7.9				7				91.6				11.1	0.9			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	03/04/1991 09:55					7.4				6				85.3				10.6	1.5			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/05/1991 09:40					8.2				10				114				12.8	1.9			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/06/1991 09:35					8				9				91.9				10.6	1.9			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/07/1991 09:45					8				13				94.2				9.9	0.6			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	19/08/1991 11:00					8.3				13				107			< 0.5	11.2				
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/09/1991 09:30					7.8				13				99.9				10.5	0.6			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	22/10/1991 11:15					8.2				10				101				11.4	1.1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/11/1991 10:35					7.6				7				89.9				10.9	4.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	05/12/1991 09:35					7.9				7				95.7				11.6	3.3			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/12/1992 11:59					7.7				7							91.6	11.1	2.2			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/01/1993 11:40					7.6				6				92.5				11.5	2.8			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	03/02/1993 12:05					7.9				7				105				12.7	1.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/03/1993 13:20					8.2				8				95.6				11.3	1.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/04/1993 12:50					7.5				8.5				94.2				11	2.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/05/1993 14:10					8.1				8				92.2				10.9	1.2			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/06/1993 13:35					7.6				16				101				9.9	1.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	06/07/1993 13:20					8.1				17				114				11	1.5			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/08/1993 13:40					8.1				14				105			< 0.5	10.8				
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/09/1993 13:40					8.1				15.5				107				10.6	0.9			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/09/1993 13:25					7.8				13				95.1				10	1.5			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/10/1993 13:15					7.9				8				94.7				11.2	2.3			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/11/1993 13:15					8				8				95.6				11.3	1.2			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/12/1993 13:50					7.7				5				97.2				12.4	1.2			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/01/1994 13:40					7.9				6				94.9				11.8	1.3			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	26/01/1994 13:25					7.8				5				95.7				12.2	1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/03/1994 13:15					7.9				5.5				93.7				11.8	1.2			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	28/03/1994 13:30					7.5				8				106				12.5	1.6			

0108 / Cad 0111 / Amr0111 / Amr0111 / Amr0116 / N O 0116 / N O 0116 / N O 0117 / Nitr 0117 / Nitr 0117 / Nitr 0117 / Nitr 0118 / Nitr 0118 / Nitr 0118 / Nitr 0119 / NH ₃ 0119 / NH ₃ 0119 / NH ₃ 0119 / NH ₃ 0135 / Sld '0135 / Sld '0138 / Sld '0143 / Sld '0144 / Sld '0158 / Har0158 / Har0158 / Har0158 / Har0163 / Hdn0164 / Hdn0172 / Chlc																																
µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l			
Unknown r	Low	Additi	Low	Unknown r	Low	Additi	wqValue(0	Calculated,	Unknown r	Calculated	Low	Low	Additi	Unknown r	Calculated,	0119_25	Unknown r	Calculated	Low	Unknown r	wqValue(0	Unknown r	wqValue(0	0158_25	Unknown r	Calculated,	Calculated	0163_25	0164_25	Unknown r		
	< 0.03			0.76			< 0.756				0.756 < 0.004					< 0.0006			< 0.0006	< 3												
		0.038		0.93			0.9177				0.918 0.0123					0.00023			0.00023					16.4								
	< 0.03			0.4			< 0.396				0.396 < 0.004					< 0.00041			< 0.00041					11								
		0.097		0.75			0.7448				0.745 0.0052					0.0007			0.0007					26.8								
	< 0.03			0.59			< 0.586				0.586 < 0.004					< 6e-005			< 6e-005					3.8								
	< 0.03			0.86			0.8451				0.845 0.0149					< 5e-005			< 5e-005					3.4								
	< 0.03			0.73			< 0.726				0.726 < 0.004					< 0.00024			< 0.00024	< 3												
	< 0.03			0.58			< 0.576				0.576 < 0.004					< 0.00054			< 0.00054					3.2								
	< 0.03			0.63			< 0.626				0.626 < 0.004					< 0.00058			< 0.00058					3.7								
	< 0.03			0.7			< 0.696				0.696 < 0.004					< 0.00067			< 0.00067	< 3												
		0.205		0.67			0.6596				0.66 0.0104					0.00281			0.00281					21.8								
	< 0.03			0.6			< 0.596				0.596 < 0.004					< 0.00071			< 0.00071	< 3												
	< 0.03			0.5			< 0.496				0.496 < 0.004					< 0.00066			< 0.00066					4								
		0.364		0.76			0.7519				0.752 0.0081					0.00556			0.00556					9.9								
	< 0.03			0.71			< 0.706				0.706 < 0.004					< 0.00031			< 0.00031					3.3								
	< 0.03			0.64			< 0.636				0.636 < 0.004					< 0.00017			< 0.00017	< 3												
		0.072		0.64			< 0.636				0.636 < 0.004					0.0006			0.0006					8.55								
	< 0.03			0.72			< 0.716				0.716 < 0.004					< 0.0001			< 0.0001	< 3												
	< 0.03			0.59			< 0.586				0.586 < 0.004					< 0.00041			< 0.00041					3.73								
	< 0.03			0.62			< 0.616				0.616 < 0.004					< 0.00049			< 0.00049	< 3												
	< 0.03			0.57			0.5657				0.566 0.0043					< 0.00051			< 0.00051	< 3												
	< 0.03			0.51			0.5053				0.505 0.0047					< 0.00024			< 0.00024					3.52								
	< 0.03			0.71			< 0.706				0.706 < 0.004					< 0.00041			< 0.00041					5								
		0.09		0.68			0.6716				0.672 0.0084					0.00214			0.00214					17.2								
	< 0.03			0.52			< 0.516				0.516 < 0.004					< 0.00068			< 0.00068					3.77								
	< 0.03			0.48			< 0.476				0.476 < 0.004					< 0.00059			< 0.00059					12.6								
	< 0.03			0.8			< 0.796				0.796 < 0.004					< 0.00034			< 0.00034					7.57								
	< 0.03			0.67			< 0.666				0.666 < 0.004					< 0.00037			< 0.00037	< 3												
		0.03			1.32		1.303			1.3				0.017		0.00038		0.0004						5				93.2234	93.3		78.4058	14.8176
	< 0.01				0.94		< 0.938			0.938				< 0.002		< 0.0001		0.0001						7				125.583	126		105.373	20.2096
		0.02			1.3		1.285			1.28				0.015		0.00016		0.0002						12				100.74	101		83.0003	17.74
		0.01			0.69		0.682			0.682				0.008		0.00014		0.0002				< 5					110.56	111		90.3914	20.1684	
		0.02			1.21		1.197			1.2				0.013		0.00044		0.0004					6				100.701	101		84.6483	16.0524	
		0.01			1.37		1.356			1.36				0.014		0.00021		0.0003				< 5					91.3795	91.4		75.4094	15.9701	
		0.01			1		0.993			0.993				0.007		0.00028		0.0009				< 5					112.116	112		97.1333	14.9822	
	< 0.01				0.82		< 0.818			0.818				< 0.002		< 0.00026							5				113.147	113		97.383	15.7643	
		0.02			0.65		0.643			0.643				0.007		0.00045						< 5					104.367	104		88.6435	15.7231	
		0.04			0.8		0.794			0.794				0.006		0.00073						< 5					116.723	117		100.629	16.0936	
		0.01			0.59		0.583			0.583				0.007		0.0001		0.0001						8			70.5615	70.6		60.4773	10.0842	
	< 0.01				1.14		1.136			1.14				0.004		< 0.00013		0.0002						5			128.047	128		112.365	15.682	
	< 0.01				1.03		1.028			1.03				0.002		< 7e-005		0.0001						5			100.725	101		86.8956	13.8298	
		0.01			1.15		1.14			1.14				0.01		6.00E-05		0.0001						3			119.404	119		101.129	18.275	
		0.03			0.83		0.822			0.822				0.008		0.00035		0.0003						4			72.9235	73		62.6747	10.2488	
	< 0.01				0.71		0.707			0.707				0.003		< 3e-005		0						4			74.858	74.9		66.4202	8.4378	
	< 0.01				0.84		0.836			0.836				0.004		< 0.00018		0.0003			< 3					141.948	142		122.603	19.3452		
		0.01			0.94		0.93			0.93				0.01		0.00017		0.0002						5			109.975	110		93.3878	16.5875	
		0.04			0.74		0.735			0.735				0.005		0.00091		0.0009						4			90.2544	90.3		77.9064	12.348	
		0.06			0.9		0.897			0.897				0.003		0.00136		0.0027			< 3					122.238	122		104.375	17.8634		
	< 0.01				0.98		< 0.978			0.978				< 0.002		< 0.00014		0.0002						10			93.8244	93.9		76.9076	16.9168	
		0.05			1.06		1.053			1.05				0.007		0.00091		0.0014						5			138.293	138		119.606	18.6866	
	< 0.01				0.84		< 0.838			0.838				< 0.002		< 6e-005		0.0001						8			75.5797	75.6		64.6723	10.9074	
		0.02			1.19		1.186			1.19				0.004		0.00023		0.0002			< 3					130.659	131		110.367	20.2919		
	< 0.01				0.91		0.905		0.905					0.005	< 0.0001	< 7e-005								7			85.5131		85.5	71.1895	14.3237	
		0.02			0.66		0.648		0.648					0.012	0.0001	0.00011								41			59.747		59.8	50.9388	8.80824	
		0.014			0.96		0.956		0.956					0.004	0.0002	0.00016					< 3					115.979		116	96.6339	19.3452		
		0.09			0.83		0.825		0.825					0.005	0.0022	0.00142					< 3					101.247		101	84.9479	16.2994		
		0.22			1.1		1.087		1.09					0.013	0.0011	0.00115								10			109.44		109	93.3878	16.0524	
		0.01			0.44		0.435		0.435					0.005	0.0002	0.00016								4			111.7		112	95.2356	16.464	
	< 0.01				0.67		0.667		0.																							

[illegible]

[illegible]

5841 / Phe 7198 / Met 7199 / CdC 7201 / Met 7204 / CrCi 7216 / Tot 7273 / Con 7274 / HH 7274 / HH 7375 / SIL 7605 / HH 7833 / CrCi 7996 / Met 7999 / Met 8000 / Met 8387 / CrCi 9584 / Bica 9901 / O D 9901 / O D 9901 / O D 9901 / O D 9921 / pH 9924 / Oxy 9924 / Oxy 9924 / Oxy 9924 / Oxy 9933 / ColformsPre																													
---	µg/l	µg/l	µg/l	µg/l	µg/l	mS/cm	---	---	mg/l	---	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	mg/l	%	%	%	%	---	mg/l	mg/l	mg/l	mg/l	NO/100ml		
Unknown r wq	Value(0 wq	Value(0 wq	Value(0 wq	Value(0 wq	Value(0 wq	Value(0 Unknown r	Unknown r	Field	Unknown r	Unknown r	wqValue(3 wq	Value(0 wq	Value(0 wq	Value(0 wq	Value(0 wq	Value(0 wq	Value(0 wq	Value(0 9901_25	Field	Unknown r	Calculated	Unknown r	Field	Calculated	Unknown r	9924_25	Unknown method		
124															179.34		101.7								11.1		11.1366		
															115.9		107.1									11.5		11.5452	
															65.88		102									11.9		11.8594	
															80.52		104.8									13.1		13.1052	
															81.74		83.8									10.7		10.6968	
															136.64		100.6									12.7		12.739	
															112.24		94									11.4		11.4147	
															115.9		106.9									12.1		12.1012	
															114.68		101.2									11.2		11.1727	
															157.38		106.3									11.2		11.2393	
															95.16		102.3									10.5		10.484	
															153.72		107.7									11.2		11.1625	
															148.84		107.7									11.4		11.439	
															131.76		97.5									10.7		10.6569	
															137.86		98.8									11.3		11.3327	
															106.14		91									11		11.0008	
															85.4		90.5									11.8		11.761	
															129.32		98.7									12.5		12.4887	
															134.2		105.5									13.1		13.0823	
															124.44		110.7									13		12.9655	
																	104.4									12.1		12.0592	
																	111.8									11.4		11.3949	
																	107.7									11		11.0325	
																	99.6									10.1		10.1094	
																	101.5									10.7		10.6691	
																	104.4									11.5		11.4616	
																	100.2									13.2		13.2212	
																	99.7									12.7		12.6706	

Station name	NGR	Station nur	Date/Time (sampling)	0162 / Alky	0162 / Alky	0162 / Alky	0061 / pH	0061 / pH	0061 / pH	0050 / Lear	0062 / Con	0076 / Terr	0076 / Terr	0077 / Con	0077 / Con	0081 / O D	0081 / O D	0081 / O D	0082 / O D	0082 / O D	0085 / BOI	0085 / BOI	0088 / BOI	0105 / Mer
				mg/l	mg/l	mg/l	---	---	---	µg/l	µS/cm	°C	°C	µS/cm	µS/cm	%	%	%	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l
				Low	Unknown r	Low	Additi	Field	Low	Unknown r	Unknown r	Low	Field	Unknown r	Field	Low	Calculated	Unknown r	Calculated	Unknown r	Low	Unknown r	Low	Unknown r
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/05/1994 13:50							8.2				10					98.5	11.1			1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/06/1994 13:30							7.5				12					91.1	9.8			16.5	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/07/1994 13:20							8				12.5					101	10.7			1.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	19/08/1994 10:20							7.9				14					100	10.3			0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	19/09/1994 12:45							7.8				12					94.9	10.2			1.5	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	19/10/1994 13:00							7.5				11					94.5	10.4	> 8.1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	26/10/1994 10:20							8.2				10					104	11.7			1.5	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/11/1994 10:30							7.9				10					107	12			0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	16/01/1995 14:00			66				7.76				7					99	12	< 0.5			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/01/1995 14:05			52				7.54				6					97.3	12.1			1.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/03/1995 12:30			32				7.42				6					105	13	< 0.5			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/05/1995 11:10			83				7.97				13					117	12.3			0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	08/06/1995 12:10			85				8.01				13					102	10.7	< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	26/06/1995 11:45			83				8.26				14.5					99.3	10.1	< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/07/1995 11:20			83				8.05				15.1					103	10.3			0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	02/10/1995 12:50			78				8.2				11.8					102	11			1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	23/10/1995 13:35			83				8.27				12					101	10.9			1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/10/1995 14:00			77				7.78				12					106	11.4			2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	08/12/1995 13:50			121				7.82				5					93.3	11.9	< 0.5			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/12/1995 14:15			107				7.95				6					98.1	12.2			1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/01/1996 12:50			56				7.02				8					93.9	11.1	< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	22/02/1996 12:50			108				7.97				6					105	13			0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	26/03/1996 11:55			54				8.02				6					102	12.7			0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/04/1996 09:30			92				7.84				8					96.4	11.4			4.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	16/07/1996 14:20			98				8.6				17					134	12.9			0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	29/07/1996 13:55			90				8.64				16					111	10.9			1.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	02/08/1996 10:20			87				8.27				14					110	11.3			0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	28/08/1996 10:40			93				8.24				14					99.2	10.2			1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/10/1996 14:50			79				8.18			10.7						97.5	10.8			1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/12/1996 12:10			154				7.7				6.7					102	12.4			1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	18/12/1996 12:51			109				8.13				7.8					113	13.4			0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	23/01/1997 13:30			79				7.96				5.2					101	12.8			1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/02/1997 12:43			42				7.59				6.6					99.6	12.2			1.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/04/1997 11:24			93				8.26				8.9					106	12.25			1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	09/05/1997 12:21			71				8.1				9.7					86.4	9.8			0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/07/1997 11:30			91				8.46				13.9					115	11.8			0.9	1.4
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	28/07/1997 11:55			91				8.44				16					118	11.6			0.6	0.9
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/08/1997 11:00			86				8.06				14					103	10.6			0.8	0.9
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/08/1997 11:45			93				7.99				15					103	10.4			2.3	3.2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	15/09/1997 11:45							8.34				12					153	16.5			1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	22/10/1997 12:00							8.3				8.5					103	12			1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	02/12/1997 10:15							8.2				5					92.5	11.8			0.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	27/01/1998 10:05							8.1				5					108	13.8			1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/02/1998 10:25							8.2				8					88	10.4			0.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	30/03/1998 12:10							8				9.5					97.4	11.1			1.5	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/04/1998 11:25							8.1				8					96.4	11.4			1.5	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	29/05/1998 11:33							8.4				12									0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/07/1998 13:15							8.1				13					119	12.5			1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/08/1998 11:50							8.5				14.5					123	12.5			2.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	28/08/1998 11:35							8.4				14					134	13.8			1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	09/09/1998 13:00							7.8				15					116	11.7	< 1.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	29/09/1998 16:05							8.3				13					101	10.6			1.3	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	15/10/1998 10:20							8.1				11					101	11.1			1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	05/11/1998 11:05							8				11					104	11.4			1.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	18/11/1998 12:55							7.8				8					98.9	11.7			0.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/12/1998 13:35							8.2				7					103	12.5	< 0.5			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	15/01/1999 11:20							7.8				7					99	12			0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	16/02/1999 14:00							8.5				8					104	12.3			0.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	16/03/1999 10:49							8.3				8					101	11.9			0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	28/04/1999 12:30							7.6				12					101	10.9			1.3	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/05/1999 10:41							8.2				11					98.1	10.8			0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	05/07/1999 12:00							8.4				15					102	10.3			1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	27/07/1999 13:50							8.9				16					118	11.6			0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	18/08/1999 10:30							8.1				13					97	10.2			1.4	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	09/09/1999 12:10							8.5				15					104	10.5			1.3	

0108 / Cad 0111 / Amr0111 / Amr0111 / Amr0116 / N O 0116 / N O 0116 / N O 0117 / Nitr 0117 / Nitr 0117 / Nitr 0117 / Nitr 0118 / Nitr 0118 / Nitr 0118 / Nitr 0119 / NH $\pm$ 0119 / NH $\pm$ 0119 / NH $\pm$ 0119 / NH $\pm$ 0135 / Sld :0135 / Sld :0138 / Sld l0143 / Sld l0144 / Sld `0158 / Har0158 / Har0158 / Har0158 / Har0163 / Hdn0164 / Hdn0172 / Chlc																																	
μ g/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l				
Unknown r	Low	Additi	Low	Unknown r	Low	Unknown r	Low	Additi	wqValue(0	Calculated,	Unknown r	Calculated	Low	Low	Additi	Unknown r	Calculated,	0119_25	Unknown r	Calculated	Low	Unknown r	wqValue(0	Unknown r	wqValue(0	0158_25	Unknown r	Calculated,	Calculated	0163_25	0164_25	Unknown r	
			0.01															0.0003	0.00018														
			0.25															0.0017	0.00169														
			0.022															0.0005	0.00048														
			0.013															0.0003	0.00025														
			0.04															0.0005	0.00054														
			0.12															0.0008	0.00075														
			0.03															0.0009	0.00055														
			0.05															0.0007	0.00073														
			0.036			0.99			0.985	0.985				0.005	0.0003	0.00031											3						
			0.07			0.73			0.719	0.719				0.011	0.0003	0.00033											19						
			0.02			0.42			0.413	0.413				0.007	< 0.0001	7.00E-05											5						
			0.19			0.36			0.351	0.351				0.009	0.0041	0.00403											3						
			0.06			0.7			0.693	0.693				0.007	0.0014	0.00136											3						
			0.11			0.41			0.398	0.398				0.012	0.005	0.00279							< 3										
			0.04			0.64			0.633	0.633				0.007	0.0012	0.00106											5						
			0.02			0.81			0.801	0.801				0.009	0.0007	0.00042											5						
			0.029			1.076			1.071	1.07				0.005	0.0011	0.00061											2						
			0.04			0.9			0.889	0.889				0.011	0.0005	0.00051											17						
			0.08			1.2			1.192	1.19				0.008	0.0007	0.00067											3						
			0.01			1.13			1.123	1.12				0.007	0.0001	0.00012											2						
			< 0.01			0.92			0.913	0.913				0.007	< 0.0001	< 2e-005											12						
			0.08			1.35			1.334	1.33				0.016	0.001	0.00102											4						
			0.02			0.5			0.492	0.492				0.008	0.0003	0.00027											8						
			0.28			0.89			0.874	0.874				0.016	0.003	0.00307											11						
			< 0.01			0.83			0.826	0.826				0.004	0.0011	< 0.0003											2						
			< 0.01			0.889			0.885	0.885				0.004	0.0011	< 0.00028											4						
			0.01			0.82			0.811	0.811				0.009	0.0005	0.00024											4						
			< 0.01			1.22			1.218	1.22				0.002	0.0004	< 0.00024											2						
			0.01			0.76			0.755	0.755				0.005	0.0003	0.00019											4						
			0.04			1.22			1.213	1.21				0.007	0.0003	0.00029											6						
			0.04			2.12			2.115	2.12				0.005	0.0008	0.00062											11						
			0.04			1.05			1.046	1.05				0.004	0.0005	0.00047											3						
			0.05			0.76			< 0.758	0.758			< 0.002	0.0003	0.00028												8						
			< 0.01			0.9			0.894	0.894				0.006	0.0003	< 0.00017											< 1.5						
			0.03			0.76			0.755	0.755				0.005	0.0007	0.00054											5						
			0.01			0.9			0.894	0.894				0.006	0.0007	0.00024												3					
			0.03			0.85			0.839	0.839				0.011	0.0023	0.00085												6					
			< 0.01			0.8			0.792	0.792				0.008	0.0003	< 0.00024												11					
			0.17			1.16			1.139	1.14				0.021	0.0044	0.00437												8					
			0.01			1.01			1.008	1.01				0.002	0.0005	0.00021											< 1.5						
			0.03			1.14			1.134	1.13				0.006	0.001	0.00049											< 1.5						
			< 0.01			1.29			1.285	1.28				0.005	0.0002	< 0.00013												3					
			0.01			1.42			1.416	1.42				0.004	0.0002	0.00013												6					
			< 0.01			1.21			1.203	1.2				0.007	0.0002	< 0.00016												2					
			0.02			0.79			0.785	0.785				0.005	0.0004	0.00035												3					
			< 0.01			0.71			0.702	0.702				0.008	0.0002	< 0.00016												10					
			< 0.01			1.04			1.033	1.03				0.007	0.0005	< 0.00021												4					
			< 0.01			0.77			0.766	0.766				0.004	0.0003	< 0.00023												2					
			< 0.01			0.77			0.762	0.762				0.008	0.0008	< 0.00025												2					
			0.05			3.18			3.156	3.16				0.024	0.003	0.00122												2					
			0.01			0.34			0.323	0.323				0.017	0.0002	0.00017												25					
			< 0.01			1.04			1.037	1.04				0.003	0.0004	< 0.00023												4					
			< 0.01			0.68			0.675	0.675				0.005	0.0002	< 0.0002												5					
			0.02			0.67			0.658	0.658				0.012	0.0004	0.00039												8					
			0.01			1.26			1.254	1.25				0.006	< 0.0001	0.0001												2					
			0.03			0.9			0.895	0.895				0.005	0.0007	0.00044												< 1.5					
			0.01			0.58			0.577	0.577				0.003	< 0.0001	9.00E-05												5					
			< 0.01			0.77			0.764	0.764				0.006	0.0005	< 0.00016												2					
			< 0.01			0.81			0.805					0.005	0.0003													7					
			0.02			0.76			0.757					0.003	0.0002													4					
			0.02			0.91			0.903					0.007	0.0006													< 1.5					
			0.01			0.79			0.785	0.785				0.005	0.0006	0.00026												6					
			< 0.01			0.73			0.723					0.007	0.0019													2					
			0.02			0.58																											

[illegible]

[illegible]

6841 / Phe 7198 / Met 7199 / CdC 7201 / Met 7204 / CrCi 7216 / Tot 7273 / Con 7274 / HHF 7274 / HHF 7375 / SILK 7605 / HHF 7833 / CrCi 7996 / Met 7999 / Met 8000 / Met 8387 / CrCi 9584 / Bica 9901 / O D 9901 / O D 9901 / O D 9901 / O D 9921 / pH 9924 / Oxy 9924 / Oxy 9924 / Oxy 9924 / Oxy 9933 / ColformsPre																										
---	μg/l	μg/l	μg/l	μg/l	μg/l	mS/cm	---	---	mg/l	---	μg/l	μg/l	μg/l	μg/l	μg/l	mg/l	%	%	%	%	---	mg/l	mg/l	mg/l	mg/l	NO/100ml
Unknown r	wqValue(0	wqValue(0	wqValue(0	wqValue(0	wqValue(0	Unknown r	Unknown r	Field	Unknown r	Unknown r	wqValue(3	wqValue(0	wqValue(0	wqValue(0	wqValue(0	wqValue(0	9901_25	Field	Unknown r	Calculated	Unknown r	Field	Calculated	Unknown r	9924_25	Unknown method

Station name	NGR	Station nur	Date/Time (sampling)	0162 / Alky	0162 / Alky	0162 / Alky	0061 / pH	0061 / pH	0061 / pH	0050 / Lear	0062 / Con	0076 / Terr	0076 / Terr	0077 / Con	0077 / Con	0081 / O D	0081 / O D	0081 / O D	0082 / O D	0082 / O D	0085 / BOI	0085 / BOI	0088 / BOI	0105 / Mer
				mg/l	mg/l	mg/l	---	---	---	µg/l	µS/cm	°C	°C	µS/cm	µS/cm	%	%	%	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l
				Low	Unknown r	Low	Additi	Field	Low	Unknown r	Unknown r	Low	Field	Unknown r	Field	Low	Calculated	Unknown r	Calculated,	Unknown r	Low	Unknown r	Low	Unknown r
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	29/02/2000 10:45						7.8				8				98.9			11.7			1.4	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/04/2000 10:50						8.3				7				85			10.3			2.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/05/2000 14:00						8.3				11				98.1			10.8			2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	16/06/2000 13:35						8.1				17				107			10.3			1.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	10/08/2000 14:00						8.5				16				104			10.2			1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/08/2000 13:35						8.4				16				102			10			1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	27/09/2000 12:25						7.9				14				97.3			10			1.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	31/10/2000 13:35						7.9				9				88.4			10.2			1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	22/11/2000 13:50						7.9				7.2				91.2			11			1.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	05/12/2000 11:20						7.7				10				93.2			10.5	< 1.4			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/12/2000 14:00						7.7				10				97.6			11			1.3	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	08/02/2001 14:35						8.2				5.9										1.3	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/06/2001 13:30					8.5					12.88										1.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/07/2001 13:30					8.37					15.89										1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	15/08/2001 13:35					8.19					16.2										2.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/10/2001 14:15					8.05					13.13										1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	15/11/2001 12:05					8.04					8.24										0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	18/02/2002 10:29					7.94					7.87										1.5	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/03/2002 14:55					7.68					9.46										0.5	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/03/2002 12:25					8.36					7.21										0.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/04/2002 11:55					8.39					8.59										0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/05/2002 11:55					8.15					10.43										1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	06/06/2002 12:05					8.13					11.89										1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/07/2002 12:40					7.99					13.43										1.3	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/08/2002 11:20					8.26					15.52										1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	22/10/2002 11:10					7.47					10.79										1.3	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/11/2002 11:20					7.72					9.22										1.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/11/2002 13:15					7.97					9.02										0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/12/2002 11:35					7.82					4.69										0.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	08/01/2003 11:35			123		7.74					3.8										0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/02/2003 11:35			69		7.72					4.5										0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/03/2003 11:30			59		8.12					6.79										0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	02/04/2003 11:15			89		8.85					7.85										1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	08/05/2003 13:10			93		8.32					11.69										1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	05/06/2003 14:40			93		8.25					12.56										0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	03/07/2003 13:00			79		8.49					13.31										1.1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/08/2003 12:35			82		8.37					17.73										0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/09/2003 11:20			76		8.39					13.25										0.8	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	08/10/2003 12:10			71		8.19					11.96										0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	18/11/2003 12:00			89		8.08					10.35									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/12/2003 12:10			73		7.58					7.29									< 2.4		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	22/01/2004 12:20					7.81					7.43											
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	19/02/2004 11:50					7.81					7.42										1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	18/03/2004 11:00					8.2					8.02										0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	19/04/2004 11:00					8.16					8										1.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/05/2004 13:20					8.36					13.91										1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/06/2004 11:09					8.23					12.54										1.3	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	30/07/2004 11:50					8.37					15.49										1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/08/2004 11:12					8.29					15.36										4.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/08/2004 10:50					8.29					15.92									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	29/09/2004 11:45					8.15					12.7									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	20/10/2004 11:00					7.94					10.14										1.3	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/11/2004 10:35					8.03					10.43										0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	23/01/2005 11:00					7.06					7.84										1	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	03/03/2005 10:55					8.29					4.74										0.6	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/04/2005 10:45					8.32					9.43								< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	22/04/2005 13:25					8.92					10.54										0.9	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/05/2005 10:00					8.48					9.98										0.7	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/06/2005 10:00					8.08					12.95										1.2	
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	15/07/2005 10:33					8.18					15.72									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/08/2005 11:25					8.37					15.6									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/09/2005 11:15					8.3					13.13									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	31/10/2005 10:45					7.98					11.76									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	23/11/2005 10:05					8.04					6.04									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/12/2005 10:50					7.25					5.59									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/01/2006 11:00					8.04					6.41									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	05/02/2006 12:30					7.83					5.16									< 1		
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/03/2006 1																					

0108 / Cad 0111 / Amr0111 / Amr0111 / Amr0116 / N O 0116 / N O 0116 / N O 0117 / Nitr 0117 / Nitr 0117 / Nitr 0117 / Nitr 0118 / Nitr 0118 / Nitr 0118 / Nitr 0119 / NH30119 / NH30119 / NH30119 / NH30135 / Sld :0135 / Sld :0138 / Sld l0143 / Sld l0144 / Sld `0158 / Har0158 / Har0158 / Har0158 / Har0163 / Hdn0164 / Hdn0172 / Chlc																																
µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l			
Unknown r	Low	Additi	Low	Unknown r	Low	Unknown r	Low	Additi	wqValue(0	Calculated,	Unknown r	Calculated	Low	Low	Additi	Unknown r	Calculated,	0119_25	Unknown r	Calculated	Low	Unknown r	wqValue(0	Unknown r	wqValue(0	0158_25	Unknown r	Calculated,	Calculated	0163_25	0164_25	Unknown r
	0.03						0.42	0.413				0.413	0.007		0.0003	0.0003	8						40.6353			40.6	34.7083	5.92704				
	0.01						0.423	0.418				0.418	0.005		0.00015	0.0001	7						67.7128			67.7	56.6819	11.0309				
	0.01						0.862	0.853				0.853	0.009		0.0002	0.0002	6						112.291			112	94.3866	17.9046				
	0.05						0.669	0.66				0.66	0.009		0.00152	0.0015	6						85.7104			85.7	72.6627	13.0477				
	0.03						0.748	0.743				0.743	0.005		0.00085	0.0008	7						114.508			115	97.6327	16.8756				
	0.05						0.752	0.744				0.744	0.008		0.00141	0.0014	9						105.706			106	90.6411	15.0646				
< 0.01							0.634	0.627				0.627	0.007	< 0.0002	< 0.0002	7						88.6409			88.6	77.1573	11.4836					
	0.02						0.596	0.592				0.592	0.004		0.00027	0.0003	6						73.8071			73.8	64.4226	9.38448				
	0.03						0.416	0.411				0.411	0.005		0.00036	0.0004	4						49.287			49.3	42.9484	6.33864				
	0.03						0.368	0.344				0.344	0.024		0.00028	0.0003	52						38.1877			38.2	32.9604	5.22732				
	0.05						0.289	0.282				0.282	0.007		0.00046	0.0005	11						37.392			37.4	31.7119	5.68008				
	0.02						0.709	0.705				0.705	0.004		0.00027	0.0003	2						104.858			105	88.3938	16.464				
	0.04						0.7	0.694				0.694	0.006		0.0009	0.0009	4						113.853			114	94.1369	19.7156				
	0.03						0.704	0.699				0.699	0.005		0.00084	0.0008	2						125.3			125	105.873	19.4275				
< 0.01							0.481	0.477				0.477	0.004	< 0.00029	< 0.0003	3						93.0477			93	81.1525	11.8952					
< 0.01							0.439	0.436				0.436	0.003	< 0.00023	< 0.0002	4						70.7695			70.8	61.4262	9.34332					
< 0.01							0.79	0.785				0.785	0.005	< 0.00016	< 0.0002	2						129.702			130	109.369	20.333					
	0.02						1.018	1.014				1.01	0.004		0.00027	0.0003	3						133.999			134	107.121	26.8775				
< 0.01							0.799	0.795				0.795	0.004	< 8e-005	< 0.0001	< 1.5							114.939			115	91.8896	23.0496				
	0.03						0.66	0.654				0.654	0.006		0.00045	0.0004	2						125.276			125	99.88	25.3957				
< 0.01							0.56	0.557				0.557	0.003	< 0.00016	< 0.0002	2						124.634			125	101.378	23.2554					
< 0.01							0.762	0.759				0.759	0.003	< 0.00019	< 0.0002	2						131.883			132	109.369	22.5145					
	0.01						0.82	0.812				0.812	0.008		0.00021	0.0002	2						136.874			137	114.113	22.7615				
	0.01						0.508	0.502				0.502	0.006		0.00023	0.0002	5						104.175			104	89.892	14.2825				
	0.07						0.329	0.323				0.323	0.006		0.00191	0.00191	3						108.093			108	90.6411	17.4518				
< 0.01							0.824	0.817				0.817	0.007	< 6e-005	< 6e-005	4						103.51			104	89.3926	14.1179					
	0.04						0.58	0.567				0.567	0.013		0.00036	0.00036	10						52.2752			52.3	45.1957	7.07952				
	0.05						0.798	< 0.796				0.796	< 0.002		0.00079	0.00079	2						107.742			108	92.389	15.3527				
< 0.01							0.46	< 0.458				0.458	< 0.002	< 8e-005	< 8e-005	2						117.491			117	99.3806	18.1104					
	0.04						1.109	1.107				1.11	0.002		0.00026	0.00026	2						141.372			141	118.857	22.5145				
	0.02						0.684	< 0.682				0.682	< 0.002		0.00013	0.00013	3						95.2265			95.2	80.9028	14.3237				
< 0.01							0.663	0.656				0.656	0.007	< 0.00014	< 0.00014	2						77.9038			77.9	66.4202	11.4836					
< 0.01							0.739	0.731				0.731	0.008	< 0.00016	< 0.00016	< 1.5						121.387			121	101.878	19.5098					
	0.04						0.95	0.943				0.943	0.007		0.00083	0.00083	2						120.444			120	102.127	18.3162				
	0.05						0.988	0.979				0.979	0.009		0.0011	0.0011	2						117.088			117	100.13	16.9579				
	0.02						0.568	0.562				0.562	0.006		0.00046	0.00046	< 1.5						108.441			108	92.389	16.0524				
	0.05						0.667	0.661				0.661	0.006		0.0016	0.0016	2						100.89			101	86.8956	13.9944				
< 0.01							0.42	0.414				0.414	0.006	< 0.00023	< 0.00023	3						95.1085			95.1	81.4022	13.7063					
	0.01						0.381	0.374				0.374	0.007		0.00021	0.00021	2						96.3899			96.4	81.9016	14.4883				
	0.07						0.88	0.869				0.869	0.011		0.00131	0.00131	< 1.5						110.637			111	93.6375	16.9991				
	0.06						0.85	0.846				0.846	0.004		0.00034	0.00034	20						96.2774			96.3	82.9004	13.377				
	0.05						1.166	1.15				1.15	0.016		0.00049	0.00049																
	0.02						0.888	0.883				0.883	0.005		0.0002	0.0002	2															
	0.01						0.636	0.632				0.632	0.004		0.00016	0.00016	< 1.5															
	0.04						0.742	0.738				0.738	0.004		0.00063	0.00063	< 1.5															
< 0.01							0.832	0.823				0.823	0.009	< 0.00024	< 0.00024	3																
	0.02						0.717	0.706				0.706	0.011		0.00044	0.00044	2															
	0.07						0.613	0.603				0.603	0.01		0.00191	0.00191	2															
	0.05						0.783	0.773				0.773	0.01		0.00135	0.00135	4															
	0.03						0.857	0.845				0.845	0.012		0.00084	0.00084	2															
	0.02						0.63	0.623				0.623	0.007		0.00044	0.00044	3															
< 0.01							0.599	0.592				0.592	0.007	< 0.00016	< 0.00016	8																
	0.01						0.905	0.9				0.9	0.005		0.00019	0.00019	< 1.5															
	0.01						0.606	0.6				0.6	0.006		2.00E-05	2.00E-05	< 3															
< 0.01							0.7	< 0.698				0.698	< 0.002	< 0.00012	< 0.00012	< 3																
< 0.01							0.59	0.586				0.586	0.004	< 0.00017	< 0.00017	< 3																
		< 0.03			0.56			0.551			0.551	0.009		< 0.00057																		

0174 / CN I	0180 / OrtI	0180 / OrtI	0186 / Thic	0192 / Pho	0192 / Pho	0209 / K- F	0235 / Mg	0237 / Ma	0239 / Ca F	0241 / Calc	0483 / Aldr	0487 / HCl-	0491 / HCl-	0499 / HCl-	0511 / Diel	0527 / Hep	0531 / Hep	0539 / DDT	0551 / DDE	0555 / DDT	0559 / TDE	0562 / End	0569 / End	0570 / End	0575 / DDT			
mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	μg/l	μg/l	μg/l	μg/l	μg/l	μg/l	μg/l	μg/l	μg/l	μg/l	μg/l	μg/l		
Unknown r	Low	Additi	Low	Unknown r	Unknown r	Unknown r	Low	V.Low / Sp	Low	Unknown r	Low	Low	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	Unknown r	wqValue(0
		0.007						0.024		1.44																		
		0.002						0.013		2.68																		
		0.016						0.041		4.35																		
		0.005						0.031		3.17																		
		0.006						0.018		4.1																		
		0.018						0.041		3.66																		
		0.004						0.04		2.79																		
		0.002						0.02		2.28																		
		0.002						0.016		1.54																		
		0.012						0.033		1.27																		
		0.011						0.025		1.38																		
		0.011						0.038		4																		
		0.015						0.034		4.79																		
		0.03						0.038		4.72																		
	< 0.004							0.018		2.89																		
	0.01							0.02		2.27																		
	0.017							0.028	2.14	4.94																		
	0.013							0.02	3.07	6.53																		
	0.015							0.028	2.96	5.6																		
	0.011							0.019	3.08	6.17																		
	< 0.004							0.019	2.53	5.65																		
	< 0.004							0.036	2.69	5.47																		
	0.026							0.037	2.6	5.53																		
	< 0.004							0.024	1.48	3.47																		
	< 0.004					0.041			1.69	4.24																		
	0.005					0.024			1.84	3.43																		
	< 0.004					0.022			1.09	1.72																		
	0.015					0.026			1.74	3.73																		
	0.064					0.093			1.88	4.4																		
	0.032										5.47																	
	< 0.004								1.61	3.48																		
	0.034								1.23	2.79																		
	< 0.004								2.17	4.74																		
	0.005								2.02	4.45																		
	0.038								1.59	4.12																		
	< 0.004								1.58	3.9																		
	0.015								1.28	3.4																		
	0.034								1.27	3.33																		
	0.027								1.28	3.52																		
	< 0.004								2.08	4.13																		
	< 0.004									3.25																		
	0.049																											
	0.026																											
	< 0.004																											
	< 0.004																											
	< 0.004																											
	< 0.004																											
	0.105																											
	0.071																											
	0.072																											
	0.019																											
	0.023																											
	0.012																											
	0.008																											
	0.024																											
	0.05																											
	< 0.02																											
	< 0.02																											
	0.028																											
	0.028																											
	0.028																											
	< 0.02																											
	0.024																											
	0.104																											
	< 0.02																											
	< 0.02																											
	0.028																											
	0.073																											
	0.02																											
	< 0.02																											

0664 / Oil {0664 / Oil {0749 / Phe 0753 / PCB 1109 / End 2328 / Tot 2345 / E.cc3164 / Chri3169 / pH i3267 / Typi3267 / Typi3461 / F Cc3683 / N In3970 / Amr3976 / Turf5884 / Ca:f6030 / Silvr6046 / Arse6050 / Mar6051 / Iron6450 / Cu F6450 / Cu F6452 / Cop 6455 / Zinc6455 / Zinc6460 / Fe- i6461 / Fe - 6462 / Nick6512 / Visit6841 / Phe																													
---	---	mg/l	µg/l	µg/l	NO/ml	NO/ml	µg/l	---	---	---	NO/100ml	mg/l	mg/l	FTU	---	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	---	---	
Unknown r	Field	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	Unknown r	Unknown r	Field	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	Unknown r	Unknown r	Low	Unknown r	Unknown r	Low	Unknown r	Unknown r	wqValue(6	Unknown r	Field	Field
	0								0			0.45								< 1				12.4				0	
	0								0			0.433								< 1				8.45				0	
	0								0			0.872								1.55				9.47				0	
	0								0			0.719								1.32				10.8				0	
	0								0			0.778								1.47				6.24				0	
	0								0			0.802								1.43				9.67				0	
	0											< 0.644								1.2				45.9				0	
	0								0			0.616								1.36				22.7				0	
	0								0			0.446								1				14.7				0	
	0								0			0.398							< 1					29.9				0	
	0								0			0.339								1.17				14.5				0	
	0								0			0.729							< 1					6.46				0	
	0								0			0.74							< 1					10.5				0	
	0								0			0.734							< 1					11.9				0	
	0								0			< 0.491								2.72				30.9				0	
	0								0			< 0.449								1.12				8.29				0	
	0								0			< 0.8							< 1					16				0	
												1.038								1.03				3.89					
	0								0			< 0.809								1.02				32.9				0	
	0								0			0.69							< 1					11.1				0	
	0								0			< 0.57							< 1					5.29				0	
	0								0			< 0.772							< 1					4.32				0	
	0								0			0.83							< 1					4.56				0	
	0								0			0.518								1.15				8.3				0	
	0								0			0.399								5.57				3.43				0	
	0								0			< 0.834								1.47				9.65				0	
	0								0			0.62								1.72				13.6				0	
	0								0			0.848							< 1					6.43				0	
	0								0			< 0.47							< 1					6.29				0	
												1.149			8.70201				< 1					7.98					
												0.704			9.31034					1.03				7.26					
												< 0.673			9.53405				< 1					12.4					
												< 0.749			8.60759				< 1					3.61					
												0.99			9.19101				< 1					3.96					
												1.038			9.73301				< 1					6.01					
												0.588			9.48718				< 1					4.52					
												0.717			10.2353					1.21				3.86					
												< 0.43			9.78979				< 1					5.32					
												0.391			9.31818				< 1					2.89					
												0.95			9.0799					1.28				7.1					
												0.91			10.2154					1.82				34.7					
												1.216								1.62				23.9					
												0.908							< 1					8.61					
												0.646							< 1					5.73					
												0.782								1.06				8.06					
												< 0.842							< 1					3.86					
												0.737								1.29				9.26					
												0.683							< 1					3.53					
												0.833								1.3				11.3					
												0.887								1.26				7.93					
												0.65								1.42				5.78					
												< 0.609								1.88				9.47					
												0.915								1.39				4.23					
												0.616							< 1					5.24					
												< 0.71							< 1					4.7					
												< 0.6								1				3.22					
												< 0.59								1.15				2.82					
												< 0.6							< 1					4.59					
												< 0.863								1.28				5.78					
												< 0.7								1.62				5.06					
												0.674																	

6841 / Phe 7198 / Met 7199 / CdC 7201 / Met 7204 / CrCi 7216 / Tot 7273 / Con 7274 / HH 7274 / HH 7375 / SILI 7605 / HH 7833 / CrCi 7996 / Met 7999 / Met 8000 / Met 8387 / CrCi 9584 / Bica 9901 / O D 9901 / O D 9901 / O D 9901 / O D 9921 / pH I 9924 / Oxy 9924 / Oxy 9924 / Oxy 9924 / Oxy 9933 / ColformsPre
--- µg/l µg/l µg/l µg/l µg/l mS/cm --- --- mg/l --- µg/l µg/l µg/l µg/l µg/l mg/l % % % % --- mg/l mg/l mg/l mg/l NO/100ml
Unknown r wqValue(0 wqValue(0 wqValue(0 wqValue(0 wqValue(0 Unknown r Unknown r Field Unknown r Unknown r wqValue(3 wqValue(0 wqValue(0 wqValue(0 wqValue(0 wqValue(0 9901_25 Field Unknown r Calculated Unknown r Field Calculated Unknown r 9924_25 Unknown method

1	98.447	98.4	12.27
60	99.1478	99.1	10.45
1	105.296	105	10.39
60	99.4617	99.5	9.75
121	98.4662	98.5	10.32
53	104.973	105	12.34
75	61.9584	62	7.35
65	99.7144	99.7	11.38
84	93.2942	93.3	11.25
67	93.7776	93.8	10.93
75	93.3442	93.3	10.41
84	113.267	113	12.21
53	97.3999	97.4	10.14
75	99.8417	99.8	9.93
84	98.0258	98	10.84
	100.97	101	11.59
65	106.379	106	12.27
52	83.6084	83.6	10.75
59	150.06 86.6255	86.6	11.4
65	84.18 99.3714	99.4	12.84
65	71.98 97.2422	97.2	11.85
65	108.58 96.7254	96.7	11.48
87	113.46 96.6804	96.7	10.47
59	113.46 100.694	101	10.69
84	96.38 98.8637	98.9	10.32
94	100.04 110.902	111	10.53
58	92.72 127.432	127	13.32
84	86.62 103.786	104	11.17
94	108.58 101.044	101	11.29
84	89.06 100.211	100	12.06
84	102.812	103	12.33
84	103.12	103	12.37
84	108.384	108	12.81
76	107.57	108	12.72
94	104.948	105	10.81
70	106.58	107	11.32
52	104.098	104	10.36
76	104.71	105	10.45
94	101.611	102	10.02
94	99.9743	100	10.58
52	99.0293	99	11.12
94	103.656	104	11.56
52	126.858	127	15.06
52	103.03	103	13.23
94	112.776	113	12.88
94	107.071	107	11.91
71	112.849	113	12.72
56	106.431	106	11.2
104	102.289	102	10.13
94	103.739	104	10.3
77	98.4662	98.5	10.32
77	97.5763	97.6	10.55
69	109.669	110	13.62
72	106.347	106	13.36
56	98.1038	98.1	12.07
94	97.6998	97.7	12.41
77	102.958	103	13.3
94	104.759	105	11.65
97	100.004	100	10.5

Station name	NGR	Station nur	Date/Time (sampling)	0162 / Alky	0162 / Alky	0162 / Alky	0061 / pH	0061 / pH	0061 / pH	0050 / Lear	0062 / Con	0076 / Terr	0076 / Terr	0077 / Con	0077 / Con	0081 / O D	0081 / O D	0081 / O D	0082 / O D	0082 / O D	0085 / BOE	0085 / BOE	0088 / BOE	0105 / Mer
				mg/l	mg/l	mg/l	---	---	---	µg/l	µS/cm	°C	°C	µS/cm	µS/cm	%	%	%	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l
				Low	Unknown r	Low	Additi	Field	Low	Unknown r	Unknown r	Low	Field	Unknown r	Field	Low	Calculated	Unknown r	Calculated,	Unknown r	Low	Unknown r	Low	Unknown r
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/07/2006 13:45					8.3					17.4											1.2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	24/08/2006 13:38					8.5					15.07								< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	27/09/2006 14:10					8.67					13.57								< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/10/2006 14:15					8.17					12.67											1.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	29/10/2006 13:20					7.59					11.6								< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	19/11/2006 12:45					8.18					8.52								< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	05/12/2006 11:05					7.92					8.83								< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	19/01/2007 11:40	44.7				7.57			128	8.26									< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	12/03/2007 11:30	98.4				8.2			263	8.92									< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	02/04/2007 14:15	84				8.9			249	9.66									< 1.9			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	02/05/2007 14:25			77		8.66			202	13.65												1.1
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	10/05/2007 11:30			74.2		7.98			212	10.71									< 2.9			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	07/06/2007 10:15				92	8.21				12.49				260					< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	10/07/2007 11:35				71	7.77				12.93				214								1.1
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/08/2007 11:45				94	8.1				14.12				241								2.7
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/09/2007 10:40				91	8				13.29				246								1.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/10/2007 12:00				90	8.06				0.91				235								1.7
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/11/2007 11:00				92	7.95				8.66				288								5.8
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	06/12/2007 10:40				50	7.64				9.51				134								2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	30/01/2008 11:35				70	7.68				6.72		206										1.9
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/02/2008 11:45			101		7.81				7.19		284										2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	17/03/2008 14:50			71		7.73				7.58		178										1.1
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	18/04/2008 10:35			104		8.37				7.43		273							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	23/05/2008 12:40			79		8.69				12.43		236										3.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	30/06/2008 09:55			94		8.34				12.47		245							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/07/2008 12:40	109				7.97				14.02		290										2.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	20/08/2008 11:45	72				8.12				13.9		191										1.4
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/09/2008 10:15	139				8.2				11.24		378							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	20/10/2008 11:55	90				7.6				11.74		229										2.2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	09/11/2008 12:41	49					7.94			8.66		140										1.4
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	04/12/2008 10:40	66				7.67				5.83		229										2.1
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	20/01/2009 10:30	66				7.41				4.87		210										1.4
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/02/2009 10:55	102				7.18				5.16		367										1.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	26/02/2009 10:40	95				7.76				6.84		279										2.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	26/04/2009 12:00	92					8.35			9.56		258							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/05/2009 11:30	93				8.2				10.71		257							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/06/2009 10:30	119				8.47				12.87		279							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/07/2009 10:25	78				7.89				13.89		214										2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	16/08/2009 10:30	119				8.3				13.65		279							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	23/09/2009 10:35	107				8.39				12.55		276										1.1
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	25/10/2009 10:30	104				7.94				11.17		261							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	10/11/2009 11:10	107				7.92				9.2		271							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	01/12/2009 10:45	81				7.69				7.14		229							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	20/01/2010 11:25	66				7.92				4.1		227										1.6
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	14/02/2010 10:40	97				7.45				5.17		295							< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	16/03/2010 11:20	94				8.56				5.9		281.7										1.2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	21/04/2010 11:10	99				8.81				8.35		278										1.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	11/05/2010 10:50					8.25				8.97												3.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	24/06/2010 10:25					7.39				14.41									< 1			
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	23/07/2010 11:10					7.71				14.05												1.5
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	20/08/2010 10:55					7.96				14.47												5.2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	29/09/2010 14:35					8.33				12.7												1.3
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	27/10/2010 13:10					8.48				10.9												1.4
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	03/12/2010 13:10					8.41				3.7												2.2
TAFF @ RHYDYCAR SPORTS CENTRE/68442	SO0498805621	68442	13/12/2010 11:30					8.15				5.03									< 1			

0108 / Cad 0111 / Amr0111 / Amr0111 / N O 0116 / N O 0116 / N O 0117 / Nitr 0117 / Nitr 0117 / Nitr 0118 / Nitr 0118 / Nitr 0118 / Nitr 0119 / NH:0119 / NH:0119 / NH:0119 / NH:0135 / Sld '0135 / Sld '0138 / Sld '0143 / Sld '0144 / Sld '0158 / Har0158 / Har0158 / Har0158 / Har0163 / Hdn0164 / Hdn0172 / Chlc																														
µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Unknown r	Low	Additi	Low	Unknown r	Low	Additi	wqValue(0	Calculated,	Unknown r	Calculated	Low	Low	Additi	Unknown r	Calculated,	0119_25	Unknown r	Calculated	Low	Unknown r	wqValue(0	Unknown r	wqValue(0	0158_25	Unknown r	Calculated,	Calculated	0163_25	0164_25	Unknown r
	< 0.03			0.49			< 0.486				0.486	< 0.004				< 0.00094			< 0.00094				5							
	< 0.03			0.97			0.965				0.965	< 0.005				< 0.00079			< 0.00079	< 3										
	< 0.03			1.47			< 1.466				1.47	< 0.004				< 0.00071			< 0.00071				4							
	< 0.03			1.31			1.303				1.3	0.007				< 0.00067			< 0.00067				20							
	< 0.03			0.64			< 0.636				0.636	< 0.004				< 0.00024			< 0.00024	< 3										
	< 0.03			0.78			< 0.776				0.776	< 0.004				< 0.00049			< 0.00049				4							
	< 0.03		< 0.2				< 0.196			< 0.196	< 0.004					< 0.00042			< 0.00042				18							
	< 0.03			0.45			< 0.446				0.446	< 0.004				< 0.00018			< 0.00018				3		85.3248					
	< 0.03			0.41			< 0.406				0.406	< 0.004				< 0.00051			< 0.00051	< 3					175.316					
	< 0.03			0.52			< 0.516				0.516	< 0.004				< 0.00053			< 0.00053	< 3					165.983					
	< 0.03			0.5			< 0.496				0.496	< 0.004				< 0.00071			< 0.00071				3.8		134.653					
	< 0.03			0.72			< 0.716				0.716	< 0.004				< 0.00055			< 0.00055				5.4		141.319					
	< 0.03			0.65			< 0.646				0.646	< 0.004				< 0.00066			< 0.00066				3							
	0.071			0.52			0.5156				0.516	0.0044				0.00095			0.00095				3.4							
	0.091			0.83			0.8141				0.814	0.0159				0.00224			0.00224				41.4							
< 0.03				0.75			< 0.746				0.746	< 0.004				< 0.0007			< 0.0007				5							
	0.075			0.68			0.6759				0.676	0.0041				0.0007			0.0007				5.8							
	0.505			0.9			0.8822				0.882	0.0178				0.00745			0.00745				8.2							
< 0.03				0.49			< 0.486				0.486	< 0.004				< 0.00023			< 0.00023				44.9							
	0.082			0.54			< 0.536				0.536	< 0.004				0.00057			0.00057	< 3										
	0.277			0.83			0.8255				0.826	0.0045				0.00267			0.00267				6.3							
< 0.03				0.56			< 0.556				0.556	< 0.004				< 0.00025			< 0.00025				3							
	0.083			0.55			0.5441				0.544	0.0059				0.00125			0.00125	< 3										
< 0.03				0.34			0.3267				0.327	0.0133				< 0.00065			< 0.00065				5.4							
< 0.03				0.51			< 0.506				0.506	< 0.004				< 0.00066			< 0.00066	< 3										
< 0.03				0.77			0.751				0.751	0.019				< 0.00069			< 0.00069				3.7							
	0.03			0.43			< 0.426				0.426	< 0.004				0.00073			0.00073				3.6							
< 0.03				0.77			< 0.766				0.766	< 0.004				< 0.0006			< 0.0006	< 3										
< 0.03				0.54			0.5356				0.536	0.0044				< 0.00025			< 0.00025				9.4							
< 0.03				0.35			< 0.346				0.346	< 0.004				< 0.00043			< 0.00043				4.7							
	0.073			0.75			0.7448				0.745	0.0052				0.00046			0.00046				20.9							
< 0.03				0.59			< 0.586				0.586	< 0.004				< 0.0001			< 0.0001	< 3										
< 0.03				0.81			0.8009				0.801	0.0091				< 6e-005			< 6e-005	< 3										
< 0.03				0.74			< 0.736				0.736	< 0.004				< 0.00025			< 0.00025	< 3										
< 0.03				0.56			< 0.556				0.556	< 0.004				< 0.00053			< 0.00053	< 3										
< 0.03				0.66			< 0.656				0.656	< 0.004				< 0.00058			< 0.00058	< 3										
< 0.03				0.67			< 0.666				0.666	< 0.004				< 0.00067			< 0.00067				3							
	0.05			0.52			0.5155				0.516	0.0045				0.00095			0.00095				15.4							
< 0.03				0.57			< 0.566				0.566	< 0.004				< 0.00071			< 0.00071				3.1							
< 0.03				0.49			< 0.486				0.486	< 0.004				< 0.00066			< 0.00066				3.6							
< 0.03				0.58			< 0.576				0.576	< 0.004				< 0.00052			< 0.00052				3.6							
< 0.03				0.73			< 0.726				0.726	< 0.004				< 0.00043			< 0.00043	< 3										
< 0.03				0.61			< 0.606				0.606	< 0.004				< 0.00022			< 0.00022	< 3										
< 0.03				0.63			< 0.626				0.626	< 0.004				< 0.0003			< 0.0003				6.2							
< 0.03				0.73			< 0.726				0.726	< 0.004				< 0.00011			< 0.00011	< 3										
< 0.03				0.61			< 0.606				0.606	< 0.004				< 0.0004			< 0.0004				3.23							
< 0.03				0.61			< 0.606				0.606	< 0.004				< 0.00048			< 0.00048	< 3										
	0.146			0.56			0.5525				0.553	0.0075				0.00247			0.00247				6.28							
< 0.03				0.52			< 0.516				0.516	< 0.004				< 0.00019			< 0.00019	< 3										
< 0.03				0.67			< 0.666				0.666	< 0.004				< 0.00038			< 0.00038				22.1							
	0.094			0.69			0.6753				0.675	0.0147				0.00217			0.00217				19.6							
< 0.03				0.55			< 0.546				0.546	< 0.004				< 0.00067			< 0.00067				6.32							
< 0.03				0.48			< 0.476				0.476	< 0.004				< 0.00058			< 0.00058				3.48							
< 0.03				0.64			0.6357				0.636	0.0043				< 0.00034			< 0.00034				4.72							
< 0.03				0.65			< 0.646				0.646	< 0.004				< 0.00038			< 0.00038	< 3										

0174 / CN I0180 / OrtI 0180 / OrtI 0186 / Thic 0192 / Pho 0192 / Pho 0192 / Pho 0209 / K- F 0235 / Mg 0235 / Mg 0237 / Mađ 0239 / Ca F 0239 / Ca F 0241 / Calc 0483 / Aldr 0487 / HCF-0491 / HCF-0499 / HCF-0511 / Diel 0527 / Hep0531 / Hep0539 / DDT0551 / DDE0555 / DDT0559 / TDE 0562 / End 0569 / End 0570 / End 0575 / DDT
mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l μg/l
Unknown r Low Additi Low Unknown r Unknown r Unknown r Low V.Low / Sp Low Unknown r Low Low Unknown r Low Low Unknown r Unknown r Unknown r Unknown r Unknown r Unknown r Unknown r Unknown r Unknown r Unknown r Unknown r Unknown r wqValue(0
< 0.02 < 0.02 0.064 < 0.02 < 0.02 < 0.02 0.021 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 0.029 0.028 0.057 0.034 0.044 0.126 < 0.02 0.036 0.057 < 0.02 0.031 < 0.02 0.033 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 0.031 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 0.021 0.039 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 0.028 0.025 0.043 < 0.02 < 0.02 < 0.02 0.023

0664 / Oil 0664 / Oil 0749 / Phe 0753 / PCB 1109 / End 2328 / Tot 2345 / E.cc 3164 / Chr 3169 / pH 3267 / Typ 3267 / Typ 3461 / N In 3970 / Am 3976 / Tur 5884 / Ca 6030 / Sil 6046 / Ar 6050 / Mar 6051 / Iron 6450 / Cu 6452 / Cop 6455 / Zinc 6460 / Fe 6461 / Fe 6462 / Nick 6512 / Vis 6841 / Phe																												
---	---	mg/l	µg/l	µg/l	NO/ml	NO/ml	µg/l	---	---	---	NO/100ml	mg/l	mg/l	FTU	---	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	---	---	
Unknown r	Field	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	Unknown r	Unknown r	Field	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	wqValue(0	Unknown r	Unknown r	Unknown r	Unknown r	Low	Unknown r	Unknown r	Low	Unknown r	Unknown r	wqValue(6	Unknown r	Field
												< 0.52									1.6				< 5			
												< 1									1.2				< 5			
												< 1.5								< 1				< 5				
												< 1.34									2.4					16.6		
												< 0.67									1.3					6.5		
												< 0.81									1.2					8		
												< 0.23									1.1					13.8		
												< 0.48									1.1					10.8		
												< 0.44								< 1						6.7		
												< 0.55								< 1					< 5			
												< 0.53									1.3				< 5			
												< 0.75									2					12		
												< 0.68									1.7					10.6		
												0.591									2					10		
												0.921									2.4					69.2		
												< 0.78									1.9					7.4		
												0.755									1.9					8.7		
												1.405									2.2					8.1		
												< 0.52									2.2					22.9		
												0.622									1.9					6.3		
												1.107									1.8					14.8		
												< 0.59									1.6				< 5			
												0.633									1.5				< 5			
												< 0.37													< 5			
												< 0.54									1				< 5			
												< 0.8									1.2					7.6		
												0.46									1.4					6.4		
												< 0.8									1.9			< 5				
												< 0.57									1.9					7.4		
												< 0.38									1.5					8.6		
												0.823									1.5					11.7		
												< 0.62								< 1					< 5			
												< 0.84								< 1					< 5			
												< 0.77								< 1					< 5			
												< 0.59									1.1				< 5			
												< 0.69									1.6				< 5			
												< 0.7									1.2				< 5			
												0.57									2.2					13		
												< 0.6									1.1				< 5			
												< 0.52									1.3				< 5			
												< 0.61									1.3					5		
												< 0.76									1					6.9		
												< 0.64									1.1				< 5			
												< 0.66								< 1						9		
												< 0.76								< 1						6.3		
												< 0.64								< 1					< 5			
												< 0.64								< 1					< 5			
												0.706								< 1						6.6		
												< 0.55								< 1					< 5			
												< 0.7									1.42					10		
												0.784									2.95					21.4		
												< 0.58									1.42					12.5		
												< 0.51									1.28					5.4		
												< 0.67								< 1						6.2		
												< 0.68								< 1					< 5			

6841 / Phe 7198 / Met 7199 / CdC 7201 / Met 7204 / CrCi 7216 / Tot 7273 / Con 7274 / HH 7274 / HH 7375 / SILI 7605 / HH 7833 / CrCi 7996 / Met 7999 / Met 8000 / Met 8387 / CrCi 9584 / Bica 9901 / O D 9901 / O D 9901 / O D 9901 / O D 9921 / pH I 9924 / Oxy 9924 / Oxy 9924 / Oxy 9924 / Oxy 9933 / ColformsPre																										
---	µg/l	µg/l	µg/l	µg/l	µg/l	mS/cm	---	---	mg/l	---	µg/l	µg/l	µg/l	µg/l	µg/l	mg/l	%	%	%	%	---	mg/l	mg/l	mg/l	mg/l	NO/100ml
Unknown r	wqValue(0	wqValue(0	wqValue(0	wqValue(0	wqValue(0	Unknown r	Unknown r	Field	Unknown r	Unknown r	wqValue(3	wqValue(0	wqValue(0	wqValue(0	wqValue(0	wqValue(0	9901_25	Field	Unknown r	Calculated	Unknown r	Field	Calculated	Unknown r	9924_25	Unknown method
								77									106.489				106		10.18			
								77									101.269				101		10.17			
								94									102.425				102		10.63			
								77									100.473				100		10.64			
								94									99.0601				99.1		10.75			
								77									105.181				105		12.28			
								94									91.91				91.9		10.65			
								66								54.534	100.259				100		11.78			
								66								120.048	105.603				106		12.21			
							0.066									102.48	115.777				116		13.15			
								66								93.94	113.129				113		11.72			
								66								90.524	103.077				103		11.42			
								114								112.24	102.509				103		10.9			
								112								86.62	82.3522				82.4		8.67			
								112								114.68	101.631				102		10.42			
								112								111.02	103.129				103		10.77			
								114								109.8	81.568				81.6		11.6			
								112								112.24	97.7192				97.7		11.37			
								112								61	104.571				105		11.92			
								108								85.4	106				106		12.94			
								114								123.22	104.769				105		12.64			
								114								86.62	102.024				102		12.19			
								112								126.88	97.0586				97.1		11.64			
								112								96.38	107.723				108		11.47			
								112								114.68	102.181				102		10.87			
								124								132.98		110.7					11.4		11.3748	
								114								87.84		90.8					9.35		9.35479	
								124								169.58		101.8					11.1		11.1398	
																109.8		106.2					11.5		11.4877	
																59.78		103.7					12.1		12.0659	
																80.52		105.8					13.2		13.21	
																80.52		83.8					10.7		10.7245	
																124.44		99.2					12.6		12.6006	
																115.9		91.9					11.2		11.1849	
																112.24		102.7					11.7		11.6927	
																113.46		100.7					11.2		11.1566	
																145.18		105.3					11.1		11.1009	
																95.16		104.1					10.7		10.7274	
																145.18		110.2					11.4		11.4166	
																130.54		106.7					11.3		11.3302	
																126.88		98.1					10.8		10.7524	
																130.54		99.2					11.4		11.3923	
																98.82		91.5					11.1		11.0529	
																80.52		89.9					11.7		11.7381	
																118.34		98.7					12.5		12.5338	
																114.68		102.7					12.8		12.8001	
																120.78		103.9					12.2		12.181	
																		105					12.1		12.1256	
																		105.4					10.7		10.7379	
																		105.2					10.8		10.8026	
																		99.6					10.1		10.1337	
																		101.8					10.8		10.7732	
																		103.3					11.4		11.3939	
																		99.2					13.1		13.0892	
																		98.3					12.5		12.5282	

APPENDIX D – SITE VISIT NOTES & PHOTOGRAPHIC PLATES (C.2017)

Plate 13



Plate 14

Locality 15: Possible adit tunnel/channel structure.

WYG Environment
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Cardiff
CF24 0AD



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Environmental Consultancy
Ground Technologies & Investigation

Project :-
Rhydycar West Merthyr

Client: Marvel Ltd.

Project No.: A091860

Date : June 2017



Plate 15

Locality 17: Stream, observed to be dry.



Plate 16

Locality 18: Small stream draining land to the north. Slight orange discolouration.

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Ground Technologies & Investigation

Project :-
Rhydycar West Merthyr

Client: Marvel Ltd.

Project No.: A091860

Date : June 2017



Plate 17

Locality 19: Tributary stream of the northern tributary of the Nant Cannaid stream.

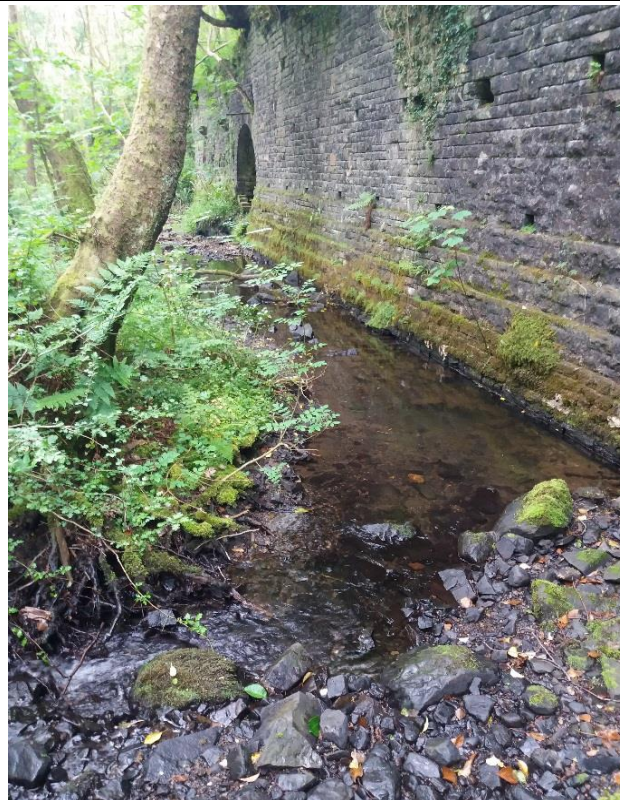


Plate 18

Locality 21: Diverted Nant Canaid stream flowing through Cwm Pit

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Environmental Consultancy
Ground Technologies & Investigation



Project :-
Rhydycar West Merthyr

Client: Marvel Ltd.

Project No.: A091860

Date : June 2017



Plate 19

Locality 21: Pipe noted in stone wall structure viewing south. No evidence of recent discharge from the pipe.



Plate 20

Locality 21: Second mine entrance at Cwm Pit. Appears to be blocked up by bricks.

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Project :-
Rhydycar West Merthyr

Client: Marvel Ltd.

Project No.: A091860

Date : June 2017

2017 Site Walkover Notes

The below provides a summary of the findings from the site walkover in c.2017 by WYG (now Tetra Tech). The site walkover covered the land ownership boundary, however, notes relevant to the site boundary and the immediate surrounding area are discussed herein.

An attempt was made to view a stream indicated to be flowing through the Black Pins North Tip close to the western boundary of the land ownership boundary (to the west of the site), but due to the dense vegetation in this area the stream could not be located. The land sloping down from this locality towards the east was noted to be boggy and damp in areas beneath the rough grass, with small areas of standing water recorded.

Three small streams were observed to spread and converge at a point crossing the footpath before flowing southwards and eventually discharging into the Nant Melin Cannaid. The spread of streams at this point were noted to be slightly stained orange (Plate 16) in areas of standing water although the running water within the small, incised channels was largely clear and transparent. It is not clear where the source of this water is coming from. Given the discoloration and staining of the water, there is a possibility that the source of water is mine water derived although this could not be verified given the dense vegetation. The catchment area of the streams most likely includes the rough grassland to the north of this locality.

Plate 17 shows water flowing within a stream onto the site close to the south-western boundary at an estimated flow rate of 1-2L/sec on the 15th June 2017. Water is channelled towards a concrete culvert which eventually discharges the water into the diverted stream of the Nant Canaid within the southern area of the site near Cwm Pit. The diverted stream of the Nant Canaid was viewed at the 'waterfalls' in the south-western point of the site, with the flow of the water over the waterfalls estimated to be 20-40L/sec. The channel was noted to be as wide as 3m in some places with numerous cobble and boulder sized mudstone and sandstones in the bed of the stream. The water was observed to be clear and transparent as it flowed over a 1.5m thick, blocky sandstone bed which is also exposed along the southern side of the valley at this locality.

The remains of Cwm Pit were observed at Locality 21, with the diverted stream of the Nant Canaid flowing adjacent to the remaining stone masonry wall (Plate 18). The stream is generally 2m wide here, 3m in some parts, with the bed of the channel comprising numerous cobbles and boulders of sandstone and mudstone. The flow at this locality is estimated to be 1-2L/sec during the first visit although it had clearly increased in rate (5-10L/sec), as had the height of the water level in the stream during the second visit on the 15th June 2017. Plate 19 shows an old discharge pipe protruding from the southern stone wall. No water was observed to be emerging from this pipe and no evidence could be found to suggest that water had been discharging for a long time. Plate 20 views a tunnel entrance extending southwards into the stone wall by approximately 15m where it was found to be blocked up by a brick wall. A small hole (20cm wide) was noted in the top of the brick wall which could potentially indicate an escape point of water collecting in the tunnel behind; although it is more likely to be representative of vandalism from people trying to obtain access to the tunnel beyond. No water was noted to be escaping from this point or from an old drainage channel running from the entrance and out towards the stream as shown in Plate 20.

Another small tunnel entrance, considered likely to be previously associated with the drainage for the mine, is located eastwards of the previous tunnel entrance at Locality 22. Water was not observed to be emerging from this point at the time of the visits although a small channel is observed to be leading away from tunnel entrance into the stream indicating water has been discharging from this point during periods of heavy rainfall (and, possibly, rising groundwater levels).

Plate 22 is viewing the stream as it flows east of Cwm Pit at Locality 23, exposing the tip material of the Cwm Upper and Lower Tip on either side of the channel. Figures presented within previous reports reviewed in Section 2.4 and Ordnance Survey (OS) mapping indicate at this point the stream becomes a sink and is no longer shown to be present. However, no evidence of a sink could be found, and rather the stream continues to flow eastwards where it is culverted beneath the footpath close to the former tub boat canal balancing pond before discharging into a marshy area within the 'Glyn-dyrys Pit' (Zone 5) as discussed in Section 3.2.5.

Plate 23 is viewing northwards at the former balancing pond (Locality 24) which was historically used to top up the water levels in the tub boat canal which extends north-eastwards away from the pond. Water within the

balancing pond was noted to be visually clear with no obvious signs of any contamination / minewater discharge. An overflow was noted to be present on the northern extent of the pond as shown in Plate 24 at Locality 25. No water was observed to be overflowing from this point during both site visits. Water was however observed to be overflowing at a point in the north-western corner of the pond as shown in Plate 25 into the remains of the former tub boat canal. The water draining this area was noted to be cloudy white colour, which is likely being impacted by the presence of tipped material at this locality including gas canisters, plastic bottles and pieces of metal. The tub boat canal was traced north-eastwards which was noted to be dry except for small areas of standing water at the base of the former canal structure.

Several previous reports reviewed in Section 2.4 indicate that the balancing pond receives water from the Nant Melin Cannaid. However, the stream was observed to flow past the balancing pond but at a lower elevation of approximately 3m and consequently cannot be the source of water in the pond. An attempt was therefore made to locate the likely source of water feeding the pond. A spring fed stream was located close to the outfall of the pond in the north-western corner at Locality 26. This area west of the pond is heavily overgrown and densely vegetated as indicated in Plate 26. It is likely the pond receives both emerging spring water from the adjacent tip as well as surface runoff. Groundwater is not considered likely to be providing baseflow into the pond given the fact the pond is an artificial feature and is therefore likely to be clay lined.

The Nant Canaid stream was observed at Locality 27 prior to being culverted beneath the former main line railway as shown in Plate 27. The water was noted to be transparent and clear at this locality with an estimated flow of 2-5L/sec.

Plate 28 is viewing westwards up the main line railway track beneath the bridge over the railway at Locality 28. A stream of water was noted to be flowing down the former track towards the east from a tunnel entrance in the distance. The estimated flow of water is low at approximately 1-2L/min. No discoloration of the water was noted. Clear running water was noted to be emerging from a manhole chamber close to the entrance of the railway tunnel at Locality 29 as shown in Plate 29. A pipe can be seen extending from the tunnel entrance and heading towards the manhole chamber, and therefore is likely to be draining the surface water collecting inside the tunnel most likely from emerging springs. The water continues to flow down the railway track before being diverted southwards and eventually discharging into the Nant Canaid stream.

Evidence of seepage through the stone masonry wall associated with the bridge crossing the railway line at Locality 30 was noted as shown in Plate 30. The seepage zone was found to be approximately 2.5m high from the ground at its maximum, along a 5m section of the wall. The water seepage zone is the source of water which then flows within a drainage ditch adjacent to the former railway track in a north-eastwards direction towards locality 32. The water seeping through the masonry wall was noted to be clear and providing a constant, but slow trickle of water.

Plate 31 is viewing an emerging spring within the exposed spoil material at the base of the Glyn-dyrys Tip at Locality 31 adjacent to the former railway line. Water was observed to be slowly emerging from this point in the tip material and is considered representative of a series of springs which are thought to emerge through the tip material, adjacent to the former railway. Two further springs could be observed emerging from the tip material, with water discharging directly into a man-made culvert beneath the railway track and discharging into a stream east of this locality. Water emerging from the seepage face (locality 30) and springs (locality 31) to the south-west of this locality also discharge into the culvert at this point.

No water was noted to be flowing beneath the railway bridge at locality 33. There were, however, numerous cobble sized rocks within the dry channel as shown in Plate 33 surrounding the culvert which would indicate that this channel receives flowing water following periods of heavy rainfall; acting as an ephemeral stream.

A small channel (0.5m wide) of clear, transparent water was noted to be flowing towards a small pond at Locality 34 as shown in Plate 34. The source of this water is from two emerging springs located at Locality 36 as discussed in further detail below. A second stream was identified at Locality 35 which was noted to be flowing beneath heavy vegetation and was found to be low flowing as seen in Plate 35. The stream flows across the central area of the former Glyn-dyrys Pond where it meets the stream identified at the previous locality, prior to discharging through a culvert at Locality 36 (Plate 36). Water flowing through the culvert, beneath the A470, then discharges into the former Glamorgan Canal off-site to the east.

A flowing spring was noted to be emerging at the base of the Glyn-dyrys Tip, along the western flank of the former railway line at Locality 37 (Plate 37). The flow of water emerging from the spring was estimated to be flowing at a rate of 1-2L/sec, with the emerging water then flowing southwards along the former railway track.

A second spring was noted approximately 5m northwards from this position although this had a much lower flow rate of approximately 5L/min. It should be noted that this second spring was not observed to be flowing during the first site visit (30th & 31st May 2017). From this point viewing northwards along the former railway line, the land area was observed to be dry, with no free-flowing water. However, there is evidence to suggest that flood water does flow through this area as seen by flood debris including boulder sized rocks and tree branches, likely sourced from emerging springs at the base of the Glyn-dyrys Tip at locality 45. An area of subsidence beneath an exposed coal seam was observed approximately 20m north-east of Locality 37, adjacent to the railway track. This collapsed area is the result of subsidence linked to potential mine workings below this area, and has created an area of potential recharge to the groundwater, with surface water likely directed to this zone during periods of rainfall.

Plate 38 is viewing a break in the former tub boat canal at Locality 38, which drains the balancing pond previously identified at Locality 24. The channelled water then flows southwards from this point, which appears to be a former pond area of the canal, and then discharges into the marsh area (locality 41) directly down-gradient to the east. A possible crown hole filled with water (Plate 39) was noted at locality 39, approximately 20m northwards of Locality 38 adjacent to the former tub boat canal and adjacent footpath. The hole was approximately 2.5m x 2.5m in size and the water was observed to be cloudy in appearance with a slight orange tinge. No water was noted to be entering the hole although it is likely to receive surface run-off following periods of rainfall.

A second break in the canal wall (likely due to subsidence) was noted at Locality 40, with water found to emerge from beneath the eastern side of the footpath into a channel which discharges into the marsh area eastwards of this locality. The slow flowing water was observed to be stained an orange/red colour (Plate 40) which is sourced from the stagnant, ponded water observed within the canal in Plate 41. The water collecting within the former canal structure is considered likely to be sourced from surface run-off from the land area to the west of this locality, with water draining to the marsh area at this break in the former canal wall.

Plate 42 and Plate 43 are viewing the ponded area of water within the marshy area of Locality 41. Water in this marshy, ponded area is sourced from water flowing in the diverted Nant Canaid stream, which discharges through at culvert beneath the footpath at Locality 42 (Plate 44). The water was estimated to be discharging through the culvert at an estimated rate of 2-3L/sec on the 15th June 2017. Plate 45 views the stream flowing northwards away from the culvert, prior to discharging water into the marshy area to the north, where the water in this area spreads and ponds as seen at Locality 41. The stream had a thickness of 2 to 3m and the water was found to be generally clear and transparent. Plates 46 & 47 show evidence of recently pooled flood waters within the north-eastern extreme of the marshy area previously identified at Locality 41. This area (Locality 44) likely acts as a flood water overflow area following periods of heavy rainfall.

An attempt was made to find an outlet for the water ponding in this marshy (hollow) area. No obvious outlet was found however, and it is therefore considered likely the water is draining through one of the following pathways or through a combination of all three: fissures within the underlying natural boulder clay material; fissures (cavities) within the Glyn-dyrys tip material opening due to subsidence, or; through mining related features such as through former mine entrances (adits) or tunnelways.

Plates 48 & 49 are viewing evidence of flood water derived depressions at the base of the Glyn-dyrys Tip at Locality 45. As seen in the photographs, these areas of depression at the base of the tip are lined with knocked down trees, branches and washed materials including bricks, concrete, clinker etc. (most likely sourced from the more recent A470 Tip). Anecdotal evidence suggests that there was previously a culvert installed at the base of the A470 Tip, which overlies the Glyn-dyrys Tip and drains the water pooled in the marshy area up-gradient of this position to the west (Locality 41). A large flood event is believed to have occurred approximately 2.5 years ago, following the 'burst' of the culvert, resulting in large quantities of water emerging through the base of the tip causing the resultant flood damage in this area. Water is often seen to emerge as springs in this area following periods of heavy rain which then spreads and flows as surface run-off through the channels

identified at Locality 35 and Locality 37. This area was dry during the first visit to the site on the 31st May 2017. However, as seen in Plate 50, water had recently collected within large depression, at the base of the tip, following a period of heavy rainfall.

Several reports reviewed in Section 2.4, such as the Arup (2008) identify the 'Glyn-dyrys Shaft' as the main point of discharge for groundwater present within the former coal mine and ironstone workings beneath the site. However, the Glyn-dyrys shaft is shown to be located close to the Glyn-dyrys Tip, in the central area of the site, on the historical OS Maps. The hydrogeological model contained within the Arup (2008) Report indicates that the main discharge point is in fact located in an area surrounded by residential houses, on the eastern side of the A470. A review of the historical OS Maps for the site indicate that this point is in 'Upper Abercanaid', and is labelled as the 'Engine Houses', which can be viewed in Plate 51 at Locality 46. Water can be seen emerging from the base of a square stone building (inferred to be the remnants of the Engine Houses) into a channel which leads into the former Glamorgan Canal. The flow of the water discharging from this point was not accurately quantified during the site walkover visits, but was estimated to be between 50-100L/sec on the 15th June 2017. Water in the canal is then directed southwards before being culverted eastwards towards the River Taff.

The Glamorgan Canal was observed to be heavily overgrown and partially infilled at Locality 47. The canal channel structure was found to be dry during the first visit, with a small amount of water at its base during second site visit as seen in Plate 52. The Glamorgan Canal collects the majority of surface water which is discharged from the site.

Stagnant water, which had a white cloudy appearance, was present at the base of a tip within Lower Colliers Row as shown in Plate 53 (Locality 48) just north of the sites northern boundary. Water collecting in these basal depressions are likely draining the raised tip area located to the west of this position.

A large pond is shown to be located at Locality 49 on Figure 4. During the first visit on the 30th May 2017 this pond was largely found to be dry, except for standing water located in the centre. However, during the site walkover on 15th July 2017, the pond was found to be largely filled with water as shown in Plate 54. The source of the water is difficult to ascertain with any certainty but is likely receiving a combination of shallow groundwater flow and surface run-off from the land to the west of the pond. The pond also likely collects water discharging within the ephemeral channels identified up-gradient of the site at Locality 13 and Locality 15 following periods of heavy rainfall. An overflow point of the pond could not be found. Water likely infiltrates through the base of the pond and flows as shallow groundwater towards the east of the site; likely discharging as spring water at the base of the Colliers Row tip to the east.

Monitoring Boreholes

Several ground investigations have previously been carried out across the site as detailed in Section 2.4. As a result of these previous investigations, a number of groundwater monitoring boreholes exist across the site as shown in Figure 5. An electric dip meter was used to determine the depth to groundwater in accessible on-site monitoring boreholes; thus, providing an up-to-date record of the groundwater levels that exists beneath the site. Not all the monitoring borehole locations could be located during the site walkover survey; with some points found to be inaccessible. Further discussion on the groundwater levels is presented in Section 3.5.8. Monitoring boreholes located by WYG during the site walkover visits are summarised below

Existing Groundwater Monitoring Boreholes

Borehole ID	Location	Status	Comments
BH7005	Zone 6	Accessible	No comment
BH7006	Zone 4	Accessible	No comment
BH7007	Zone 4	Accessible	No comment
BH7008	Zone 6	Not Accessible	Borehole cover rusted and sealed tight
BH7011	Zone 6	Not Accessible	Blocked with rubbish

Borehole ID	Location	Status	Comments
BH7014	Zone 6	Accessible	No comment
BH7015	Zone 6	Accessible	No comment
BH7017	Zone 4	Not Accessible	Borehole cover rusted and sealed tight
BH7018	Zone 4	Not Accessible	Borehole cover rusted and sealed tight
BH7019	Zone 4	Not Accessible	Borehole cover rusted and sealed tight
CZ9A	Zone 6	Accessible	Dull installation monitoring borehole

APPENDIX E– SITE VISIT PHOTOGRAPHIC PLATES (C.2021)



Plate 1 Photos showing evidence of recent flooding from the ‘hollow’ and a storm event in c. 2020 - 2



Plate 2 Photos showing evidence of recent flooding from the ‘hollow’ and a storm event in c. 2020 - 2

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Plate 3

Photos showing evidence of recent flooding from the ‘hollow’ and a storm event in c. 2020 - 2



Plate 4

Photo of culvert beneath access track at edge of site boundary - 3

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Plate 5 Photo looking eastwards along vehicle access track at damage which is the result of flood water overtopping from the ‘hollow’. - 4



Plate 6 Photo viewing culvert outfall within the northern bank of the Nant Melin Cannaid Stream - 5

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Plate 7 Photo viewing water flowing along the former Aberdare to Merthyr Railway line - 6



Plate 8 Photos viewing groundwater seepage through the masonry of the bridge which crosses over the former Aberdare to Merthyr railway line - 7.

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Plate 9 Photos viewing groundwater seepage through the masonry of the bridge which crosses over the former Aberdare to Merthyr railway line - 7.



Plate 10 Photo showing exposed coal seam within cutting of the railway line. - 8

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Plate 11 Photos showing springs emerging at the base of the Glyndyrys Tips - 9



Plate 12 Water which flows along the former Aberdare to Merthyr railway line, joins spring water from beneath the Glyndyrys Tip and is directed towards a ponded area at Locality 26. - 9

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Plate 13

Photo viewing spring water emerging at the base of the Glyndyrus Tip flowing along the former railway track beneath the Cyfartha Junction heading in a south, south-east direction.- 10



Plate 14

Water up-welling from the base of the Glyndyrus Tip. - 11

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Plate 15 Stagnant water within the ‘Leat’ of the Cyfartha Tub Boat Canal and water found to be seeping from the leat and into the ‘hollow’ -12



Plate 16 Stagnant water within the ‘Leat’ of the Cyfartha Tub Boat Canal and water found to be seeping from the leat and into the ‘hollow’ -12

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Plate 17 Water draining away from a break in the ‘Leat’ and discharging into the ‘hollow’ - 13



Plate 18 Water draining away from a break in the ‘Leat’ and discharging into the ‘hollow’ - 13

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Plate 19 Observed water flowing and ponding within the ‘hollow’ area of the site. - 14



Plate 20 Observed water flowing and ponding within the ‘hollow’ area of the site. - 14

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Plate 21 Water observed to overtop from the pond on the northern extent and flow into the ‘leat’. - 15



Plate 22 Water pooling at the base of the adjacent tip in the south-western extent of the Cyfartha Pond. - 16

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Plate 23 Photo showing heavily silted Nant Cannaid and the culvert beneath the A470 - 17



Plate 24 Photo showing heavily silted Nant Cannaid and the culvert beneath the A470 - 17

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Plate 25 Photo of the Nant Cannaid culvert beneath the former Aberdare to Merthyr railway line - 18



Plate 26 Photo of the dry Nant Cannaid stream - 19

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Plate 27 Photo showing the culvert for the Nant Cannaid beneath track crossing - 20



Plate 28 Photo showing a buried culvert outfall point on the bend of the Nant Cannaid prior to the culvert beneath the former Aberdare to Merthyr railway line. - 21

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Plate 29 Photo showing metal tram lines within the bed of the Nant Canaid Stream - 22



Plate 30 Photo of a brick lined culvert entrance within the base of the stone masonry wall of Cwm Pit - 23

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Plate 31

Photo of a brick lined culvert entrance within the base of the stone masonry wall of Cwm Pit - 23



Plate 32

Photo viewing the Cwm Pit Masonry Wall and the difference in levels between current stream level and the previous ground level, as well evidence of erosion - 24

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Plate 33 Photo showing a small culvert emerging adjacent to a much larger culvert beneath a railway line - 25



Plate 34 Photo showing water flowing through the culvert during the visit in May 2021 which is sourced from water emerging at the base of the Glyndyrus Tip - 26

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Plate 35 Photo showing an area of collapse - 27

Plate 36

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Plate 37

Photo viewing a large area of collapse which was dry at the time of the visit - 30



Plate 38

Photo viewing dry channel within a cutting - 32

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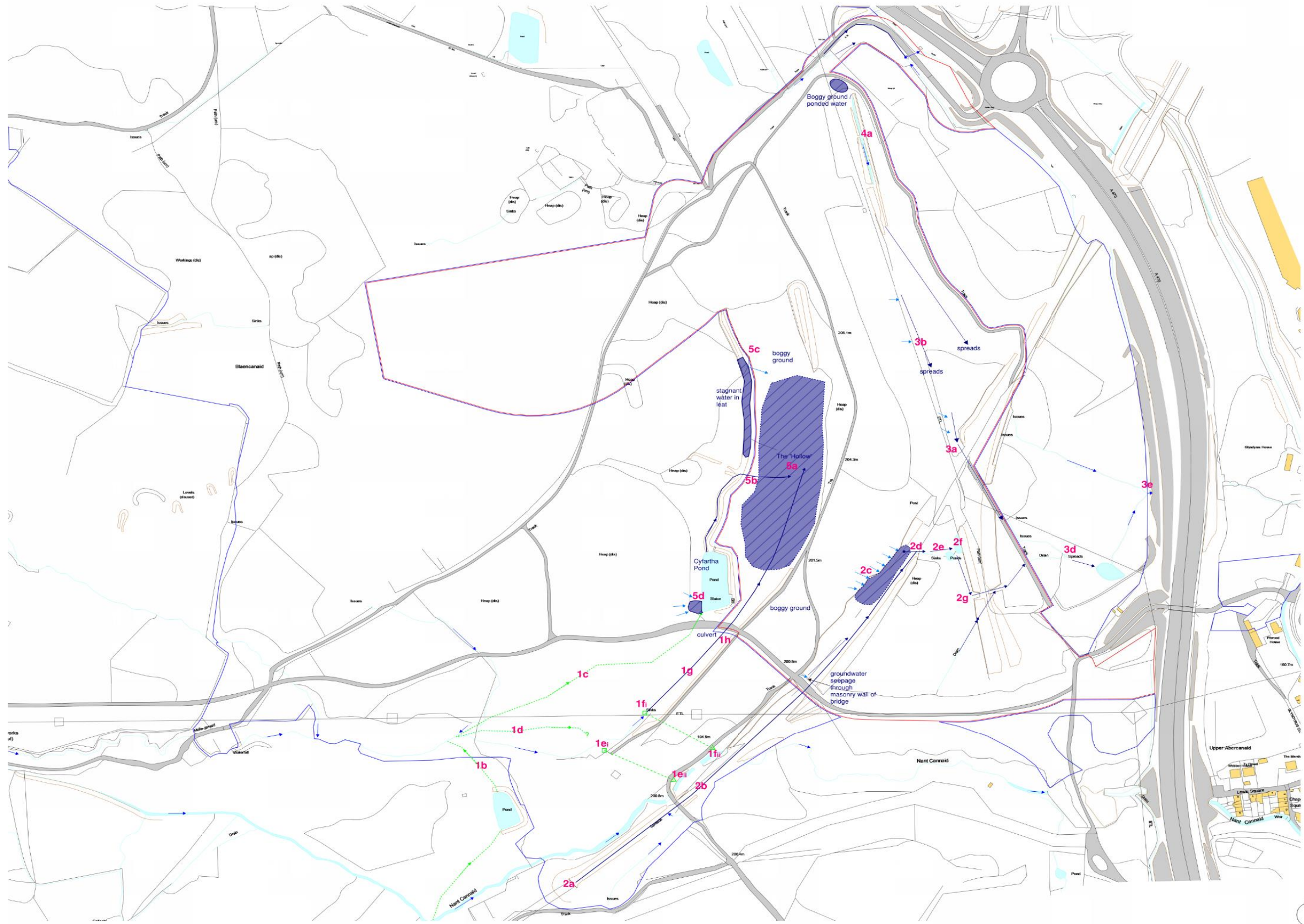
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APPENDIX F– HYDROLOGICAL MAP AND NOTES



- Legend**
- 4a** Hydrology Map Locality Reference
 - Flow direction of known water feature marked on plan
 - Flow direction of water feature marked on plan by Tetra Tech
 - Springs
 - Ponded water observed by Tetra Tech
 - Historic watercourse/ culvert route based on Historic Plans
 - Site Boundary
 - Ownership Boundary

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Project	Rhydycar West Restart		Drawing Title		Appendix F - Hydrological Map	
Client	Marvel Limited		Checked by	Project No.	B023905	
			AJ			

Hydrological Map

The below sets out the hydrological environment at the Rhydycar West development site and the nearby surrounding area prior to the drainage works undertaken by the Council in April and May 2022. Alterations to the baseline as a result of these works is presented separately in Appendix G but have also been highlighted in red within the below table.

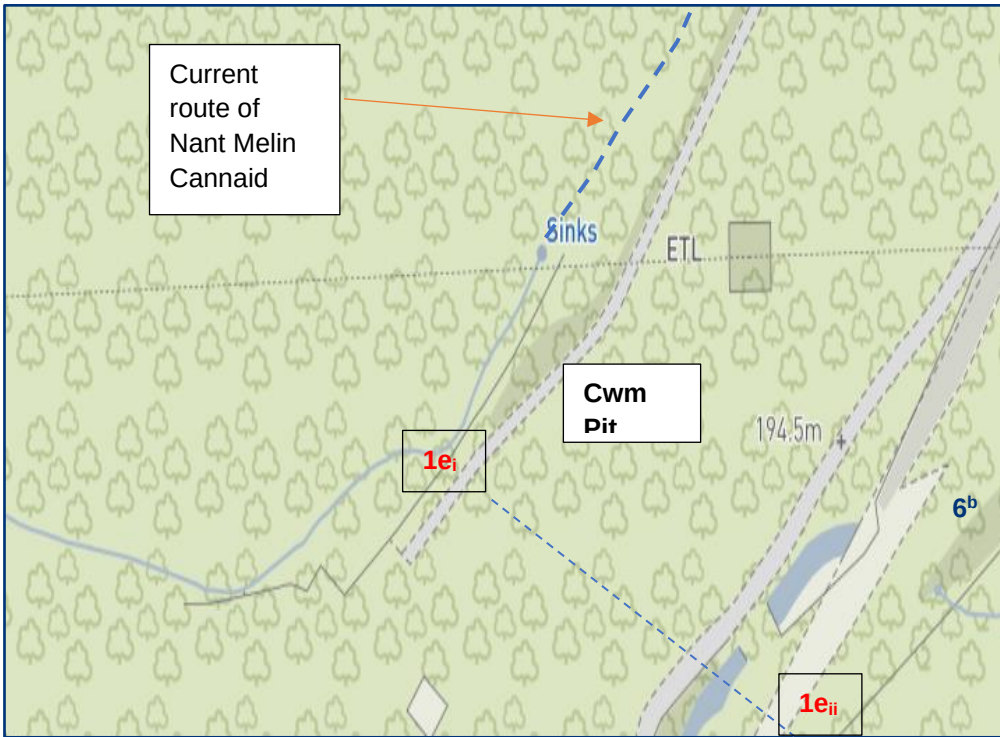
The information presented below has been drawn from the below sources which should be read in conjunction with this Appendix/ Hydrology Map:

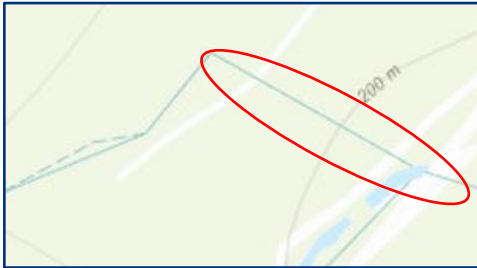
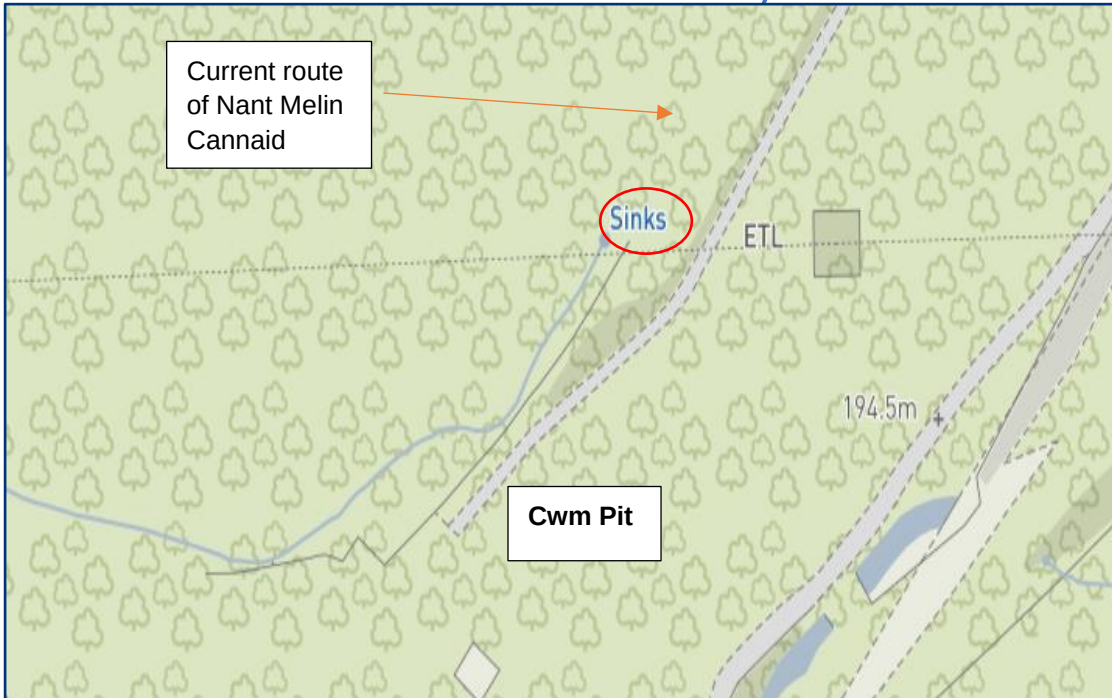
- Sections 1-6 of this report
- Groundsure Enviro + Geo Insight Report. Ref. GS-8054802. Dated 19 July 2021;
- WYG (now 'Tetra Tech') site visits (see Section 4.2 and 4.4);
 - 30th & 31st May 2017;
 - 15th June 2017;
 - 26th May 2021;
 - 3rd September 2021;
 - 10th June 2022
- National Library of Scotland Ordnance Survey Map – (<https://maps.nls.uk/>) [Accessed November 2021]

The Hydrology Map for the site is presented overleaf with supporting notes provided in the table below.

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
Area 1			
1a (2)	The point at which the 'Nant Melin Cannaid' stream is diverted from the Nant Cannaid near to the site of a former ironworks. The Nant Melin Cannaid (un-named on OS Mapping) flows in a easterly direction through Cwm Pit.	This area is outside the proposed development area and beyond the landholding boundary and has not been surveyed by Tetra Tech.	N/A.
1b	As shown on historical OS Mapping, the Nant Melin Cannaid was diverted into several directions just west of Cwm pit. The stream was diverted towards the reservoir located west of Cwm Pit (located outside the ownership boundary). This diverted channel is understood to have been infilled although it has not been surveyed by Tetra Tech. The channel fed into a balancing pond which can be seen on the adjacent historical plan. A second channel is shown to connect with the pond and the Nant Canaid to the south. It is thought that the pond was used to control water levels/ flow into Cwm Pit.	This area is outside the proposed development area and beyond the landholding boundary and has not been surveyed by Tetra Tech.	Map extract from the National Library of Scotland - Glamorgan XII (includes: Gelli Gaer; Merthyr Tudful; Surveyed 1968)
1c	Diverted channel (leat/ channel) previously fed into and provided a source of water for the Cyfarthfa Pond. This feature is understood to have been infilled and that water in the pond now receives water from springs emerging at the foot of the adjacent tip and from surface water run-off.	This channel is understood to have been infilled. No evidence of water flowing into the Cyfarthfa Pond has been observed by Tetra Tech.	 (Surveyed: 1868 to 1875, Published: 1885)

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
1d	Diverted channel of the Nant Melin Cannaid is shown on the adjacent mapping to flow towards Cwm Pit but then is shown to stop and possibly enter underground.	The Nant Melin Cannaid flow through Cwm Pit along the former tramways / railway lines (photo taken during 2017 survey) 	

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
1e	The remains of Cwm Pit were observed at Locality 21 (2017) where the Nant Melin Cannaid flows through following the former tramways and railway line. The stream is generally 2m wide here, 3m in some parts, with the bed of the channel comprising numerous cobbles and boulders of sandstone and mudstone. At Locality 22 (2017) and 23 (2021), a brick lined culvert was observed within the stone wall at Grid Reference 04405,04346. This culvert is approximately 1m higher in elevation compared to the water level in the stream. It is likely that water from the stream was directed for use at the mine or it was used to drain the area, with discharge to the Nant Cannaid. A culvert was observed at Locality 5 within the northern bank of the Nant Cannaid which could have potentially connect with the culvert a Cwm Pit.	 1e_i  1e_{ii}	(Map extract has been sourced from Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874) 

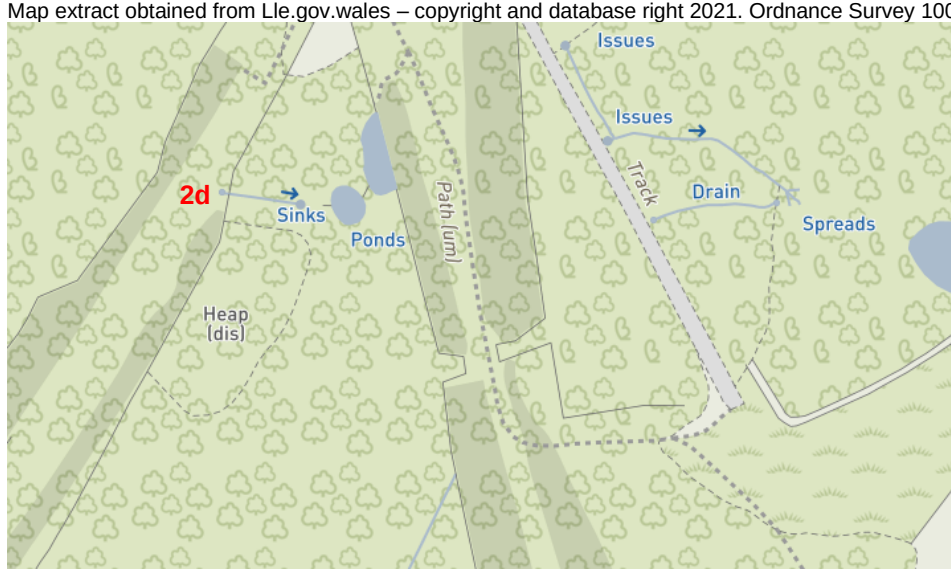
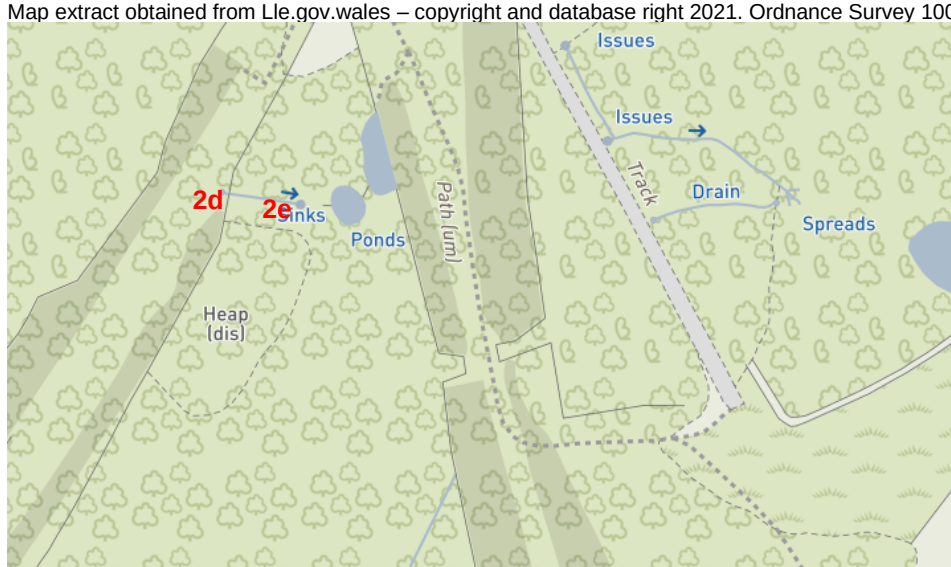
Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
1f	The Nant Melin Cannaid flows through Cwm Pit and is understood to have once discharge via a culvert to the Nant Canaid Stream beneath the adjacent unnamed slag tip. This can be seen on most freely available mapping base plans for the site e.g. – 'ESRI World Topo' (see adjacent map extract). Tetra Tech could not find any evidence of the area marked as 'sinks' (Grid Reference 304454,204384) (1f_i) and it is likely that the culvert has either become blocked or is now above the water level in the stream. Water now flows along the former railway line and discharges into the 'hollow' area of the site via a culvert beneath a track at the edge of the site boundary. The outflow to the culvert has been observed by Tetra Tech (see Photo 1f_{ii}). The culvert has been blocked/ silted up and no water has been observed to be flowing this culvert.	Map extract from - Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874  Photo below shows the outfall of the brick lined culvert within the northern bank of the Nant Cannaid.  1f_{ii}	(Map extract has been sourced from Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874) 
1g	The diverted Nant Melin Cannaid flows through Cwm Pit and follows the former railway line that led away from Cwm Pit to the north-east. This is not shown on current OS Maps for the site. The stream has largely eroded	The photo below shows the the water course that flows through Cwm Pit along the route of a former railway line.	The route of this stream passed the area marked as 'sinks' is not shown on historical or present-day OS mapping.

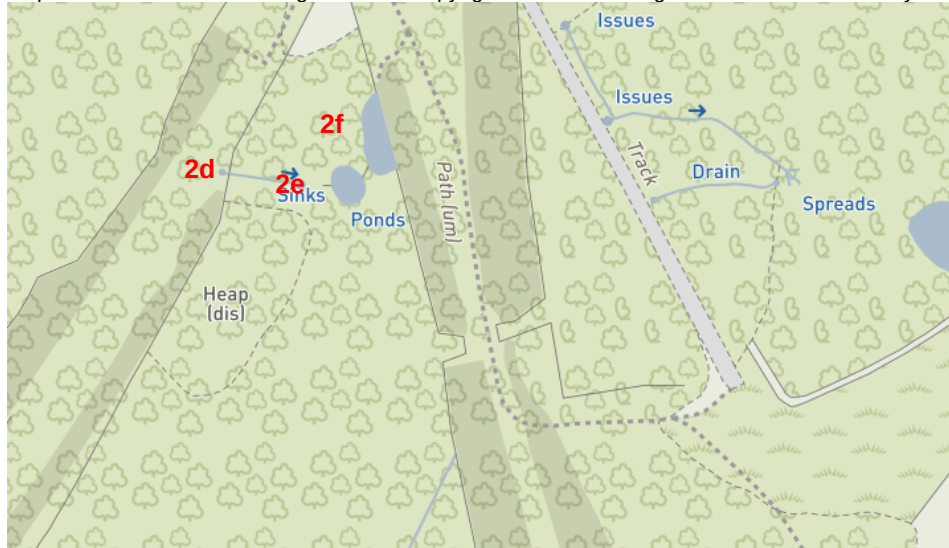
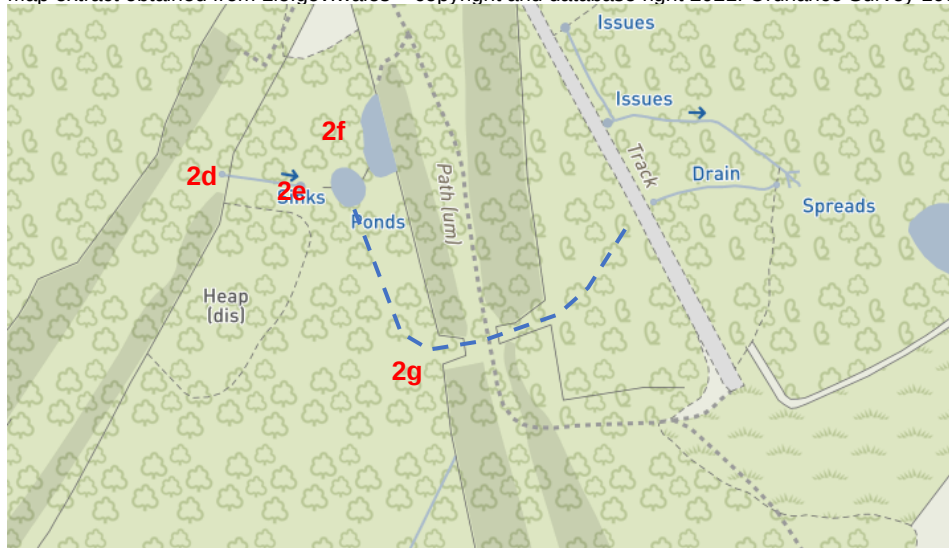
Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
	away the former railway track and is culverted beneath the track at Locality 1h. The stream flows past the Cyfarthfa Pond (which is at a higher elevation) and into a basin area, between the pond (to the west) and Glyndyrys Tip (to the east), known as the 'Hollow'.		
1h	Stream is culverted beneath a trackway. During the May 2021 visit, Tetra Tech observed evidence of past flooding which was the result of the culvert becoming blocked last year (c.2020) during a storm. Flood waters are understood to have damaged the path and flowed along this path and down towards the former Great Western railway line (Aberdare to Merthyr line), exposing a coal seam in the cutting.		The route of this stream passed the area marked as 'sinks' is not shown on historical or present-day OS mapping.

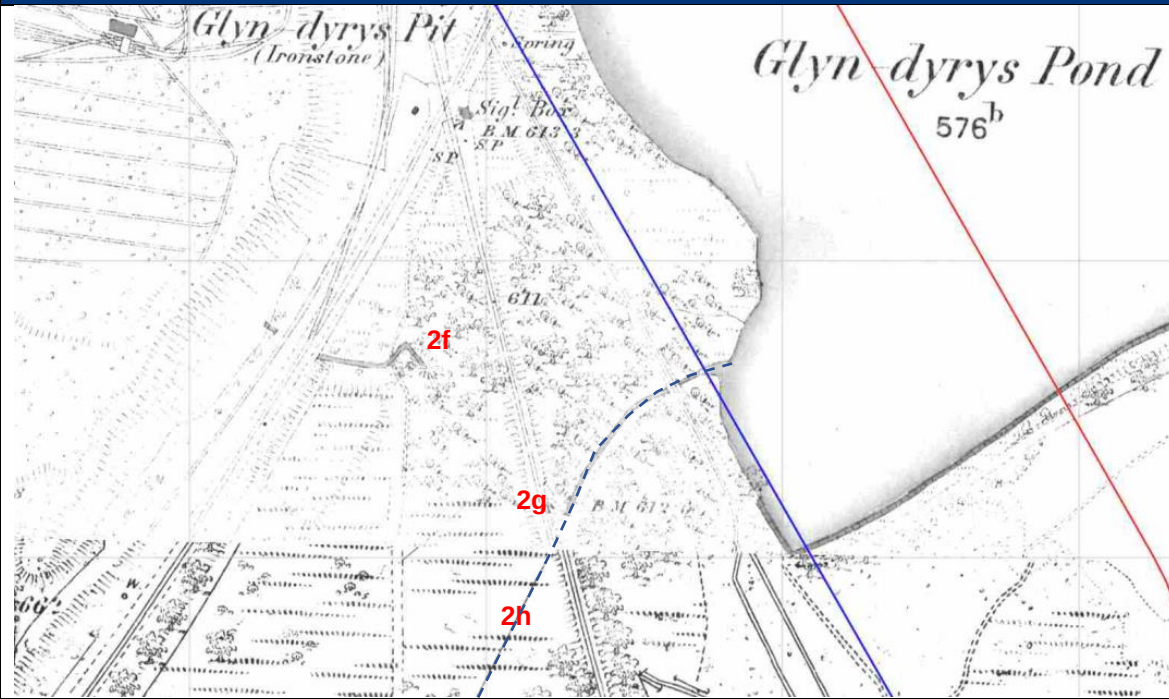
Area 2

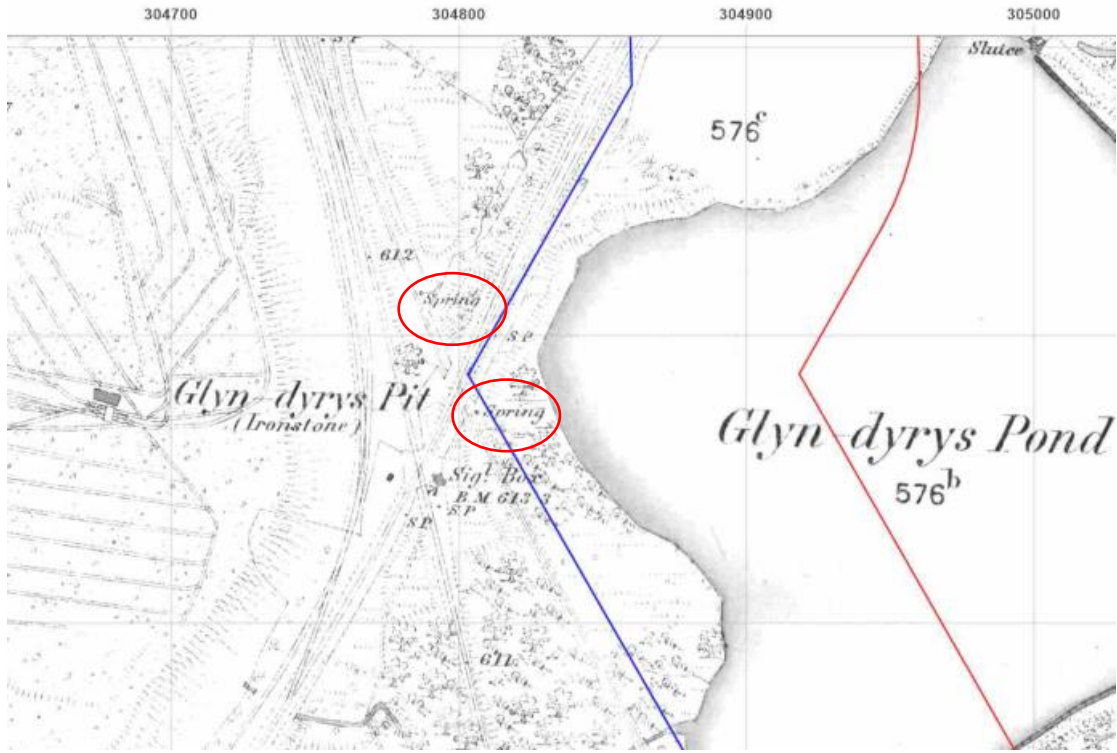
Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
2a	Clear running water was noted to be emerging from a manhole chamber close to the entrance of the railway tunnel (Locality 29 c.2017) as shown in the adjacent photo. A pipe can be seen extending from the tunnel entrance and heading towards the manhole chamber, and therefore is likely to be draining water collecting inside the tunnel. It should be noted that a cut-off drain has now been installed and discharges this water into the Nant Cannaid Stream. The manhole lid adjacent to the tunnel entrance has been removed which shows a cast iron pipe entering and leaving the chamber. Further details are provided within the Tetra Tech 2022 report (Appendix G).		
2b	Water is flowing along the former Aberdare to Merthyr railway line. This is thought to be combination of groundwater discharge and surface water run-off, as well as from tributary watercourses along the route which are discharging water emerging from springs up on the hillside, to the south-west. The watercourse has been eroding the former railway track, most likely during storm events. Groundwater seepage through the stone masonry wall of the bridge is occurring on the western side of the bridge.		Watercourse is not shown on historical or present-day mapping.

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
	Approximately 40m further down from the bridge, there is an area of the cutting where subsidence has taken place and a coal seam has been exposed. This is thought to be the result of flooding from Cwm Pit. Cobbles of coal were observed further down-gradient of this locality along the former railway track. It is worth noting that this area of subsidence/ erosion is considerably greater than when it was first surveyed by WYG (now Tetra Tech) in May 2017. It should be noted that a cut-off drain has now been installed and discharges this water into the Nant Cannaid Stream. Further details are provided in Appendix G.		
2c	There are circa 7 springs that were observed to emerge at the base of the Glyndyrus tip (this was 'Locality 31' in the previous WYG DTS) during the visit by Tetra Tech in May 2021. It should be noted that only three springs were observed last time (c.2017). The source of the water is thought to be a combination of groundwater discharge emerging from the adjacent tip (potentially sourced from the 'Hollow' area and/or natural upwelling of groundwater from mine-workings. Water floods western area of the former railway track and flows northwards to a culvert which goes underneath the track flows eastwards (see Locality 2d below)	Photo taken during the Tetra Tech visit in May 2021. 	Springs/ resultant watercourse is not shown on contemporary OS Mapping. Photo of a spring that was observed during the Tetra Tech site visit in May 2021. 

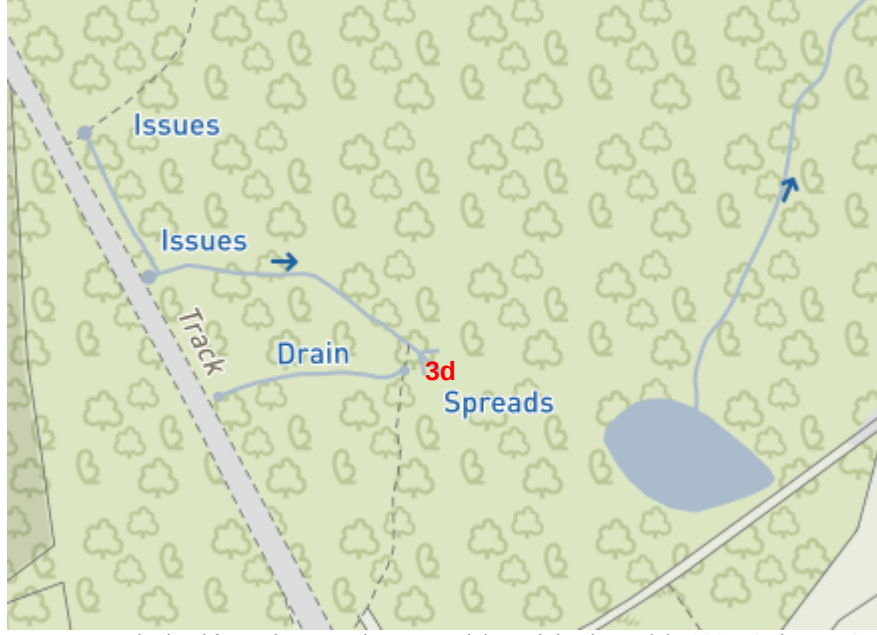
Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
2d	Water collects adjacent to the former railway line and flows in a north-east direction before draining to a culvert close to the rail track. The culvert on the western side of the former track has been silted up and is no longer visible. It is worth noting that this was visible during last survey visit in May 2017. Water was observed to emerge on the eastern side of the track where it is also joined by water flowing along the former track, from the railway tunnel (Map Locality 9). Council drainage works did not extend to this locality before they were put on hold. As a result, water continues to discharge as shown on the adjacent map.		Map extract obtained from Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874 
2e	Water flows away from Map Locality 12 and collects in a ponded area which eventually flows beneath a former railway track (Map Locality 15). Note that no water was observed to flowing on the previous site visits in c.2017 (see 'Locality 33' in the previous WYG DTS). Note that the adjacent mapping shows that water 'sinks' although no evidence for this could be seen during the visit in May 2021. Potential that water was culverted beneath the railway track and discharged into the Glyndyrus Pond. As reported the Tetra Tech site report (2022) at Appendix G, the are shown as 'sinks' was observed to be a collapse which had been fenced off by the Coal Authority.		Map extract obtained from Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874 

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
2f	Photo shows the pond (see adjacent map) which is not shown on the ESI World Topo basemap but is shown on the Ordnance Survey mapping on the Lle.gov.wales website. Photograph taken during the Tetra Tech visit to site in May 2021. Ponds first marked on historical OS Maps in c. 1962. However, a culvert feature beneath former railway (Locality 2d) is first shown in c.1875 mapping.		Map extract obtained from Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874 
2g	Water outflow from ponds (Map Locality 2e and 2f) flows beneath the former railway eastwards into the former Glyndyrys Pond (infilled).		Map extract obtained from Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874 
2h	Drain marked on current OS map. This drain is thought to relate to the former drainage	Could not find the drain on previous visits.	Historical OS Map (1975)

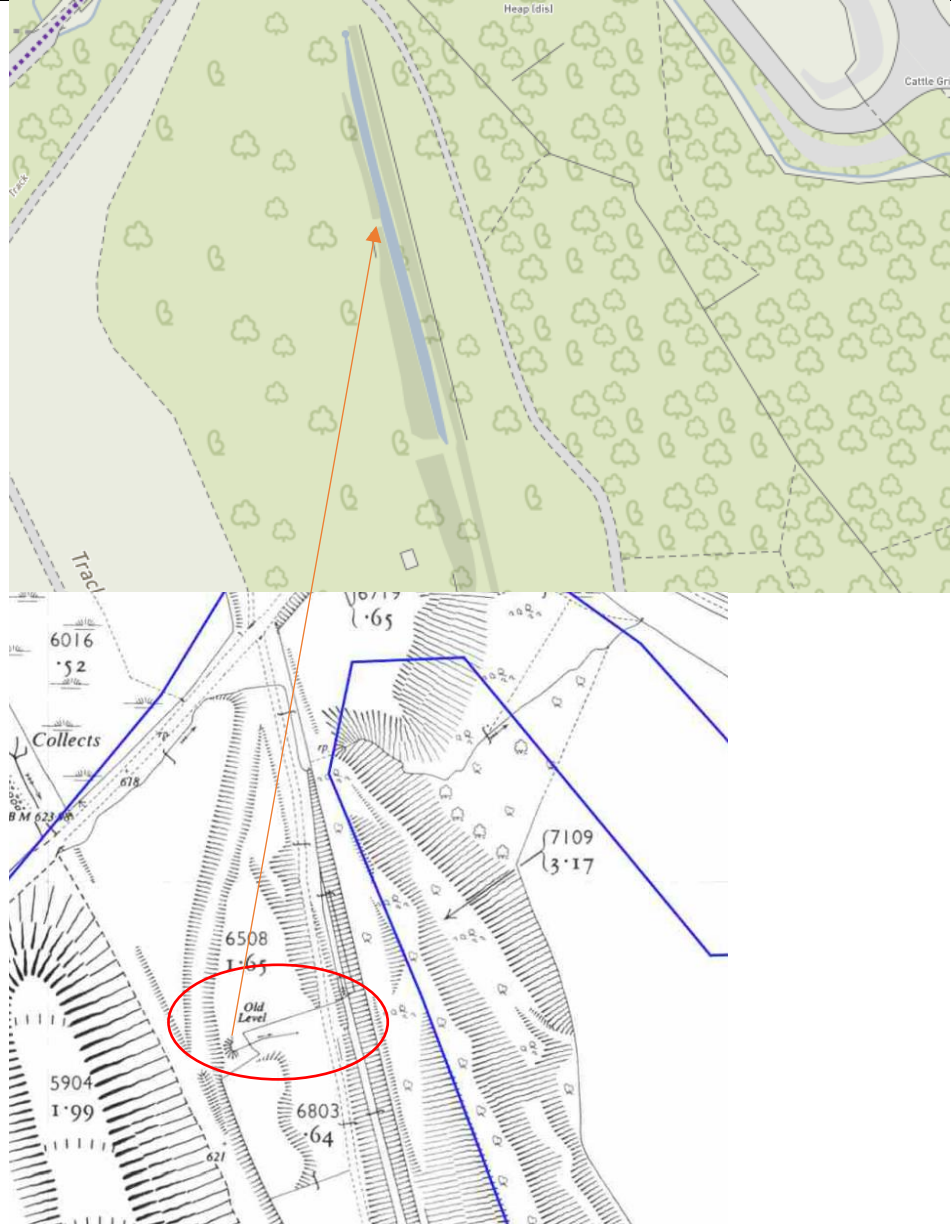
Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
	channel which fed into the Glyndyrys Pond to the north-east of this locality. A sluice gate is marked on the historical OS map at the point where the channel meets the Nant Canaid stream (to the south-west of this locality).		
Area 3			

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
3a	Evidence of flooding was observed in the area of the site known as the 'Cyfarthfa Junction' where there would have been a number of railway lines crossing at this point. Springs were noted to emerge (this was 'Locality 37' in the previous 2017 visit); with water flowing along the former track, heading southwards ('Locality 34' in the 2017 visit). It is understood that the area close to the junction and track (base of the Glyndyrys & A470 Tips) was used as a tipping ground by the pits, where slag and waste materials would have been tipped. Likely springs are emerging within tipped waste from the up-gradient Glyndyrys Tip and/ or groundwater up-welling from saturated former mine workings. The spring observed by WYG/ Tetra Tech in 2017 and 2021 at this locality is marked on OS Maps (1875). A second spring was observed (and shown on historic mapping) to the south of this locality, on the eastern side of the former railway line. A large stone lined channel has been constructed at this locality which cascades down towards the former Aberdare to Merthyr railway line/ widened track. Further information is provided in Appendix G.	 Springs	

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
3b	A spring was observed further north, within a densely vegetated area with brick and slag materials/ cobbles scattered along the ground. Groundwater observed to slowly up-well at this point. Visual observation of this spring (see adjacent photo) did not appear that much water was emerging from this point. However, a considerable amount of water was noted to be discharging locally from this this area. As such, it is likely to be several, diffuse springs and/ or groundwater emerging in this area (most likely from the 'Marshy Area' which is located behind the tips at a higher elevation). Much evidence of flooding and washout of materials (brick, slag etc) which was also observed in the previous walkover (see 'Locality 45' in the previous WYG DTS). Water is thought to discharge towards an area noted to be "Glyndyrus Pond" ('Locality 35' in previous WYG DTS) before discharging from site at 'Locality 36' in the former WYG DTS. <i>Note – exact location of the spring not known.</i> A capture drain has been installed along the base of the tip as reported in Appendix G.		Not shown on current OS Mapping.

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
3d	Channel surveyed in 2017. A small channel (0.5m wide) of clear, transparent water was noted to be flowing towards a small pond (see adjacent map).	See Photo plate from the previous WYG DTS (2017) walkover.	 Map extract obtained from Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
3e	Confluence of two streams which flows across the former Glyndyrus Pond, with water leaving the site via a culvert beneath the A470. <i>This is shown as 'Surface Water Discharge Point No. 3' on the main Hydrological Map above.</i>		 Map extract obtained from Lle.gov.wales – copyright and database right 2021. Ordnance Survey 100021874
Area 4			

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
4a	It is unclear if an outlet of a culvert (which is understood to have been installed at the time when the A470 was being built) which is thought to be located within this area and/ or whether the water shown on mapping is a result of spring discharge, discharge from culvert, mine water discharge or collection of surface water run-off at the base of the tip. Water thought to flow southwards from this locality along the former railway line. It should be noted that an 'Old Ironstone Level' is recorded in this area on historical OS Mapping. Water shown to be flowing out of the old level on the 1958 OS Mapping. Water is thought to be flowing to the south-east along the former railway.		 The top map extract shows a water feature (blue line) flowing southwards along a former railway line (dashed line). The area is labeled 'Heap Idiol' and 'Cattle Gr'. The bottom map extract shows a detailed view of the 'Old Level' (circled in red) with various elevation points (6016, 6508, 6803, 5904, 621, 678, 621, 64, 65, 7109, 3.17) and a 'Collects' label. The 'Old Level' is marked with a red circle and a red arrow pointing to the water feature in the top map extract.

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
Area 5			
5a	The "Hollow" area was found to be flooded during one of the visits in 2017 with ponded water observed throughout the basin. This area is fed by the watercourse (Nant Melin Cannaid) that flows through Cwm Pit, following the former railway line through this area although a number of ponds and flooded areas have been observed either side of the watercourse within the basin area. This area likely acts as a flood water overflow area following periods of heavy rainfall. We understand that during heavy rainfall periods last year (c.2020) flood waters had eroded trackways to the south-east and damaged the former railway line near the 'CyfarthfaJunction'. Attempts have been made to find an outlet for the water ponding in this marshy area. No obvious outlet has been found and therefore, it is considered likely the water is draining through one of the following pathways or through a combination of all three: fissures within the underlying natural boulder clay material; fissures (cavities) within the Glyndryys tip material opening due to subsidence, or; through mining related features such as through former mine entrances (adits) or tunnelways. The client representative explained during the visit in May 2021 that the 'hollow' was full of water the week prior and	See photos taken at Locality 41 to 44 in the previous WYG DTS Report. Photos below were taken by Tetra Tech during the visit in May 2021: 	Not shown on current or historic OS Mapping. Approximate extent has been shown on the main hydrological mapping above. Photo viewing eastwards into the marshy basin from near leat. Perry had remarked that this area was completely flooded following a period of heavy rain. 

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
	was visible from the top of the tip.		

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
5b	Small, incised channel which flows between a break in the former tub boat canal (leat) which is draining water that is overtopping the Cyfarthfa reservoir and flowing northwards within the leat. Water flows eastwards down hill into the 'hollow' area. Potential for groundwater to be emerging from a former coal level which is located nearby to the west of this position.	 Photo taken during the Tetra Tech visit in May 2021	Not shown on current or historic OS Mapping.
5c	Stagnant water was observed in the leat and evidence of groundwater seepage observed to be draining the canal and discharging into the adjacent 'Marshy Area'. During the WYG visit in c. 2017, A second break in the canal wall (likely due to subsidence) was noted at Locality 40 in the previous 2017 visit; with water found to emerge from beneath the eastern side of the footpath into a channel which discharges into the marsh area eastwards of this locality.	Photo taken during the Tetra Tech visit in May 2021	Not shown on current OS Mapping.

Map Locality	Description	Photo Plate / Further Comment	Map Extract / Further Photo Plate
	The slow flowing water was observed to be stained an orange/red colour (Plate 40 – see Appendix E which is sourced from the stagnant, ponded water observed within the canal.		
5d	Stagnant, pooled water observed within the south-western corner of the Cyfarthfa pond. This is the area close to where the diverted stream (see Map Locality 1d) which now would have entered the pond. Water levels in the pond likely receive both surface water run-off and spring discharge water from the adjacent tip to the west of the reservoir. There is potential that water is still being sourced by the former diverted channel (although it is understood that this channel has been infilled). No obvious inflow areas could be observed at the time of the Tetra Tech visit in May 2021.	Photo taken during the Tetra Tech visit in May 2021 	

APPENDIX G – SITE SURVEY WALKOVER REPORT (10TH JUNE 2022)

Tetrattech

Site Visit Report – Rhydycar West



Description (Project title)	Rhydycar West	Project (Number)	784-B023905
Report No.	001	Prepared by	Adam James
Site location	Rhydycar West, Merthyr Tydfil, South Wales	Date of visit	Friday 10 th June 2022

Reason for site visit

An Associate Hydrogeologist from Tetra Tech visited the site on Friday 10th June 2022 to survey the recent tip drainage works that have been constructed by the Council. We understand that the Council have undertaken the drainage works in order to better drain the site and improve the stability of the tips. However, the works were undertaken without the relevant permissions and permits and therefore, the works are on hold which leaves the recently constructed drainage network incomplete.

Site weather conditions

The weather was dry during the visit. The weather preceding the visit has also been dry with limited rain showers. Low flow conditions observed in the few water features that were flowing at time of visit.

Summary of observed site features / work in progress

An account of the site visit is outlined below and is supported by Figure 1 (Survey Features Plan) and the supporting photo plates which are attached at the rear of this Site Visit Report.

Locality 1 – Gravel lined area, near to the site entrance, which appears to have been used as a temporary storage/ site office location (Photo 1). Portaloo is still located here with a couple of heras fence panels. Evidence of some burning as shown in Photo 2.

Locality 2 – It is understood that this part of the existing track had been widened and used as an area to stockpile equipment and limestone boulders (Storage Area).

Locality 3 – The widened track extending from the storage area (Locality 2) meets with a second, newly constructed access track which runs circa 470 metres, in an approximate north to south direction, along the base of the Glyndyrys/ A470 Tip. A drainage/ capture ditch has been constructed along the length of this access track, between the track and the base of the tip. This ditch has likely been constructed capture spring water that emerges at the base of the tip, as well as surface water run-off. The drainage route extends into the stone lined channel at Locality 4 (see below) (Photo 3a). At the junction between the two new tracks, Japanese Knotweed was observed and was found to be growing out through the newly constructed track as shown in Photo 3b.

Locality 4 – A half constructed stone lined drainage channel (Photo 4a) cascades down into the former railway track which trends north to south at 'Cyfartha Junction' (Photos 4b, 5 & 6). All water which is captured/ diverted by the new drainage network discharges to this point. We understand that no further engineering works are planned to be constructed beyond this point and that water discharging from here would flow southwards along the former railway track, connecting to existing streams prior to flowing off site via the culverts beneath the A470. Spring water was still observed to be emerging at this point although there was minimal flow (Photo 7). During previous visits to the site, water emerging from the base of the Glyndyrys Tip to the north of this locality had been observed to flow to this point however, there was no water observed other than the aforementioned spring discharge.

Locality 5 – This is an area where several springs have been observed at the base of the Glyndyrys Tip. Water was observed to be discharging at the base of the tip and pool within the depression area in between the tip base and the former Aberdare to Merthyr railway track/ newly widened track. The water discharging from this area still follows the previous drainage route, which was beneath the railway track (water now flows over the newly constructed/ widened track as shown in Photo 8 & Photo 9) and towards a pond area (Locality 14) to the

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south-east of this locality. This is presumed to be a temporary measure and that water emerging from this area will be collected and subsequently channeled towards the main discharge point at the Cyfartha Junction (Locality 4) if and when the works are allowed to resume.

Locality 6 – A large stone lined channel (Photo 10) has been constructed at this locality which cascades down towards the former Aberdare to Merthyr railway line/ widened track. This stone lined channel has not been finished, and the drain at the base of the feature does not connect with the drain observed at Locality 5. As such, it is presumed that during storm/ rainfall events, water will discharge along the newly widened track towards Locality 5 or spill over into the area of depression to the east of this locality. There was no water flowing at the time of the visit. An access track has been constructed alongside the stone lined cascade feature to allow plant to access the top of the slope. Trees and vegetation have been cleared to make a wide track towards the Nant Melin Canaid stream (Locality 13). This locality is the location of a coal seam which had been exposed within the railway embankment, and had eroded overtime from flood waters emerging from Cwm Woods as a result of water spilling out of the 'Hollow' area (depression basin behind the A470/Glyndyrus Tip).

Locality 7 – Groundwater emerging from the masonry wall (Photo 11) on the northern section of the railway bridge wall is collecting within the newly constructed drainage ditch which runs alongside the newly widened track in a north-eastern direction towards Locality 6.

Locality 8 – Within the Nant Canaid Stream, which was dry at time of the visit, save for some standing/ ponded water and small flow of water within the gravel bed of the stream (Photo 12).

Locality 9 – A small, incised drainage ditch, which extends from near to the former railway tunnel (Locality 11) to this locality, discharges water collected from the tunnel into the Nant Canaid Stream (Photo 13). A culvert has been installed beneath the former railway track/ newly constructed track as shown in Photo 14. Although no water was flowing from the culvert, it has likely been constructed to channel water which flows from the adjacent slopes/ roadway to the south of this locality. The water flowing into the Nant Canaid stream was observed to be laden with silt as shown in Photo 15.

Locality 10 – This locality is viewing a section of pipe (Photo 16) which is broken, with water flowing across the former railway track into the newly constructed drainage ditch which flows towards Locality 9. We understand that a cast iron pipe, which extends from the tunnel (Locality 11), is present within the embankment and discharges into the Nant Canaid at an unknown location.

Locality 11 – The manhole lid adjacent to the tunnel entrance has been removed which shows a cast iron pipe entering and leaving the chamber as shown in Photo 17 & 18. The pipe entering the manhole lid extends from the tunnel as shown in Photo 19. The pipes were estimated to be 100mm/150mm in diameter. The pipe entering the manhole is thought to be collecting drainage water collecting in the tunnel. Water was observed to be emerging from beneath the closed tunnel doors and flowing along the track towards the newly constructed ditch at Locality 10.

Locality 12 – A second cast iron pipe which was been exposed within the newly constructed drainage ditch at this locality (Photo 20). The purpose or source of this pipe is not understood and could be a drainage pipe draining spoil tips to the west of this location. This pipe has not been observed during previous visits. The pipe is trending approximately south-west to north-west and potentially connects into the cast iron pipe which extends from the tunnel. The discharge point for the pipe is unclear. Photo 21 is looking towards the tunnel and shows the newly constructed drainage ditch with water that is discharging from both the broken cast iron pipe (Locality 10) and the tunnel, flowing within it.

Locality 13 – Photo 22 shows the clearing from this locality towards the stone lined cascade feature which was observed at Locality 6. No drainage works have been completed at this locality although it is considered likely that the Nant Melin Canaid Stream was to be diverted at this point and connected to the stone lined cascade feature at Locality 6; either as an open ditch or via a series of culverts. Sections of 600mm plastic piping were observed to be stockpiled at this locality as shown in Photo 23. The Nant Melin Canaid stream is still flowing as

shown in Photo 24. Water within the stream continues to flow into the “hollow” (depression behind the A470/ Glyndyrus Tip) which continues to act as a natural soakaway; with water emerging as springs beneath the base of the tip to the east.

Locality 14 – This is an area of collapse which has been fenced off by the coal authority as shown in Photo 25. Water discharging from the springs at the base of the tip (Locality 5) flows towards a pond feature which eventually over flows into this area of collapse as shown in Photo 26. Anecdotal evidence suggests that there were no licensed mines within this area of the site. It is therefore unclear whether this collapse is the result of natural subsidence, historic drainage feature (i.e., culvert beneath the former railway lines) or a mine feature. Water discharging into this collapsed features is either being lost to below mine workings or is flowing beneath the adjacent railway embankment and re-emerging at the base of the embankment to the east. Tetra Tech has observed this collapsed feature to be full of water during a previous visit, with water then flowing to the south and off-site via culvert beneath the railway track.

Locality 15 – Large area of collapse. No water was observed to be present at the base (although it was difficult to observe with the overgrown vegetation).

Site Walkover Summary

The recent drainage works have been implemented to mitigate against known drainage issues at the site, namely; water discharge from the Nant Meline Canaid Stream which ponds behind the A470/ Glyndyrus Tip, spring emergence of this ponded water at the base of A470/ Glyndyrus Tip, discharge of water from the railway tunnel entrance and areas of flooding. Although the works completed thus far are likely to have a beneficial impact on the site drainage, the network is incomplete, and its effectiveness is yet to be tested in the absence of any significant rainfall/ storm events since the works begun.

Water from the Nant Melin Canaid is still collecting within the ‘Hollow’ area behind the A470/ Glyndyrus tip. This area continues to act as a natural soakaway, with water flowing through and re-emerging at the base of the tip to the east; although no water was found to be discharging within the newly installed constructed capture drain which could suggest that water from the ‘Hollow’ is lost to ground/ below mineworking’s.

Water was not largely found to be flowing within the new drainage network other than from water emerging from the cast iron pipe at the former tunnel entrance. It is recommended that a further visit is undertaken during or following a large storm event to further survey the drainage network and water flow paths. In addition, the impact to the land/ water features beyond the Cyfartha Junction (main discharge point) is unknown.

Attachments / Figures

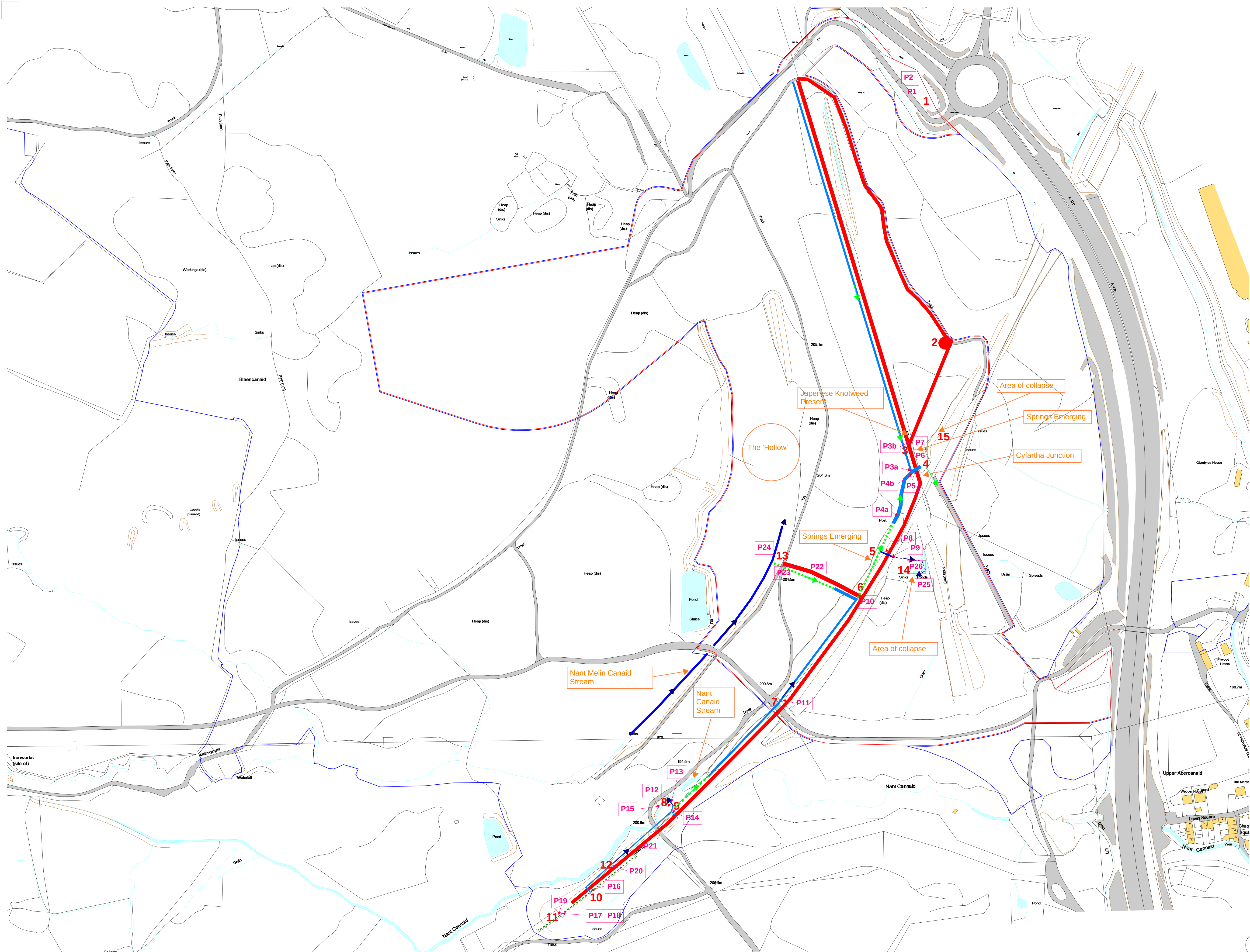
Figure 1 – Site Features and Photo Location Plan

Photo Plates

Report prepared by				Distribution
NAME	Adam James	SIGNATURE		Draft Report circulated to Ali Tyebkhan, Peter Waldren, Paul Cooke, Sarah Roberts and Conor Lydon

Figures

Figure 1 – Site Features Plan



Key

Locality **1**

Photo Location **P25**

New/ Widened Track **—**

New Drainage Ditch **—**

Observed Water Flow & Direction **—**

Proposed/ Likely Water Flow Route **—**

Culvert **—**

Cast Iron Pipe (Buried) **—**

P2	S0	23/09/21	WS	Application boundary (red line) amended
P1	S0	13/06/21	WS	DRAFT ISSUE
Rev.	Status Date	Check Description		

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Project
Rhydyccar West
Merthyr Tydfil
Marvel Ltd

Title
Existing Site Plan

Job No Scale at A1 Status Rev. Ext. Int.
4170 1 : 2000 S0 P2

Project Originator Zone Level Type Role Sheet
RHDR HMA- NO-XX- DR -A -PL-002

ISO 14001 : 2015 ISO 9001 : 2015 RIBA Chartered Practice
Please consider the environment before printing this document.
Refer to dimensions where provided - do not scale from this drawing

Photo Plates



Photo 1



Photo 2



Photo 3a



Photo 3b



Photo 4a



Photo 4b



Photo 5



Photo 6

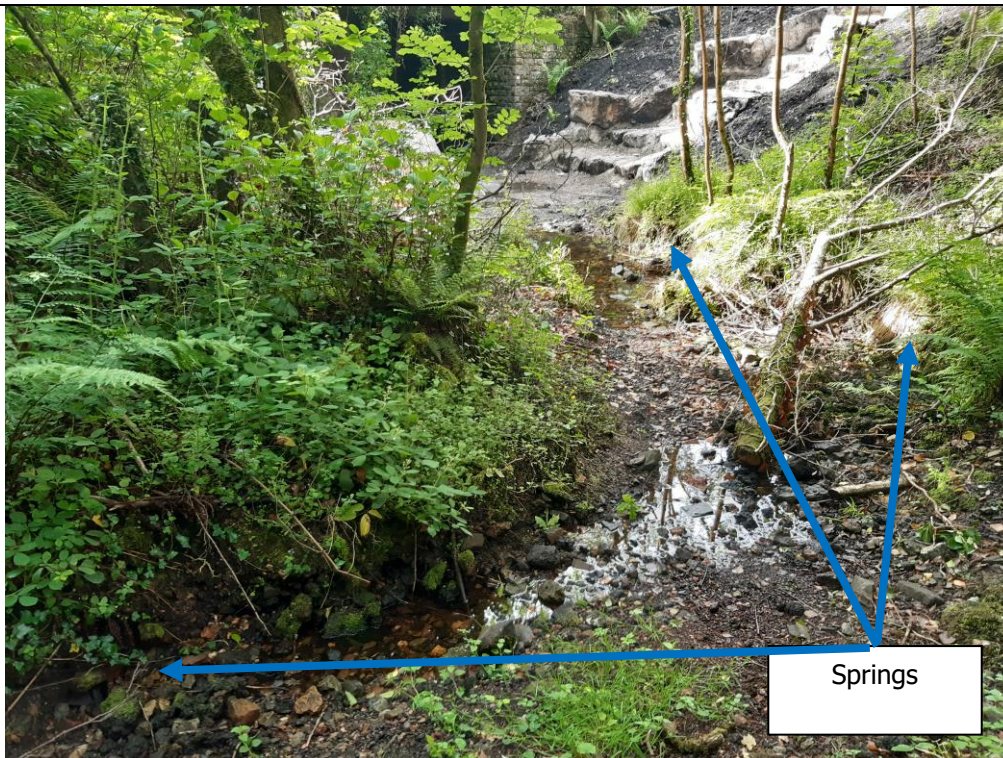


Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25



Photo 26