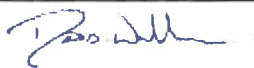




Paul Downing & Associates Ltd

# H5 Site Condition Report for Western Power Distribution, Players Industrial Estate, Clydach, Swansea, Wales, SA6 5BQ

Version 1.0

In support of Application REF: EPR/EB3190HQ

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## Executive Summary

Paul Downing & Associates Ltd was commissioned to produce a site condition report (SCR) in support of permit application EPR/EB3190HQ for the storage of used oils in drums and former network equipment at the Western Power Distribution Depot at Players' Industrial Estate, Clydach, Swansea, Wales, SA6 5BQ under the Environmental Permitting Regulations 2014.

The purpose was to identify the baseline conditions with regards to soil and groundwater contamination by carrying out a site visit, review of literature and additional relevant data and reports. The site walkover carried out on 7 October 2015 by Paul Downing.

The Depot is located south west of Clydach, west of the River Tawe.

The area under assessment covers 0.04 Hectares of the Western Power Distribution Depot including the oil drum storage and former network equipment area. The surrounding land use is made up of industrial works, woodland and commercial land.

The area under assessment consists of hard standing with dedicated surface water drainage containing oil drums and a used equipment storage area.

A review of the geology, hydrogeology, hydrology and environmental constraints such as Sites of Specific Scientific Interest was carried out. The geology beneath the site comprises glacial superficial deposits overlying the Swansea Member Sandstone which are both classified as Secondary A Aquifers.

There are no environmentally sensitive designations in the area other than a SSSI, named Glais Moraine, cited for its geological importance and nearby Ancient Woodlands.

A source pathway receptor qualitative risk assessment was carried out based on the information collected and the current operations on site to understand any potentially complete SPR Linkages on site.

Two potential sources have been suggested for assessment and these were unidentified Historic/Legacy contamination in the sub surface and spills and loss of primary containment.

There is a medium risk associated with catastrophic spills and leaks due to the connection to the surface water drainage system and recommendations have been made to minimise this risk through storing the oil drums in a self bunded steel container on site.

The recommendations have also been made to mitigate any potential risks arising from any unidentified land contamination beneath the site that may come into contact with construction workers in the future.

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# 1 Introduction

## 1.1 Scope of Work

Paul Downing & Associates Ltd was commissioned to produce a site condition report (SCR) in support of permit application EPR/EB3190HQ on behalf of Western Power Distribution's Depot at Player's Industrial Estate, Clydach, Swansea, Wales, SA6 5BQ under the Environmental Permitting Regulations 2014.

The aim of this report was to identify the baseline conditions with regards to soil and groundwater contamination by carrying out a site visit, review of literature and additional relevant data and reports.

## 1.2 Background

Natural Resources Wales have requested that a permit application be submitted for the area of land identified in Figure 1, Annex A. The area of land is used for storage of waste transformer oils and former network equipment from the Western Power Distribution network.

The report has been written in accordance with Natural Resources Wales H5 guidance for producing a SCR and comprises a site walkover, review of previous reports, Groundsure data (GS2523307) and involved discussions with the Natural Resources Wales. This report has also been completed in accordance to BS 10175:2011 – "Investigation of Potentially Contaminated Sites", code of practice and CLR 11 – "Model Procedures for the Management of Contaminated Land".

The work undertaken for this SCR comprises:

- a site walkover assessment;
- a review of the historical land uses associated with the site to assess the potential for ground contamination;
- a review of the environmental setting to assess the sensitivity of the surrounding environment to contamination/pollution;
- consultation with the regulatory authorities to establish whether there are any significant environmental issues that may impact upon the site;
- a review of the "Groundsure" Site check report dated 12/10/2015 ref GS2523307; and
- A review of additional publically and commercially available reports and data sets.

The environmental risk assessment presented within this report has been prepared having regard to the source-pathway-receptor model introduced under Part IIA of the Environmental Protection Act 1990 and associated guidance on contaminated land published by the Department of Environment, Food and Rural Affairs. The methodology is essentially a qualitative assessment based on the identification and evaluation of potential 'source-pathway-receptor pollutant linkages'. On the basis of this risk assessment, consideration has been given to the potential for the site to be designated as 'contaminated land' (under the local authority contaminated land inspection strategy) as defined in Part IIA of the Environmental Protection Act 1990.

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*A statement of limitations is presented at the end of this report.*

## 2 Site Setting

### 2.1 Site Location

The Clydach Swansea Western Power Distribution Depot site is located in the southern part of the Player's Industrial Estate south west of Clydach and north and west of the River Tawe.

It is located at National Grid Reference: (SN) 268773 200690.

The area under consideration is located on the north eastern boundary of the site and consists of an area for the storage of former network equipment and the storage of 205L used oils drums. Figure 1 in Annex A shows the outline of the area under assessment.

The land is typically flat and covered with roads and hard standing surrounding the site it makes up approximately 0.04 Hectares of the entire Western Power Distribution site at the Clydach Depot.

### 2.2 Surrounding Land Use

The current land use in the area is primarily industrial with some office space and car parking nearby, the main current land uses include:

- Transport, storage and delivery;
- Fuel distributors and supply;
- Industrial products such as signs and access equipment; and
- Motoring, vehicle repair testing and servicing.

The majority of surrounding land to the north and west is developed and consists of hard standing, commercial and industrial premises. The Western Power Distribution site borders the River Tawe to the south and south east and woodlands to the west.

### 2.3 Site Layout - Operations and Infrastructure

The following observations were made during the site walkover carried out on 7 October September 2015.

The area under application consists of concrete hard standing with surface water drains defining the boundary. The site is secured from outside by steel fencing and has open access into the site to allow for deliveries of former network equipment and the movement of pallets.

There was evidence of staining on the concrete hard standing at the time of the visit and spill kits were present and advertised across the site. Photo 1 and Photo 2 show the storage of the oil drums and former network equipment such as transformers at the site.

Drainage from the drum store and equipment area is collected in an Aco drain and then pumped to the surface water drainage system by a sump pump. The surface water drainage systems passes through a single chamber interceptor and then a double chamber interceptor prior to discharging to the River Tawe south east of the site.

The Clydach Depot Environmental Management Map is shown in Figure 2 Annex A.

## 2.4 Site History

The site is located under the authority of Swansea City Council<sup>1</sup> and a review of planning applications and historical maps of the site are described below and presented in Annex C.

## 2.5 Planning History

There are many planning applications associated with the postcode SA6 5BQ and the applications made in the last 10 years have been shown below in Table 2.1.

**Table 2.1: Planning applications based on postcode SA6 5BQ**

Date	Application No.	Address	Application Description
17/07/2014	2014/0720	Clydach Market, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Change of use from market (Class A1) to offices, storage, distribution and maintenance yard (Class Sui Generis), single storey modular extension, gate house, external alterations, 2.4 metre boundary fence and associated works including demolition of single building
16/10/2013	2013/0851	Clydach Market, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Change of use from market (Class A1) to offices, storage, distribution and maintenance yard (Class Sui Generis), single storey modular extension, gate house, external alterations, 2.4 metre boundary fence and associated works including demolition of single building
07/01/2013	2012/1694	Welsh Water Players Industrial Estate Clydach Swansea SA6 5BQ	Temporary siting of a portable building
16/07/2012	2012/0951	Western Power, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Construction of building to house fire engine/pump vehicle and ancillary equipment
03/07/2012	2012/0946	Clydach Coal Yard Players Industrial Estate Clydach Swansea SA6 5BQ	Siting of a mobile catering unit
30/10/2009	2009/1544	Welsh Water Players Industrial Estate Clydach Swansea SA6 5BQ	Temporary siting of a portable building
07/05/2008	2008/0963	Clydach Market, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Additional use for indoor sporting and musical events and exhibitions (Class D2)
17/12/2007	2007/2496	Land North West of Merthyr House, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Construction of 6 no. industrial units and associated car parking on land north west of Merthyr House, Players Industrial Estate, Clydach
12/12/2007	2007/2780	Land North West of Merthyr House Players Industrial Estate Clydach Swansea SA6 5BQ	Erection of 8 no. industrial lock-up units
01/09/2006	2006/1970	Welsh Water Players Industrial Estate Clydach Swansea SA6 5BQ	Temporary siting of a portable building
15/04/2005	2005/0851	Unit 9 Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Single storey rear extension, enclosed by 2.4 metre high palisade fencing

The planning application relating to the change of use at Clydach Market was accompanied by a Phase II Site Investigation. The site is located approximately 200m south of Clydach Market and the investigation report is summarised in Section 5 of this report and presented in Annex E.

## 2.6 Historical Mapping

Historical maps have been collated dating back to 1877 and these are presented in Annex C.

Based on the historical maps a summary of the site's key development over time is given in Table 2.2:

<sup>1</sup><http://www.swansea.gov.uk/>

**Table 2.2: Summary of key developments shown in historical maps**

<b>Date</b>	<b>Key Features</b>
1877	The site is located in a field bounded by the River Tawe in the east and south and the Cwym Clydach Railway station and line to the north and west. Clydach foundry, brick, tin and gas works are located north of the site. Patent Fuel Works are located south west of the site.
1897-1899	The site remains undeveloped however there is a new building located north east. The building is named Glan-yr-afon Works. A small excavation has appeared south east of Cwym Clydach Railway Station – north east of the site.
1914	No significant changes. There is evidence of extensive quarrying taking place in the region although not present on site.
1961	The excavation is now a significant size and has shown changes in its boundary throughout this time. A crane is present in the excavation. Sinks and issues are identified on the 2002 map showing where groundwater appears in springs and then drains back into the underlying formation.
1971	The railway line appears to have been decommissioned and the land to the east of it, including the site, is mapped as marshlands.
1975	The excavation north of the site is no longer present and may have been backfilled.
1980	The site remains undeveloped with no significant changes. The surrounding area has become more developed with buildings and infrastructure.
1993	Somme landscaping has occurred and site boundaries have been defined.
2002	Between 1993 and 2002 there has been a depot built on site and the current layout is present. Historical aerial images from Google Earth suggest the depot was constructed in or around 1999.
2010	The area is named as an industrial estate on the Ordnance Survey map. No significant changes on site.

The site has not had a long industrial history with the current depot being constructed in around 1999. Based on the historical maps it has been an electricity facility since its construction.

## 2.7 Potentially Contaminative Land Uses

There are 16 records of potentially contaminative current land uses and industrial processes within 250m of the site. They include electrical features including infrastructure and facilities on site, industrial infrastructure and unspecified works or factories.

There are 186 records of potentially contaminative historical land uses identified within 500m, these are presented in Annex D and Section 1.1 of Groundsure Report GS2523307. The historical contaminative uses are based on the historical mapping in Annex C and include former railway sidings, the foundry, gas works and tin plate works.

There is an area of potentially infilled land based on historical mapping north east of the site shown in Annex D Section 1.0.

## 3 Environmental Setting

### 3.1 Geology

The geology has been determined from the British Geological Survey Map App<sup>2</sup> and the Groundsure Report, Annex D, which is derived from the BGS 1:50,000 Digital Geological Map of Great Britain.

The site lies on superficial deposits overlying bedrock. The superficial deposits are Alluvium made up from Clay, Silt, Sand and Gravel. The superficial deposits formed up to 2 million years ago in the Quaternary Period formed from rivers depositing mainly sand and gravel detrital material in channels to form river terrace deposits, with fine silt and clay from overbank floods forming floodplain alluvium, with some bogs depositing peat.

<sup>2</sup> <http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>

The underlying bedrock is the Swansea Member part of the South Wales Upper Coal Measures Formation. It consists of Mudstone, Siltstone, Sandstone, Coal, Ironstone and Ferricrete. The sandstone is a sedimentary bedrock formed approximately 307 to 309 million years ago in the Carboniferous Period.

The sandstone is green-grey containing lithic arenites ("Pennant sandstones") with thin mudstone/siltstone and Seatearth interbedded with thin layers of coals.

The following table shows a summary of the geology taken from a nearby borehole that was progressed as part of the A4067 infrastructure work in 1983 that runs south of the site.

**Table 3.1: Geology of nearby borehole logs**

Borehole ID & Location	Direction and distance from site	Depth (mbgl)	Thickness (m)	Description	Geology
BGS ID: 256156 : BGS Reference: SN60SE36 British National Grid (27700) : 268387,200277	565m south	0.00 to 3.00	3.00	Medium dense becoming dense slightly silty very fine to coarse, very sandy gravel with cobbles and boulders	Alluvium
		3.00 to 20.00	17.00	Very dense slightly silty very fine to coarse sandy gravels with cobbles and boulders	
		20.00 to 32.30	12.30	Grey fine to medium grained slightly weathered sandstone moderately strong to strong highly fractured	Sandstone
		32.30 to 33.30	1.00	Dark grey fine grained moderately to highly weathered siltstone very weak highly fractured with occasional slicken sides	Siltstone
		33.30 to 35.70	2.40	Grey fine to medium grained sandstone moderately weak to moderately strong	Sandstone
		35.70 to 36.20	0.50	Dark grey fine grained highly weathered siltstone very weak highly fractured	Siltstone
Groundwater was encountered throughout drilling works from 0.75mbgl.					

Ref: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

### 3.2 Hydrology & Surface Water Features

There are 35 Detailed River Networks recorded within 500m of the site and these include primary, secondary, tertiary and culverted water courses. The closest primary river is the River Tawe approximately 79m south east of the site. The Detailed River Networks are shown in Figure 3 and described in Section 6.10 of Annex D.

There is biological and chemical surface water quality data for the surrounding waterways. The biological data ranges from B to A suggesting a good to very good biological quality between 2005 and 2009. The chemical quality data also ranges from B to A with a few surface water features beyond 1km scoring C and D however all water courses showed an improvement in chemical water quality between 2005 and 2008.

There are many surface water abstraction licences located within 2000m of the site. Surface water has historically been abstracted from the Swansea Canal and River Tawe and used for process water, effluent dilution and non-evaporative cooling. The closest historical abstraction is located 496m north of the site from the Swansea Canal Swansea Valley and was issued to the British Waterways Board for use in the sewage treatment works.

### 3.3 Hydrogeology

The overlying superficial deposits and bedrock Swansea Member Sandstone are classified as Secondary A Aquifers defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and, in some cases, forming an important source of base flow to rivers.

There are eight groundwater abstraction licences identified within 2000m of the site. These are licensed for pollution remediation and general farming and domestic. The full catalogue of groundwater abstractions is presented in Annex D Section 6.3

There are no source protection zones within 500m of the site and the soil on site is considered to have a high leaching potential due to soil in urban areas having an assumed high permeability in the absence of site-specific information

Based on the borehole log summarised in Table 3.1 and the nearby River Tawe groundwater is considered to be relatively shallow <5m below ground level. Groundwater flow direction is likely to be influenced by sub surface infrastructure associated with the former nearby mining activities, regional topography as well as the River Tawe.

### 3.4 Flood Risk

#### *Surface Water Flooding*

The site is located within a Natural Resources Wales designated Flood Zone 2 and 3 and the risk of flooding from rivers and the sea (RoFRaS) is considered high.

The RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m. The data considers the probability that flood defences will overtop or breach by considering their location, type, condition and standard of protection.

A high RoFRaS designation means that the property is in an area with a 1 in 30, or greater, chance of flooding in any given year.

#### *Groundwater Flooding*

The British Geological Survey (BGS) has identified the potential for superficial groundwater flooding associated with the shallow unconsolidated Alluvium that overlies the bedrock. The confidence rating for this designation is moderate, the rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the British Geological Survey's confidence in the accuracy of the susceptibility result for groundwater flooding.

It is recommended that where the potential for groundwater flooding exists consideration of geological conditions should be given in all land use and planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

### 3.5 Environmental Sensitivity

The site is located within 100m of the Glais Moraine Site of Specific Scientific Interest (SSSI). The SSSI is located 91m south east and has a crescentic form that is thought to represent a retreat stage of the Late Devensian ice sheet, rather than its maximum limit. Exposures along the northern and western margins of the moraine show highly variable composition of till, sand and gravel and also structural features. The Glais moraine has been responsible for local diversion of the River Tawe westwards.

There are also 97 records of Ancient Woodlands located within 2000m of the site with the closest unnamed ancient and semi natural woodland being located 100m south east. None of the other following environmental designations are present within 2000m of the site:

- Area of Outstanding Natural Beauty (AONB);
- National Nature Reserves (NNRs) or National Parks (NPs);
- Special Areas of Conservation (SACs);
- Special Protection Areas (SPAs);
- RAMSARs;
- Environmentally Sensitive Areas (ESAs);
- Nitrate Sensitive Areas (NSAs);
- Nitrate Vulnerable Zones (NVZs);
- World Heritage Sites;
- National Parks (NPs); or
- Greenbelt.

The SSSI and Ancient Woodland map is shown in Annex A, Figure 4 and the citation for the designation of the Glais Moraine SSSI is presented in Annex D.

## 4 Regulatory Setting

The site is currently used for storage of waste oils and former equipment that has been recovered from the network and brought to site.

### 4.1 Environmental Permits

There are no IPC or IPPC Authorisations registered within 500m of the site.

### 4.2 Discharge Consents & Industrial Processes

There are six discharge consents within 500m of the site and these are for trade discharges, sewage treatment effluent and storm water overflow. The closest to the site was registered to Clydach Sewage Treatment Works 116m north west for the discharge of unspecified effluent, the consent was revoked in 1992.

### 4.3 Landfill and Waste Licences

Natural Resources Wales holds records for one landfill operation at Inco Europe Ltd on Glais Road 402m north east of the site. It is licensed to accept industrial waste and is regulated under the Environmental Permitting Regulations EPRINC001. There is an additional former landfill that was licensed to accept inert, industrial, commercial, household and special waste between 1970 and 1987 located 1283m south of the site.

The Local Authority have identified three potential historic refuse tips based on a search of historic mapping, these are all located north east of the site between 432m and 537m. No other information is available regarding these potential refuse tips.

Waste licences exist for five sites within 1500m of the site, they include special waste transfer stations and an ELV Facility.

All waste sites are shown in Figure 5 in Annex A and also Section 3 in Annex D.

#### 4.4 Records of Pollution Incidents & Contaminated Land

Pollution incidents are recorded by Natural Resources Wales on the National Incident Recording System (NIRS) and given a category rating based on their severity of impact caused to water, land and air.

There have been seven recorded List 2 pollution incidents within 500m of the site.

These relate to storm water sewage, fire-fighting runoff and atmospheric pollutants and were registered as Category 3 and 4 incidents having no or minor impacts on land, air and water. There have been no List 1 Incidents recorded.

There are no sites determined as Contaminated Land under the Part 2A Contaminated Land Regulations part of the Environmental Protection Act 1990.

#### 4.5 Petroleum Licences

There are no records of current fuel sites or petrol filling stations within 500m of the site.

#### 4.6 Mining

The Coal Authority has identified evidence of coal mining activity within 75m of the site and this is likely to represent the mining and quarrying works identified in the historic mapping surrounding the site.

## 5 Review of Previous Reports

There are no records available of site investigations or geotechnical surveys on the site however there is a Phase II Geotechnical Site Investigation carried out at the Former Clydach Market Site by Quantum Geotechnical (August 2014)<sup>3</sup> as part of a planning condition.

The report outlines the scope of work and details the findings of the investigative works.

Four trial pits were progressed across the site to depths ranging between 1.0 and 2.0 metres below ground level (mbgl). Each trial pit encountered made ground overlying alluvium. Soil samples were collected and analysed for a range of potential contaminants including metals, inorganics, hydrocarbons and leachability. No groundwater was encountered at the time of the investigation.

The results of the assessment concluded that all concentrations of potential contaminants tested were below the specified guidelines for commercial end use. None of the trial pits were excavated below the superficial alluvium deposits.

The leachability testing indicated that Copper and Lead marginally exceeded the threshold used for comparison on the Natural Resources Wales/Environment Agency (NRW/EA) website. The overall assessment of risk considered hardness of water, flooding or inundation, mobility of contaminants in the sub surface and the likelihood of natural attenuation. It concluded:

*"A very low residual risk has been highlighted where any flooding or inundation of the made ground might occur. The levels of mobile contamination that could be released by such an event are very*

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<sup>3</sup> Phase II Ground Investigation Report by Quantum Geotechnical on behalf of Dawnus Group Ltd, Report No G351/GIR Rev2, August 2014



*low and will be diluted by any natural attenuation;*

*No remedial measures are therefore considered necessary in re-development of the site for the quoted end use."*

## 6 Environmental Risk Assessment

### 6.1 Risk Assessment Framework

The following environmental risk assessment has been prepared having regard to the source-pathway-receptor model introduced under Part IIA of the Environmental Protection Act 1990 and associated guidance on contaminated land published by the Department of Environment, Food and Rural Affairs.

The methodology is essentially a qualitative assessment based on the identification and evaluation of potential 'source-pathway-receptor pollutant linkages'.

An Environmental Risk Assessment involves assessing the likely probability and consequence of a Pollutant Linkage existing and determining a consequent level of risk. A pollutant linkage will only be present where the sources pathways and receptors are all present. For a risk to exist all three of the following components must be present:

- Source of contamination;
- Pathway for the contaminant to move from source to receptor; and
- Receptor that could be affected by the contaminant.

The following sections identify the potential sources, pathways and receptors present on site and assess the potential linkages.

### 6.2 Potential Sources

The following table identifies the potential sources of contaminants on the site and qualitatively assesses their significance on a scale of 1 (Low) to 5 (High) versus the likelihood on a scale of 1 (Unlikely) to 3 (Very likely).

The risk score is the product of the significance and likelihood has been categorised as follows:

1-4 = Low Potential Risk

5-10 = Medium Potential Risk

11-15 = High Potential Risk

**Table 6.1: Potential Sources On Site**

ID	Potential Source	Potential Significance (1 Low 5 High)	Likelihood (1 Unlikely 3 Very Likely)	Risk Score
1	Unidentified Historic/Legacy contamination in the sub surface	3	2	6
2	Leaky drums and equipment over time	2	2	4
3	Catastrophic spills of chemicals/solvents/hydrocarbon fuels and loss of primary containment	2	2	4

The potential sources are considered low risk on the whole apart from the unidentified historic/legacy contamination in the sub surface beneath the site.

### 6.3 Potential Pathways

The following table identifies the potential pathways that exist on site.

**Table 6.2: Potential Pathways On Site**

<b>ID</b>	<b>Potential Pathways</b>
1	Vertical leaching through the soils
2	Aquifer flow
3	Dermal contact and ingestion during excavation without PPE
4	Inhalation during excavation/wind blown

### 6.4 Potential Receptors

The following table identifies the potential receptors that have been identified on site and in the surrounding area.

**Table 6.3: Potential Receptors**

<b>ID</b>	<b>Potential Receptors</b>
1	Site employees at surface
2	Construction workers (excavation crews)
3	Surface water features including ecosystems
4	Groundwater beneath the site

### 6.5 Potentially Complete SPR Linkages

By combining the information in the source pathway receptor tables the potentially complete linkages have been assessed and are shown in Table 6.4. There are a total of 12 potentially complete linkages, this is considered conservative as no significant impacts have been identified on or nearby the site and there are very few likely receptors.

**Table 6.4: Review of all SPR Linkages identified on site**

Potential Receptors					
Potential Sources		Site employees at surface	Construction workers (excavation crews)	Surface water features including ecosystems	Nearby Groundwater
	Unidentified Historic/Legacy contamination in the sub surface	Inhalation	Inhalation, ingestion, dermal contact	Aquifer flow, drainage channels	Vertical leaching and migration through strata to groundwater
	Leaky drums and tanks holding transformer oils. Transformers and network equipment leaking/residual oils	Inhalation, ingestion, dermal contact	Inhalation, ingestion, dermal contact	Permeable hard standing, aquifer flow, drainage channels	Permeable hard standing, vertical leaching and migration through strata to groundwater
	Catastrophic spills of chemicals/solvents/hydrocarbon fuels and loss of primary containment	Inhalation, ingestion, dermal contact	Inhalation, ingestion, dermal contact	Permeable hard standing, aquifer flow, drainage channels	Permeable hard standing, vertical leaching and migration through strata to groundwater

**Table 6.5: Summary of potentially complete SPR Linkages and rationale for risk rating identified on site**

Source	Pathway	Receptor	Risk	Rationale
Unidentified Historic/Legacy contamination in the sub surface	Inhalation of vapours	Site Workers	Low/Medium	There is the potential for unaccounted legacy contamination in the subsurface. By using the correct PPE and EMS this potentially medium risk would be mitigated.
	Dermal contact and ingestion	Construction Worker	Low/Medium	By using the correct PPE and EMS this potentially medium risk would be mitigated.
	Aquifer flow, drainage and utility trenches discharging to springs and nearby rivers	Surface Water Features including ecosystems	Low	The vertical seepage pathway is cutoff by the engineered hard standing, where competent, therefore leachate production is limited.
	Vertical leaching through soil profile	Nearby Groundwater	Low	The vertical seepage pathway is cutoff by the engineered hard standing, where competent, therefore leachate production is limited.
Spills, leaks and loss of primary containment – cumulative effects/Catastrophic spills.	Inhalation of vapours	Site Workers	Low	There may be occasions when chemicals/hydrocarbons are brought onto site and a loss of containment may occur. With a robust incident response and management system in place including the use of the correct PPE the risk is considered low.
	Dermal contact and ingestion	Construction Workers	Low	Loss of containment of chemicals/hydrocarbons and the cumulative effect of small-scale drips and leaks over time with a history of contaminative land uses may result in an impacted soil. With a robust incident response and management system in place including the use of the correct PPE the risk is considered low.
	Discharge points from the site or catastrophic overland runoff, bund failure, leaky	Surface Water Features including ecosystems	Low/Medium	By having hardstanding on site and an incident management plan in place this risk is minimised however the connection to the surface water discharge system should be reconsidered along with secondary containment of drums in a self bunding steel container.
	Vertical leaching through soil profile	Nearby Groundwater	Low	By having competent hard standing and an incident management plan in place this risk can be minimised. With a robust incident response and management system in place including the use of the correct PPE and spill kits the risk is considered low.

## 7 Conclusion & Recommendations

### 7.1 Conclusions

Overall the site would be given a classification of low risk based on the existing processes on site.

The medium risks are associated with the surface water drainage discharge and the risk of spills and leaks from the drum store/equipment storage facility.

Unidentified contaminated materials may be present in fill material beneath the site however the likelihood is, if present, their mobility is limited in the alluvium and the leaching potential from the overlying existing hard standing is minimal.

By implementing the correct environmental management systems on site the potential impacts associated with continued operation would not be considered significant and unlikely to pose a threat to the existing site condition.

### 7.2 Recommendations

The following recommendations have been made to enable the potential impacts of a completed SPR linkage to be reduced and in some cases eliminated.

1. *Containerise the existing oil drum store* – Self bunding systems would be preferred to reduce the risk of leaks and spills into the existing surface water drainage system.
2. *Personal protective equipment (PPE) and due care and attention during excavation or earthworks* - To reduce the potential for dermal contact, ingestion and/or inhalation of potential contaminants all site workers involved in excavation of soils should wear the correct PPE as a precaution. Dust suppression could also be employed as an additional protective system including surface runoff management.
3. *Hard Standing* - Undertake regular inspections of the hard standing to ensure competence. Areas showing signs of wear and tear should be repaired and joints sealed as soon as feasibly possible. The hard standing provides the first level of environmental protection in the event of a spill and also minimises infiltration of precipitation, therefore, reducing the risk of mobilising any contamination in the sub surface;
4. *Pollution Prevention Management Systems* - A pollution management system should be put in place (if not already existing) to ensure staff on site are able to manage a potentially environmentally damaging incident as well as adopting best practice when handling potentially contaminating materials. This includes using drip trays/secondary bunds, on-site spill kits, installation of valves on the surface water drainage system to close off the system in the event of a spill and training on control of the drainage system.

## 8 Statement of Limitations

*This report was prepared in accordance with the scope of work outlined within this report and is subject to the applicable cost, time and other constraints. Paul Downing & Associates Ltd performed the services on behalf of the Client in a manner consistent with the normal level of care and expertise exercised by members of the environmental profession. No warranties, expressed or implied, are made.*

*Except as otherwise stated, Paul Downing & Associates Ltd's assessment is limited strictly to identifying the specified environmental conditions associated with the subject Site and does not evaluate structural or geotechnical conditions of any part of the Site (including any buildings, equipment or infrastructure).*

*All conclusions and recommendations made in the report are the professional opinions of the Paul Downing & Associates Ltd personnel involved with the project and, while normal checking of the accuracy of data has been conducted, Paul Downing & Associates Ltd assumes no responsibility or liability for errors in data obtained from such sources, regulatory agencies or any other external sources, nor from occurrences outside the scope of this project.*

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## 9 Annexes

### ANNEX A Figures

Figure 1 Site Boundary and Location

Figure 2 Clydach Swansea Environmental Management Map

Figure 3 Surface Water Features

Figure 4 Environmental Designations

Figure 5 Landfills and Former Waste Sites

### ANNEX B Photolog

### ANNEX C Historical Maps

### ANNEX D Groundsure Report and SSSI Citation

## **ANNEX A Figures**

**Figure 1 Site Boundary and Location**

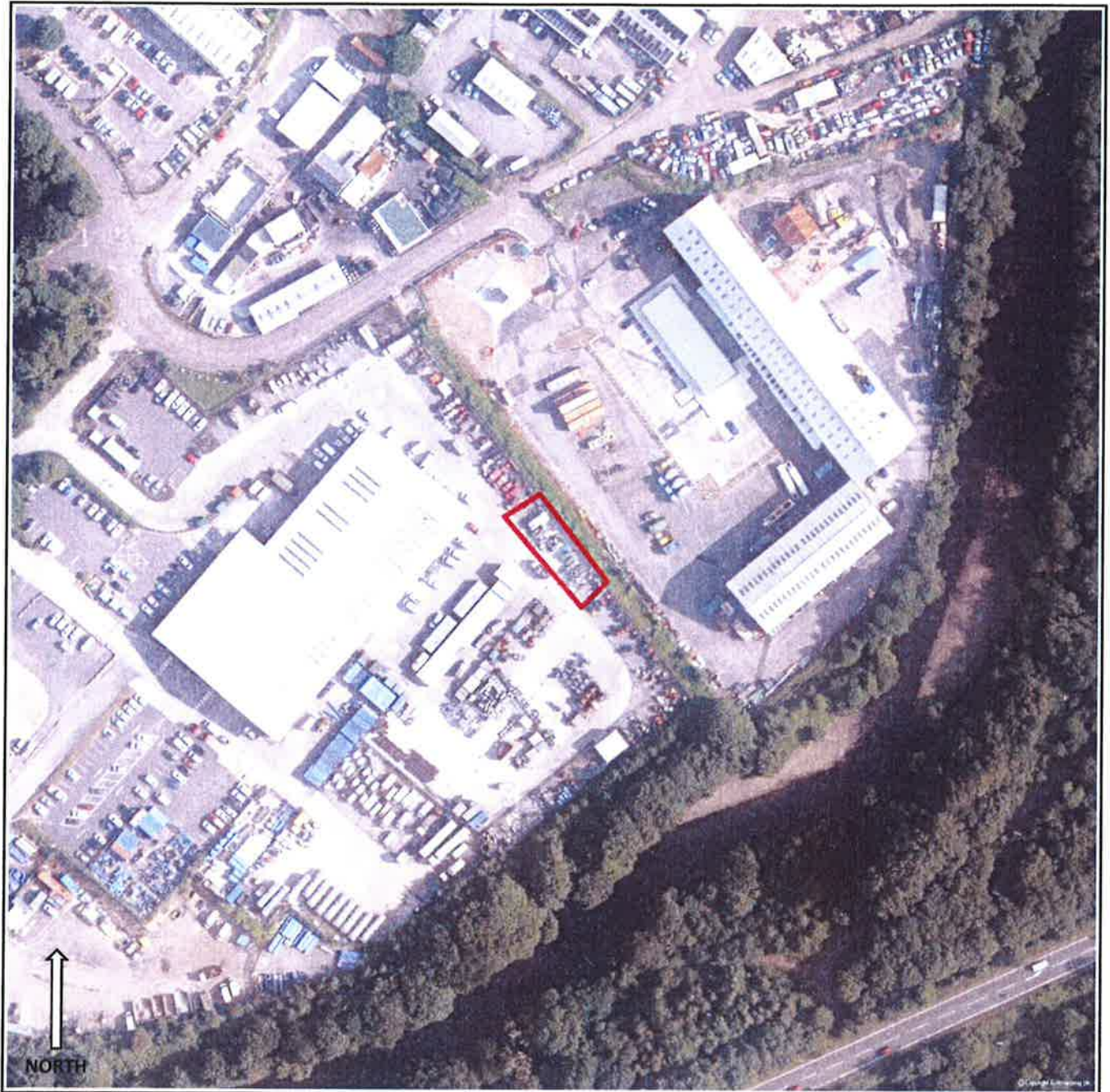
**Figure 2 Clydach Swansea Environmental Management Map**

**Figure 3 Surface Water Features**

**Figure 4 Environmental Designations**

**Figure 5 Landfills and Other Waste Sites**





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### Figure 1 Site Location

Western Power Distribution, Players'  
Industrial Estate, Clydach, Swansea,  
Wales, SA6 5BQ  
Site Condition Report

Reference: GS2523307



ALBERTA SOLUTIONS  
1500, 1st  
2nd Floor East  
Village Park Building  
Edmonton  
Phone: 780.443.4444  
Fax: 780.443.4444  
12-13-08  
Tel: 780.443.4444

WPD CLAYTON DEPOT 0815  
Drainage Plan  
DESIGNED BY: ALBERTA SOLUTIONS  
CHECKED BY: MICHAEL WILLIAMS  
DATE: 12-13-08  
VERSION: 2

SCALE: 1"=100'

- MM 1 6" Main run, 0.75m inv, 2 x 4" outlets
- MM 2 10" Main run, 1.17m inv, 2 x 10" outlets
- MM 3 6" Main run, 0.50m inv, 2 x 4" outlets
- MM 4 6" Main run, 0.25m inv, 1 x 6" outlet
- MM 5 6" Main run, 0.20m inv, 1 x 6" outlet
- MM 6 8" Main run, 0.24m inv, 1 x 8" outlet
- MM 7 9" Main run, 1.20m inv, 2 x 8" outlets
- MM 8 8" Main run, 0.24m inv, 1 x 8" outlet
- MM 9 8" Main run, 0.24m inv, 2 x 8" outlets
- MM 10 8" Main run, 0.22m inv, 1 x 8" outlet
- MM 11 10" Main run, 0.22m inv, 4 x 8" outlets
- MM 12 10" Main run, 1.35m inv, 3 x 8" outlets
- MM 13 Manometer - Center CANS 15x12
- MM 14 Catchment Manhole
- MM 15 Catchment

Storm water system, with flow direction

Foul water system, with flow direction

Presumed storm water system, with flow direction - further information obtained from previous site drainage plan supplied by the client

Presumed foul water system, with flow direction - further information obtained from previous site drainage plan supplied by the client

Storm water gulley

Manhole with reference number

Roof water down pipe

Areas of potentially poor storage or use

Existing Control Measures



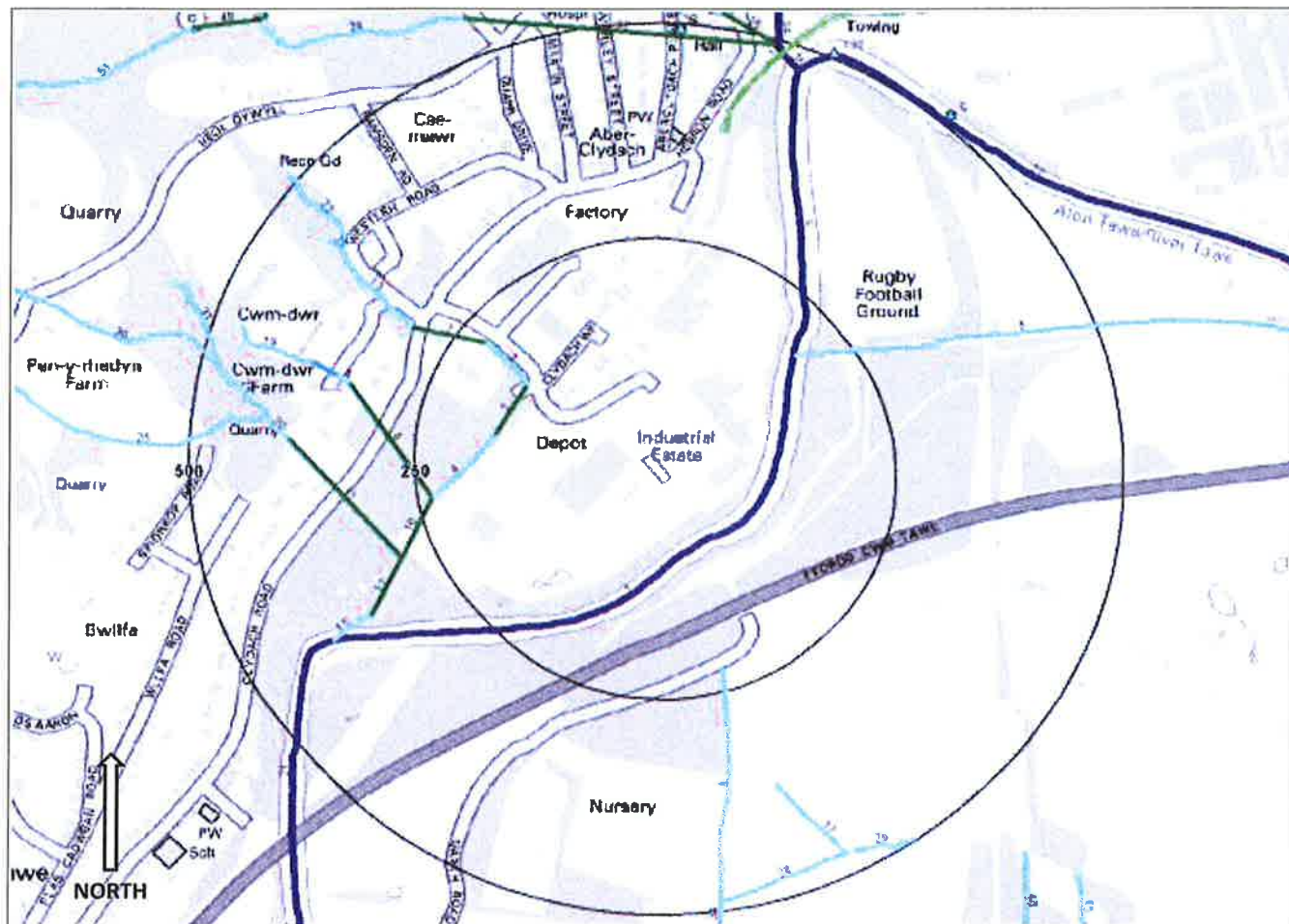
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Figure 2 WPD Environmental Management Plan

Western Power Distribution, Playfair Industrial Estate, Cheltenham, Swanscombe, Kent, SE26 5BQ, HS Site Condition Report

Reference: WPD





Mapping  
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Site Outline

250 Search Buffers (m)  
500

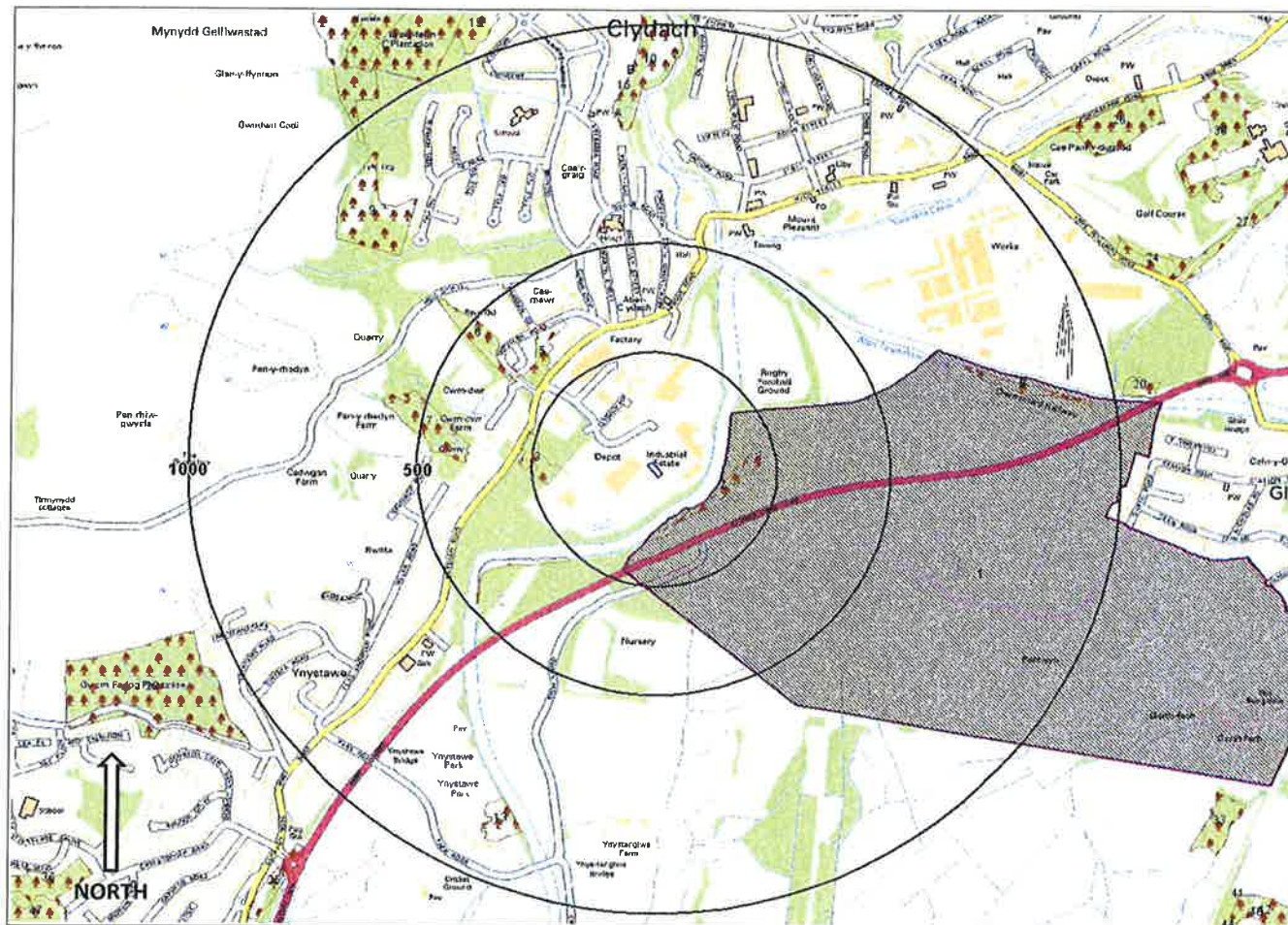
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|--|---------------------------------------|--|-------------------------------------|
|  | Primary River                         |  | Canal                               |
|  | Secondary River                       |  | Canal Tunnel                        |
|  | Tertiary River                        |  | Culvert                             |
|  | Lake/Reservoir                        |  | Multiple Channel Culvert            |
|  | Underground River (Inferred)          |  | Underground River (Potential Sewer) |
|  | General Quality Assessment: Biology   |  | Underground River (Local knowledge) |
|  | General Quality Assessment: Chemistry |  |                                     |

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### Figure 3 Hydrology

Western Power Distribution, Players'  
Industrial Estate, Clydach, Swansea,  
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H5 Site Condition Report

Reference: GS2523307



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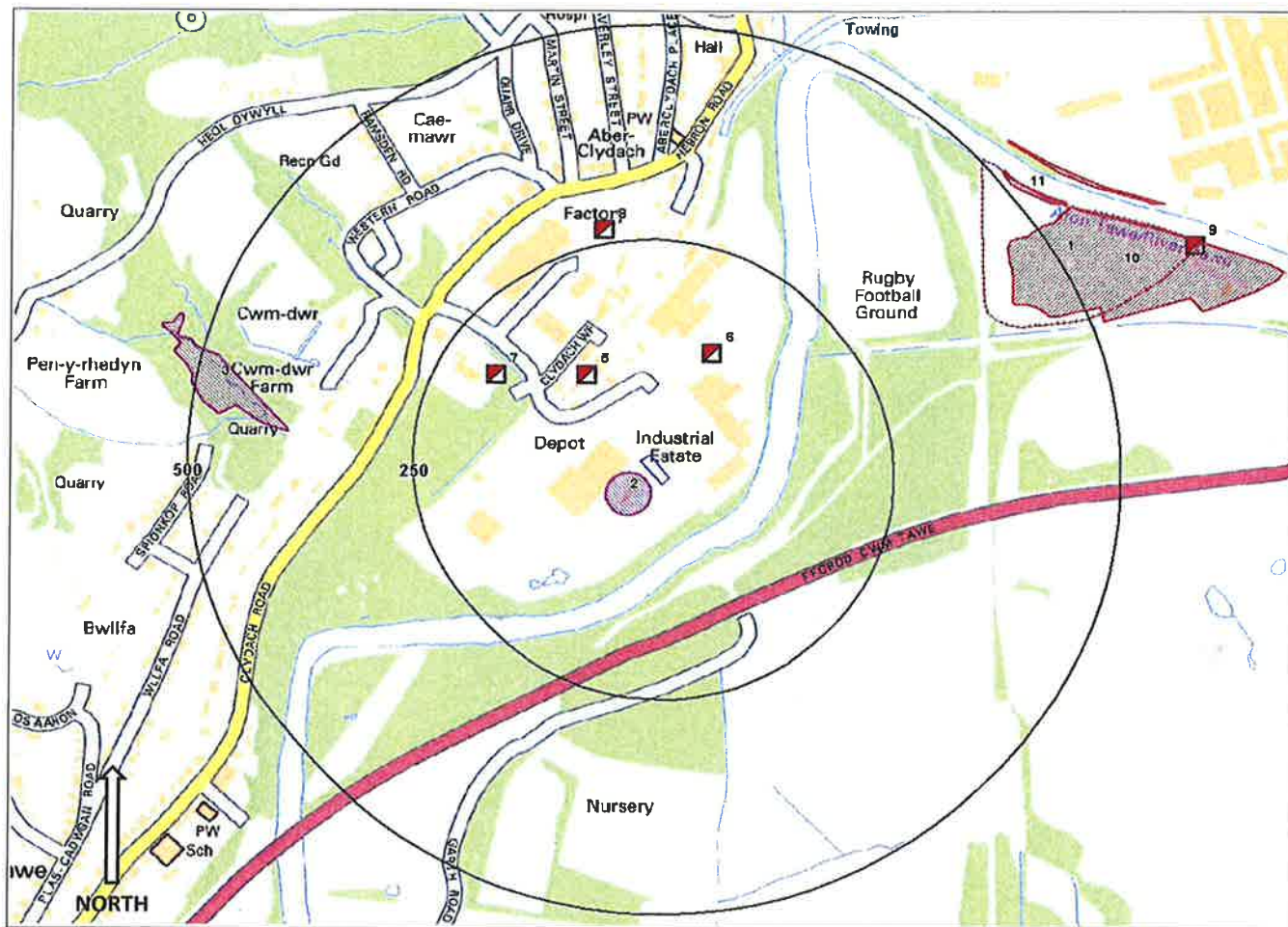
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#### Figure 4 Environmental Designations

Western Power Distribution, Players'  
Industrial Estate, Clydach, Swansea,  
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HS Site Condition Report

Reference: GS2523307





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- |  |                           |  |   |  |                                  |
|--|---------------------------|--|---|--|----------------------------------|
|  | Site Outline              |  | E.A. Active Landfill                                |  | Historic and Planned Waste Sites |
|  | Search Buffers (m)        |  | E.A. Historic Landfill                              |  | E.A. Licensed Waste Site         |
|  | BGS / DoE Survey Landfill |  | Local Authority/Historical Mapping Landfill Records |  |                                  |

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#### Figure 5 Landfill and Waste Sites

Western Power Distribution, Players  
Industrial Estate, Clydach, Swansea,  
Wales, SA6 5BQ  
H5 Site Condition Report

Reference: GS2523307

## **ANNEX B Photolog**



Photograph 1: Equipment store and drum store



Photograph 2: Drum store, minor leakage on hard standing

## **ANNEX C Historical Mapping**



## Site Details:

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SWANSEA, SA6 5BQ

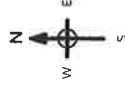
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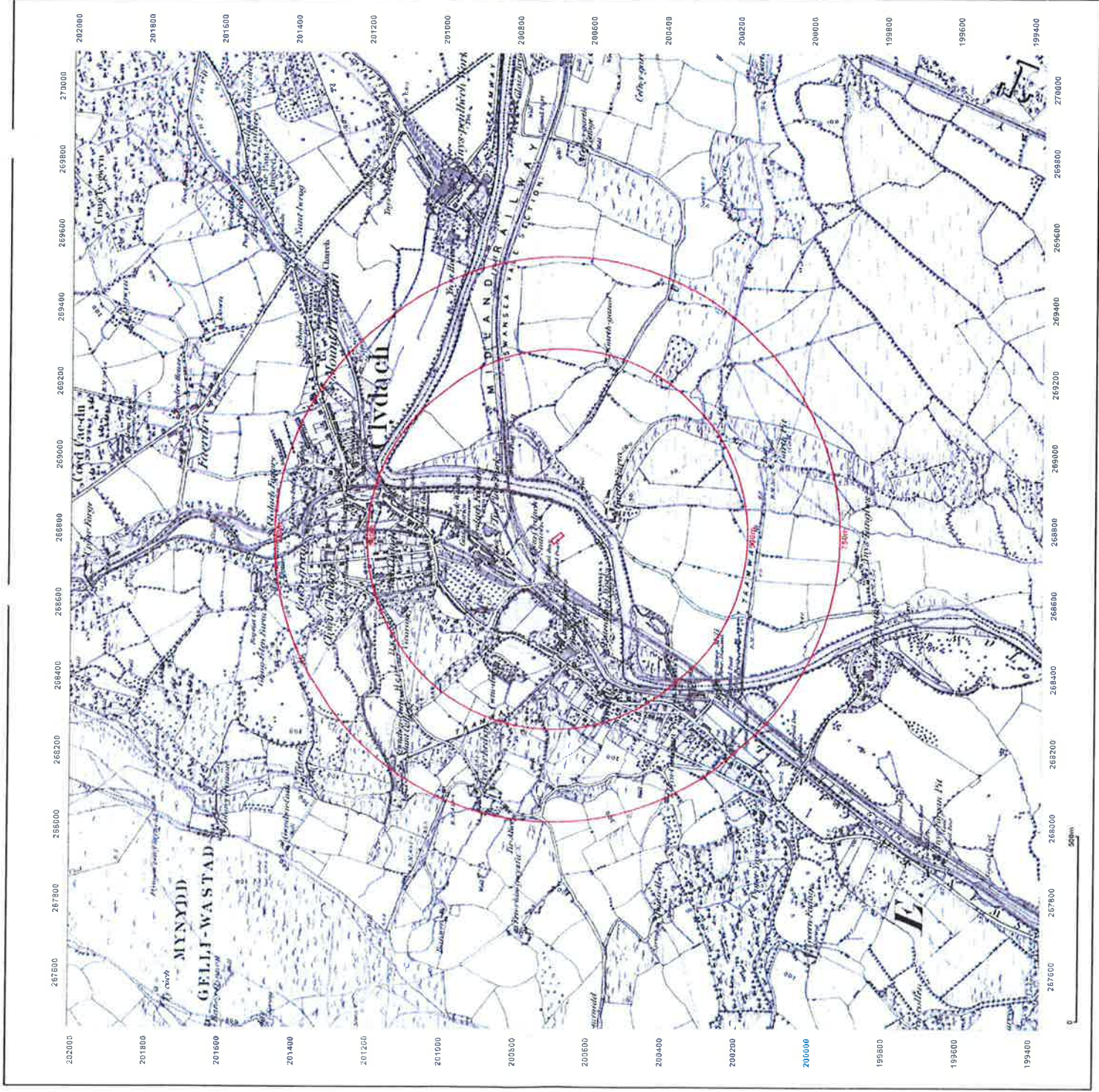


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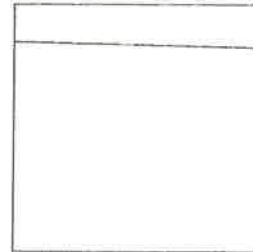
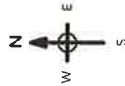
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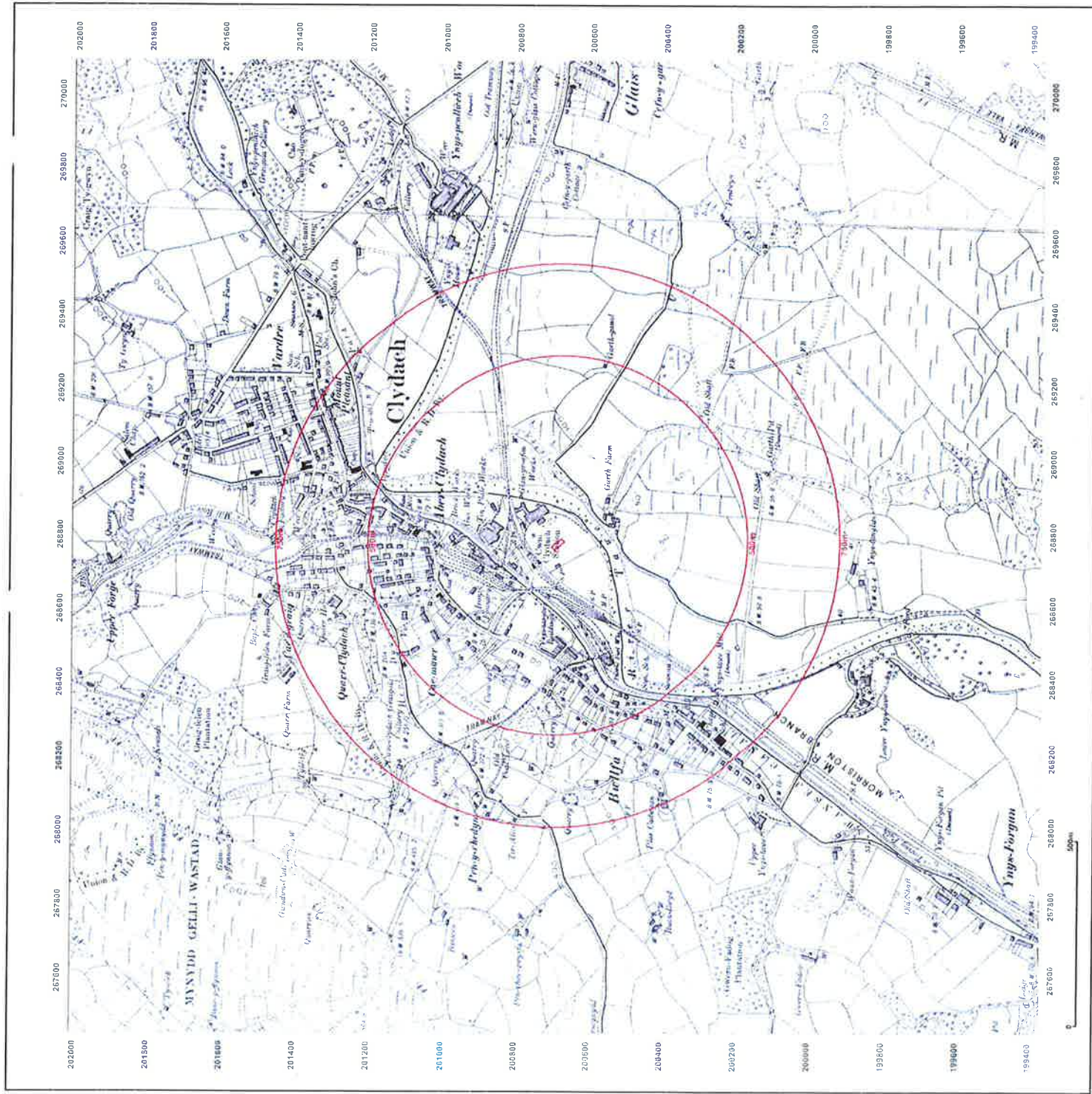


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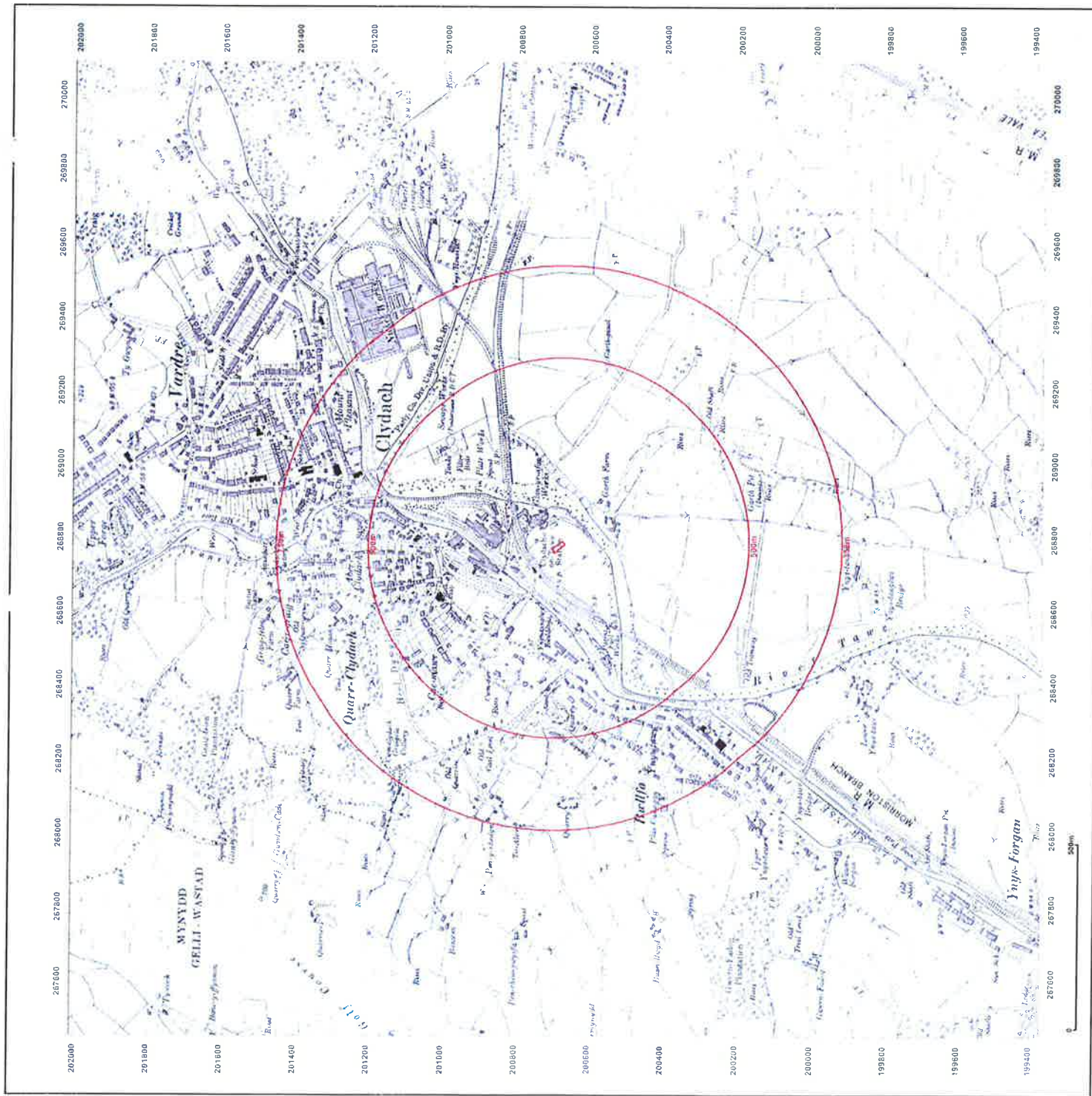


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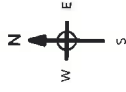
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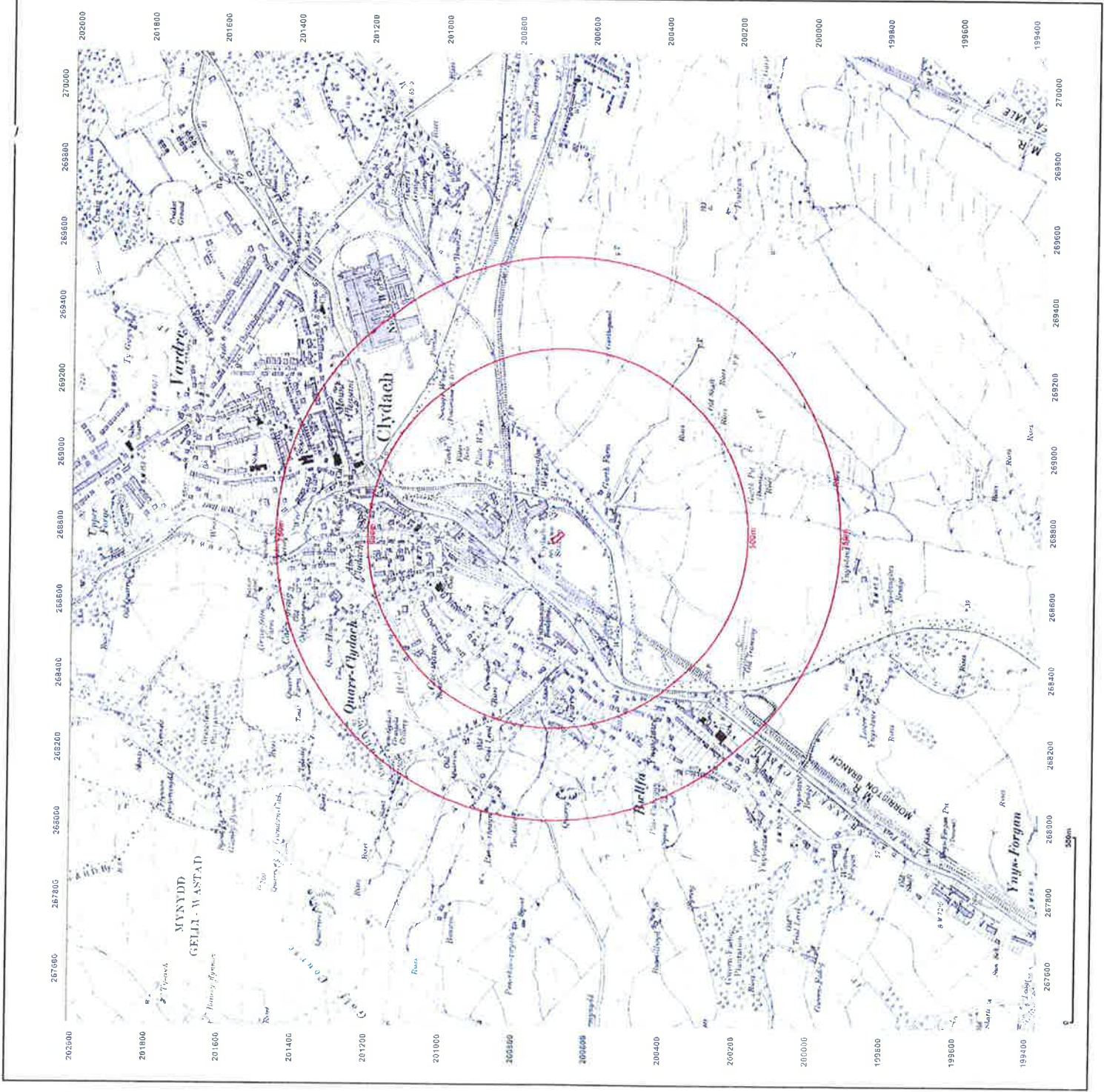


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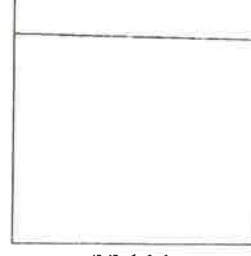
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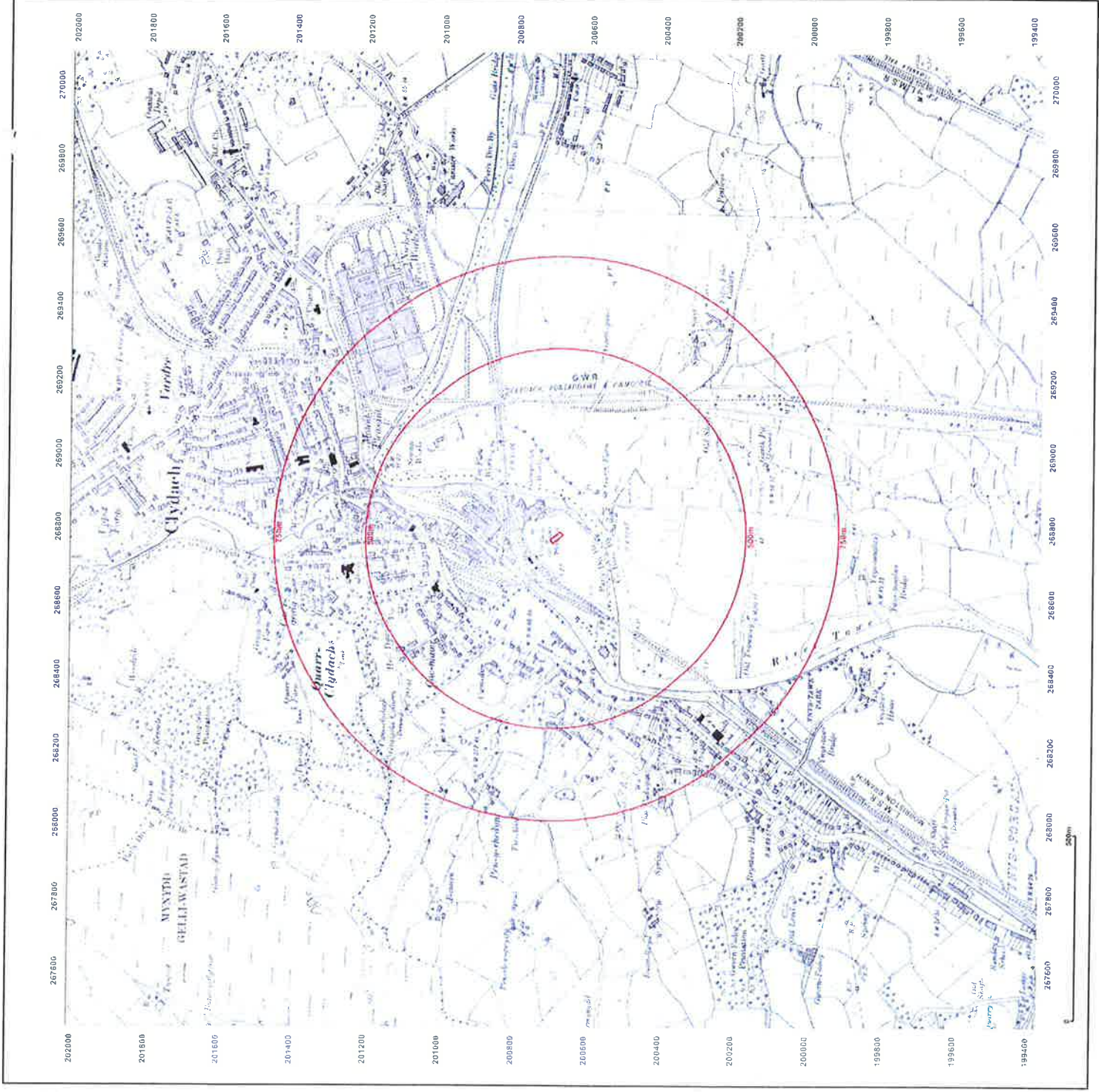


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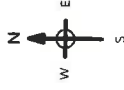
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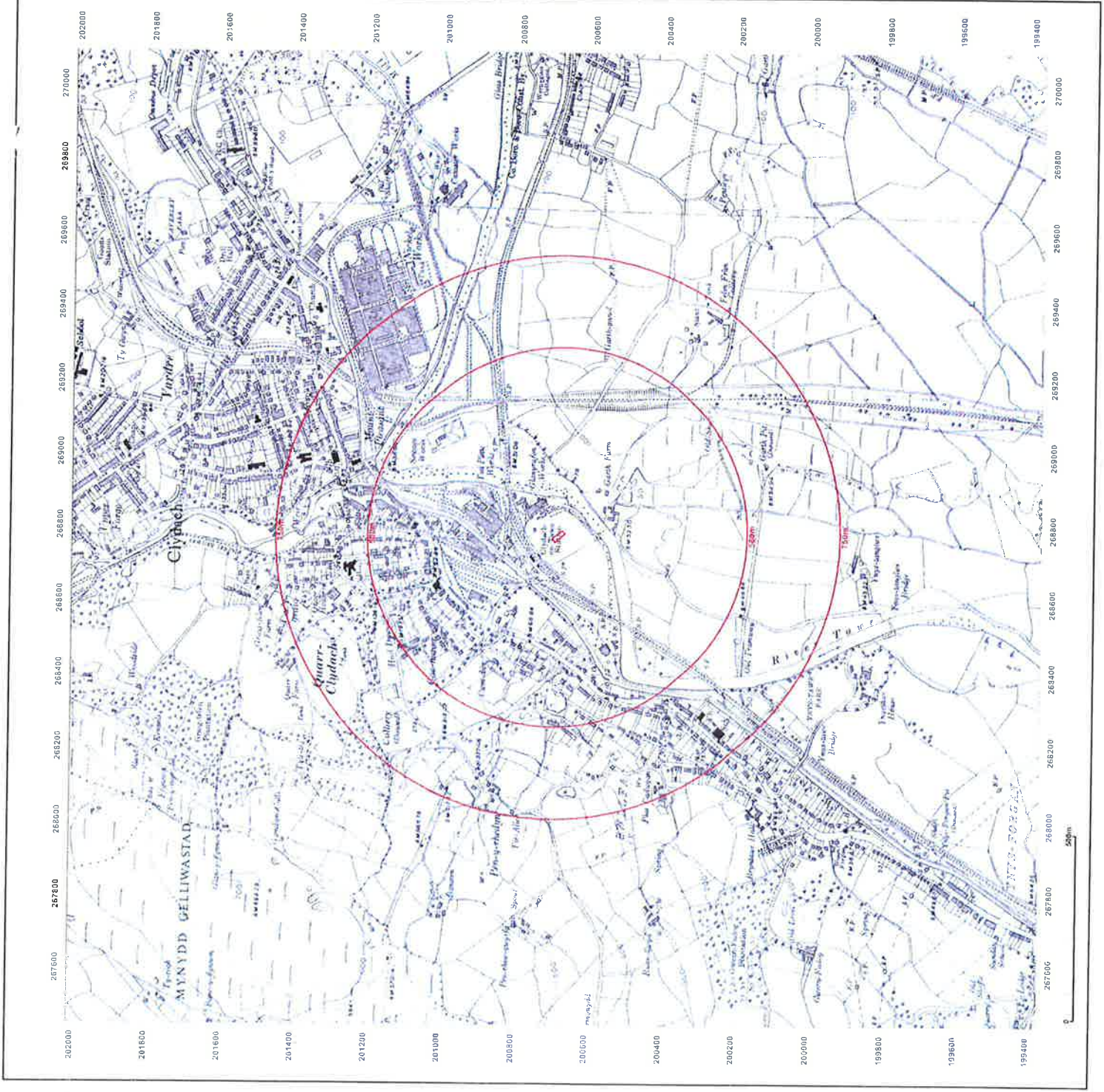


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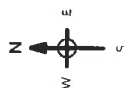
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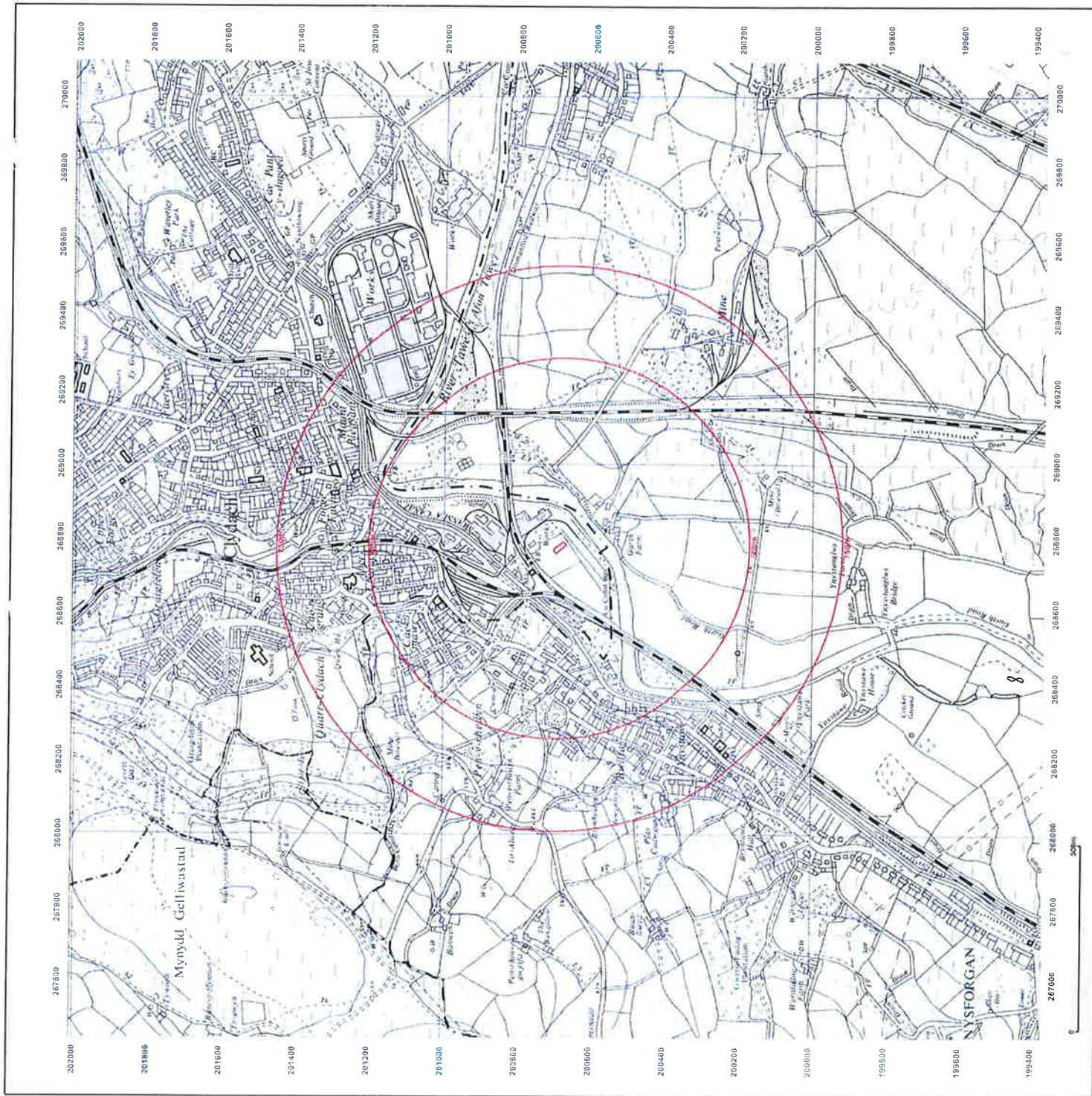


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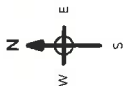
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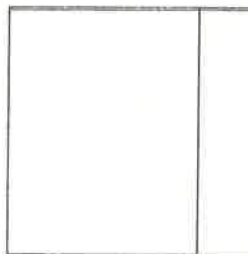
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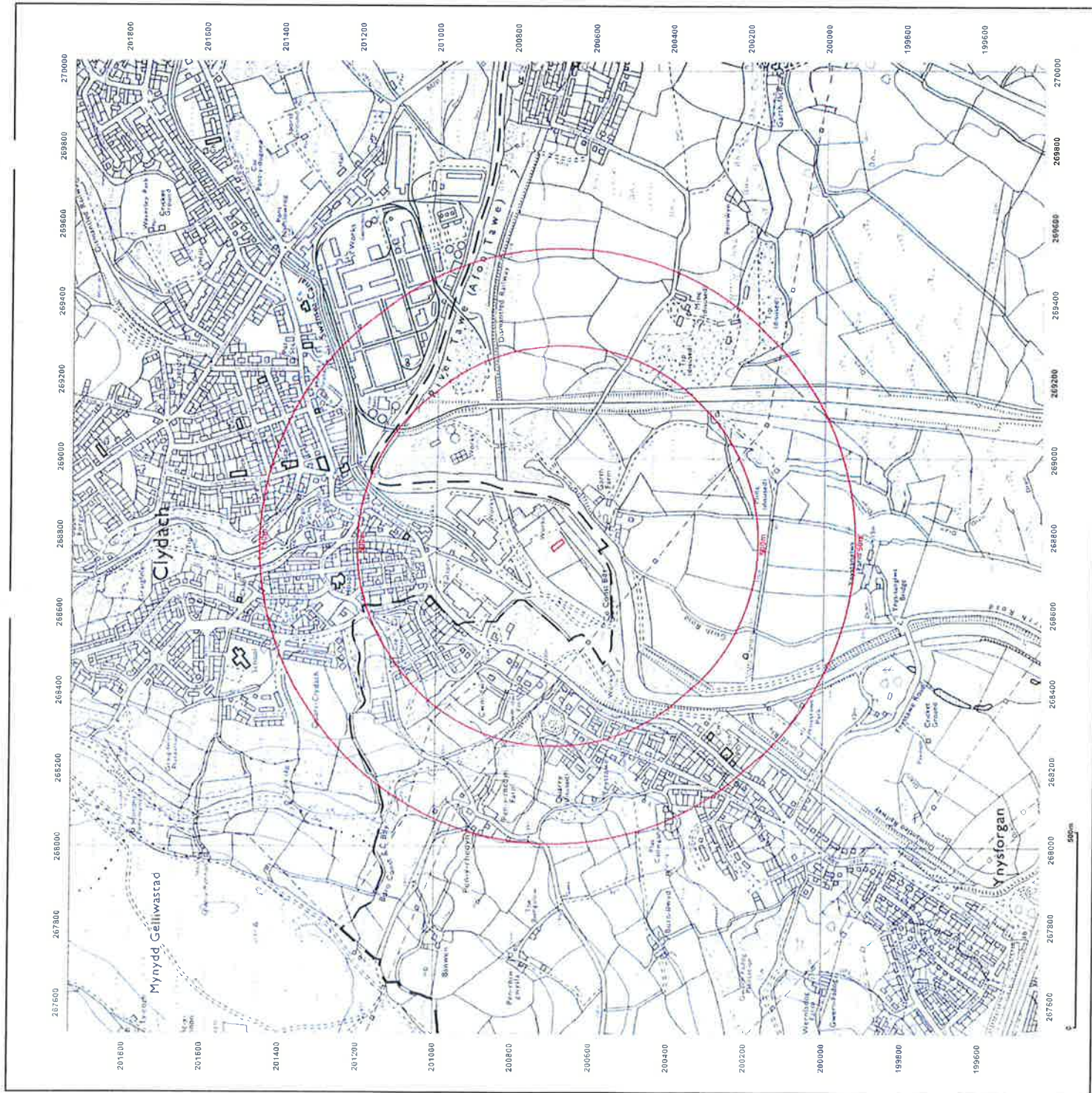


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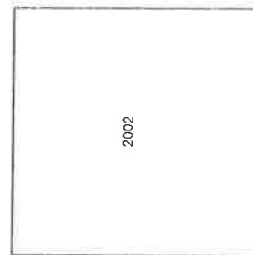
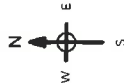
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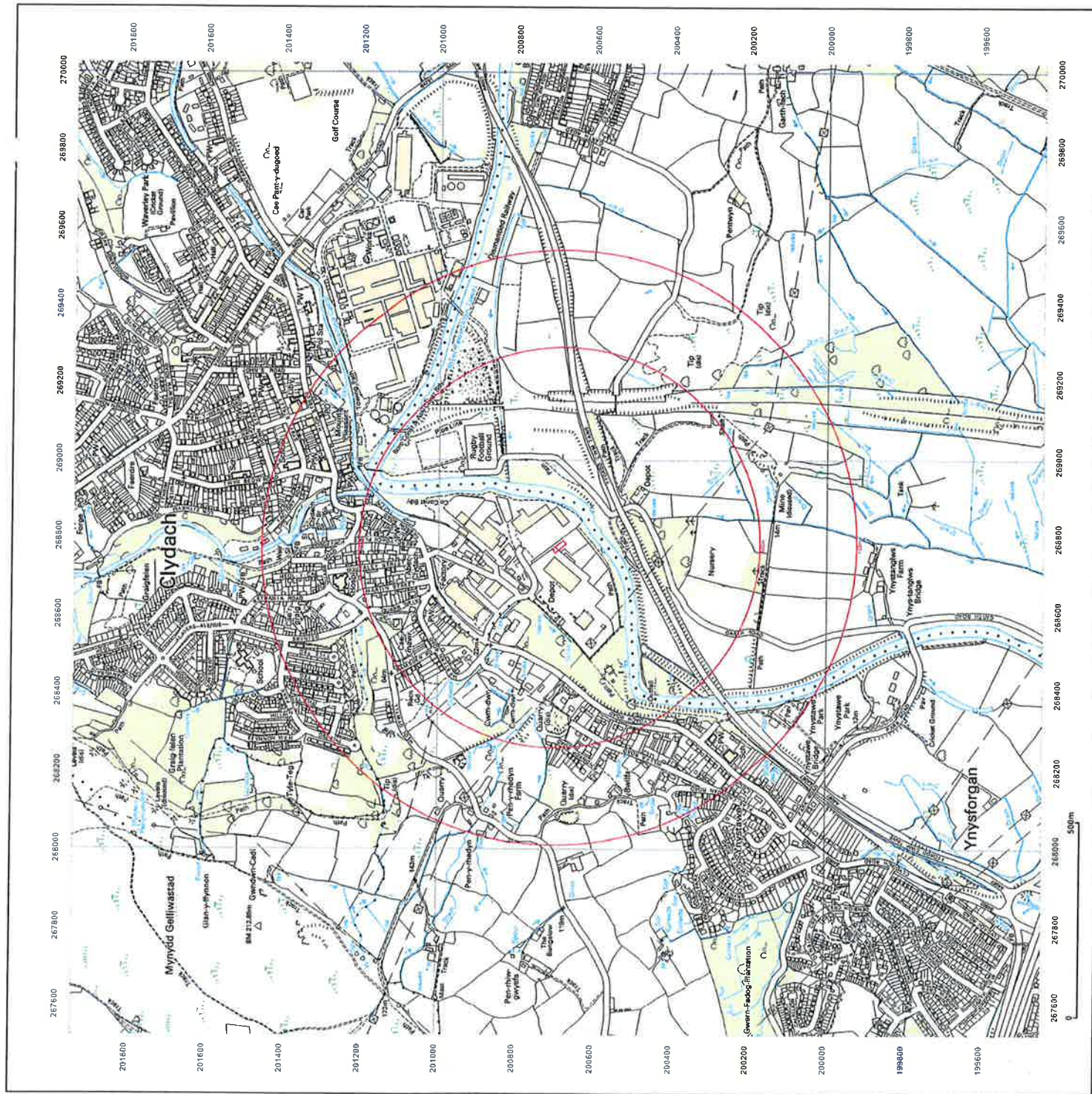


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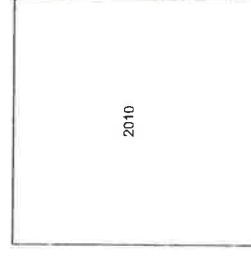
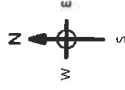
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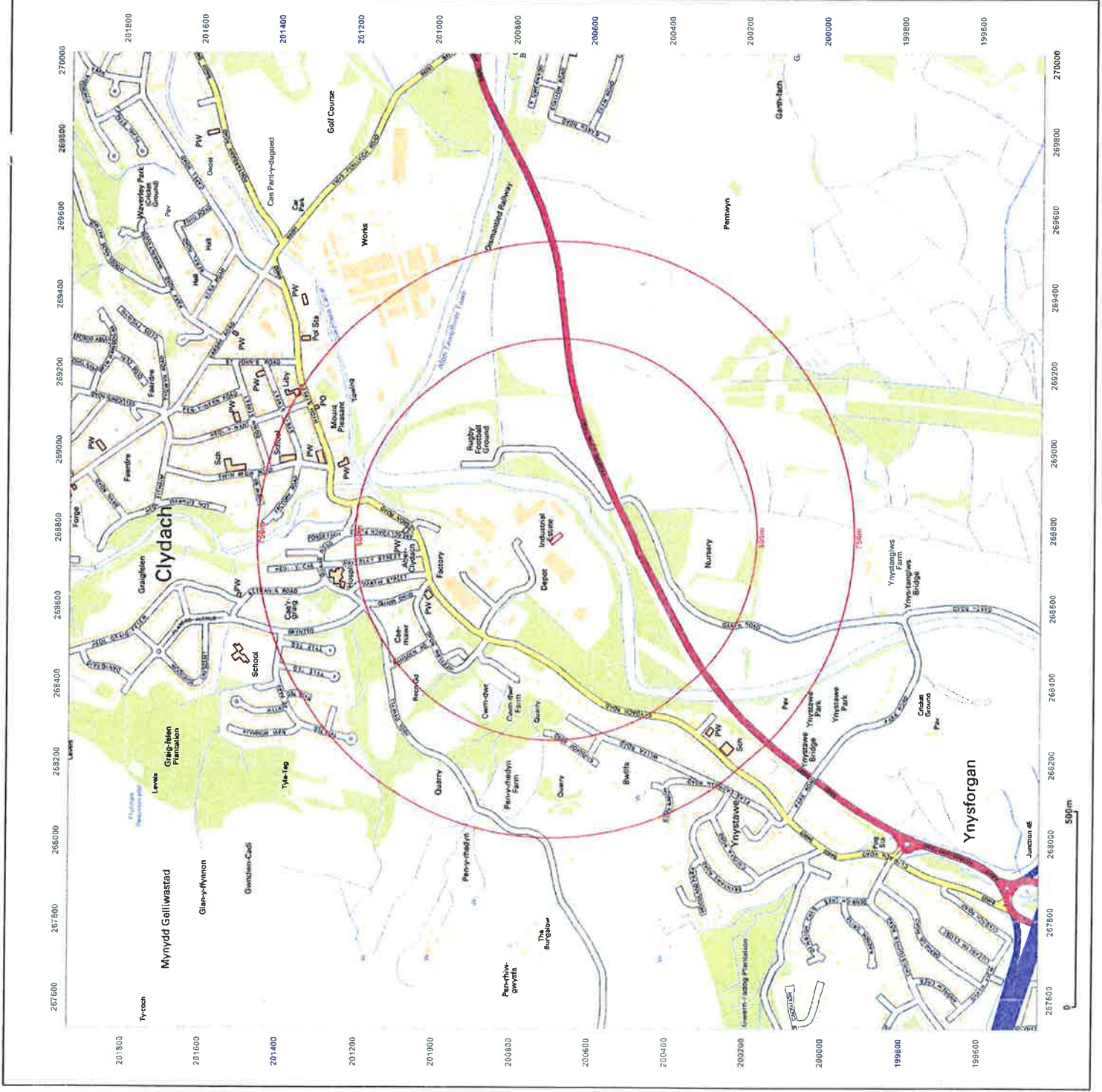


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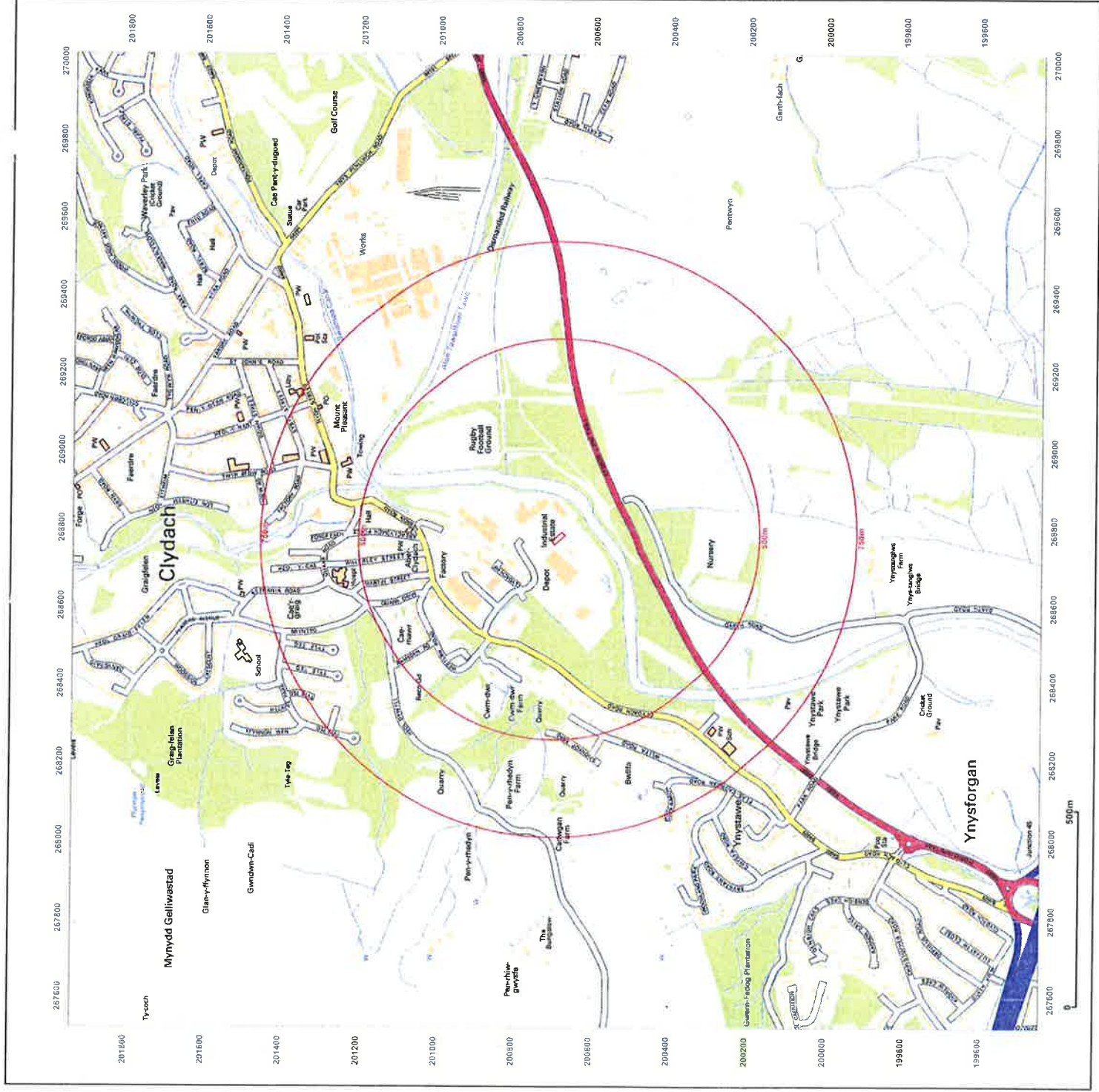


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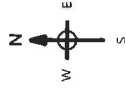
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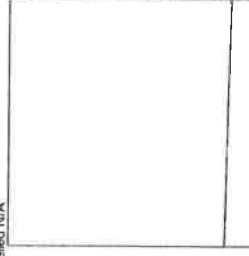
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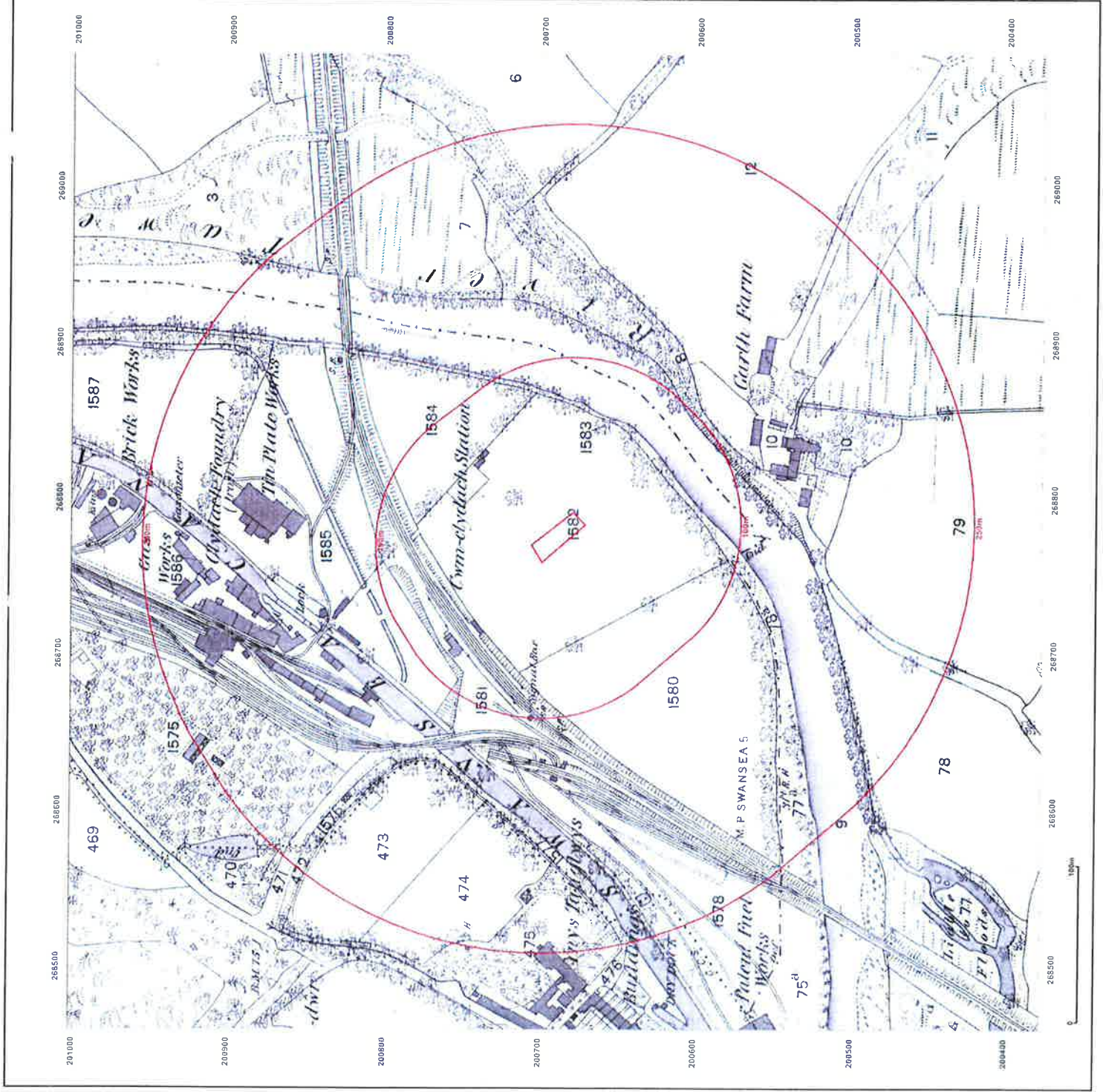


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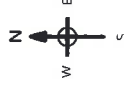
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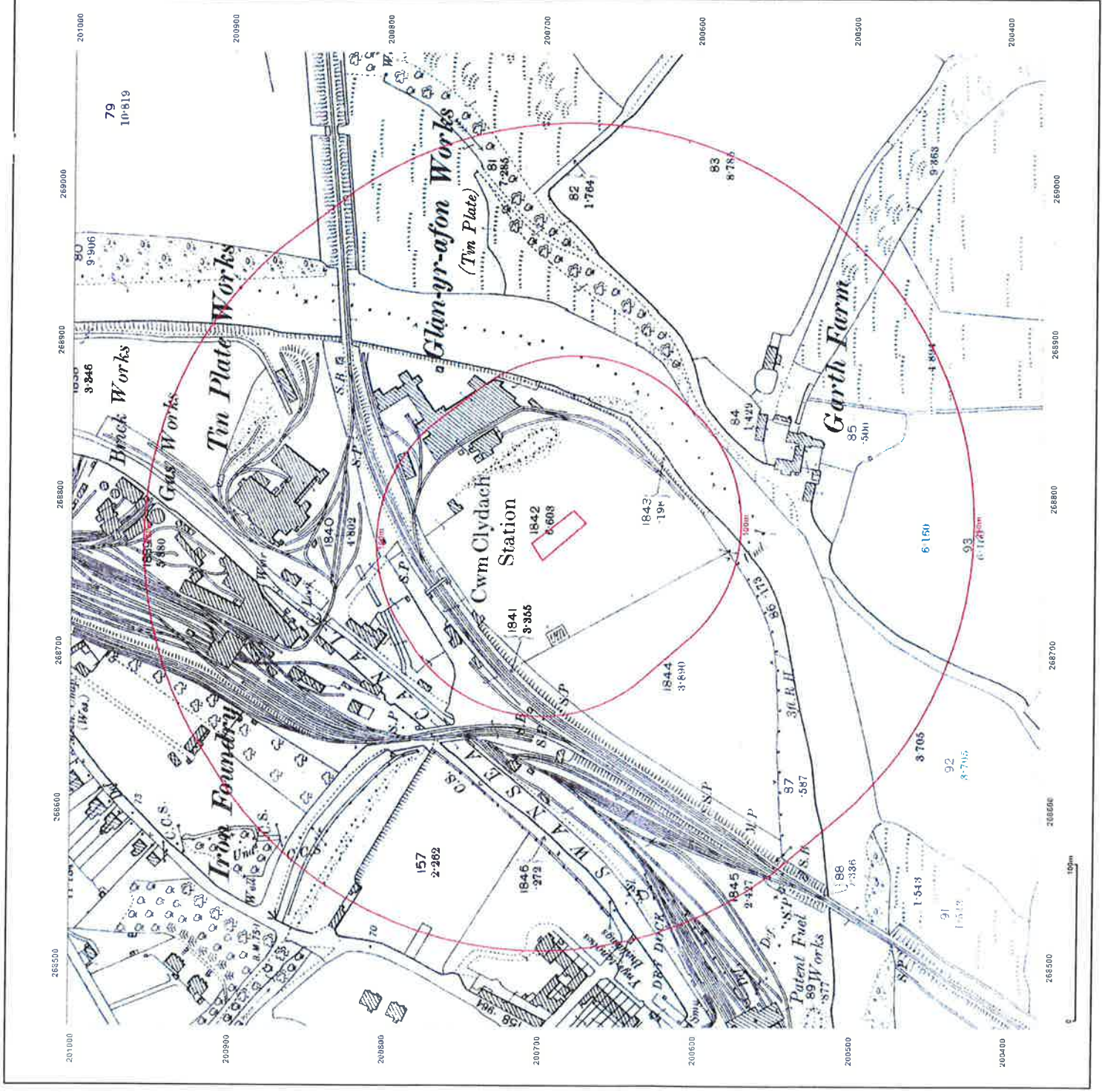


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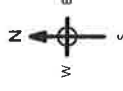
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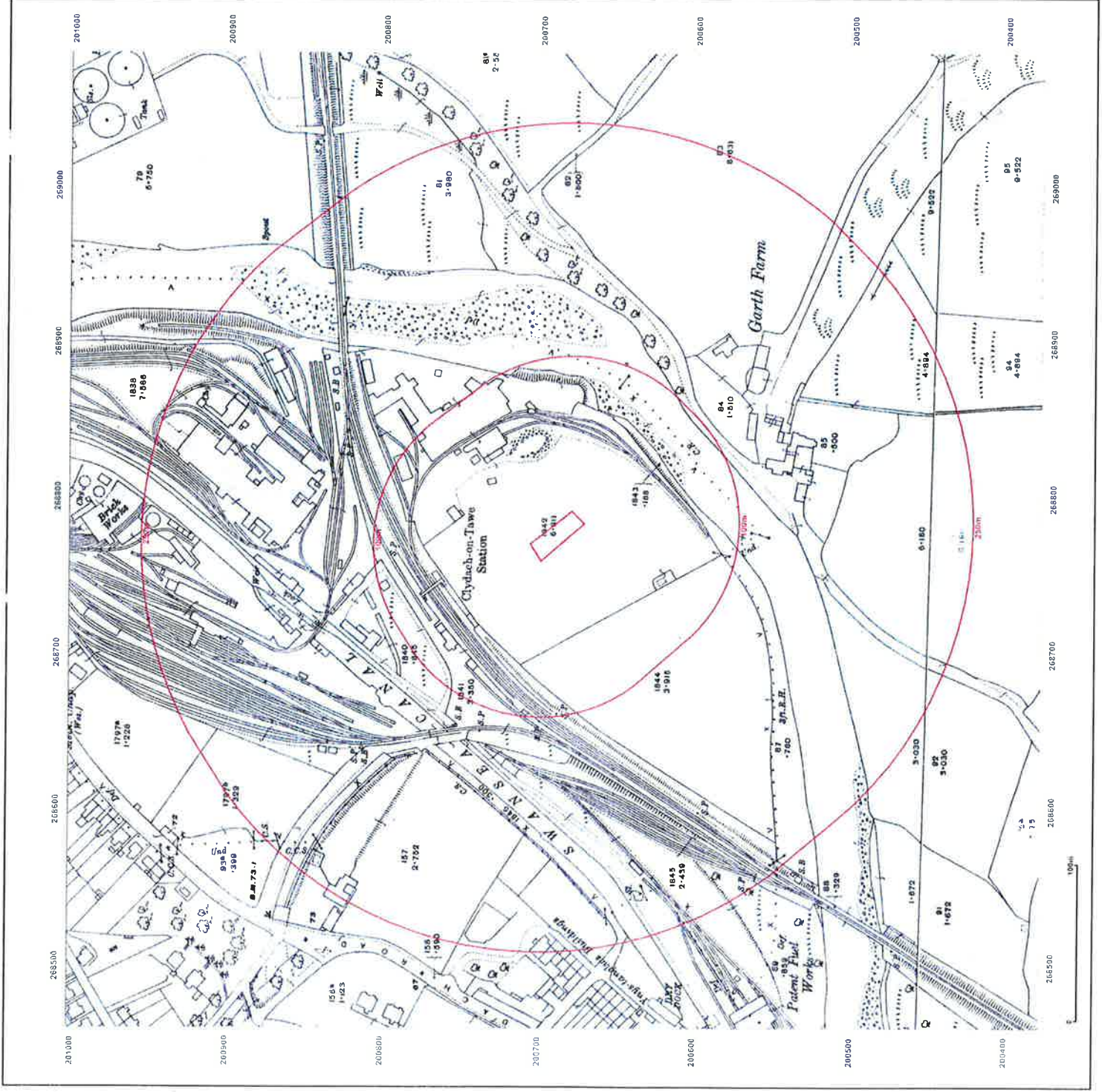


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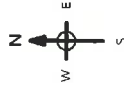
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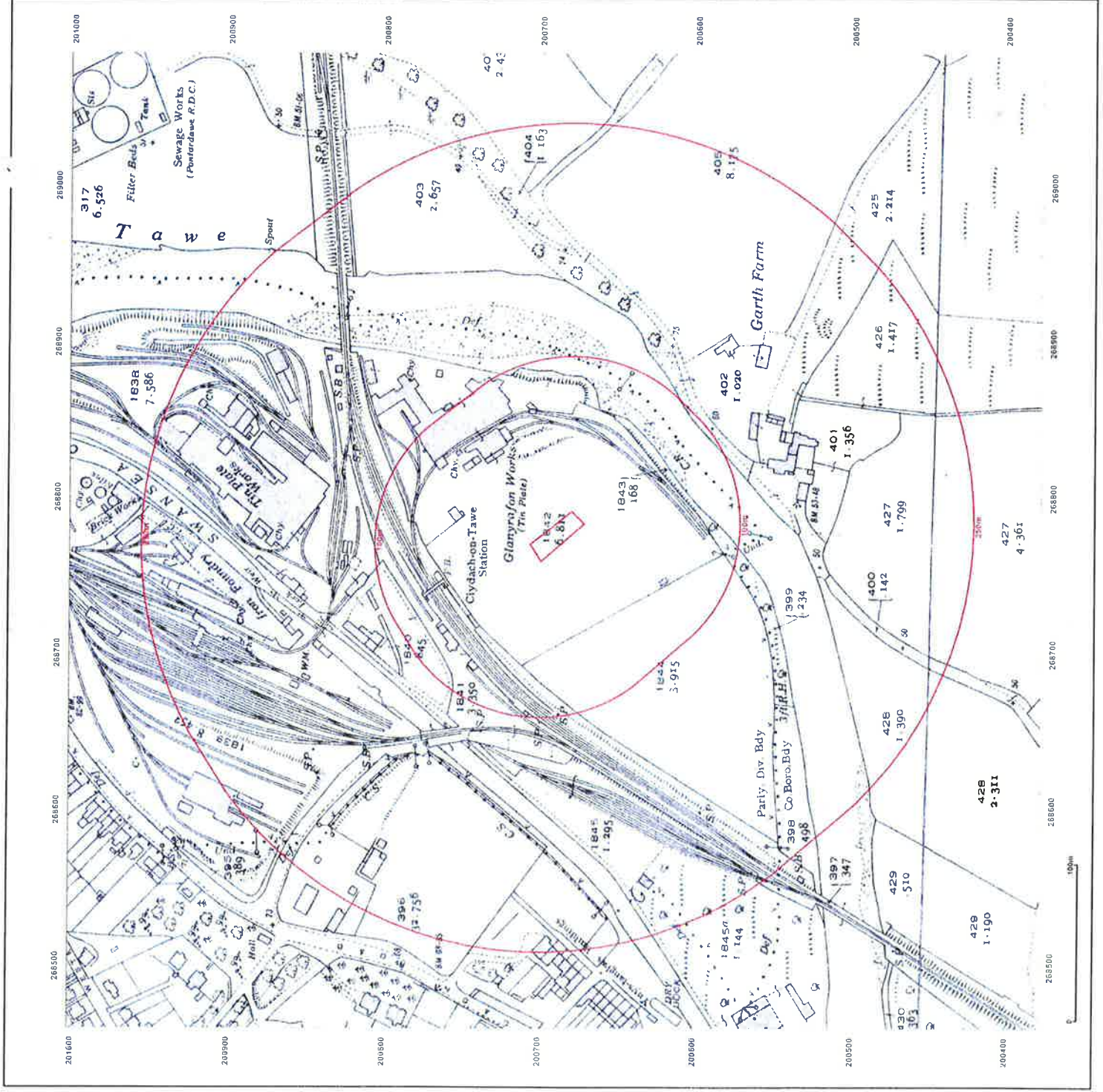


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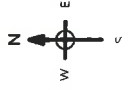
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**Map Name:** National Grid

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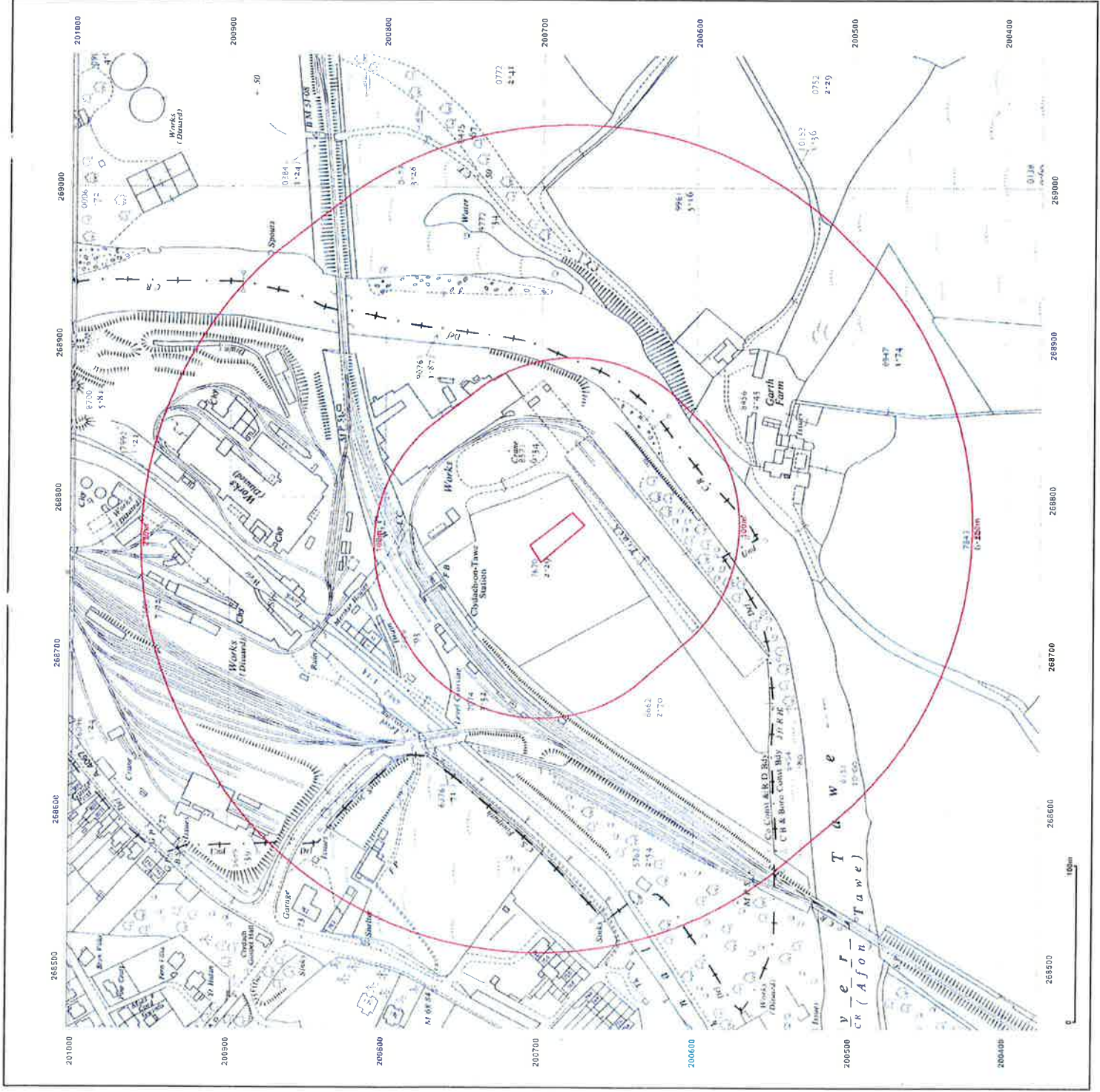


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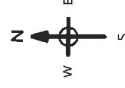
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**Map Name:** National Grid

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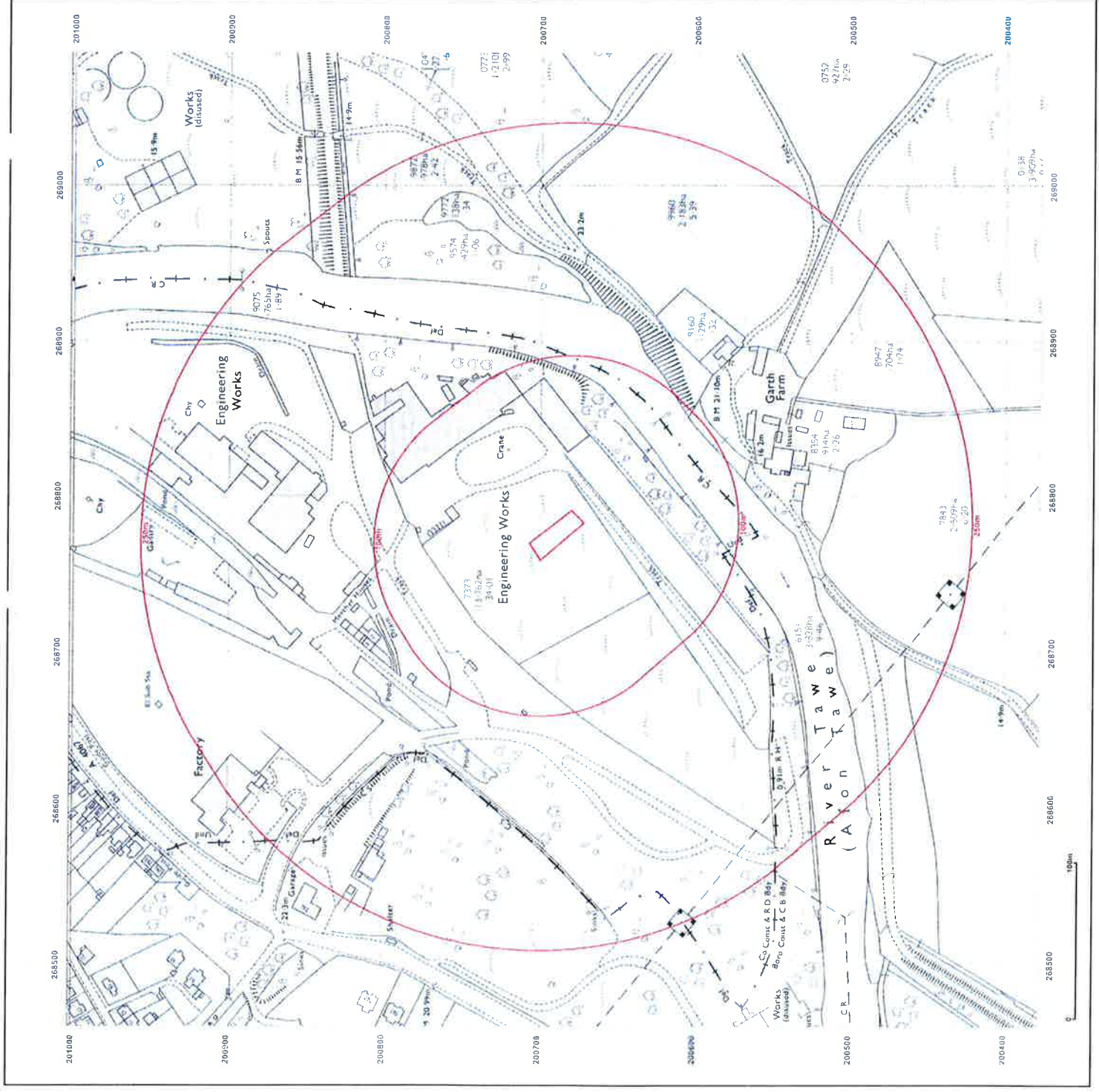


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**Grid Ref:** 268773, 200690

**Map Name:** National Grid

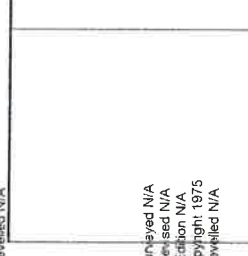
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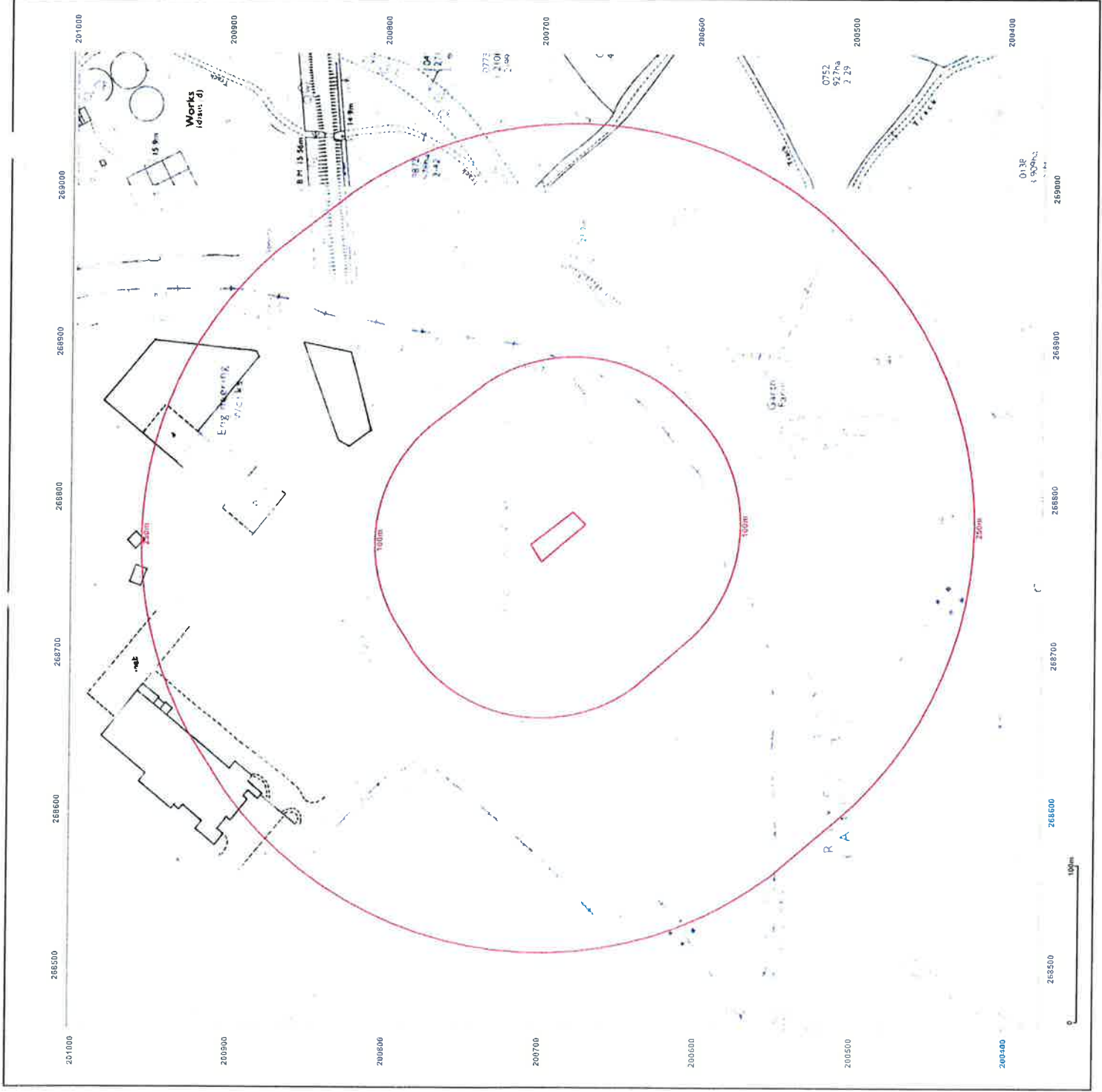


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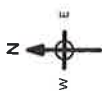
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**Grid Ref:** 268773, 200690

**Map Name:** National Grid

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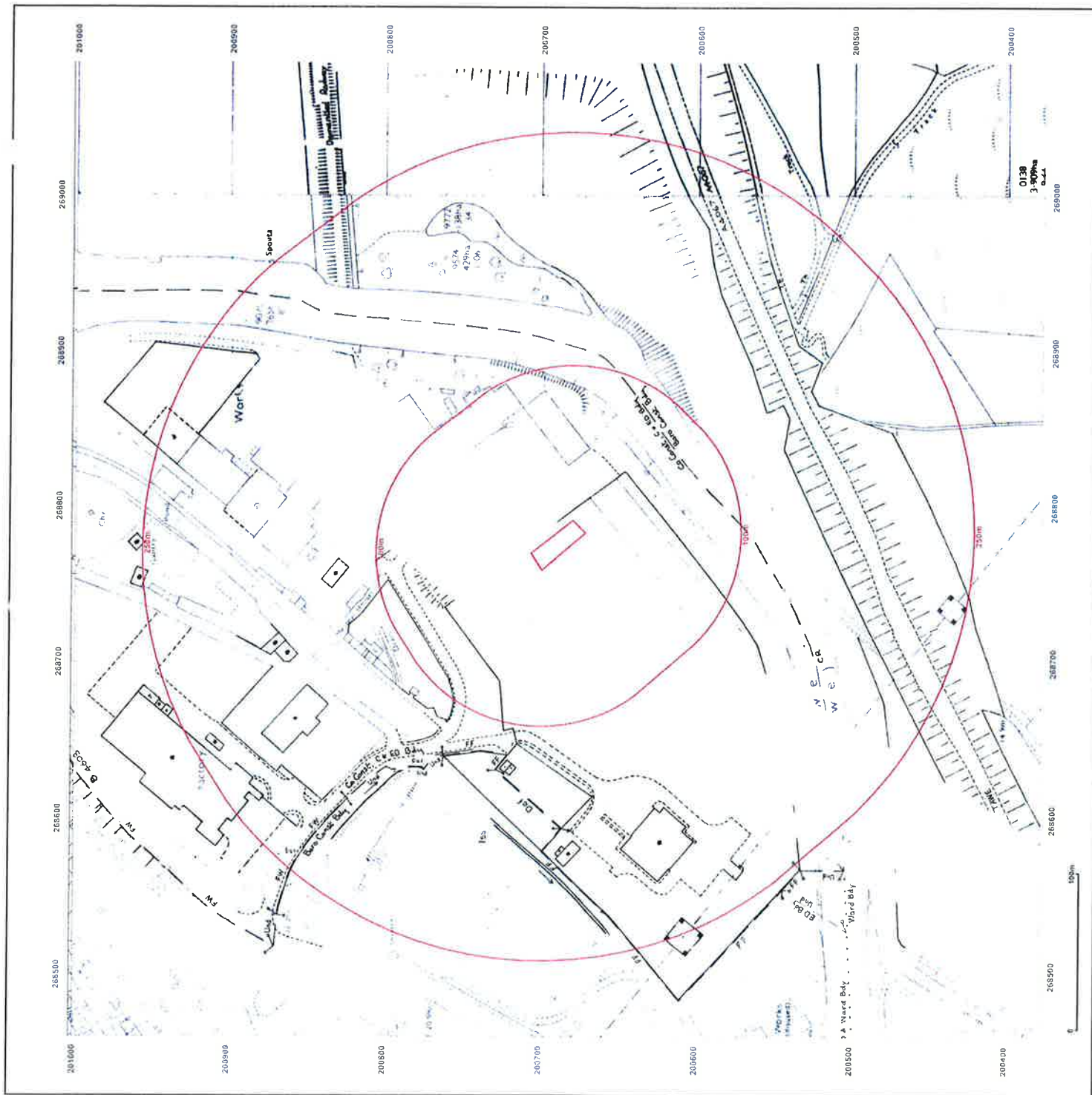


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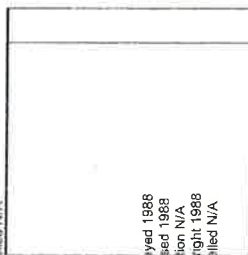
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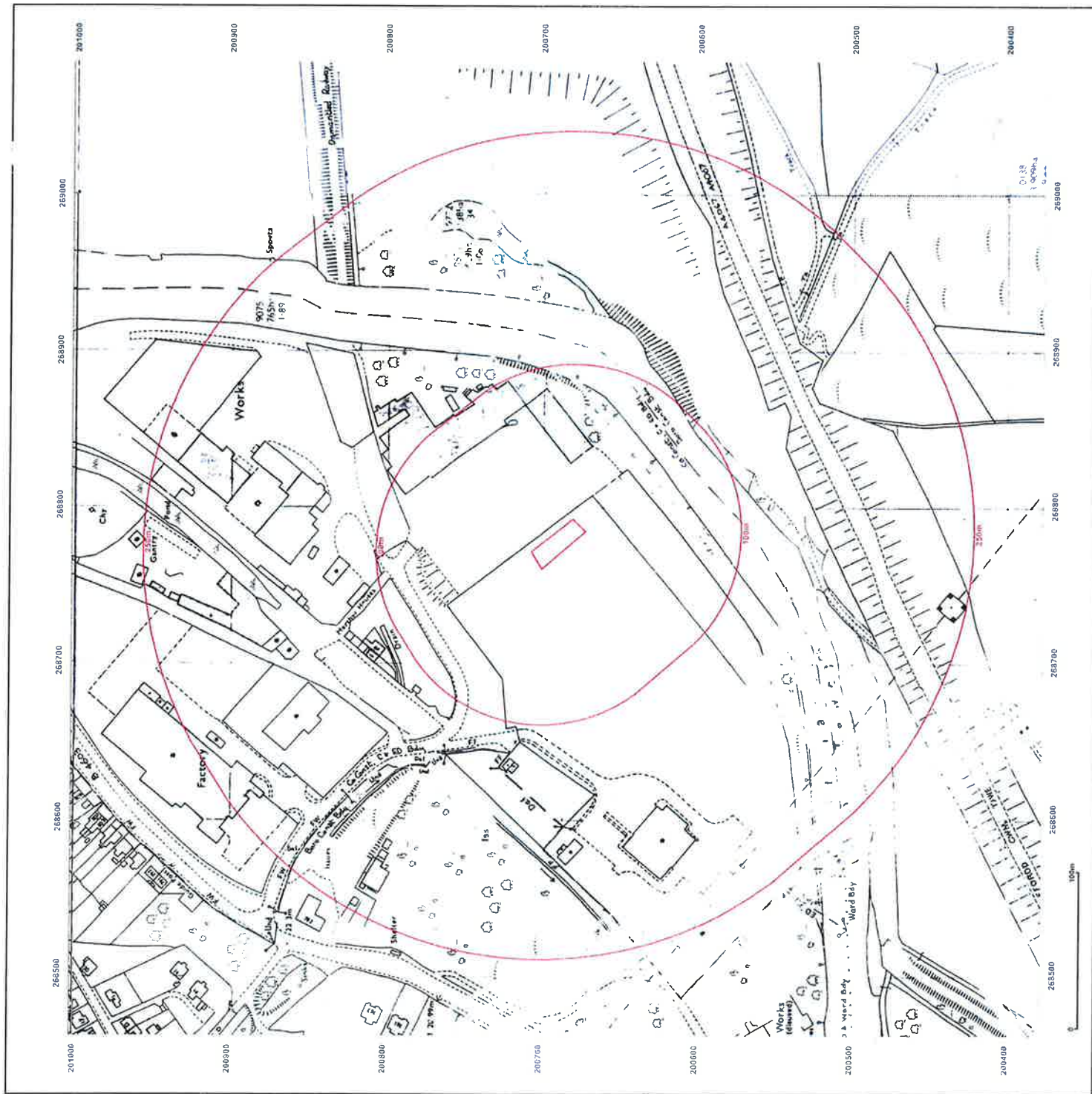


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**Report Ref:** GS-2523308  
**Grid Ref:** 268773, 200690

**Map Name:** National Grid

**Map date:** 1989-1993

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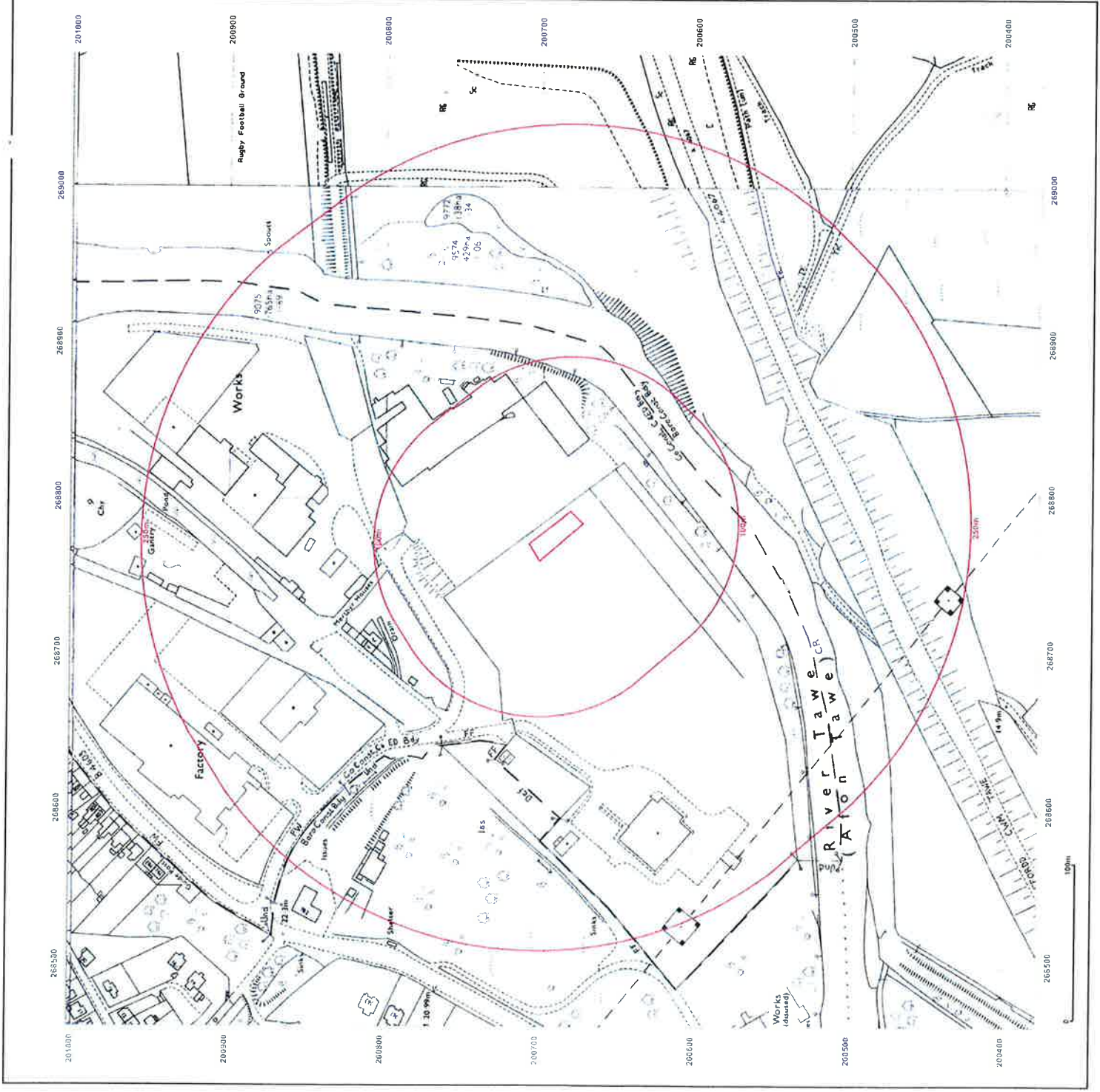


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## **ANNEX D Groundsure Data (GS2523307) & Glais Moraine SSSI Citation**





# Groundsure

LOCATION INTELLIGENCE

Paul Downing Ltd  
23, Carlton Road,  
Headley Down, GU35 8JW

Groundsure Reference: GS-2523307  
Your Reference: WPD\_Clydach

Report Date 12 Oct 2015

Report Delivery Method: Email - pdf

## Groundsure Enviroinsight

Address: WESTERN POWER, PLAYERS INDUSTRIAL ESTATE, SWANSEA, SA6 5BQ

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Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviroinsight** as requested.

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Yours faithfully,

Managing Director  
Groundsure Limited

Enc.  
Groundsure Enviroinsight

**ANNEX D Groundsure Data (GS2523307) & Glais Moraine SSSI Citation**



Paul Downing Ltd  
23, Carlton Road,  
Headley Down, GU35 8JW

Groundsure Reference: GS-2523307  
Your Reference: WPD\_Clydach

Report Date 12 Oct 2015

Report Delivery Method: Email - pdf

### Groundsure Enviroinsight

Address: WESTERN POWER, PLAYERS INDUSTRIAL ESTATE, SWANSEA, SA6 5BQ

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Yours faithfully,

Managing Director  
Groundsure Limited

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# Groundsure Enviroinsight

**Address:** WESTERN POWER, PLAYERS INDUSTRIAL ESTATE, SWANSEA, SA6 5BQ  
**Date:** 12 Oct 2015  
**Reference:** GS-2523307  
**Client:** Paul Downing Ltd



Aerial Photograph Capture date: 22-May-2010  
Grid Reference: 268773,200690  
Site Size: 0.04ha

Report Reference: GS-2523307  
Client Reference: WPD\_Clydach

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# Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

## Section 1: Historical Industrial Sites

	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	6	19	41	120
1.2 Additional Information – Historical Tank Database	0	0	6	13
1.3 Additional Information – Historical Energy Features Database	0	0	5	16
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	2	0
1.6 Potentially Infilled Land	0	6	18	77

## Section 2: Environmental Permits, Incidents and Registers

	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	2	4
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	4	3
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

### Section 3: Landfill and Other Waste Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
<b>3.1 Landfill Sites</b>						
3.1.1 Environment Agency Registered Landfill Sites	0	0	0	1	0	Not searched
3.1.2 Environment Agency Historic Landfill Sites	0	0	0	0	0	1
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	1	2	0
<b>3.2 Landfill and Other Waste Sites Findings</b>						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	1	0	1	Not searched	Not searched
3.2.2 Environment Agency Licensed Waste Sites	0	0	3	1	1	0

### Section 4: Current Land Use

	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	16	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

### Section 5: Geology

5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

### Section 6: Hydrogeology and Hydrology

0-500m

6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	6
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	1	4	21
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	1	1	3	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500



## Section 6: Hydrogeology and Hydrology

0-500m

6.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	Yes	Yes	Yes
6.10 Detailed River Network entries within 500m of the site	0	0	10	25	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

## Section 7: Flooding

7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes
7.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site?	Yes
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	High
7.4 Are there any Flood Defences within 250m of the study site?	Yes
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

## Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	1	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	2	4	11	80
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0

## Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

## Section 9: Natural Hazards

### 9.1 What is the maximum risk of natural ground subsidence?

Moderate

#### 9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?

Very Low

#### 9.1.2 What is the maximum Landslides hazard rating identified on the study site?

Very Low

#### 9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?

Negligible

#### 9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?

Moderate

#### 9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?

Negligible

#### 9.1.6 What is the maximum Running Sand hazard rating identified on the study site?

Low

### 9.2 Radon

#### 9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

#### 9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary.

## Section 10: Mining

### 10.1 Are there any coal mining areas within 75m of the study site?

Yes

### 10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?

No

### 10.3 Are there any brine affected areas within 75m of the study site?

No

# Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

## 1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

## 2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

## 3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

## 4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

## 5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

## 6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

## 7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

## 8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

## 9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon.

## 10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

## 11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

## Note: Maps

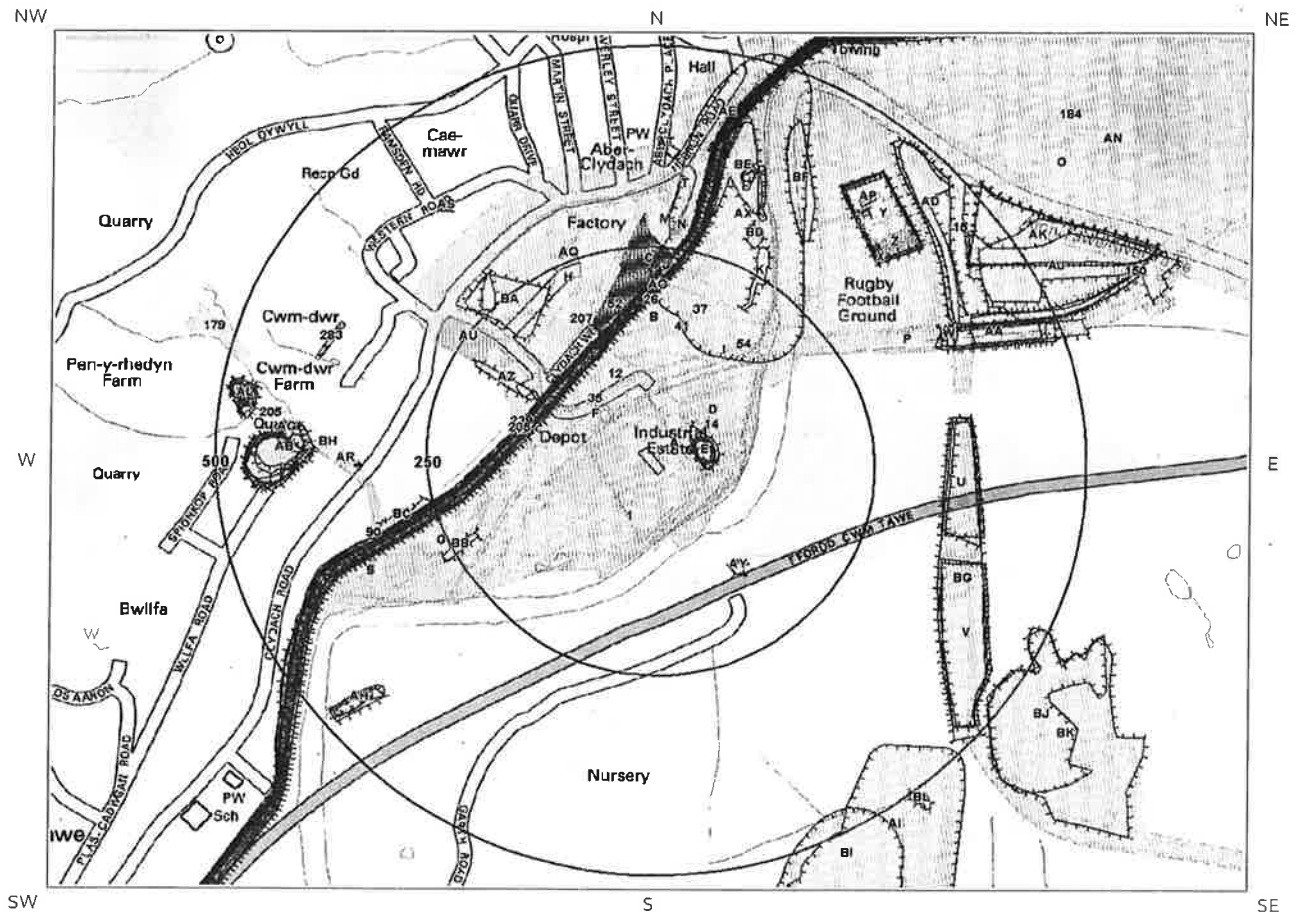
Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

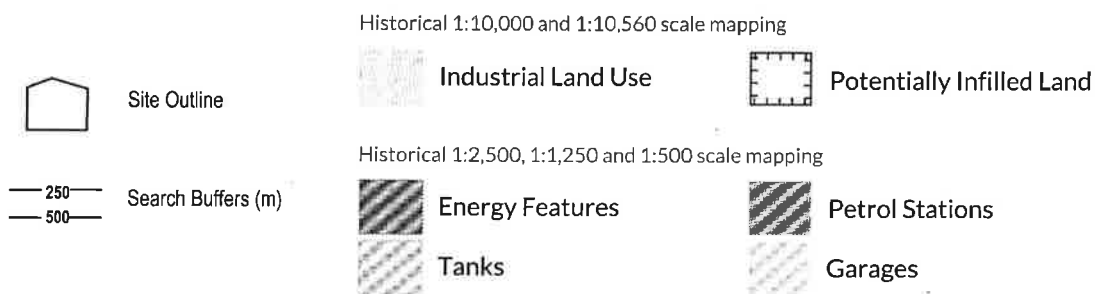
All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.



# 1. Historical Land Use



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# 1. Historical Industrial Sites

## 1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 186

ID	Distance [m]	Direction	Use	Date
1	0	On Site	Railway Sidings	1975
2A	0	On Site	Unspecified Works	1938
3A	0	On Site	Unspecified Works	1948
4A	0	On Site	Unspecified Works	1936
5A	0	On Site	Unspecified Works	1897
6F	0	On Site	Tramway Sidings	1897
7B	9	SE	Unspecified Works	1964
8B	9	SE	Mineral Railway Sidings	1964
9D	30	NE	Unspecified Works	1975
10C	33	NW	Tin Plate Works	1948
11C	33	NW	Tin Plate Works	1936
12	34	NE	Railway Sidings	1921
13D	38	NE	Unspecified Works	1921
14	39	E	Unspecified Works	1913
15	41	NE	Railway Sidings	1938
16E	41	NE	Refuse Heap	1938
17E	41	NE	Refuse Heap	1938
18E	41	NE	Refuse Heap	1921
19B	42	SE	Railway Sidings	1948
20B	42	SE	Railway Sidings	1936
21E	42	NE	Refuse Heap	1897
22E	44	NE	Refuse Heap	1936
23E	44	NE	Refuse Heap	1948
24F	45	NW	Railway Station	1897
25E	48	SE	Railway Sidings	1913
26	51	NW	Railway Sidings	1913
27F	51	NW	Railway Station	1913
28F	51	NW	Railway Station	1921
29F	53	NW	Railway Station	1948
30F	53	NW	Railway Station	1936
31F	55	NW	Railway Station	1938
32	60	NW	Railway Sidings	1877
33F	68	NW	Railway Station	1877
34F	71	NW	Railway Building	1921

35	74	NW	Railway Station	1964
36B	80	NW	Tin Plate Works	1897
37	82	N	Unspecified Works	1975
38J	82	NW	Tin Plate Works	1913
39C	86	NW	Tin Plate Works	1938
40AO	90	N	Tin Plate Works	1921
41	95	N	Tin Plate Works	1877
42G	106	W	Patent Fuel Works	1897
43G	119	W	Railway Sidings	1913
44G	119	W	Fuel Works	1913
45G	120	W	Patent Fuel Works	1877
46H	129	NW	Iron Foundry	1897
47AX	136	NE	Brick Works	1897
48AY	140	SE	Unspecified Pit	1877
49AZ	141	NW	Unspecified Ground Workings	1913
50H	145	NW	Unspecified Factory	1975
51I	145	NE	Railway Building	1921
52	147	N	Iron Foundry	1877
53I	160	NE	Railway Building	1921
54	164	NE	Railway Building	1938
55J	193	N	Gas Works	1877
56BA	195	NW	Unspecified Heap	1964
57K	206	NE	Unspecified Pit	1948
58K	206	NE	Unspecified Pit	1936
59BB	215	SW	Unspecified Ground Workings	1913
60C	224	N	Gasometer	1877
61L	227	NE	Unspecified Disused Works	1975
62L	227	NE	Unspecified Commercial/Industrial	1964
63M	229	N	Gas Works	1897
64C	232	N	Unspecified Tank	1921
65C	234	N	Unspecified Tank	1913
66BC	248	W	Dry Dock	1877
67T	251	N	Unspecified Works	1975
68M	266	N	Unspecified Tanks	1877
69N	268	N	Unspecified Tanks	1921
70M	270	N	Unspecified Tank	1913
71N	274	N	Unspecified Tanks	1938
72N	274	N	Unspecified Tanks	1936
73N	274	N	Unspecified Tanks	1948
74BD	278	NE	Unspecified Pit	1964
75M	280	N	Unspecified Tank	1964
76S	280	SW	Fuel Works	1921
77N	280	N	Unspecified Tank	1913



78N	281	N	Kilns	1877
79P	289	NE	Railway Sidings	1921
80O	297	NE	Railway Sidings	1936
81O	297	NE	Railway Sidings	1948
82BE	301	N	Refuse Heap	1921
83P	302	NE	Railway Sidings	1913
84Q	313	NE	Refuse Heap	1936
85Q	313	NE	Refuse Heap	1948
86R	314	W	Tramway Sidings	1921
87R	314	W	Tramway Sidings	1913
88BF	316	NE	Refuse Heap	1964
89S	323	SW	Unspecified Disused Works	1975
90	323	W	Railway Building	1921
91T	328	N	Smithy	1897
92U	333	E	Cuttings	1964
93U	333	E	Cuttings	1975
94BG	336	E	Cuttings	1938
95U	340	E	Cuttings	1936
96U	340	E	Cuttings	1948
97Q	341	N	Unspecified Pit	1964
98AR	344	W	Railway Building	1921
99V	348	E	Cuttings	1936
100V	348	E	Cuttings	1948
101V	350	E	Cuttings	1964
102V	350	E	Cuttings	1975
103W	355	NE	Cuttings	1948
104W	355	NE	Cuttings	1936
105L	357	NE	Sewage Works	1913
106L	357	NE	Sewage Works	1938
107L	357	NE	Sewage Works	1938
108X	358	NE	Filter Beds	1921
109L	358	NE	Sewage Works	1921
110S	358	SW	Chimney	1964
111X	358	NE	Filter Beds	1913
112Y	360	NE	Sewage Works	1936
113Y	360	NE	Sewage Works	1948
114AA	361	NE	Cuttings	1913
115BH	362	W	Railway Building	1921
116Z	363	NE	Unspecified Tanks	1964
117Z	363	NE	Unspecified Tanks	1975
118Y	364	NE	Unspecified Tanks	1938
119X	365	NE	Filter Beds	1921
120X	366	NE	Filter Beds	1913
121AA	368	NE	Cuttings	1877
122Z	371	NE	Unspecified Tanks	1921

123Z	373	NE	Unspecified Tanks	1913
124Y	374	NE	Unspecified Tanks	1936
125Y	374	NE	Unspecified Tanks	1948
126AA	375	NE	Cuttings	1921
127AB	383	W	Unspecified Ground Workings	1877
128AB	384	W	Unspecified Quarry	1897
129Y	384	NE	Unspecified Tanks	1921
130AB	385	W	Unspecified Slant	1921
131Y	385	NE	Filter Beds	1913
132AC	387	NE	Refuse Heap	1938
133AC	387	NE	Refuse Heap	1938
134AB	389	W	Unspecified Quarry	1921
135Z	389	NE	Unspecified Tanks	1913
136AD	389	NE	Refuse Heap	1936
137AD	389	NE	Refuse Heap	1948
138AP	393	NE	Filter Beds	1913
139AB	394	W	Unspecified Quarry	1938
140AB	395	W	Unspecified Ground Workings	1948
141AB	395	W	Unspecified Ground Workings	1936
142Y	396	NE	Unspecified Tanks	1913
143AB	396	W	Unspecified Quarry	1913
144AE	398	N	Sawmills	1877
145AA	399	NE	Cuttings	1936
146AA	399	NE	Cuttings	1948
147AB	401	W	Unspecified Quarry	1964
148AB	401	W	Unspecified Quarry	1975
149AE	401	N	Sawmill	1897
150	405	NE	Tramway Sidings	1897
151AF	405	NE	Refuse Heap	1948
152AF	405	NE	Refuse Heap	1936
153AG	407	W	Unspecified Pit	1975
154AG	407	W	Unspecified Pit	1964
155AH	418	SW	Unspecified Pit	1913
156AH	424	SW	Unspecified Pit	1921
157AM	428	SE	Railway Sidings	1938
158AH	430	SW	Unspecified Pit	1936
159AH	430	SW	Unspecified Pit	1948
160AI	430	SE	Unspecified Disused Mine	1975
161AI	430	SE	Unspecified Disused Mine	1964
162AJ	432	NE	Refuse Heap	1975
163AJ	433	NE	Refuse Heap	1964
164AK	438	NE	Refuse Heap	1938
165AK	438	NE	Refuse Heap	1938
166AK	442	NE	Refuse Heap	1948

167AK	442	NE	Refuse Heap	1936
168AL	456	W	Unspecified Ground Workings	1913
169AL	456	W	Unspecified Heap	1921
170AL	457	W	Unspecified Pit	1938
171AL	457	W	Unspecified Pit	1938
172AL	460	W	Unspecified Ground Workings	1948
173AL	460	W	Unspecified Ground Workings	1936
174AL	466	W	Unspecified Pit	1964
175AL	466	W	Unspecified Pit	1975
176AM	469	SE	Railway Sidings	1936
177	469	SE	Railway Sidings	1948
178BI	471	SE	Unspecified Old Shaft	1897
179	476	W	Tramway Sidings	1877
180BJ	479	SE	Refuse Heap	1964
181BK	480	SE	Unspecified Disused Tip	1975
182AN	484	NE	Nickel Works	1948
183AN	484	NE	Nickel Works	1936
184	490	NE	Nickel Works	1921
185BL	498	SE	Unspecified Ground Workings	1913
186AN	499	NE	Mineral Railway Sidings	1964

## 1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

19

ID	Distance (m)	Direction	Use	Date
187AO	154	NW	Gas Works	1899
188C	210	N	Gas Works	1879
189C	225	N	Unspecified Tank	1899
190C	225	N	Gasometer	1879
191C	237	N	Gasometer	1899
192C	238	N	Unspecified Tank	1918
193AQ	256	N	Unspecified Tank	1996
194M	266	N	Tanks	1961
195M	267	N	Tanks	1899
196M	275	N	Unspecified Tank	1918
197Z	365	NE	Tanks	1961
198Z	365	NE	Tanks	1971



199Z	367	NE	Unspecified Tank	1918
200Z	367	NE	Unspecified Tank	1935
201AP	388	NE	Tanks	1935
202AP	388	NE	Tanks	1918
203AP	414	NE	Tanks	1918
204AP	414	NE	Tanks	1935
205	434	W	Unspecified Tank	1918

### 1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary:

21

ID	Distance (m)	Direction	Use	Date
206AO	154	NW	Gas Works	1899
207	173	NW	Electricity Substation	1996
208C	210	N	Gas Works	1879
209C	225	N	Gasometer	1879
210C	237	N	Gasometer	1899
211AQ	257	NW	Electricity Substation	1971
212AR	327	W	Electricity Substation	1971
213AR	328	W	Electricity Substation	1996
214AR	329	W	Electricity Substation	1988
215AR	329	W	Electricity Substation	1989
216AR	329	W	Electricity Substation	1988
217AS	372	NW	Electricity Substation	1995
218AS	372	NW	Electricity Substation	1995
219AT	373	N	Electricity Substation	1995
220AT	373	N	Electricity Substation	1995
221AT	379	N	Electricity Substation	1985
222AT	379	N	Electricity Substation	1992
223AS	384	NW	Electricity Substation	1969
224AS	384	NW	Electricity Substation	1985
225AS	386	NW	Electricity Substation	1992
226AS	386	NW	Electricity Substation	1962

### 1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

## 1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 2

ID	Distance (m)	Direction	Use	Date
227AU	216	NW	Garage	1961
228AU	240	NW	Garage	1971

## 1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 101

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

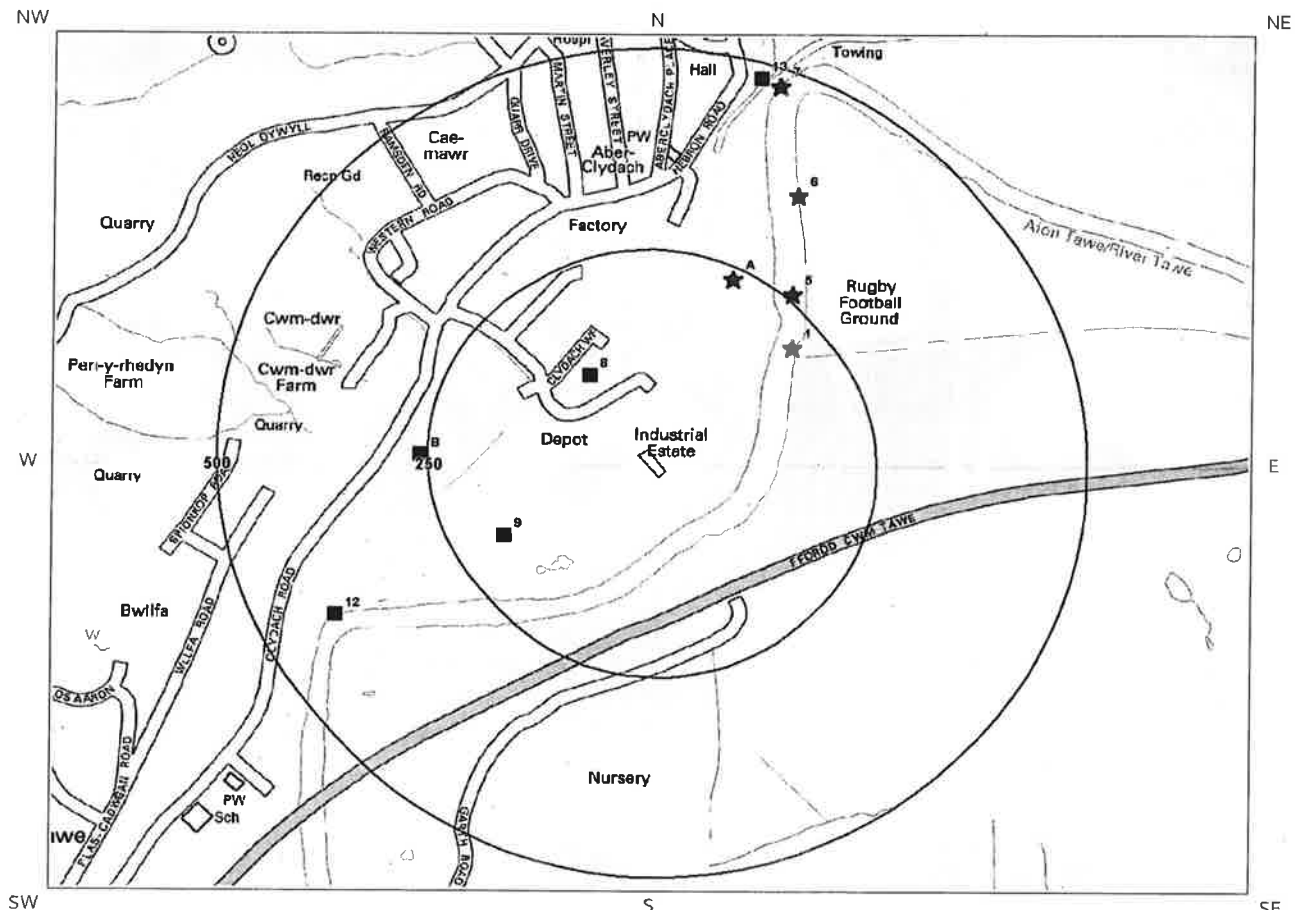
ID	Distance(m)	Direction	Use	Date
229E	41	NE	Refuse Heap	1938
230E	41	NE	Refuse Heap	1938
231E	41	NE	Refuse Heap	1921
232E	42	NE	Refuse Heap	1897
233E	44	NE	Refuse Heap	1936
234E	44	NE	Refuse Heap	1948
235	115	NW	Canal	1921
236AV	115	NW	Canal	1897
237AV	116	NW	Canal	1948
238AV	116	NW	Canal	1936
239	117	NW	Canal	1877
240AV	118	NW	Canal	1913
241AV	119	NW	Canal	1938
242AW	120	NW	Canal	1975
243AW	120	NW	Canal	1964
244AX	136	NE	Brick Works	1897
245AY	140	SE	Unspecified Pit	1877
246AZ	141	NW	Unspecified Ground Workings	1913
247BA	195	NW	Unspecified Heap	1964
248K	206	NE	Unspecified Pit	1936
249K	206	NE	Unspecified Pit	1948

250BB	215	SW	Unspecified Ground Workings	1913
251BA	247	NW	Pond	1877
252BC	248	W	Dry Dock	1877
253BD	278	NE	Unspecified Pit	1964
254BE	301	N	Refuse Heap	1921
255Q	313	NE	Refuse Heap	1936
256Q	313	NE	Refuse Heap	1948
257BF	316	NE	Refuse Heap	1964
258U	333	E	Cuttings	1964
259U	333	E	Cuttings	1975
260BG	336	E	Cuttings	1938
261U	340	E	Cuttings	1936
262U	340	E	Cuttings	1948
263BE	341	N	Unspecified Pit	1964
264V	348	E	Cuttings	1936
265V	348	E	Cuttings	1948
266V	350	E	Cuttings	1975
267V	350	E	Cuttings	1964
268W	355	NE	Cuttings	1948
269W	355	NE	Cuttings	1936
270Y	357	NE	Sewage Works	1913
271Y	357	NE	Sewage Works	1938
272Y	357	NE	Sewage Works	1938
273X	358	NE	Filter Beds	1921
274Y	358	NE	Sewage Works	1921
275X	358	NE	Filter Beds	1913
276Y	360	NE	Sewage Works	1948
277Y	360	NE	Sewage Works	1936
278AA	361	NE	Cuttings	1913
279X	365	NE	Filter Beds	1921
280X	366	NE	Filter Beds	1913
281AA	368	NE	Cuttings	1877
282AA	375	NE	Cuttings	1921
283	383	NW	Pond	1938
284AB	383	W	Unspecified Ground Workings	1877
285AB	384	W	Unspecified Quarry	1897
286BH	385	W	Unspecified Slant	1921
287AP	385	NE	Filter Beds	1913
288AC	387	NE	Refuse Heap	1938
289AC	387	NE	Refuse Heap	1938
290AB	389	W	Unspecified Quarry	1921
291AD	389	NE	Refuse Heap	1948
292AD	389	NE	Refuse Heap	1936
293AP	393	NE	Filter Beds	1913



294AB	394	W	Unspecified Quarry	1938
295AB	395	W	Unspecified Ground Workings	1936
296AB	395	W	Unspecified Ground Workings	1948
297AB	396	W	Unspecified Quarry	1913
298AA	399	NE	Cuttings	1936
299AA	399	NE	Cuttings	1948
300AB	401	W	Unspecified Quarry	1964
301AB	401	W	Unspecified Quarry	1975
302AF	405	NE	Refuse Heap	1936
303AF	405	NE	Refuse Heap	1948
304AG	407	W	Unspecified Pit	1964
305AG	407	W	Unspecified Pit	1975
306AH	418	SW	Unspecified Pit	1913
307AH	424	SW	Unspecified Pit	1921
308AH	430	SW	Unspecified Pit	1936
309AH	430	SW	Unspecified Pit	1948
310AI	430	SE	Unspecified Disused Mine	1964
311AI	430	SE	Unspecified Disused Mine	1975
312AJ	432	NE	Refuse Heap	1975
313AJ	433	NE	Refuse Heap	1964
314AK	438	NE	Refuse Heap	1938
315AK	438	NE	Refuse Heap	1938
316AK	442	NE	Refuse Heap	1936
317AK	442	NE	Refuse Heap	1948
318AL	456	W	Unspecified Ground Workings	1913
319AL	456	W	Unspecified Heap	1921
320AL	457	W	Unspecified Pit	1938
321AL	457	W	Unspecified Pit	1938
322AL	460	W	Unspecified Ground Workings	1936
323AL	460	W	Unspecified Ground Workings	1948
324AL	466	W	Unspecified Pit	1964
325AL	466	W	Unspecified Pit	1975
326BI	471	SE	Unspecified Old Shaft	1897
327BJ	479	SE	Refuse Heap	1964
328BK	480	SE	Unspecified Disused Tip	1975
329BL	498	SE	Unspecified Ground Workings	1913

## 2. Environmental Permits, Incidents and Registers Map



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- |  |                    |   |                               |   |  |
|--|--------------------|---|-------------------------------|---|--|
|  | Site Outline       | ★ | Recorded Pollution Incident   | ▼ | RAS 3 & 4 Authorisations                                       |
|  | Search Buffers (m) | ◆ | Dangerous Substances (List 1) | ▲ | Part A(1) Authorised Processes and Historic IPC Authorisations |
|  | 250                | ◇ | Dangerous Substances (List 2) | ▲ | Part A(2) and Part B Authorised Processes                      |
|  | 500                | ■ | Water Industry Referrals      | ◻ | COMAH / NIHHS Sites  |
|  |                    | ■ | Licenced Discharge Consents   | ◻ | Sites Determined as Contaminated Land                          |
|  |                    | □ | Red List Discharge Consents   | ⊛ | Hazardous Substance Consents and Enforcements                  |

## 2. Environmental Permits, Incidents and Registers

### 2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

---

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

---

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

---

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

---



#### 2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

0

Database searched and no data found.

#### 2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

#### 2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

6

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
8	116	NW	268700 200800	<p>Address: CLYDACH DEPOT STW (NOW CONNECT, CLYDACH DEPOT STW (NOW CONNECT, UNKNOWN, UNKNOWN, UNKNOWN, UNKNOWN  Effluent Type: UNSPECIFIED  Permit Number: BF0134901  Permit Version: 1</p> <p>Receiving Water:  Status: CONSENT EXPIRED - TIME LIMIT  Issue date: 10/03/1977  Effective Date: 10-Mar-1977  Revocation Date: 19/10/1992</p>
9	188	SW	268600 200600	<p>Address: HYDER DEPOT PLAYERS IND ESTATE, HYDER DEPOT, PLAYERS IND ESTATE, CLYDACH ROAD CLYDACH, ,  Effluent Type: TRADE DISCHARGES - SITE DRAINAGE  Permit Number: BP028020101  Permit Version: 1</p> <p>Receiving Water:  Status: NEW CONSENT (WRA 91, S88 &amp; SCHED 10 AS AMENDED BY ENV ACT 1995)  Issue date: 19/10/1999  Effective Date: 19-Oct-1999  Revocation Date: -</p>
10B	259	W	268500 200700	<p>Address: 782 CLYDACH ROAD, CLYDACH, , ,  SWANSEA, SA6 5BD  Effluent Type: UNSPECIFIED  Permit Number: BM0043801  Permit Version: 1</p> <p>Receiving Water:  Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88)  Issue date: 30/01/1985  Effective Date: 30-Jan-1985  Revocation Date: 25/11/2012</p>
11B	259	W	268500 200700	<p>Address: 782 CLYDACH ROAD, CLYDACH, , ,  SWANSEA, SA6 5BD  Effluent Type: UNSPECIFIED  Permit Number: BM0043801  Permit Version: 2</p> <p>Receiving Water:  Status: VARIED UNDER EPR 2010  Issue date: 26/11/2012  Effective Date: 26-Nov-2012  Revocation Date: -</p>
12	411	SW	268400 200500	<p>Address: SWO.YNYSTAWE (POINT 83 NEW MAP, SWO.YNYSTAWE (POINT 83 NEW MAP, UNKNOWN, UNKNOWN, UNKNOWN, UNKNOWN  Effluent Type: UNSPECIFIED  Permit Number: BW4104601  Permit Version: 1</p> <p>Receiving Water:  Status: CONSENT EXPIRED - TIME LIMIT  Issue date: 04/02/1963  Effective Date: 04-Feb-1963  Revocation Date: 14/03/1994</p>

ID	Distance (m)	Direction	NGR	Details
13	481	N	268900 201170	<p>Address: CANAL CSO TOWPATH OF HEBRON RD, CANAL CSO, TOWPATH OF HEBRON ROAD, CLYDACH, SWANSEA</p> <p>Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY</p> <p>Permit Number: BP0353201</p> <p>Permit Version: 1</p> <p>Receiving Water: Status: NEW CONSENT (WRA 91, S88 &amp; SCHED 10 AS AMENDED BY ENV ACT 1995)</p> <p>Issue date: 31/03/2006</p> <p>Effective Date: 31-Mar-2006</p> <p>Revocation Date: -</p>

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

## 2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

## 2.3 Environment Agency Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

7

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
1	211	NE	268938 200834	<p>Incident Date: 03-Apr-2001</p> <p>Incident Identification: 1477</p> <p>Pollutant: Sewage Materials</p> <p>Pollutant Description: Storm Sewage</p> <p>Water Impact: Category 3 (Minor)</p> <p>Land Impact: Category 4 (No Impact)</p> <p>Air Impact: Category 3 (Minor)</p>

ID	Distance (m)	Direction	NGR	Details
2A	235	NE	268868 200921	Incident Date: 10-May-2001 Incident Identification: 5160 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
3A	235	NE	268868 200921	Incident Date: 10-May-2001 Incident Identification: 5160 Pollutant: Atmospheric Pollutants and Effects: Contaminated Water Pollutant Description: Smoke: Firefighting Run-Off Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
4A	235	NE	268868 200921	Incident Date: 10-May-2001 Incident Identification: 5160 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
5	257	NE	268938 200902	Incident Date: 06-Aug-2003 Incident Identification: 179565 Pollutant: Sewage Materials Pollutant Description: Crude Sewage Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
6	362	NE	268944 201024	Incident Date: 01-Dec-2002 Incident Identification: 124092 Pollutant: Sewage Materials Pollutant Description: Storm Sewage Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
7	478	N	268922 201160	Incident Date: 03-Apr-2003 Incident Identification: 148218 Pollutant: Sewage Materials Pollutant Description: Crude Sewage Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

## 2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.

# 3. Landfill and Other Waste Sites

## 3.1 Landfill Sites

3.1.1 Records from Environment Agency landfill data within 1000m of the study site:

1

The following Environment Agency landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
1	402	NE	269372 200951	<p>Address: Inco Europe Ltd, Glais Road, Clydach, Swansea, SA6 5QR  Landfill Reference: 34002.0  Environmental Permitting Regulations (Waste) Reference: INC001  Landfill Type: A7 : Industrial Waste Landfill (Factory curtilage)</p> <p>Operator: INCO Europe Ltd  Status: Closure  IPPC Reference:  EPR Reference:</p>

3.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

1

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	1283	S	268800 199200	<p>Site Address: Ynysallan Site, Morriston  Waste Licence: Yes  Site Reference: -  Waste Type: Inert, Industrial, Commercial, Household, Special  Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue:  Licence Surrendered: 31-Dec-1987  Licence Hold Address: -  Operator: -  First Recorded: 31-Dec-1970  Last Recorded: 31-Dec-1987</p>

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.



3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

3

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
10	432	NE	269318 200929	Refuse Tip	1971 mapping	Polygon
11	509	NE	269180 201019	Refuse Tip	1969 mapping	Polygon
12	537	NE	269226 201037	Refuse Tip	1969 mapping	Polygon

## 3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

2

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
2	10	SW	268746 200661	<p>Type of Site: Waste Transfer Station Site Address: 2-4 Players Industrial Estate, Coal Wharfs 1, Clydach, SWANSEA, West Glamorgan, SA6 5BQ</p> <p>Planning Application Reference: 2/2/93/407/03 Date: -</p> <p>Further Details: Scheme proposes a single story bldg of 160 sqm and a portable building for office and canteen of 24 sqm. An application (ref: 2/2/93/407/03) for Detailed Planning permission was submitted to Swansea C.C. on 10th September 1993. Data Source: Historic Planning Application Data Type: Point</p>
3	389	W	268300 200801	<p>Type of Site: Ground Workings and Refuse Heap Site Address: N/A</p> <p>Planning Application Reference: N/A Date: 1899</p> <p>Further Details: N/A Data Source: Historic Mapping Data Type: Polygon</p>

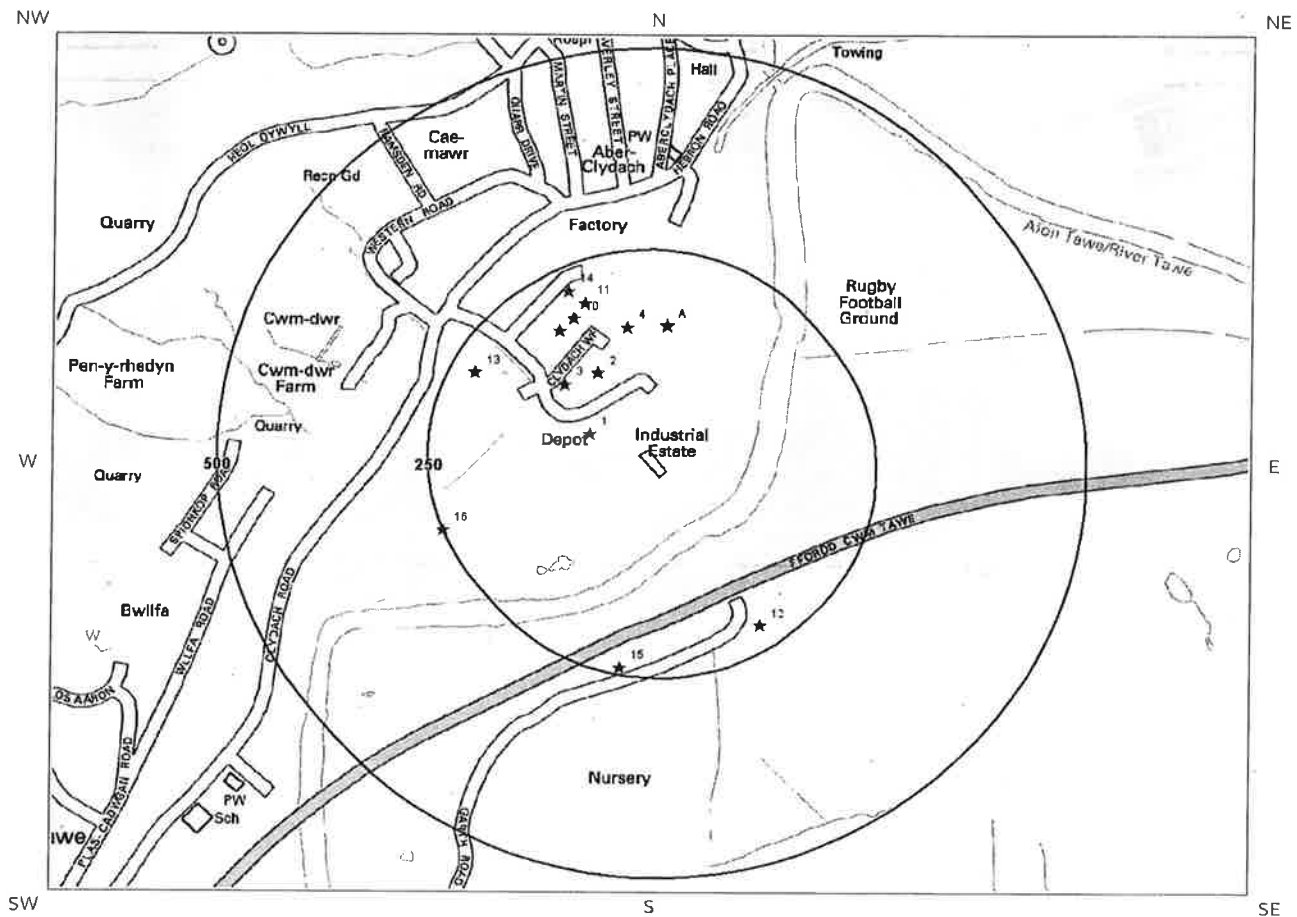
### 3.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

5

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
5	116	NW	268700 200800	<p>Site Address: Building Services, Station Road, Clydach, Swansea C, &amp; C Swansea, SA4 1TL</p> <p>Type: Special Waste Transfer Station</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SWA001</p> <p>EPR reference: -</p> <p>Operator: City &amp; County of Swansea</p> <p>Waste Management licence No: 34015</p> <p>Annual Tonnage: 4999.0</p> <p>Issue Date: 28/02/1988</p> <p>Effective Date: -</p> <p>Modified: 26/03/2004</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Asbestos Store</p> <p>Correspondence Address: -, Heol Y Gors, Cwmbwrla, Swansea, C &amp; C Swansea, SA5 8LD</p>
6	137	NE	268837 200826	<p>Site Address: -</p> <p>Type: ELV Facility</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: EVA025</p> <p>EPR reference: AP3598FY/A001</p> <p>Operator: Evans David Jonathon</p> <p>Waste Management licence No: 34235</p> <p>Annual Tonnage: 2500.0</p> <p>Issue Date: 30/06/2005</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Bishops Auto Spares</p> <p>Correspondence Address: -, -</p>
7	188	NW	268600 200800	<p>Site Address: Glais Road, Clydach, Swansea, SA6 5QR</p> <p>Type: Industrial Waste Landfill (Factory curtilage)</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: INC001</p> <p>EPR reference: -</p> <p>Operator: I N C O Europe Ltd</p> <p>Waste Management licence No: 34002</p> <p>Annual Tonnage: 0.0</p> <p>Issue Date: 30/03/1997</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Closure</p> <p>Site Name: I N C O Nickel</p> <p>Correspondence Address: -, Glais Road, Clydach, Swansea, SA6 5QR</p>
8	267	N	268717 200969	<p>Site Address: Players Industrial Estate, Station Road, Clydach, Swansea, SA6 5BQ</p> <p>Type: Special Waste Transfer Station</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SWA001</p> <p>EPR reference: JP3895FX/V002</p> <p>Operator: City And County Of Swansea</p> <p>Waste Management licence No: 34015</p> <p>Annual Tonnage: 4999.0</p> <p>Issue Date: 28/02/1988</p> <p>Effective Date: -</p> <p>Modified: 26/03/2004</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Asbestos Store</p> <p>Correspondence Address: -, -</p>
9	641	NE	269372 200951	<p>Site Address: Inco Europe Ltd, Glais Road, Clydach, Swansea, SA6 5QR</p> <p>Type: Industrial Waste Landfill (Factory curtilage)</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: INC001</p> <p>EPR reference: YP3995FQ/A001</p> <p>Operator: INCO Europe Ltd</p> <p>Waste Management licence No: 34002</p> <p>Annual Tonnage: 688.0</p> <p>Issue Date: 30/03/1997</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Closure</p> <p>Site Name: Inco Europe Ltd</p> <p>Correspondence Address: -, -</p>

## 4. Current Land Use Map



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## 4. Current Land Uses

### 4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

16

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	65	NW	Depot	268700 200728	SA6	Container and Storage	Transport, Storage and Delivery
2	115	NW	Supaheat Fuels	268708 200803	Merthyr House, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Fuel Distributors and Suppliers	Household, Office, Leisure and Garden
3	127	NW	S P Morrissey Flooring Supplies	268669 200789	Unit 1/A Clydach Wharf, Players Industrial Estate, Clydach, Swansea, SA6 5AT	Construction Completion Services	Construction Services
4	156	N	Dreamrange Ltd	268743 200860	Unit 1a, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Demolition Services	Construction Services
5A	156	N	Valley Group	268790 200862	Unit 4, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Signs	Industrial Products
6A	156	N	J D Autos	268790 200862	Unit 6, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Vehicle Repair, Testing and Servicing	Repair and Servicing
7A	156	N	Bishops Auto Parts	268790 200862	Unit 5, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Vehicle Parts and Accessories	Motoring
8A	156	N	D B C Site Services 2005 Ltd	268790 200862	Unit 5, Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Scrap Metal Merchants	Recycling Services
9	183	NW	Works	268663 200856	SA6	Unspecified Works Or Factories	Industrial Features
10	187	NW	Electricity Sub Station	268680 200871	SA6	Electrical Features	Infrastructure and Facilities
11	199	NW	H Thomas Engineering	268693 200890	Players Industrial Estate, Clydach, Swansea, SA6 5BQ	Access Equipment	Industrial Products
12	219	SE	Depot	268904 200489	SA6	Container and Storage	Transport, Storage and Delivery
13	221	NW	Howie David Commercial Ltd	268563 200803	782, Clydach Road, Ynystawe, Swansea, SA6 5BD	New Vehicles	Motoring
14	221	NW	Works	268673 200906	SA6	Unspecified Works Or Factories	Industrial Features
15	240	S	Pylon	268737 200436	SA6	Electrical Features	Infrastructure and Facilities



ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
16	250	W	Pylon	268527 200607	SA6	Electrical Features	Infrastructure and Facilities

## 4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.

## 4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site:

0

Database searched and no data found.

## 4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site:

0

Database searched and no data found.

## 5. Geology

### 5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

### 5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

### 5.3 Bedrock and Solid Geology

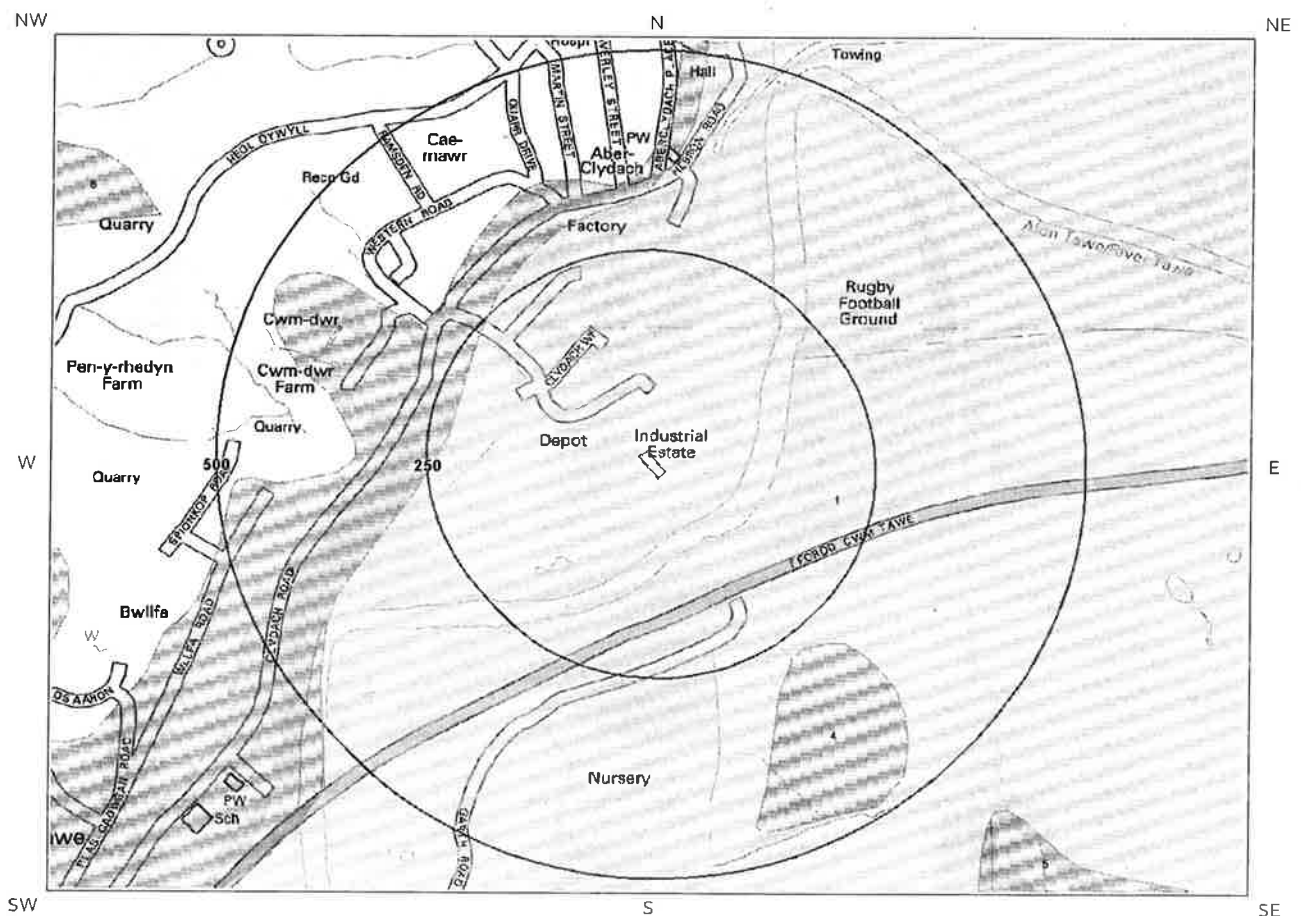
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
SW-SDST	SWANSEA MEMBER	SANDSTONE
H-MDSS	HUGHES MEMBER	MUDSTONE, SILTSTONE AND SANDSTONE
GDB-MDSS	GROVESEND FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE

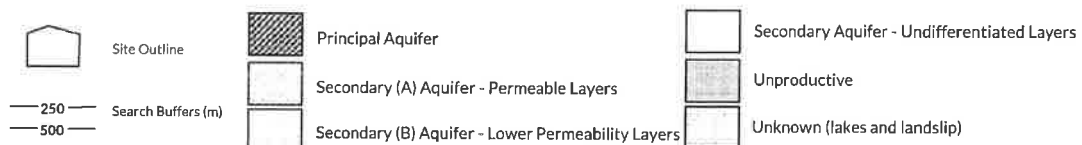
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

# 6 Hydrogeology and Hydrology

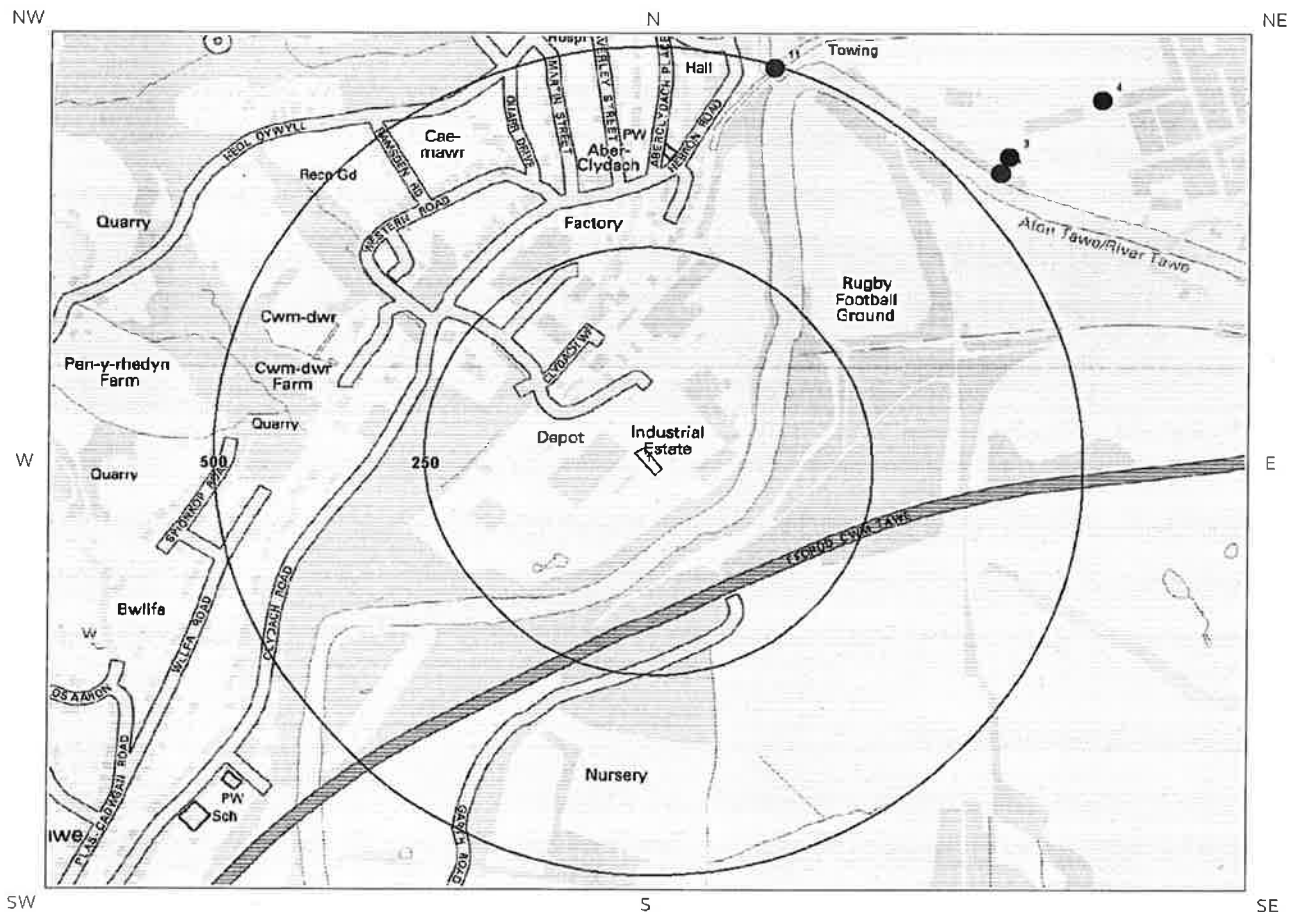
## 6a. Aquifer Within Superficial Geology



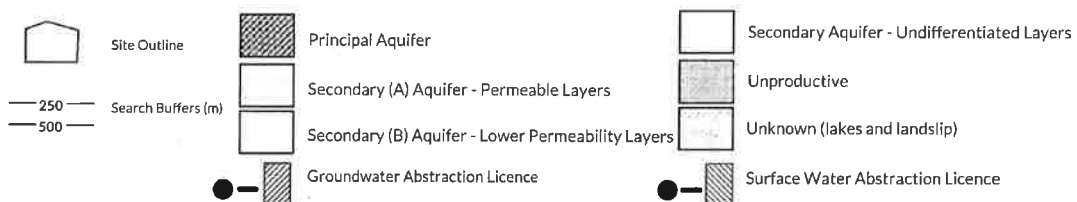
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# 6b. Aquifer Within Bedrock Geology and Abstraction Licenses

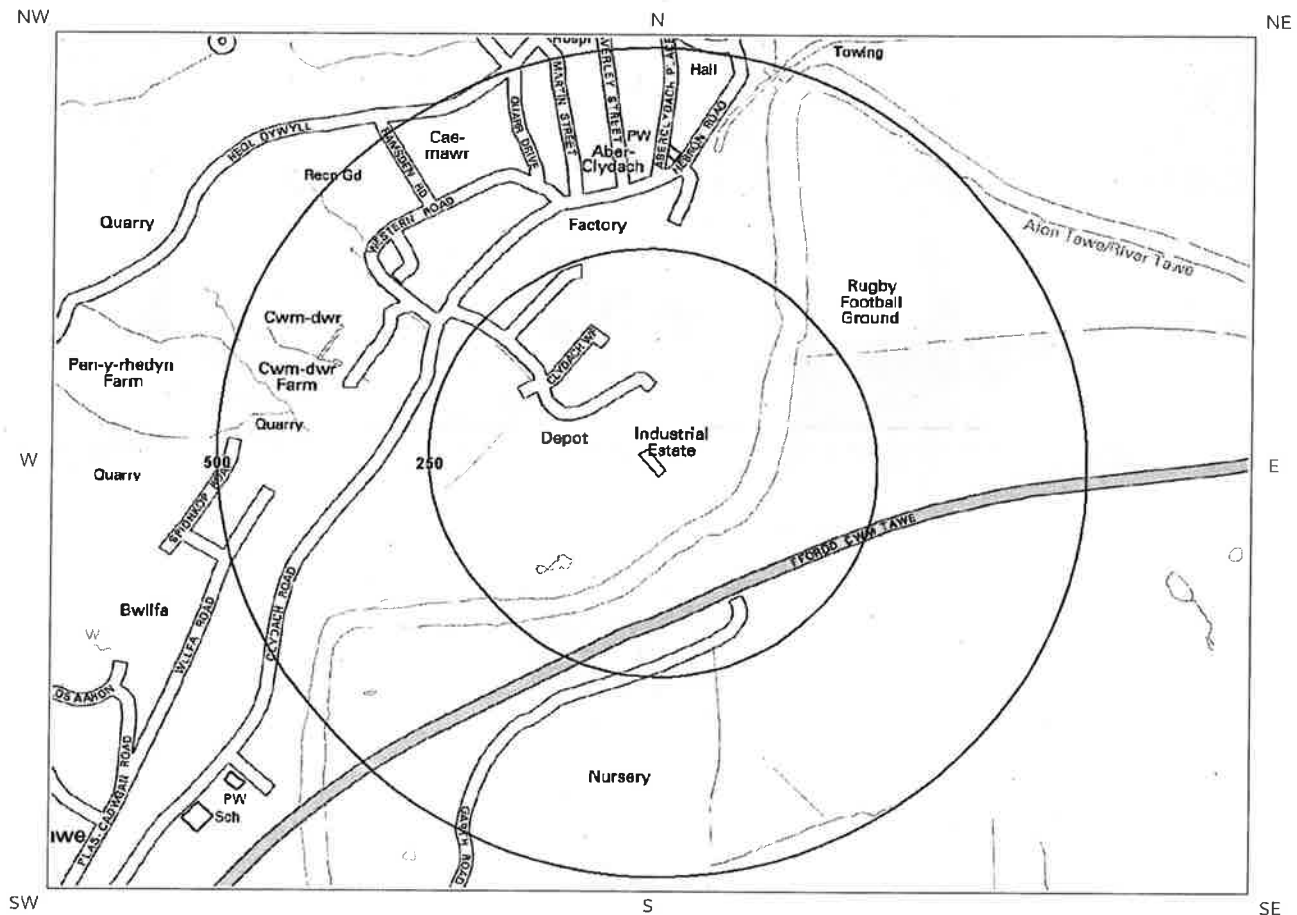


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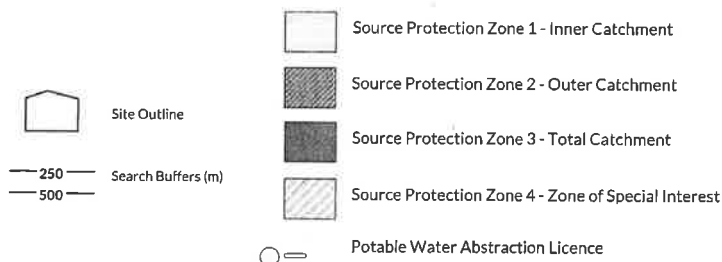




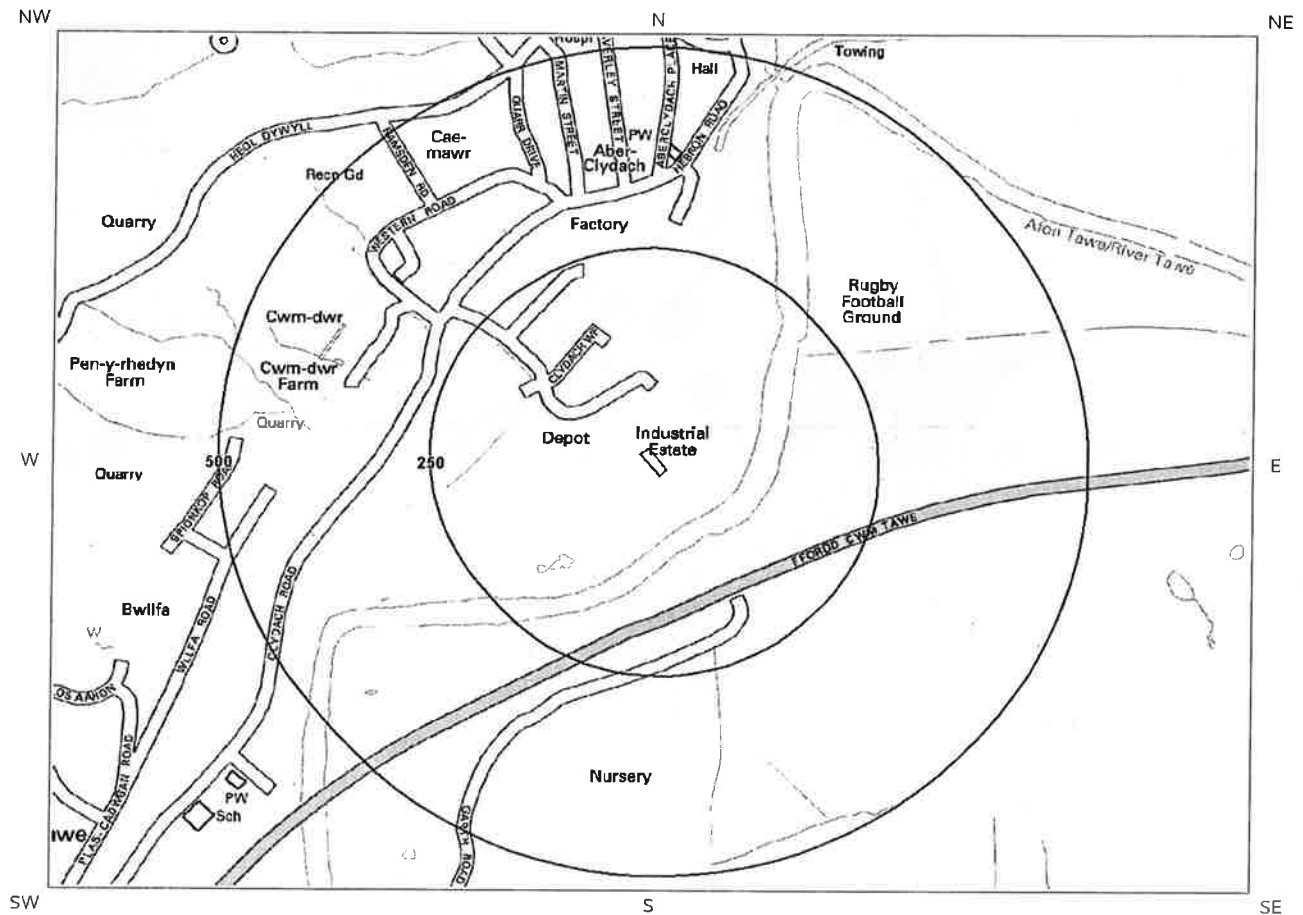
# 6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



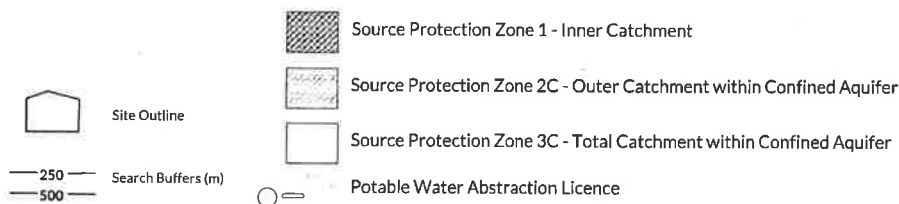
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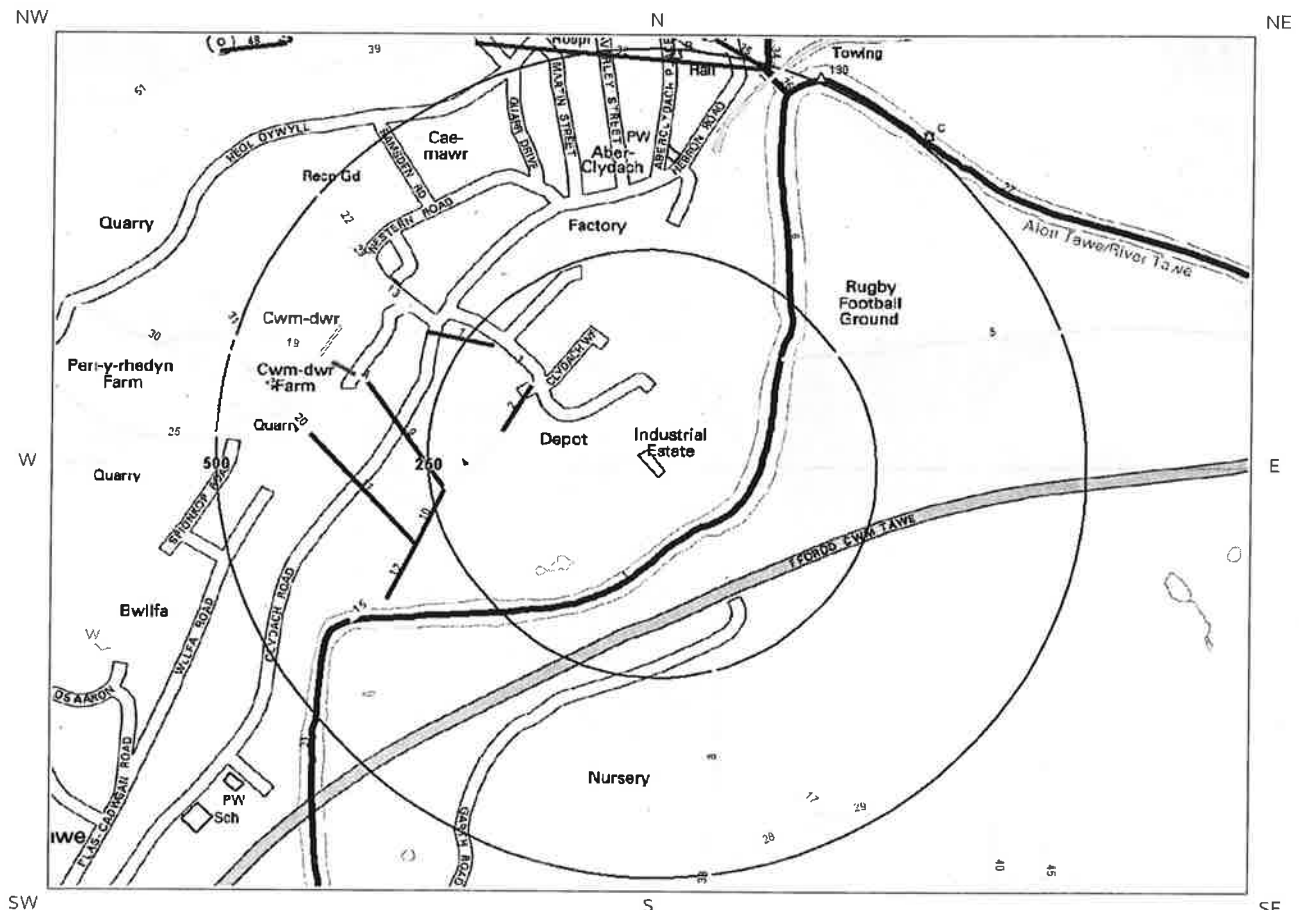
# 6d. Hydrogeology – Source Protection Zones within confined aquifer



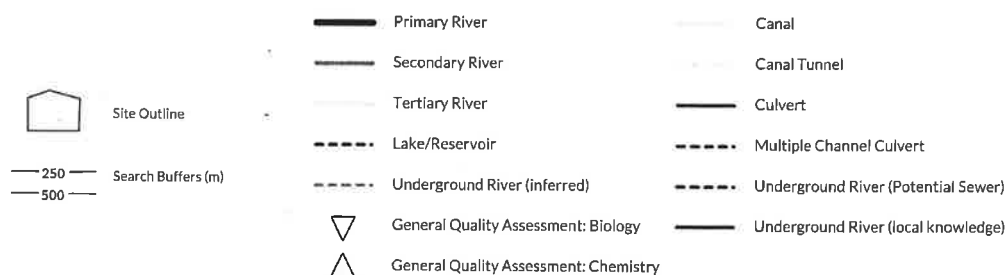
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# 6e. Hydrology – Detailed River Network and River Quality



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# 6. Hydrogeology and Hydrology

## 6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	0	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
3	223	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
4	274	SE	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

## 6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	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



### 6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site?

Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
3	563	NE	269200 201070	Status: Historical Licence No: 22/59/1/0127 Details: Pollution Remediation Direct Source: Eaw Groundwater Point: Borehole B Data Type: Point Name: Inco Europe Ltd Annual Volume (m³): 146400 Max Daily Volume (m³): 400 Original Application No: AP2094 Original Start Date: 30/11/2005 Expiry Date: 31/3/2014 Issue No: 1 Version Start Date: 30/11/2005 Version End Date:
4	692	NE	269310 201140	Status: Historical Licence No: 22/59/1/0127 Details: Pollution Remediation Direct Source: Eaw Groundwater Point: Borehole A Data Type: Point Name: Inco Europe Ltd Annual Volume (m³): 146400 Max Daily Volume (m³): 400 Original Application No: AP2094 Original Start Date: 30/11/2005 Expiry Date: 31/3/2014 Issue No: 1 Version Start Date: 30/11/2005 Version End Date:
Not shown	1005	W	267800 201000	Status: Historical Licence No: 22/59/1/0012 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well In Field No. 347, Springs In Fields 342 & 368 Data Type: Point Name: Tickner Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WR5/3558 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 1/12/1965 Version End Date:
Not shown	1015	W	267750 200810	Status: Historical Licence No: 22/59/1/0013 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well In Field No. 367 At Penrhiwgwysfa Data Type: Point Name: Phillips Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WR5/3580 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 1/12/1965 Version End Date:
Not shown	1028	W	267770 200420	Status: Historical Licence No: 22/59/1/0057 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well In Enc. No. 7542 At Baun-llwyd Data Type: Point Name: Bellingham Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WR5/3514 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 30/3/1966 Version End Date:
Not shown	1079	W	267720 200410	Status: Historical Licence No: 22/59/1/0057 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well In Enc. No. 6704 At Buan-llwyd Data Type: Point Name: Bellingham Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WR5/3514 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 30/3/1966 Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1168	W	267610 200910	Status: Historical Licence No: 22/59/1/0013 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well In Field No. 349 At Penrhiwgwysfa Data Type: Point Name: Phillips Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WR5/3580 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 1/12/1965 Version End Date:
Not shown	1577	W	267200 200460	Status: Historical Licence No: 22/59/1/0057 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well & Reservoir In Enc. No. 2047 Nr Wernfadog Cottage Data Type: Point Name: Bellingham Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WR5/3514 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 30/3/1966 Version End Date:

## 6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
11	496	N	268920 201180	Status: Historical Licence No: 22/59/1/0107 Details: Effluent/Slurry Dilution Direct Source: Eaw Surface Water Point: Swansea Canal Swansea Valley Data Type: Point Name: British Waterways Board Annual Volume (m³): - Max Daily Volume (m³): - Application No: WR611 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 11/8/1992 Version End Date:
12A	542	NE	269190 201050	Status: Historical Licence No: 22/59/1/0058 Details: Process Water Direct Source: Eaw Surface Water Point: River Tawe Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:
13A	542	NE	269190 201050	Status: Historical Licence No: 22/59/1/0058 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: River Tawe Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:
14A	542	NE	269190 201050	Status: Historical Licence No: 22/59/1/0058 Details: Process Water Direct Source: Eaw Surface Water Point: River Tawe Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:

ID	Distance (m)	Direction	NGR	Details
15A	542	NE	269190 201050	Status: Historical Licence No: 22/59/1/0058 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: River Tawe Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0038 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: British Waterways Board Annual Volume (m³): 5575214 Max Daily Volume (m³): 19747.412 Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 28/2/1966 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0059 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Canal and River Trust Annual Volume (m³): 5575214 Max Daily Volume (m³): 19748 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/4/2008 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0058 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0038 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: British Waterways Board Annual Volume (m³): 5575214 Max Daily Volume (m³): 19747.412 Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 28/2/1966 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0058 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0059 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Canal and River Trust Annual Volume (m³): 5575214 Max Daily Volume (m³): 19748 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/4/2008 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0059 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Canal and River Trust Annual Volume (m³): 5575214 Max Daily Volume (m³): 19748 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/4/2008 Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0059 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Canal and River Trust Annual Volume (m³): 5575214 Max Daily Volume (m³): 19748 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/4/2008 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0058 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:
Not shown	1078	NE	269560 201440	Status: Historical Licence No: 22/59/1/0058 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:
Not shown	1347	NE	269770 201610	Status: Historical Licence No: 22/59/1/0059 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Canal and River Trust Annual Volume (m³): 5575214 Max Daily Volume (m³): 19748 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/4/2008 Version End Date:
Not shown	1347	NE	269770 201610	Status: Historical Licence No: 22/59/1/0058 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:
Not shown	1347	NE	269770 201610	Status: Historical Licence No: 22/59/1/0038 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal [2] Data Type: Point Name: British Waterways Board Annual Volume (m³): 5575214 Max Daily Volume (m³): 19747.412 Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 28/2/1966 Version End Date:
Not shown	1347	NE	269770 201610	Status: Historical Licence No: 22/59/1/0059 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Canal and River Trust Annual Volume (m³): 5575214 Max Daily Volume (m³): 19748 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/4/2008 Version End Date:
Not shown	1347	NE	269770 201610	Status: Historical Licence No: 22/59/1/0058 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Vale Europe Limited Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:



ID	Distance (m)	Direction	NGR	Details
Not shown	1347	NE	269770 201610	<p>Status: Historical Licence No: 22/59/1/0038 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal [2] Data Type: Point Name: British Waterways Board</p> <p>Annual Volume (m³): 5575214 Max Daily Volume (m³): 19747.412 Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 28/2/1966 Version End Date:</p>
Not shown	1347	NE	269770 201610	<p>Status: Historical Licence No: 22/59/1/0059 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Canal and River Trust</p> <p>Annual Volume (m³): 5575214 Max Daily Volume (m³): 19748 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/4/2008 Version End Date:</p>
Not shown	1347	NE	269770 201610	<p>Status: Historical Licence No: 22/59/1/0059 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Canal and River Trust</p> <p>Annual Volume (m³): 5575214 Max Daily Volume (m³): 19748 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/4/2008 Version End Date:</p>
Not shown	1347	NE	269770 201610	<p>Status: Historical Licence No: 22/59/1/0058 Details: Process Water Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Vale Europe Limited</p> <p>Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:</p>
Not shown	1347	NE	269770 201610	<p>Status: Historical Licence No: 22/59/1/0058 Details: Non-Evaporative Cooling Direct Source: Eaw Surface Water Point: Swansea Canal Data Type: Point Name: Vale Europe Limited</p> <p>Annual Volume (m³): 3637800 Max Daily Volume (m³): 52369.92 Application No: - Original Start Date: 30/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 7/7/2014 Version End Date:</p>
Not shown	1589	S	268360 199140	<p>Status: Historical Licence No: 22/59/1/0123 Details: Make-Up Or Top Up Water Direct Source: Eaw Surface Water Point: River Tawe Data Type: Point Name: The City &amp; County Of Swansea</p> <p>Annual Volume (m³): 42000 Max Daily Volume (m³): 209 Application No: AP2013 Original Start Date: 17/5/2004 Expiry Date: 31/3/2014 Issue No: 1 Version Start Date: 1/4/2006 Version End Date:</p>

## 6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

No

Database searched and no data found.

## 6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

No

Database searched and no data found.

---

## 6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

---

## 6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site?

Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
5	SE	Minor Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
161	SE	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
411	NW	Minor Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.
453	S	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
490	SE	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

## 6.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site?

Yes

### 6.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following Biological Quality records are shown on the Hydrology Map (6e):

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
122B	494	N	268800 201200	River Name: Tawe Reach: Conf.lwr Clydach-inco O/f Clydach End/Start of Stretch: End of Stretch NGR	B	A	A	A	B
123B	494	N	268800 201200	River Name: Tawe Reach: Bsc Velindre O/f Ynysf.-conf.lwr Clydach End/Start of Stretch: Start of Stretch NGR	B	A	A	A	B
124C	513	NE	269100 201100	River Name: Tawe Reach: Conf.lwr Clydach-inco O/f Clydach End/Start of Stretch: Start of Stretch NGR	B	A	A	A	B
125C	513	NE	269100 201100	River Name: Tawe Reach: Inco O/f Clydach - Above Trebanos Stw End/Start of Stretch: End of Stretch NGR	A	A	A	A	B
Not shown	1290	S	269000 199400	River Name: Nant Y Fendrod Reach: Confl Nant Bran - Above Ynys Allan End/Start of Stretch: Start of Stretch NGR	B	B	B	A	A



#### 6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAH). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (6e):

Chemical Quality Grade

ID	Distance (m)	Direction	NGR	River Quality Grade	2005	2006	2007	2008	2009
127B	494	N	268800 201200	River Name: Lower Clydach Reach: Conf.afon Tawe-pont Llechart Rhyd Y G. End/Start of Stretch: End of Stretch NGR	A	A	A	A	-
128B	494	N	268800 201200	River Name: Tawe Reach: Conf.lwr Clydach-inco O/f Clydach End/Start of Stretch: End of Stretch NGR	B	B	A	A	-
129B	494	N	268800 201200	River Name: Tawe Reach: Bsc Velindre O/f Ynysf.-conf.lwr Clydach End/Start of Stretch: Start of Stretch NGR	B	A	A	A	-
130	506	NE	268971 201171	River Name: Tawe Reach: Conf.lwr Clydach-inco O/f Clydach End/Start of Stretch: Sample Point NGR	B	B	A	A	-
131C	513	NE	269100 201100	River Name: Tawe Reach: Conf.lwr Clydach-inco O/f Clydach End/Start of Stretch: Start of Stretch NGR	B	B	A	A	-
132C	513	NE	269100 201100	River Name: Tawe Reach: Inco O/f Clydach - Above Trebanos Stw End/Start of Stretch: End of Stretch NGR	B	A	A	A	-
Not shown	589	N	268900 201281	River Name: Lower Clydach Reach: Conf.afon Tawe-pont Llechart Rhyd Y G. End/Start of Stretch: Sample Point NGR	A	A	A	A	-
Not shown	589	N	268900 201281	River Name: Lower Clydach Reach: Pont Llechart - Above Confl Nant Melyn End/Start of Stretch: Sample Point NGR	A	A	A	A	-
Not shown	607	N	268900 201300	River Name: Swansea Canal Reach: Outfall To R.tawe - Intake From R.tawe End/Start of Stretch: End of Stretch NGR	B	B	A	A	-
Not shown	929	S	268542 199775	River Name: Tawe Reach: Bsc Velindre O/f Ynysf.-conf.lwr Clydach End/Start of Stretch: Sample Point NGR	B	A	A	A	-
Not shown	1290	S	269000 199400	River Name: Nant-y-fendrod Reach: Confl Nant Bran - Above Ynys Allan End/Start of Stretch: Start of Stretch NGR	D	C	B	B	-
Not shown	1350	E	270132 200837	River Name: Tawe Reach: Inco O/f Clydach - Above Trebanos Stw End/Start of Stretch: Sample Point NGR	B	A	A	A	-

## 6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details
1	79	SE	River Name: River Tawe Welsh River Name: Afon Tawe Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
2	154	NW	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
3	154	NW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
4	163	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
5	194	NE	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
6	194	NE	River Name: River Tawe Welsh River Name: Afon Tawe Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
7	219	NW	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
8	224	S	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
9	234	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
10	234	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
11	286	SW	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
12	286	SW	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
13	296	NW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
14A	334	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
15	348	SW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
16A	350	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
17	369	S	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details
18	380	N	River Name: Swansea Canal Welsh River Name: - Alternative Name: - River Type: Canal Main River Status: Currently Undefined
19	382	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
20	390	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
21	398	SW	River Name: River Tawe Welsh River Name: Afon Tawe Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
22	409	NW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
23	409	NW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
24	417	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
25	417	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
26	473	N	River Name: Lower Clydach River Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
27	473	N	River Name: River Tawe Welsh River Name: Afon Tawe Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
28	473	SE	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
29	475	SE	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
30	480	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
31	480	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
32	485	N	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
33	488	S	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
34	494	N	River Name: Lower Clydach River Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
35	494	N	River Name: Forge Fach Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined



## 6.11 Surface Water Features

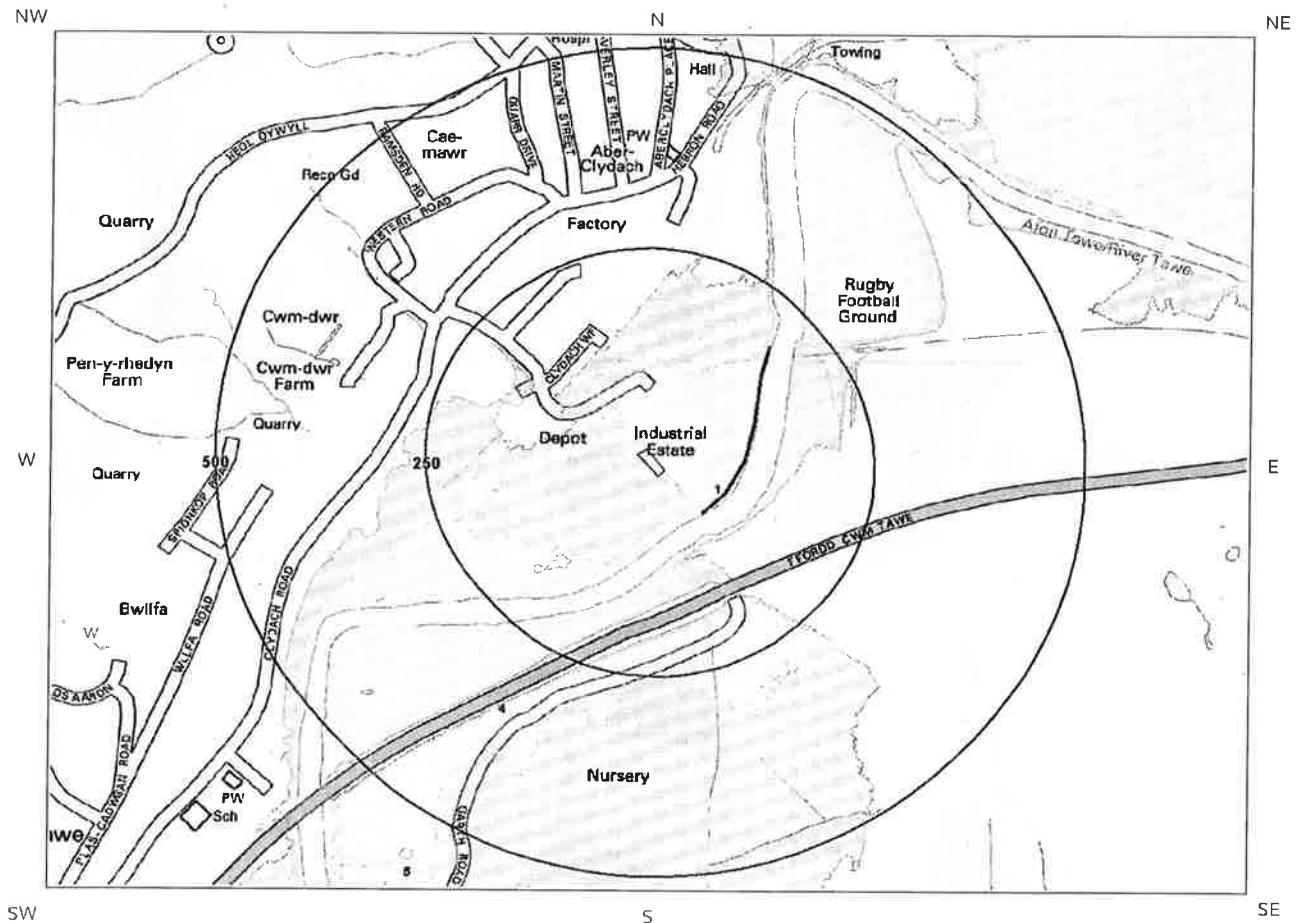
Are there any surface water features within 250m of the study site?

Yes

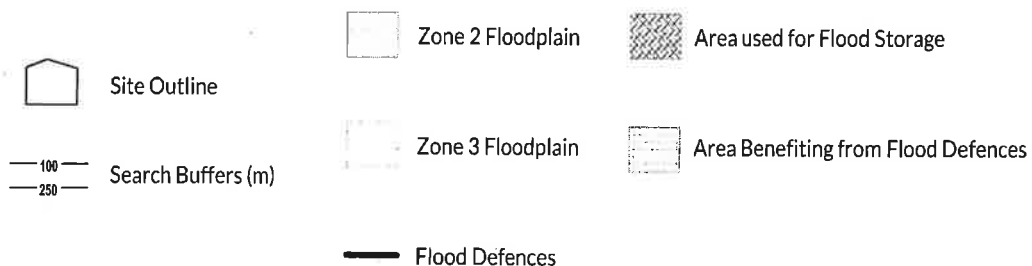
The following surface water records are not represented on mapping:

Distance (m)	Direction
66	SE
158	NW
163	W
207	NE
224	S

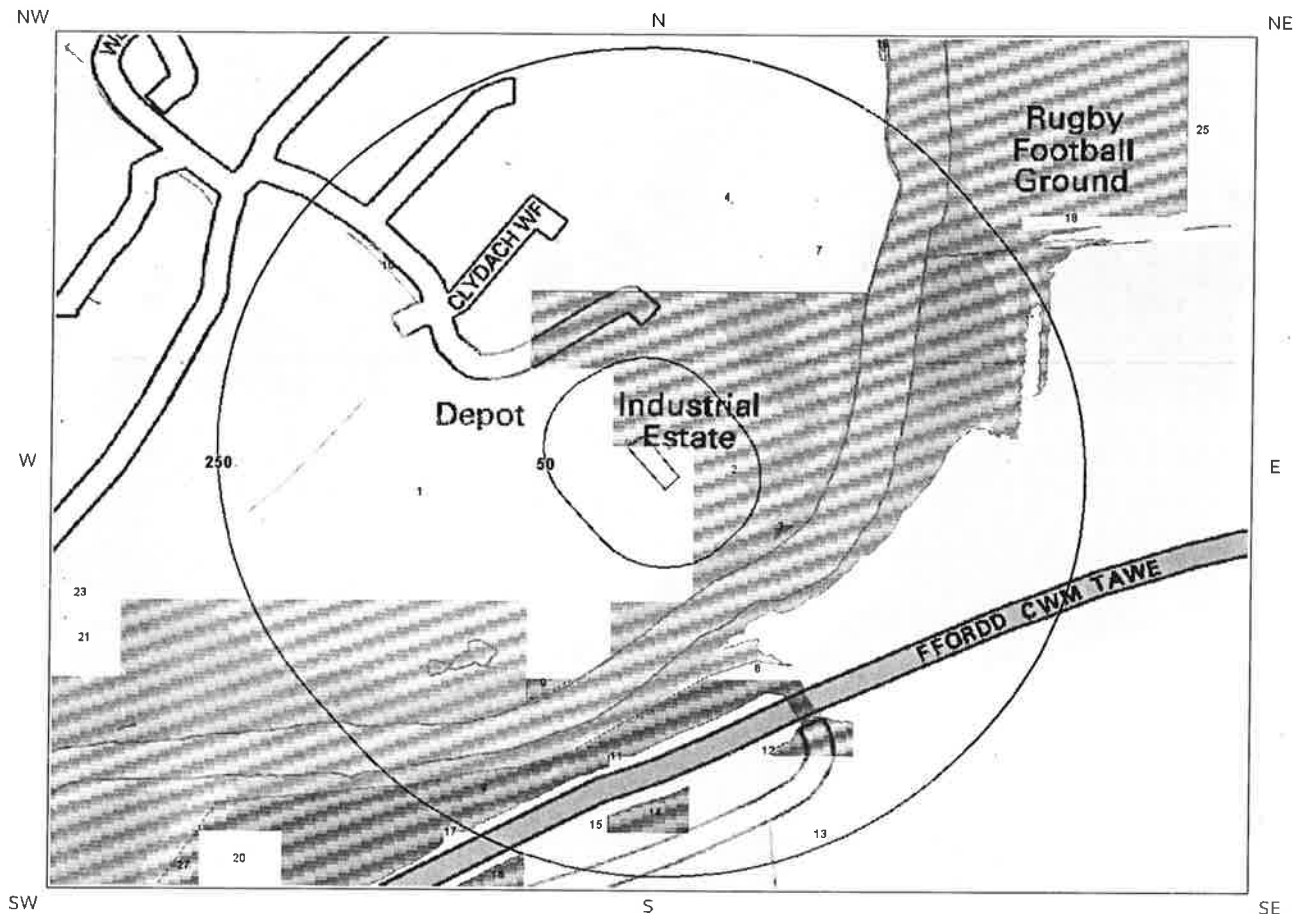
# 7a. Environment Agency Flood Map for Planning (from rivers and the sea)



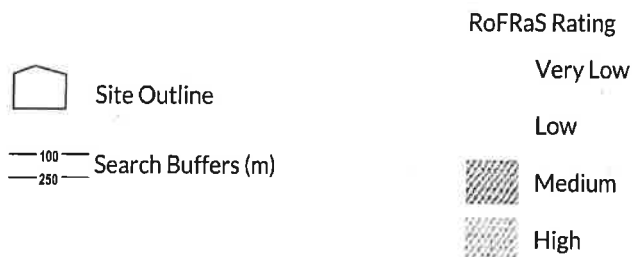
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## 7b. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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# 7 Flooding

## 7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency Zone 2 floodplain? Yes

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1	0	On Site	18-Jun-2015	Zone 2 - (Fluvial / Tidal Models)

## 7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency Zone 3 floodplain? Yes

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

ID	Distance (m)	Direction	Update	Type
1	0	NE	26-May-2015	Zone 3 - (Fluvial Models)
	156	SE	26-May-2015	Zone 3 - (Fluvial Models)

## 7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? High

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a High (1 in 30 or greater) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS flood Risk
----	--------------	-----------	-------------------

1	0.0	On Site	Low
2	0.0	On Site	High

## 7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? Yes

The following flood defence records are represented as lines on the Flood Map:

ID	Distance (m)	Direction	Update
7	70	SE	15-May-2015

## 7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

## 7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

## 7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.



## 7.8 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?

Moderate

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

## 8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

### 8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

1

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
1	91	SE	GLAIS MORAIN	Natural Resources Wales

### 8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

### 8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

### 8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

### 8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

## 8.6 Records of Ancient Woodland within 2000m of the study site:

97

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
2	100	SE	Unknown	Ancient and Semi-Natural Woodland
3	186	W	Unknown	Restored Ancient Woodland Site
4	270	SW	Unknown	Ancient and Semi-Natural Woodland
5	297	NW	Unknown	Restored Ancient Woodland Site
6	354	NW	Unknown	Restored Ancient Woodland Site
7	384	W	Unknown	Ancient and Semi-Natural Woodland
8	700	E	Unknown	Ancient and Semi-Natural Woodland
9	720	NW	COLLIERY WOOD	Ancient and Semi-Natural Woodland
10	763	N	Unknown	Ancient and Semi-Natural Woodland
11A	774	N	Unknown	Ancient and Semi-Natural Woodland
12A	802	N	Unknown	Ancient and Semi-Natural Woodland
13	808	SW	Unknown	Ancient and Semi-Natural Woodland
14	813	N	Unknown	Ancient and Semi-Natural Woodland
15	854	N	Unknown	Ancient and Semi-Natural Woodland
16B	884	N	Unknown	Ancient and Semi-Natural Woodland
17B	905	N	Unknown	Ancient and Semi-Natural Woodland
18C	958	NW	Unknown	Ancient and Semi-Natural Woodland
19	1012	NW	Unknown	Restored Ancient Woodland Site
20	1017	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1042	N	Unknown	Ancient and Semi-Natural Woodland
22	1054	SW	Unknown	Ancient and Semi-Natural Woodland
23C	1085	NW	Unknown	Restored Ancient Woodland Site
24	1108	NE	Unknown	Restored Ancient Woodland Site
25	1143	SW	Unknown	Ancient and Semi-Natural Woodland
26	1163	NE	Unknown	Ancient and Semi-Natural Woodland
27	1210	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1234	N	Unknown	Ancient and Semi-Natural Woodland

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1278	S	Unknown	Ancient and Semi-Natural Woodland
30	1308	NE	Unknown	Restored Ancient Woodland Site
Not shown	1321	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1352	N	Unknown	Ancient and Semi-Natural Woodland
33	1415	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1429	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1476	N	Unknown	Ancient and Semi-Natural Woodland
36	1523	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1542	W	Unknown	Ancient and Semi-Natural Woodland
Not shown	1553	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1557	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1563	NE	Unknown	Restored Ancient Woodland Site
41	1588	SE	GLYN-Y-GORS FARM WOOD	Ancient and Semi-Natural Woodland
42	1589	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1591	N	Unknown	Ancient and Semi-Natural Woodland
44	1596	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1598	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1607	N	Unknown	Ancient and Semi-Natural Woodland
47	1616	SW	Unknown	Restored Ancient Woodland Site
48	1628	SE	GLYN-Y-GORS FARM WOOD	Ancient and Semi-Natural Woodland
Not shown	1651	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1652	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1676	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1696	SE	GLYN-Y-GORS FARM WOOD	Ancient and Semi-Natural Woodland
Not shown	1698	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1698	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1732	N	Unknown	Ancient and Semi-Natural Woodland



ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1733	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1740	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1745	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1754	NE	Unknown	Restored Ancient Woodland Site
Not shown	1761	NE	Unknown	Restored Ancient Woodland Site
Not shown	1764	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1766	SE	GLYN-Y-GORS FARM WOOD	Ancient and Semi-Natural Woodland
Not shown	1767	E	GLAIS WOOD	Ancient and Semi-Natural Woodland
Not shown	1767	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1772	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1774	NE	Unknown	Restored Ancient Woodland Site
Not shown	1781	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1785	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1791	SE	GLYN-Y-GORS FARM WOOD	Ancient and Semi-Natural Woodland
Not shown	1793	SE	GLYN-Y-GORS FARM WOOD	Ancient and Semi-Natural Woodland
Not shown	1799	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1805	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1806	SE	GLYN-Y-GORS FARM WOOD	Ancient and Semi-Natural Woodland
Not shown	1811	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1814	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1819	E	GLAIS WOOD	Ancient and Semi-Natural Woodland
Not shown	1822	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1840	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1843	E	GLAIS WOOD	Ancient and Semi-Natural Woodland
Not shown	1848	NE	TYN-Y-COED WOOD	Ancient Replanted Woodland
Not shown	1862	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1864	E	Unknown	Ancient and Semi-Natural Woodland

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1866	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1873	E	GLAIS WOOD	Ancient and Semi-Natural Woodland
Not shown	1875	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1901	E	GLAIS WOOD	Ancient and Semi-Natural Woodland
Not shown	1918	E	GLAIS WOOD	Ancient and Semi-Natural Woodland
Not shown	1923	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1944	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1947	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1947	SE	COED GLYN-Y-GORS	Ancient and Semi-Natural Woodland
Not shown	1956	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1961	N	Unknown	Restored Ancient Woodland Site
Not shown	1985	N	CEFN-EITHRIM-ISAF WOOD	Ancient and Semi-Natural Woodland
Not shown	1990	E	GLAIS WOOD	Ancient and Semi-Natural Woodland
Not shown	1998	SE	COED GLYN-Y-GORS	Ancient and Semi-Natural Woodland
Not shown	1998	N	Unknown	Restored Ancient Woodland Site
Not shown	1999	SE	COED GLYN-Y-GORS	Ancient and Semi-Natural Woodland

## 8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

## 8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

# 9. Natural Hazards Findings

## 9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure GeoInsight, available from our website. The following information has been found:

### 9.1.1 Shrink Swell

What is the maximum Shrink-Swell\*\* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

#### Hazard

Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

### 9.1.2 Landslides

What is the maximum Landslide\* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

#### Hazard

Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

### 9.1.3 Soluble Rocks

What is the maximum Soluble Rocks\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

#### Hazard

Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

\* This indicates an automatically generated 50m buffer and site.

### 9.1.4 Compressible Ground

What is the maximum Compressible Ground\* hazard rating identified on the study site? Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build Ö consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property x*ossible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

### 9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

### 9.1.6 Running Sand

What is the maximum Running Sand\*\* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build Ö consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property Ö no significant increase in insurance risk due to running sand problems is likely.

## 9.2 Radon

### 9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

\* This indicates an automatically generated 50m buffer and site.

### 9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing

ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.



# 10. Mining

## 10.1 Coal Mining

Are there any coal mining areas within 75m of the study site?

Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

## 10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary?

No

Database searched and no data found.

## 10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

No

Guidance: No Guidance Required.

# Contact Details

**Groundsure Helpline**  
Telephone: 08444 159 000  
info@groundsure.com

## British Geological Survey Enquiries

Kingsley Dunham Centre  
Keyworth, Nottingham NG12 5GG  
Tel: 0115 936 3143.  
Fax: 0115 936 3276.  
Email:

Web: [www.bgs.ac.uk](http://www.bgs.ac.uk)

BGS Geological Hazards Reports and general geological enquiries:  
[enquiries@bgs.ac.uk](mailto:enquiries@bgs.ac.uk)

## Environment Agency

National Customer Contact Centre, PO Box 544  
Rotherham, S60 1BY  
Tel: 08708 506 506

Web: [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)  
Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)

## Public Health England

Public information access office  
Public Health England, Wellington House  
133-155 Waterloo Road, London, SE1 8UG  
[www.gov.uk/phe](http://www.gov.uk/phe)  
Email: [enquiries@phe.gov.uk](mailto:enquiries@phe.gov.uk)  
Main switchboard: 020 7654 8000

## The Coal Authority

200 Lichfield Lane  
Mansfield  
Notts NG18 4RG  
Tel: 0345 7626 848  
DX 716176 Mansfield 5  
[www.coal.gov.uk](http://www.coal.gov.uk)

## Ordnance Survey

Adanac Drive, Southampton  
SO16 0AS  
Tel: 08456 050505

## Local Authority

Authority: Abertawe - Swansea City and Borough Council  
Phone: 01792 636000  
Web: <http://www.swansea.gov.uk>  
Address: Civic Centre, Oystermouth Road, Swansea, SA1 3SN

## Gemapping PLC

Virginia Villas, High Street, Hartley Witney,  
Hampshire RG27 8NW  
Tel: 01252 845444



**Groundsure**

LOCATION INTELLIGENCE



**British Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



Environment  
Agency



Public Health  
England



The Coal  
Authority



Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.

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This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

## Standard Terms and Conditions

### 1 Definitions

In these terms and conditions unless the context otherwise requires:

**"Beneficiary"** means the person or entity for whose benefit the Client has obtained the Services.

**"Client"** means the party or parties entering into a Contract with Groundsure.

**"Commercial"** means any building or property which is not Residential.

**"Confidential Information"** means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

**"Support Services"** means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

**"Contract"** means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

**"Third Party Data Provider"** means any third party providing Third Party Content to Groundsure.

**"Data Reports"** means reports comprising factual data with no accompanying interpretation.

**"Fees"** has the meaning set out in clause 5.1.

**"Groundsure"** means Groundsure Limited, a company registered in England and Wales under number 03421028.

**"Groundsure Materials"** means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

**"Intellectual Property"** means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

**"Mapping"** means a map, map data or a combination of historical maps of various ages, time periods and scales.

**"Order"** means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.

**"Ordnance Survey"** means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

**"Order Website"** means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

**"Report"** means a Risk Screening Report or Data Report for Commercial or Residential property.

**"Residential"** means any building or property used as or intended to be used as a single dwelling.

**"Risk Screening Report"** means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

**"Services"** means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

**"Site"** means the area of land in respect of which the Client has requested Groundsure to provide the Services.

**"Third Party Content"** means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

**"User Guide"** means the user guide, as amended from time to time, available upon request from Groundsure and on the website ([www.Groundsure.com](http://www.Groundsure.com)) and forming part of this Contract.

### 2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure's acceptance of an Order shall be binding only when made in writing and signed by Groundsure's authorised representative or when accepted through the Order Website.

### 3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

### 4 Reliance

4.1 The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

### 5 Fees and Disbursements

5.1 Groundsure shall charge and the Client shall pay fees at the rate and

frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

## 6 Intellectual Property and Confidentiality

### 6.1 Subject to

- (i) full payment of all relevant Fees and
- (ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

- (i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;
- (ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;
- (iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
- (iv) not combine the Services with or incorporate such Services into any other information data or service;
- (v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);
- (vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and
- (vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey.

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

## 7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

- (i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or

subcontractors;

- (ii) any use made of the Reports, Services, Materials or any part of them; and
- (iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

- (i) loss of profits;
- (ii) loss of business;
- (iii) depletion of goodwill and/or similar losses;
- (iv) loss of anticipated savings;
- (v) loss of goods;
- (vi) loss of contract;
- (vii) loss of use;
- (viii) loss or corruption of data or information;
- (ix) business interruption;
- (x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
- (xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;
- (xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
- (xiii) loss or damage to a computer, software, modem, telephone or other property; and
- (xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

## 8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

- (i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or
- (ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
- (iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
- (iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

## 9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:



(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

- (a) supplied to the Client's specification(s) and in any event
- (b) by their nature cannot be returned.

## 10 Consequences of Withdrawal, Termination or Suspension

### 10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

## 11 Anti-Bribery

### 11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

## 12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

- (i) the Client or Beneficiary's failure to provide facilities, access or information;
- (ii) fire, storm, flood, tempest or epidemic;
- (iii) Acts of God or the public enemy;
- (iv) riot, civil commotion or war;
- (v) strikes, labour disputes or industrial action;
- (vi) acts or regulations of any governmental or other agency;
- (vii) suspension or delay of services at public registries by Third Party Data Providers;
- (viii) changes in law; or
- (ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. © Groundsure Limited June 2013

# **FORMER CLYDACH MARKET SITE, PLAYERS INDUSTRIAL ESTATE, CLYDACH, SWANSEA**

## **Phase II Ground Investigation Report**

Report No. G351/GIR (Rev.2)

Aug 2014

**Prepared for :**

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## 0.0 FOREWORD

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The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

### 0.1. Ground Investigation

#### 0.1.1. General

Recommendations made and opinions expressed in the report are based on the strata observed in the excavations, together with the results of site and laboratory tests. No responsibility can be held for conditions which have not been revealed by the Exploratory Holes or which occur between Exploratory Holes. Whilst the report may suggest the likely configuration of strata, both between Exploratory Holes and below the maximum depth of investigation, this is only indicative and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

#### 0.1.2. Investigation Procedures

Window Sampling techniques for ground investigation have been employed within the project. All Exploratory Hole operations, sampling and logging of soils, rocks and in-situ testing complies with the recommendations of the British Code of Practice BS 5930 (1999), 'Site Investigations' as superseded in part by BS EN ISO 14688-1 (2002) and 14688-2 (2004), British Code of Practice BS 10175 (2001) 'Investigation of Potentially Contaminated Sites' and BS 1377: 1990, 'Methods of Test for Soils for Engineering Purposes'.

#### 0.1.3. Routine Sampling

Representative bulk, disturbed and environmental samples of the different strata are taken following completion of logging. These samples are sealed and labelled in clear plastic bags, 2kg plastic tubs, 250ml and 60ml amber jars. Soil samples obtained for environmental testing are sampled and sealed in borosilicate amber jars or in specialist vessels where required. All samples are returned from site to QG's laboratory for controlled storage within 24 hours of sampling to await test scheduling/requirements.

#### 0.1.4. In-Situ Testing

In-situ testing comprised:

- Standard Penetration Tests in Boreholes

#### 0.1.5. Groundwater

Where possible, the depth of entry of any influx of groundwater is recorded during the course of excavation or boring operations. The rate of inflow into the excavation or borehole is monitored during the course of the excavation or during boring procedures. Upon encountering any water strikes, work is temporarily halted and the water levels monitored for a standard twenty minute period recording the change in water level at the end of the twenty minutes.

Groundwater conditions observed in the excavations are those appertaining to the period of investigation. It should be noted, however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions or other causes.

#### 0.1.6. Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded. Further to notifying the Engineer/ Client with one week's notice all soil and/or rock samples will be discarded 28 days after submission of the approved final report.

## **1.0 INTRODUCTION**

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### **1.1 General**

Upon the instructions of Dawnus Group Ltd, Quantum Geotechnical Ltd (QGL) has been commissioned to undertake a Phase II Quantitative Ground Investigation for the commercial redevelopment of the former Clydach Market site in Clydach, which Dawnus are proposing to use as a Plant Yard for their construction activities.

The site does not fall into the category of being re-developed, as the existing buildings are being refurbished, and all the existing hard standing covering the site retained. No new buildings are proposed, other than portable accommodation that will be founded at ground level on the existing tarmacadam surfacing. New drainage to soakaways is, we understand, proposed.

This Report presents a brief account of the fieldwork is presented; the strata encountered and any contamination issues and any groundwater observations obtained from the investigation are detailed.

Guidance and recommendations are made regarding any potential contamination issues, particularly the effects on site drainage. Wider site issues on geotechnical matters such as foundations and infrastructure fall outside the scope of this Report.

### **1.2 Previous Studies**

The site has previously been subject to a Phase I Preliminary Risk Assessment/Desk Study by Quantum Geotechnical Limited published in June 2014, prior to this investigation report (Report Ref: G351/DS (Rev.1)), which should be read in conjunction with this report.

The findings of the Desk Study are reiterated below for ease of reference:

A number of potential issues have been identified from the Conceptual Site Model (CSM) developed within this study. The following evaluations and subsequent recommendations are made:

*The desk study has identified the likelihood of Made Ground to be present and therefore as a potential source of land contamination that may have impacted upon the site. This in itself does not render the site as a high risk.*

*The Conceptual Site Model has identified a potential Source and potential Receptor at risk. However the pathway to realise such a pollution linkage may not be present.*



*We understand that the site will be used as a plant yard utilising the existing buildings and infrastructure and as such no re-development is planned.*

*The site benefits at present from hard cover throughout and as such any surface run-off could be dealt with by existing drainage measures and not allow percolation into the ground and groundwater; hence no leaching of potential contaminants to potential Receptors. Any new soakaway drainage may provide a pathway for any pollution linkage.*

*Targeted investigation should be undertaken where any new soakaways are planned to assess the mobility of any contaminants in the soils.*

*If no material changes to the site situation are proposed then additional investigation and assessment are not considered necessary as regards human health.*

*If ground works are to be undertaken, there may be a need for assessment of the soils to address the risk to workers. However if the guidelines and protocols contained in HSE HSG66 Protection of workers and the general public during the development of contaminated land are adhered to, then this should mitigate against further sampling, testing or risk assessment.*

### **1.3 Purpose of Ground Investigation**

The Conceptual Site Model proposed as part of the Preliminary Risk Assessment highlighted that the main sources of pollution linkage to the ongoing use of the site was from soakaway drainage, the possibility of flood water ingress into the soils and the potential human health risks from handling soils on site, due to the former use as a tinplate works with rail sidings and an un-identified spoil heap being present on the site in the past.

We understand that infiltration drainage is proposed for the site, although this is now only proposed in one specific area of the site in the northern part of the site at the location of Trial Pit 1. This being the case, an assessment of the contamination levels of the mantle of made ground and its mobility is required. This assessment will also encompass quantification of the risk to the transportation of mobile contaminants from inundation by potential flooding, identified in the CSM.

As the site will remain unaltered apart from the single new soakaway drainage, the pathways to realise a pollution linkage as regards human health aspects will not be present; so that a full holistic investigation is not deemed necessary for this project.

In accordance with BS10175: this ground investigation report was therefore targeted on a particular area of the site in relation to the potential risks posed to the controlled waters that may be affected by drainage to

the ground or possible flooding events. The general level of soil contamination can also be addressed as part of the same targeted testing regime, although the CSM has identified that no pollution linkage exists in this regard.

The ground investigation comprised of a series of trial pits at the two locations of the proposed soakaways and also at two additional points where the original surfacing had been broken through, to allow characterisation and sampling of the superficial deposits in the targeted areas of the site.

#### **1.4 Scope Of Work**

The general scope of work undertaken in the preparation of this assessment was as follows:

- Provide an appraisal of the data and identification of ground conditions that could potentially impact on the designated proposed end use.
- Conduct a brief intrusive ground investigation.
- Provide an interpretative report offering recommendations on site suitability for the proposed development with recommendations specifically on environmental issues relating to contamination levels and the mobility of these.

General notes on the techniques employed by Quantum Geotechnical are described in the Foreword together with the limitations inherent in carrying out ground investigation work.

## **2.0 THE SITE**

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### **2.1 Site Description**

The proposed development site is located around the former Clydach Market site on Players Industrial Estate in Clydach, Swansea.

The approximate National Grid Reference of the centre of the site is 268853E 200692N.

The proposed development site is shown on the Land Registry Title Plans included in Appendix I.

The proposed development site, roughly triangular in shape, is on the premises of a former indoor market (Clydach Market) located at the Players Industrial Estate, in Clydach in the Swansea Valley. It is bounded to the east and south-east by the River Tawe and other industrial buildings to the north and west, including a 'Depot'. The majority of the site is laid to tarmac with some industrial buildings near its centre and a thin line of vegetation (trees and bushes) which separates the site boundary from the river to the south-east.

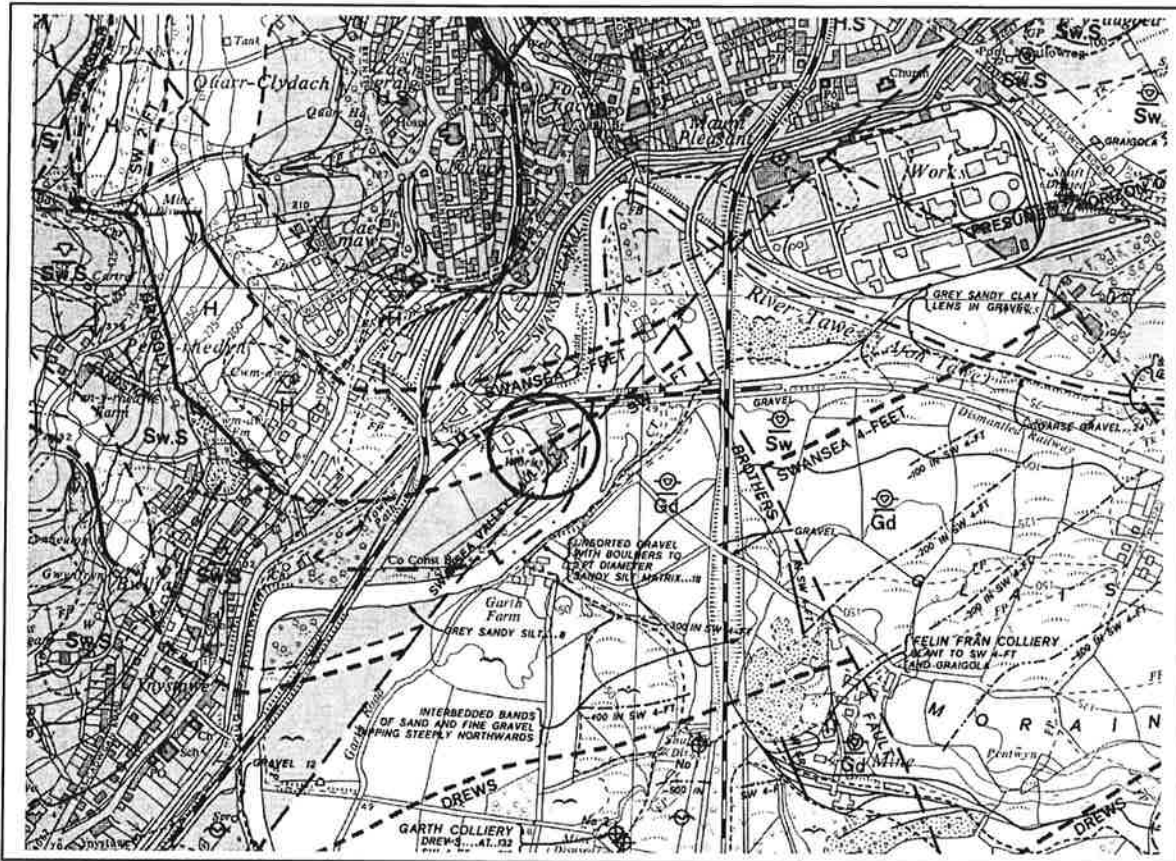
Aerial photographs of the site are included in the Groundsure reports presented in Appendices III and IV of the PRA/Desk Study Report.

### **2.2 Published Geology**

The large scale Geological Sheets SN50SE, at a scale of 1: 10,560 or 6 Inches to 1 Mile, (extract presented over page), show the site in detail with the approximate position of the site highlighted.

Formations across the majority of the site are Coal Measures strata of the upper Hughes Beds and Swansea Beds, but due to the Swansea Valley Fault crossing the site (from NE-SW) the southern corner of the site is occupied by the much younger ('undivided') Grovesend Beds. These rocks generally comprise of mudstones and sandstones with a number of productive coal seams. The general dip of the bedrock in the area shown to be in a southerly direction.

The superficial deposits at surface are indicated to be Alluvium. No depth of these soils is indicated. The 1:10,000 scale map shows the Swansea Valley Fault coursing NE-SW through the site. The Brothers Fault runs acutely southwards to the east of the Swansea Valley Fault, approximately 200m to the east of the site, and an un-named E-W trending fault located about 600m NW of the site indicate the overall structural complexity of the area. Bedding detail is sparse in the area, but generally dip to the south.



BGS Sheet SN60SE (Not to Scale). ©NERC

Using simple trigonometry, dips are estimated from the coal seam depths. North of the Swansea Valley Fault, the closest information on coal seam depths, some 800m to the west, indicate a dip of about  $11^\circ$  to the south.

There are several indications on the geological map of mining activity within the area. West of the Swansea Valley Fault, and therefore more likely to influence the site, the Graigola seam appears worked about 450m west of the site with an un-named shaft and two adits on its outcrop, along with seam contours indicated on the geological map and also the solid line of outcrop indicating proved position. A disused mine is also located about 700m to the NW; known as the Cwmclydach Graigola Colliery from early Ordnance Survey maps with two adit entrances shown. Southeast of the Swansea Valley Fault the Drews and Swansea 4-ft coal seams have been worked about 600m south of the site at 'Garth Colliery'.

The seam contours detailed on the geological map indicate the extent known workings within a particular seam. Several seam contours, at depth, are indicated in the Graigola seam west of the site; while none are indicated for the Swansea 2ft seam. The interpretation of this could be that no recorded workings extend eastwards towards the site area.

Another potentially significant factor is that no seam contours encroach close to the line of the Swansea

Valley Fault. The presence of such a major fault will have had an undoubted affect on underground workings as regards ground disturbance and hence the safe extraction of coal.

On the site itself the Graigola seam outcrop is inferred across the site. The effect of this conjectured position will be dependant on the thickness of the superficial cover.

The conjectured outcrop of the Swansea 2-ft seam is shown north of the site, so assuming a dip of about 11° to the south, is likely to underlie the site.

The south eastern limit of the site (south of the Swansea Valley Fault) may be affected at depth by the Swansea 4-ft seam.

### **2.3 Mining**

Quantum have previously undertake a site specific Coal Mining Risk Assessment for the site on behalf of the Client.

The conclusion drawn from the Coal Mining Risk Assessment was that there was no risk from recorded historical mine workings and negligible risk from unrecorded mine workings. As such no special measures were considered necessary for development of the site in this particular regard.

### **2.4 Radon Assessment**

The GroundSure Geolnsight® report obtained for the Preliminary Risk Assessment indicates that the site is not located within a Radon Affected Area as defined by the Health Protection Agency (HPA) as less than 1% of properties are above the Action Level. The report states that no Radon Protection Measures are necessary.



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### **3.0 FIELDWORK**

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#### **3.1 General**

All fieldwork was on 26<sup>th</sup> March 2014. Supervision by an Engineering Geologist from Quantum was provided on all aspects of the works.

A summary of the fieldworks is outlined below;

- 4 No. Machine excavated Trial Pits.

#### **3.2 Exploratory Hole Locations**

The exploratory hole locations were set out by a QGL Engineering Geologist in agreement with the Client to target the area of the proposed soakaway to the north of the existing building and to provide information on the soils in areas where access was possible without creating additional pathways for pollution linkages.

The fact that the site is not to be redeveloped, but effectively re-furbished renders the need to carry out a site-wide regular pattern of investigation points unnecessary.

An Exploratory Hole Location Plan is presented in Appendix I.

#### **3.3 Trial Pits**

The trial pits were excavated using a 5 tonne tracked excavator provided by the Client. The trial pits were unsupported and consequently logged from surface.

The trial pits were logged in accordance with BS5930:1999 +A2:2010; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2005, by QG's Engineering Geologist. Following completion of logging the trial holes, they were backfilled with arisings in compacted layers.

A complete set of Engineering Geologist's Trial Pit logs are presented in Appendix II.

#### **3.4 Soil Sampling**

Disturbed and environmental samples were taken within the overlying superficial / Made Ground deposits for strata identification and laboratory testing purposes. All samples are returned from site to Quantum's laboratory for controlled storage within 24 hours of sampling to await test scheduling/ requirements. Sample type and sample depth are all recorded on the Engineering Geologist's Exploratory Hole Logs found within the appropriate Appendix.

## 4.0 LABORATORY TESTING

### 4.1 General

The laboratory testing was scheduled by Quantum and comprised a number of geo-environmental tests on selected soil samples recovered from the investigation.

### 4.2 Geo-Environmental Testing

Geo-Environmental testing was carried out on selected soil and soil leachate samples gained from the ground investigation. The purpose of the testing was to gain a holistic view of any raised levels of contaminants that may exist on site, and the leachate potential of any contaminants found.

A full set of Geo-Environmental Laboratory Test Certificates are provided within Appendix III.

#### 4.2.1 Geo-Environmental Soil Testing

The table below summarises the geo-environmental tests undertaken on selected soil samples.

##### Metals and General Inorganics

- |                                |            |                     |
|--------------------------------|------------|---------------------|
| • Arsenic                      | • Barium   | • Beryllium         |
| • Boron (Water Soluble)        | • Cadmium  | • Chromium          |
| • Copper                       | • Lead     | • Mercury           |
| • Nickel                       | • Selenium | • Vanadium          |
| • Zinc                         |            |                     |
| • Cyanide (Total/Free/Complex) | • Sulphide | • Elemental Sulphur |
| • pH                           | • Sulphate | • Organic Matter    |

##### Hydrocarbons

- |  |   |                       |
|--|---|-----------------------|
| • Total Petroleum Hydrocarbons C10 – C40 | • Poly Aromatic Hydrocarbons Speciated (16 USEPA) | • Phenol (Monohydric) |
|--|---|-----------------------|

#### 4.3.2 Geo-Environmental Soil Leachate Testing

The table over page summarises the geo-environmental tests undertaken on selected leachate samples.

A full set of Geo-Environmental Test Certificates are provided within Appendix III.

#### Metals and General Inorganics

- |                                |            |                        |
|--------------------------------|------------|------------------------|
| • Arsenic                      | • Barium   | • Beryllium            |
| • Boron                        | • Cadmium  | • Chromium             |
| • Copper                       | • Lead     | • Mercury              |
| • Nickel                       | • Selenium | • Vanadium             |
| • Zinc                         |            |                        |
| • Cyanide (Total/Free/Complex) | • Sulphide | • Elemental Sulphur    |
| • pH                           | • Sulphate | • Total Organic Carbon |

#### Hydrocarbons

- |  |   |                       |
|--|---|-----------------------|
| • Total Petroleum Hydrocarbons C10 – C40 | • Poly Aromatic Hydrocarbons Speciated (16 USEPA) | • Phenol (Monohydric) |
|--|---|-----------------------|

## 5.0 GROUND CONDITIONS ENCOUNTERED

### 5.1 General

The sequence of deposits encountered during the investigation is detailed within the Engineering Geologist's logs presented within the Appendices. The logs highlight the nature of the soils encountered and provide detailed descriptions of the strata revealed at the site.

### 5.3 Ground Conditions

A summary of the ground conditions encountered and the depth to the base of each stratum, in metres below ground level is provided in the following table.

Table 1: Summary of Ground Conditions

General Strata Description	Elevation at base of strata (mbgl)			
	TP1	TP2	TP3	TP4
Made Ground	0.75	1.7	1.0	0.5
Alluvium	>1.5	>2.0	>2.0	>1.0

\* Depth of strata not proven

### 5.4 Groundwater Conditions

No groundwater was encountered during the fieldworks.

*Please note: The groundwater conditions observed in these exploratory holes are those appertaining to the period of the investigation. However, it should be noted that groundwater levels are subject to diurnal, seasonal and climatic conditions or may vary due to other causes.*

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## 6.0 GEO-ENVIRONMENTAL CONSIDERATIONS

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### 6.1 General

The site use is to remain unchanged as a commercial end-use. No development of the site is proposed other than refurbishment of the existing buildings, new portable buildings founded on the existing hard cover surfacing, and new soakaway drainage in one area in the northern part of the site.

The potential risks to the site have been assessed by consideration of the potential pollution linkages (PPL). For a risk to exist there must be a source of contamination, a receptor that may be harmed, and a pathway by which the receptor could be exposed to the contaminant. Only when all three factors are present (i.e. source, pathway, receptor) can a pollution linkage, and consequently an unacceptable risk exist. The conceptual site model considers all three elements and the potential for pollution linkages that may exist.

The information gained from the land use assessment has been collated to identify the potential pathways that may exist between any contamination source and its receptors. Each of these components was highlighted in the proposed Conceptual Site Model included within Section 6.2 of the Phase I Preliminary Risk Assessment (Desk Study).

### 6.1 Risk To Human Health

Despite the CSM identifying that there is effectively no pathway for pollutant linkage between any made ground and the site workers or end-users, it is prudent to assess the CLEA approach to human health risk assessment. The appropriate model for this project is a commercial end use; hence these Soil Guideline Values have been used in this assessment.

#### 6.1.1 *Summary of Contaminated Land Human Health Risk Laboratory Test Results*

##### **Heavy Metal and General Inorganics**

The concentrations of heavy metal and inorganic compounds are summarised and compared to the relevant Soil Guideline Values (SGV's) or Generic Assessment Criteria (GAC) for **Commercial** site end use in the following table.

The assessment criteria used in this review are those proposed within either the most recent of the CLEA SGV (2002 & 2009) supplemented by the LQM/CIEH GAC (2007 & 2009) and where gaps in the UK accepted guidelines exist, the Dutch Intervention Values (DIV) have been consulted to enable an assessment of risks.



**Table 2: Summary of Heavy Metals & Inorganics Laboratory Test Results (Soil)**

Analyte	Site Results Range (mg/kg)	No. Exceed SGV/GAC	Soil Guideline & Generic Assessment Criteria	
			Commercial (mg/kg)	Source of GAC
Arsenic	15 – 76	0	640	CLEA SGV
Barium	310 – 2000	0	22,000	EIC
Beryllium	0.6 – 2.7	0	420	LQM/CIEH
Cadmium	< 0.2 – 4.1	0	230	CLEA SGV
Chromium	12 – 18	0	8,840	LQM/CIEH
Lead	52 – 210	0	750	CLEA SGV
Mercury (inorganic)	< 0.3 – 0.7	0	3,600	CLEA SGV
Selenium	< 1.0 – 1.7	0	13,000	CLEA SGV
Boron (water soluble)	0.4 – 7.1	0	192,000	LQM/CIEH
Copper	100 – 540	0	71,700	LQM/CIEH
Nickel	70 – 410	0	1800	CLEA SGV
Vanadium	30 – 61	0	3,160	LQM/CIEH
Zinc	140 – 540	0	665,000	LQM/CIEH
Cyanide (Total)	< 1 – 1	-		
Cyanide (Complex)	< 1	0	50	DIV
Cyanide (Free)	< 1	0	20	DIV
Elemental Sulphur	< 20 – 260	-		
Sulphide	12 – 43	-		
Sulphate (Total)	770 – 2000	0	2400	BRE
pH Value	7.8 – 8.5	-		
Phenol (Monohydric)	< 2.0	0	32,000	CLEA SGV

### Hydrocarbons – Total & Polyaromatic

The concentrations of Total Petroleum Hydrocarbons, Speciated Polycyclic Aromatic Hydrocarbons are summarised in the following table and compared to the relevant Soil Guideline value (SGV) / Generic Assessment Criteria (GAC) for **Commercial** site end use.

**Table 3: Summary of Hydrocarbon Laboratory Test Results (Soil)**

Analyte	Site Results Range (mg/kg)	No. Exceed GAC	LQM/CIEH (2009) Generic Assessment Criteria Commercial (mg/kg)		
			1% SOM	2.5% SOM	6% SOM
Soil Organic Matter	1.4 – 6.6				
Poly Aromatic Hydrocarbons:					
Napthalene	0.22 – 0.82	0	200	480	1100
Acenaphthylene	< 0.20	0	84,000	97,000	100,000
Acenaphthene	< 0.10	0	85,000	98,000	100,000
Fluorene	< 0.20	0	64,000	69,000	71,000
Phenanthrene	0.55 – 1.6	0	22,000	22,000	23,000
Anthracene	< 0.10 – 0.18	0	530,000	540,000	540,000
Fluoranthene	0.26 – 1.3	0	23,000	23,000	23,000
Pyrene	0.23 – 1.1	0	54,000	54,000	54,000
Benzo(a)anthracene	< 0.20 – 0.65	0	90	95	97
Chrysene	0.35 – 0.93	0	140	140	140
Benzo(b)fluoranthene	< 0.10 – 0.89	0	100	100	100
Benzo(k)fluoranthene	< 0.20 – 0.52	0	140	140	140
Benzo(a)pyrene	< 0.10 – 0.73	0	14	14	14
Indeno(1,2,3-cd)pyrene	< 0.20 – 0.40	0	60	61	62
Dibenz(a,h)anthracene	< 0.20	0	13	13	13
Benzo(ghi)perylene	< 0.05 – 0.45	0	650	660	660
Total Speciated PAH	1.6 – 8.4	-			
Phenol (Monohydric)	< 2.0	0	1,100,000	1,100,000	1,200,000
Petroleum Hydrocarbons:					
TPH (C10 – C40)	18 – 210	0	28,000	28,000	28,000
TPH (C6 – C10)	< 0.1	0	2,100/3,700	5,100/8,600	12,000/18,000
TPH (C6 – C40)	18 – 210	-			

**Notes :-** 1. GAC's derived from LQM/CIEH (2009) in *Italics*. 2. Petroleum Hydrocarbons should be assessed as Aliphatic and Aromatic compounds (C5 - C70), for 1%, 2.5% & 5% Soil Organic Matter Content respectively (SOM). GAC presented as Aliphatic/Aromatic split. For individual petroleum hydrocarbon compounds/fractions, refer to LQM/CIEH GAC document.

## 6.2 Risk To Controlled Waters

### 6.2.1 General

The risk to controlled waters, i.e. nearby watercourses and aquifers, is defined by the potential for any contaminants present on site to leach from the soils beneath the site. The soils and bedrock underlying the site are classed as secondary aquifers; however the River Tawe is immediately adjacent to the site which is classed as a *Primary River*.

Once the leaching potential is known, the risk from this can be assessed in terms of pathways by which it may migrate, the impact on the receptors and if need be, addressed by remedial actions.

The results of the soil leachate sample testing on five samples identified on site as Made Ground is shown in the table below along with the relevant threshold levels. The more conservative values of the UK Drinking Water Standards (UK DWS) have been used where the more relevant Environmental Quality Standards (EQS) (Freshwater) have been selected as the primary Tier 1 Screening Values, as shown in Tables 4 and 5.

**Table 4: Summary of Soil Leachate Chemical Analysis (Metals & Inorganics)**

Analyte	Units	Site Results Range (µg/l) Soil Leachates [TP1 Result]	No. Exceed [No. Exceed @ TP1]	Environmental Quality Standards – Freshwater (Aquatic Life) <sup>1</sup> (µg/l)	UK Drinking Water Standards <sup>2</sup> (µg/l)
Arsenic	µg/l	2.4 – 20 [4.0]	0 [0]	50	10
Barium	µg/l	54 – 180 [54]	0 [0]	(625 DIV) <sup>3</sup>	
Beryllium	µg/l	< 0.2 [<0.2]	0 [0]	(15 DIV)	
Boron	µg/l	< 10 – 350 [<10]	0 [0]	2,000	1,000
Cadmium	µg/l	< 0.08 – 0.43 [<0.08]	0 [0]	5	5
Chromium	µg/l	< 0.4 – 2.4 [0.6]	0 [0]	5 – 250*	50
Copper	µg/l	2.9 – 31 [3.9]	5* [1*]	1 – 112*	2000
Lead	µg/l	2.2 – 13 [4.3]	4* [1*]	4 – 250*	10
Mercury	µg/l	< 0.5 [<0.5]	0 [0]	1	1
Nickel	µg/l	0.8 – 52 [1.3]	1 [0]	50	20
Selenium	µg/l	< 4.0 [<4.0]	0 [0]		10
Zinc	µg/l	2.7 – 34 [6.5]	0 [0]	8 – 2000*	5000
Cyanide total	µg/l	< 10 [<10]	0 [0]		50
Sulphate	µg/l	1,080 – 160,000 [1080]	0 [0]	400,000	250,000
Sulphide	µg/l	< 5.0 [<5.0]			
pH		7.9 – 8.2 [8.2]	0 [0]	6 – 9	6.5 – 9.5
Phenol	µg/l	< 10 [<10]	0 [0]	30	0.5

Note: \* Dependant on water Hardness; lower limit used for initial screening

**Table 5: Summary of Soil Leachate Chemical Analysis (Organics)**

Analyte	Units	Site Results Range (µg/l) Soil Leachates	No. Exceed	Environmental Quality Standards – Freshwater <sup>1</sup> (µg/l)	UK Drinking Water Standards <sup>2</sup> (µg/l)
Total Speciated PAH	µg/l	< 0.2	0	Not Specified	0.1
Napthalene	µg/l	< 0.01 – 0.4	0	10	
Acenaphthylene	µg/l	< 0.01	-		
Acenaphthene	µg/l	< 0.01	-		
Fluorene	µg/l	< 0.01	-		
Phenanthrene	µg/l	< 0.01	-		
Anthracene	µg/l	< 0.01	0	0.02	
Fluoranthene	µg/l	< 0.01	0	0.02	
Pyrene	µg/l	< 0.01	-		
Benzo(a)anthracene	µg/l	< 0.01	0		0.01
Chrysene	µg/l	< 0.01	0	(0.05 DIV)	
Benzo(b)fluoranthene	µg/l	< 0.01	0		0.1
Benzo(k)fluoranthene	µg/l	< 0.01	0		0.1
Benzo(a)pyrene	µg/l	< 0.01	0	0.03	
Indeno(1,2,3-cd)pyrene	µg/l	< 0.01	0		0.1
Dibenz(a,h)anthracene	µg/l	< 0.01	-		
Benzo(ghi)perylene	µg/l	< 0.01	0		0.1
TPH (C10 – C40)	µg/l	< 0.2	0		10
TPH (C6 – C10)	µg/l	< 10	-		

<sup>1</sup>Figures for Environmental Quality Standards (EQS) are Concentrations derived from the Environment Agency (<http://evidence.environment-agency.gov.uk/ChemicalStandards>):- Surface Water/Aquatic Life (where stated).

<sup>2</sup>UK Drinking Water Standards taken from; Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) (as amended), and Water Supply (Water Quality) Regulations 2000 (SI 2000/3184) (as amended).

<sup>3</sup>Figures in Brackets are Dutch Intervention Values (DIV)

### **6.3 Recommendations On Contaminated Land**

#### **6.3.1 Risk to Human Health of Site End Users**

All the potential contaminants tested for from within the Made Ground on site recorded concentration values well below the specified guidelines for a Commercial end use.

On this basis there is no *Source* of contamination as defined in the Conceptual Site Model to create a pollution link and as such no risk can be realised that would affect any site end user.

If any landscaped areas are proposed then good practice would dictate a suitable cover of inert soil would be needed to create a 'break' to any potential contamination affecting plants. A soil thickness of at least 300mm should be considered for this.

#### **6.4.2 Risk to Human Health During Construction**

The geo-environmental test results indicate the risks posed to construction operatives from chemical contaminants within the Made Ground is negligible.

However due to the variable nature of Made Ground and the industrial history of the area, there is potential for unidentified contamination to exist on the site and therefore during any redevelopment phase, it is possible construction site workers may be exposed to soil contaminants. Operatives working with, or likely to come into contact with Made Ground with the potential to harness raised concentrations of contaminants, should observe particular precautions concerning personal hygiene. They should be issued with the appropriate personal protective equipment and should be instructed in safe working methods. Instructions should be issued in the recognition of potentially hazardous materials including oily and odorous soil and water and also any discoloured or fibrous substances for example. Operatives should be warned to avoid contact between hands and mouth before washing. The consumption of food must be confined to designated clean areas. Suitable welfare including washing facilities should be provided.

#### **6.4.3 Risk To Nearby Watercourses**

The laboratory test certificates show that the soil leachate samples tested recorded results that show very low to negligible concentrations, thereby indicating that the majority of contaminants that may be held within the Made Ground are generally non-mobile.

The leachable levels of Copper and Lead recorded marginally exceed the threshold used for comparison from the NRW/EA website at <http://evidence.environment-agency.gov.uk/ChemicalStandards> using the Standards for Surface Water effects on Aquatic Life (where these are stated). The levels of these thresholds are dependant on the water hardness. In the absence of this particular information the lowest indicated threshold has been applied.



The site-wide levels of leachable Copper and Lead exceed the quoted thresholds for the lower levels of water hardness, but fall well below those for higher water hardness. The water hardness is therefore the driver for statistical assessment of whether a risk can be realised.

Looking at the results of leachable levels of Copper and Lead in the area where the only soakaway on site is proposed (in the area of TP1), then the values only very marginally exceed the most stringent of thresholds for surface waters affecting the aquatic life in the river.

The predominant lack of mobility of the leachable element to the Made Ground of the area designated for soakaway drainage suggests that infiltration drainage of the surface run-off that will be directed to the soakaway will not cause undue risk to controlled waters. The run-off directed to soakaway does not add to the situation that exists at present. In addition to this, the natural attenuation of any soakaway drainage will further reduce the concentrations of any leached fraction of these metals.

There may be a residual risk from the inundation of the made ground on the site from any flooding event, whereby the mobile element of the copper, lead and nickel in the made ground identified may be liberated. However we would expect the frequency of such events to be low, which along with the low risk from the leachable levels of these two metals, results in a very low risk to the River Tawe. Any such effects would be further diminished by the effects of natural attenuation, and will have been occurring since the made ground was first laid down.

## **6.5 Revised Conceptual Site Model**

The initial Conceptual Site Model highlighted risks to:

- Site workers from soils containing residues from the former works, spoil heap and rail sidings (on and adjacent to the site);
- Controlled waters from leaching of contaminants through soakaway drainage;
- Controlled waters from inundation of the site from possible flooding.

The investigation and subsequent laboratory testing has concluded that no raised contamination levels exist within the soil, that will affect the site workers or end users, as regards human health; i.e. no pollutant linkage exists from any soils associated with former rail sidings or soils heaps.

A marginal exceedance of two heavy metals, which is in fact dependant on the water hardness, from the area designated for soakaway drainage should not affect the use of soakaway proposed in the northern half of the site. The very marginal leachable potential is considered to be at a level that by natural attenuation and dilution it will not affect any discharge into controlled waters.

A residual risk has been identified should inundation of the site occur by flooding, which may possibly release minor contamination within the made ground. While there is the possibility therefore of a pollutant

linkage in this instance, the likelihood of the occurrence added to the marginal level of potential contamination renders the risk as being very low, and any potential effects would be diluted by natural attenuation.

Further revision of the Site Conceptual Model is therefore considered unnecessary. No remedial measures are considered necessary.

## 6.6 Summary Conclusions

In summary:

- The site is not to be redeveloped *per se*, but will involve refurbishment of the existing buildings and upgrading the infrastructure by means of one additional soakaway SUDS drainage. The existing hard cover, and hence drainage paths, of the whole site will remain;
- The Made Ground found on site has been tested for the potential contamination by Heavy Metals, general Inorganics and typical Hydrocarbons, considering the site's former uses;
- The leachability of any contaminants of the made ground proved have been tested for the same suite to assess their mobility;
- The soil test results have recorded levels of potential contamination for human health matters are all below the accepted thresholds for a Commercial end use;
- The leachate test results have recorded levels of potentially mobile contamination predominantly below the accepted thresholds that may affect Controlled Waters;
- The soakaway drainage is proposed in one location the northern half of the site where testing has proven leachable contaminants to be at level that constitutes a negligible risk; as such no special precautions are considered necessary to allow infiltration drainage of surface run-off of the small concrete apron in the northern part of the site into the shallow soils and made ground through soakaways.
- A very low residual risk has been highlighted where any flooding or inundation of the made ground might occur. The levels of mobile contamination that could be released by such an event are very low and will be diluted by any natural attenuation;
- No remedial measures are therefore considered necessary in re-development of the site for the quoted end use.

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## 7.0. REFERENCES

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### Bibliography: -

- Quantum Geotechnical Report 'Former Clydach Market Site, Players Industrial Estate, Clydach, Swansea – Preliminary Risk Assessment / Desk Study' Report No.G351/DS (Rev1), June 2014.

### British Geological Survey: -

- British Geological Survey, Sheet SS50SE – 1:10,560 Scale.

### Specialist Publications:-

- British Code of Practice BS 5930: (1999) '*Code of Practice for Site Investigations*'
- British Code of Practice BS 1377: (1990) '*Methods of test for soils for civil engineering purposes*'.
- British Code of Practice BS 10175: (2001) '*Code of Practice for Investigation of Potentially Contaminated Sites*'
- British Code of Practice BS EN ISO 14688-1 (2002)
- British Code of Practice BS EN ISO 14688-2 (2004)
- Health and Safety Executive Guidance Note EH40/90
- EA: '*Dealing with contaminated land in England and Wales*', 2009
- EA: Science Report: SC050021/SR3, 2009 '*Updated Technical Background to the CLEA Model*'
- BRE Special Digest 1 (2005)

For and on behalf of **Quantum Geotechnical Ltd,**

*Written by:*

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P. Darby,, B.Sc. (Hons), M.Sc.,, F.G.S  
Engineering Geologist

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Date

*Checked by*

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R. McDERMOTT, B.Sc. (Hons), M.Sc., C.Geol., F.G.S  
Senior Engineering Geologist

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Date

*Approved by:*

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J.E. STARK, B.Sc. (Hons), C.Geol., F.G.S.  
Technical Director

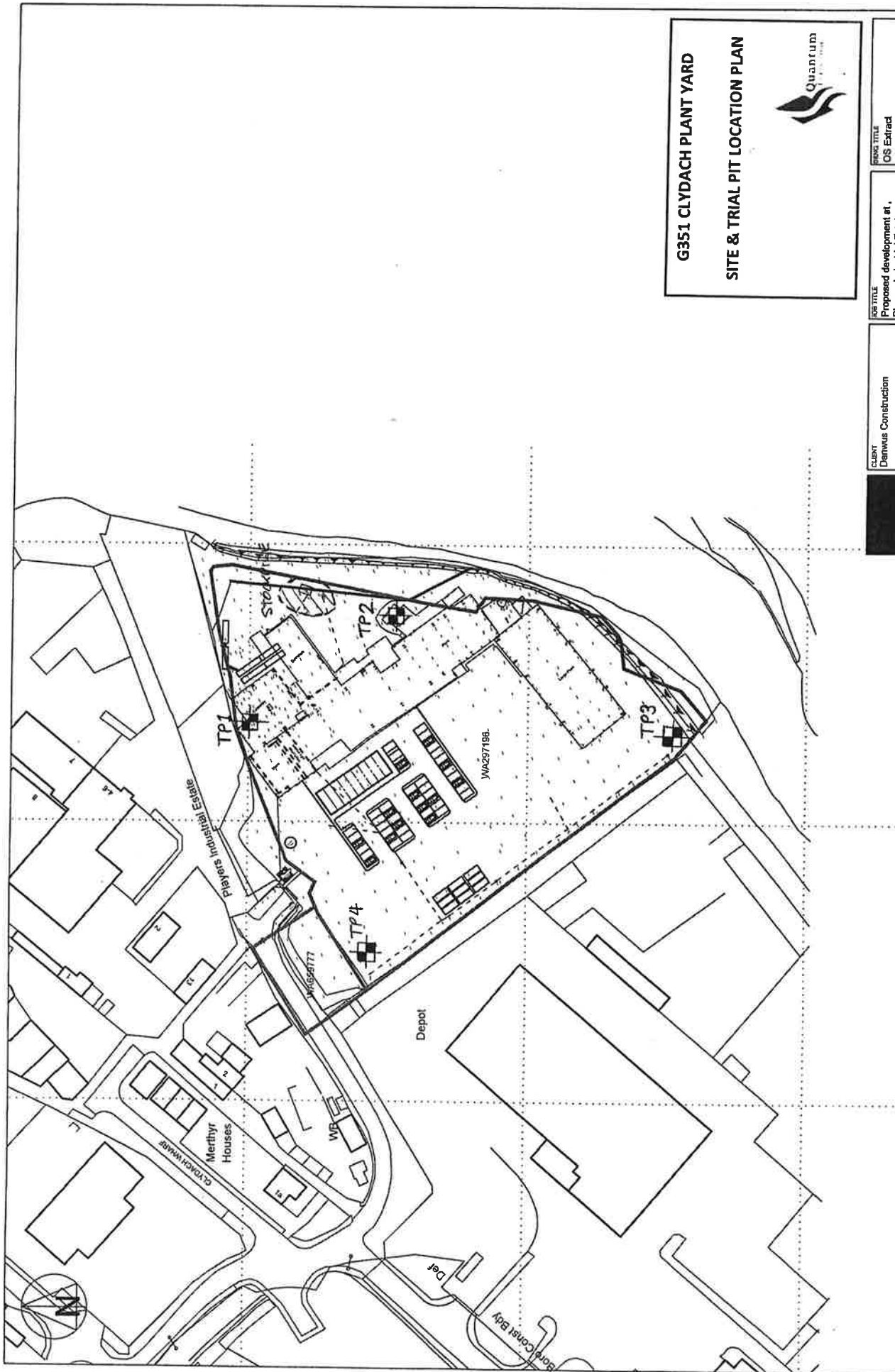
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Date

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## APPENDIX I – SITE PLAN

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# G351 CLYDACH PLANT YARD

## SITE & TRIAL PIT LOCATION PLAN



<p>HWA GRIFFITHS CHARTERED ARCHITECT ARCHITECTURE LIMITED</p>	<p>CLIENT Dannus Construction</p> <p>DATE January 2013</p>	<p>PROJECT TITLE Proposed development at, Players Industrial Estate, Clydach, Swansea SA6 5BQ</p> <p>SCALE 1:1250</p>	<p>PROJECT NO OS Extra</p> <p>REV 0</p>
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HWA GRIFFITHS DP ARCH, RIBA CHARTERED ARCHITECT LTD  
7 ST. JAMES CRESCENT, SWANSEA, SA1 6DP TEL: (01792) 644008 FAX: (01792) 444444 E-MAIL: [design@hwa-griffiths.co.uk](mailto:design@hwa-griffiths.co.uk)

This drawing is copyright  
NOTE: All dimensions to be checked  
on site and not scaled from the drawing.



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## APPENDIX II – TRIAL PIT LOGS

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<b>Contract : Clydach Plant Yard</b>							<b>Trial Pit No.</b>	
<b>Client : Dawnus Group</b>							<b>TP1</b>	
Dates : 26/03/14 -			Job Number : G351			Ground Level :		
Location :			Engineer : Quantum Geotechnical			Coordinates:		

m B.G.L.	Samples		Tests		STRATA				Water
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	DESCRIPTION	Legend	Depth (Thickness)	
1	0.60 -	ES1 ES2				MADE GROUND: Loose to compact black & dark grey sandy ash/clinker GRAVEL with occasional cobbles of sandstone and concrete slabs.		(0.75)	
			0.75			Soft (loose) brown sandy slightly gravelly SILT.		0.75  (0.75)	
			1.50			TP terminated at 1.5m depth.		1.50	

<b>PLAN</b>  	<b>Groundwater: Dry</b>  <b>Stability: Stable</b>  <b>Shoring: None</b>	<b>Remarks :</b>
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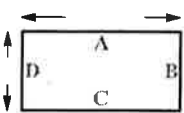
<b>Equipment Used: Tracked 5T Excavator</b>						
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	Ty Berwig, Bynau Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator:	Logged By: JS	Sheet No. 1 Of 1	m Per Page 5	All measurements in metres unless otherwise stated  
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<b>Contract : Clydach Plant Yard</b> <b>Client : Dawnus Group</b>							<b>Trial Pit No.</b> <b>TP2</b>	
<b>Dates : 26/03/14 -</b> <b>Location :</b>				<b>Job Number : G351</b> <b>Engineer : Quantum Geotechnical</b>		<b>Ground Level :</b> <b>Coordinates:</b>		

m B.G.L.	Samples		Tests		STRATA				Water
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	DESCRIPTION	Legend	Depth (Thickness)	
1	1.00 -	ES1 ES2				MADE GROUND: Loose to compact black & dark grey sandy ash/clinker GRAVEL with occasional cobbles of sandstone and concrete slabs.		(1.70)	
					1.70	Loose brown gravelly SAND.		1.70 (0.30)	
2					2.00	TP terminated at 2m depth.		2.00	

<b>PLAN</b>  	<b>Groundwater: Dry</b>  <b>Stability: Stable</b>  <b>Shoring: None</b>	<b>Remarks :</b>
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<b>Equipment Used: Tracked 5T Excavator</b>							
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	Ty Berwig, Bynae Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	<b>Operator:</b>	<b>Logged By:</b> JS	<b>Sheet No.</b> 1 Of 1	<b>m Per Page</b> 5	All measurements in metres unless otherwise stated	
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<b>Contract : Clydach Plant Yard</b> <b>Client : Dawnus Group</b>							<b>Trial Pit No.</b> <b>TP3</b>	
Dates : 26/03/14 - Location :			Job Number : G351 Engineer : Quantum Geotechnical			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		STRATA				Water
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	DESCRIPTION	Legend	Depth (Thickness)	
1	0.70 -	ES1 ES2				MADE GROUND: Loose to compact brown, black & dark grey slightly sandy ash/clinker and brick, mixed with hardcore, GRAVEL with occasional cobbles of sandstone.		(1.00)	
					1.00	Soft (loose) grey brown clayey SILT.		1.00  (1.00)	
					2.00	TP terminated at 2m depth.		2.00	

<b>PLAN</b>  	Groundwater: Dry  Stability: Stable  Shoring: None	Remarks :
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<b>Equipment Used: Tracked 5T Excavator</b>							
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	Ty Berwig, Bynna Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: JS	Logged By: JS	Sheet No. 1 Of 1	m Per Page 5	All measurements in metres unless otherwise stated	
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<b>Contract : Clydach Plant Yard</b>							<b>Trial Pit No.</b>	
<b>Client : Dawnus Group</b>							<b>TP4</b>	
Dates : 26/03/14 -			Job Number : G351			Ground Level :		
Location :			Engineer : Quantum Geotechnical			Coordinates:		

m B.G.L.	Samples		Tests		STRATA				Water
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	DESCRIPTION	Legend	Depth (Thickness)	
1	0.50 -	ES1 ES2				MADE GROUND: Loose to compact brown, black & dark grey slightly sandy ash/clinker and brick, mixed with hardcore, GRAVEL with occasional cobbles of sandstone.		(0.50)	
					0.50	Soft (loose) brown sandy slightly gravelly SILT.		0.50	
								(0.50)	
					1.00	TP terminated at 1m depth.		1.00	

<b>PLAN</b>  	<b>Groundwater: Dry</b>  <b>Stability: Stable</b>  <b>Shoring: None</b>	<b>Remarks :</b>
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<b>Equipment Used: Tracked 5T Excavator</b>						
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	Ty Berwig, Bynae Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator:	Logged By: JS	Sheet No. 1 Of 1	In Per Page 5	All measurements in metres unless otherwise stated  
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## APPENDIX III – LABORATORY TESTING

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## **Analytical Report Number : 14-52527**

**Project / Site name:** G351 Clydach

**Samples received on:** 28/03/2014

**Your job number:** G351

**Samples instructed on:** 28/03/2014

**Your order number:**

**Analysis completed by:** 03/04/2014

**Report Issue Number:** 1

**Report issued on:** 03/04/2014

**Samples Analysed:** 5 leachate samples - 5 soil samples

**Signed:**

Dr Claire Stone  
Quality Manager  
**For & on behalf of i2 Analytical Ltd.**

**Signed:**

Rexona Rahman  
Customer Services Manager  
**For & on behalf of i2 Analytical Ltd.**

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting  
leachates - 2 weeks from reporting  
waters - 2 weeks from reporting  
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Samples were received with no indication of date sampled. The recommended holding time prior to analysis may have been exceeded. Results may not be valid should be interpreted with care.



4041



Analytical Report Number: 14-52527

Project / Site name: G351 Clydach

Lab Sample Number				326501	326502	326503	326504	326505
Sample Reference				TP1 1D	TP2 1D	TP3 1D	TP4 1D	Stockpile 1D
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.00	0.70	0.50	Surface
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	18	26	28	26	16
Total mass of sample received	kg	0.001	NONE	0.85	0.78	0.86	0.93	1.2

## General Inorganics

pH	pH Units	N/A	MCERTS	8.5	8.2	7.8	8.2	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	1
Complex Cyanide	mg/kg	1	NONE	< 1	< 1	< 1	< 1	1
Free Cyanide	mg/kg	1	NONE	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO <sub>4</sub>	mg/kg	100	ISO 17025	770	2000	1200	1300	2700
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.20	0.19	0.71	0.16	0.54
Water Soluble Sulphate as SO <sub>4</sub> (2:1)	mg/kg	2.5	MCERTS	200	190	710	160	540
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.099	0.094	0.35	0.079	0.27
Sulphide	mg/kg	1	MCERTS	15	12	43	21	49
Elemental Sulphur	mg/kg	20	NONE	< 20	34	260	< 20	< 20
Organic Matter	%	0.1	MCERTS	4.7	6.6	4.2	1.4	3.9

## Total Phenols

Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
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## Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.22	0.82	0.29	0.47	0.44
Acenaphthylene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenanthrene	mg/kg	0.2	MCERTS	0.55	1.6	0.95	1.3	1.8
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.18	< 0.10	0.24
Fluoranthene	mg/kg	0.2	MCERTS	0.26	0.40	1.3	0.52	2.4
Pyrene	mg/kg	0.2	MCERTS	0.23	0.30	1.1	0.46	1.9
Benzo(a)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	0.65	0.29	0.94
Chrysene	mg/kg	0.05	MCERTS	0.35	0.76	0.93	0.75	1.8
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	0.31	0.89	0.39	1.4
Benzo(k)fluoranthene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	0.52	< 0.20	0.94
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.73	< 0.10	1.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	0.40	< 0.20	0.56
Dibenz(a,h)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	< 0.20	0.20
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.45	< 0.05	0.68

## Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	1.6	4.2	8.4	4.2	14
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Analytical Report Number: 14-52527

Project / Site name: G351 Clydach

Lab Sample Number				326501	326502	326503	326504	326505
Sample Reference				TP1 1D	TP2 1D	TP3 1D	TP4 1D	Stockpile 1D
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.00	0.70	0.50	Surface
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

**Heavy Metals / Metalloids**

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	29	76	46	48
Barium (aqua regia extractable)	mg/kg	1	MCERTS	2000	620	310	600	340
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	2.7	0.6	1.0	1.6	1.5
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.5	7.1	0.6	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.5	4.1	0.9	1.1
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	12	18	13	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	100	450	540	360	720
Lead (aqua regia extractable)	mg/kg	2	MCERTS	52	140	210	71	450
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.7	< 0.3	< 0.3	5.2
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	70	70	410	110	160
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.7	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	61	35	30	39	37
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	140	170	550	160	1400

**Petroleum Hydrocarbons**

TPH1 (C10 - C40)	mg/kg	10	MCERTS	18	210	59	35	260
TPH2 (C6 - C10)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH C6 - C40	mg/kg	10	NONE	18	210	59	35	260



Analytical Report Number: 14-52527

Project / Site name: G351 Clydach

Lab Sample Number				326506	326507	326508	326509	326510
Sample Reference				TP1 2D	TP2 2D	TP3 2D	TP4 2D	Stockpile 2D
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.00	0.70	0.50	Surface
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

#### General Inorganics

pH	pH Units	N/A	ISO 17025	8.2	8.1	7.9	8.4	8.6
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Complex Cyanide	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
Free Cyanide (Low Level)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
Sulphate as SO <sub>4</sub>	µg/l	100	ISO 17025	1080	16700	160000	2190	41300
Elemental Sulphur	mg/l	20	NONE	< 20	< 20	< 20	< 20	< 20
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Organic Carbon (TOC)	mg/l	0.1	NONE	3.4	1.3	6.1	1.7	3.8

#### Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
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#### Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	0.40	< 0.01
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

#### Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	0.4	< 0.2
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#### Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	4.0	2.4	20	6.5	6.1
Barium (dissolved)	µg/l	0.05	ISO 17025	54	100	180	100	65
Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Boron (dissolved)	µg/l	10	ISO 17025	< 10	< 10	350	< 10	16
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	0.43	< 0.08	< 0.08
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.6	< 0.4	1.2	2.4	1.8
Copper (dissolved)	µg/l	0.7	ISO 17025	3.9	2.9	31	10	9.8
Lead (dissolved)	µg/l	1	ISO 17025	4.3	2.2	13	7.4	6.2
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.3	0.8	52	7.3	1.5
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7	9.3	4.2	2.1
Zinc (dissolved)	µg/l	0.4	ISO 17025	6.5	2.7	34	11	10

#### Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH2 (C6 - C10)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

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The results included within the report are representative of the samples submitted for analysis.

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Science

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\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

a sample is calculated as the % weight of the stones not passing a 2 mm sieve. Results are not corrected for stone content.

Stone content of

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
326501	TP1 1D	None Supplied	0.60	Brown clinker. **
326502	TP2 1D	None Supplied	1.00	Brown sandy gravel. **
326503	TP3 1D	None Supplied	0.70	Brown clay and gravel with vegetation.
326504	TP4 1D	None Supplied	0.50	Brown sandy gravel. **
326505	Stockpile 1D	None Supplied	Surface	Brown gravel with brick.

\*\* Non MCerts Matrix