

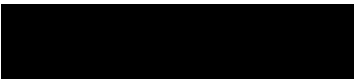
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Client	TRJ

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1.0 INTRODUCTION

1.1 Introduction

Spectrum Geo Services (SGS) were requested by TRJ to develop a Reactive Strategy for the construction works proposed at 91 Waun Wen Road, Cwmafon, SA12 9ED.

This report includes a Reactive Strategy.

1.2 Limitations

Subsoils are inherently variable and by their very nature are hidden from view such that no investigation can be exhaustive to the extent that all soil conditions are revealed. Conditions may therefore be present beneath the site that were not apparent from the data available for review.

Unless specifically noted to the contrary, it should be assumed that this report has not been submitted to any regulatory authorities for approval. Redevelopment sites may have planning conditions attached in respect of contaminated land assessment. Where we are made aware of such conditions in advance of scoping the works, we can tailor the report to the regulatory authority requirements. Where we are not made aware of any such requirements there can be no certainty that our investigation will meet any or all the regulatory authority requirements.

2.0 EXISTING SITE INFORMATION

2.1 Site Location

The site is located at 91 Waun Wen Road, Cwmafon, SA12 9ED.

At the time of the investigation, the site comprised an open area of tarmacadamed car park as shown in Drawing 22177/01.

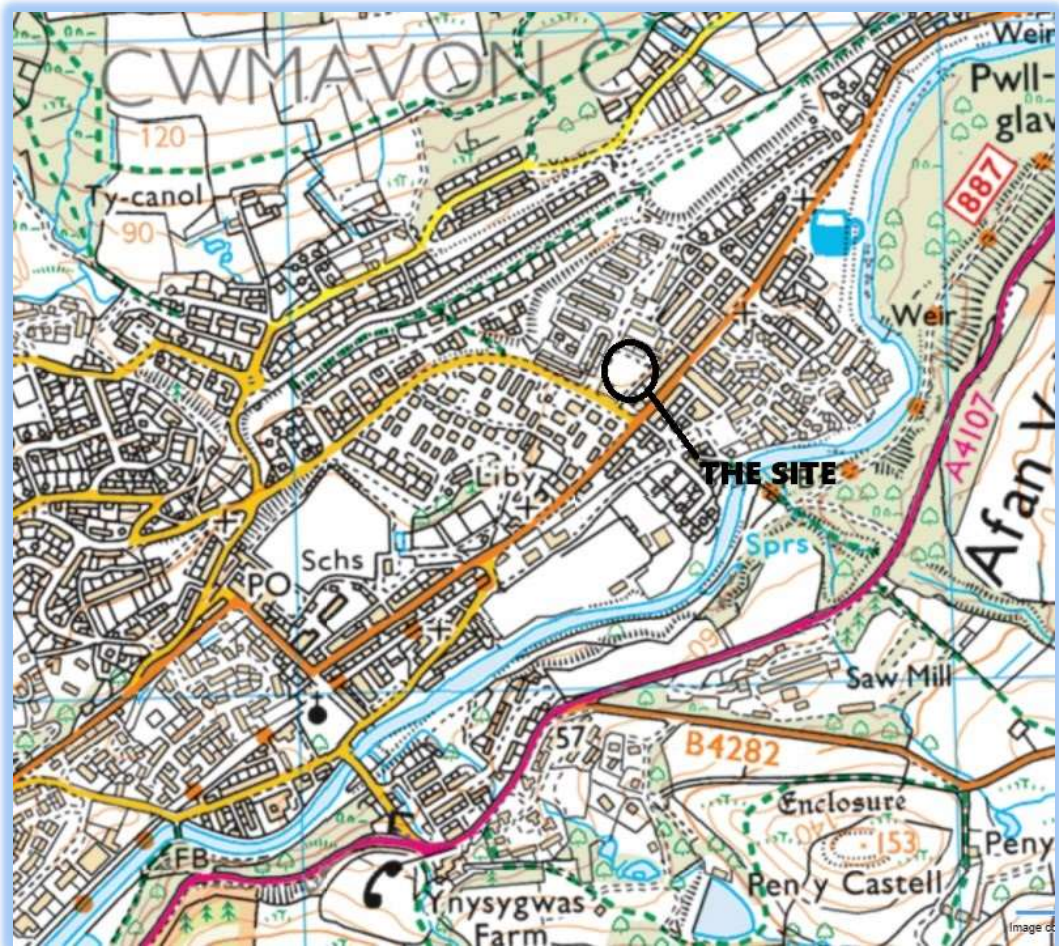


Figure SGS/22177/01: Site Location Plan

2.2 Previous Investigations

A previous Desk Study and Ground Investigation have been undertaken for Neath Port Talbot CBC, by Socotec and Tetra Tech respectively;

- *Childcare Unit Cwmavon, Desk Study and Field Reconnaissance. Report H1060-21, January 2022. Socotec.*
- *Cwmavon Ground Investigation Report. 784-B035234, July 2022. Tetra Tech.*

The SOCOTEC desk top study (DTS) and field reconnaissance report (Report No. H1060- 21) supplied by Neath Port Talbot County Borough Council outlined the following summary of the sites and its key risks.

The site is located adjacent to a former copper works and is shown on the historical mapping of the site (circa 1880) as well as a coal pit, coke ovens and gas works located to the west of the site. The eastern portion of the site historically consisted of gardens associated with the residential properties on Cunard Row. A number of tramways are also identified within the north west site boundary. By the 1920-1930s the tramway and an associated slag heap are labelled as disused and the residential properties of Cunard Row have been demolished. Re-profiling and restoration was undertaken in the 1970s and by the end of the decade the new residential properties of Waun Wen have been built and the area of the existing car park developed. These features persist today.

A mineshaft (7m north of the site boundary) and coal outcrop running through the site were identified during the DTS and represent two of the main risks associated with the redevelopment of the site and which the ground investigation has been commissioned to resolve. Due to the coal mining legacy issues there is a medium to high risk of geotechnical hazards associated with the site and the historic industrial setting suggests a low to moderate risk of geo-environmental hazards.

The DTS also suggests that current and historic land uses will be sources of contamination including car parking, hard standing past mining, former tramways and former slag heaps.

Subsequently, Tetra Tech undertook a Phase2 Ground Investigation.

The site investigation was undertaken between 16th and 19th May 2022. The scope of the investigation specified by Neath Port Talbot Council is based on the desk top study undertaken by SOCOTEC Report No. H1060-21 and included the following:

- Geophysical survey to locate mineshaft shown to be north of the site and outside the red line boundary.
- Clearance of buried services prior to excavation and the location and level of each exploratory hole location surveyed.
- Two combined dynamic sample, rotary core and rotary open hole boreholes to a depth of 30metres, with sampling and SPTs in the upper 10metres.
- Two days of windowless sampling to five metres, or refusal, with SPTs and samples.
- One day of soakaway testing in two trial pits not exceeding 1.5metres depth.
- Five TRL DCP test locations to obtain indicative CBR values around the site.
- Installation of gas/groundwater monitoring standpipes within the one borehole and two windowless samples and three return visits to measure gas/groundwater levels.
- On-site inspection and logging of recovered samples.
- Representative soil samples taken and submitted for geotechnical classification testing.
- Representative soil samples submitted and tested for a suite of potential contaminants.

Subsequent to the Phase 2 investigation, Tetra Tech noted:

- In the event that soft landscaping/ grass cover is proposed on the site (particularly in the external play area) the area will require capping with a minimum thickness of 600mm of clean, imported capping material to provide a suitable barrier between the identified contamination and potential site users;

• A Reactive Strategy should be developed for the site to outline the requirements for identification, assessment and management of any areas of previously unidentified contamination encountered during the development phase;

- Movement of materials on the site should be undertaken in conjunction with a Materials Management Plan in line with the recommendations in

the CL:AIRE Code of Practice to confirm any materials utilised on site are geotechnically and chemically suitable for re-use and to ensure all materials leaving site are disposed of at a suitable waste disposal facility;

- It remains the responsibility of the contractor as waste producer to classify any waste materials and identify a suitable off site disposal facility.

SGS had previously investigated the site within:

- *Report on Supplementary Ground Investigation, Cwmavon. September 2023, Report 22177/R2.*

This was undertaken as the location of the proposed buildings had been changed due to the shaft exclusion zone.

This reactive strategy focuses upon the data recovered during 22177/R2.

2.3 Published Geology

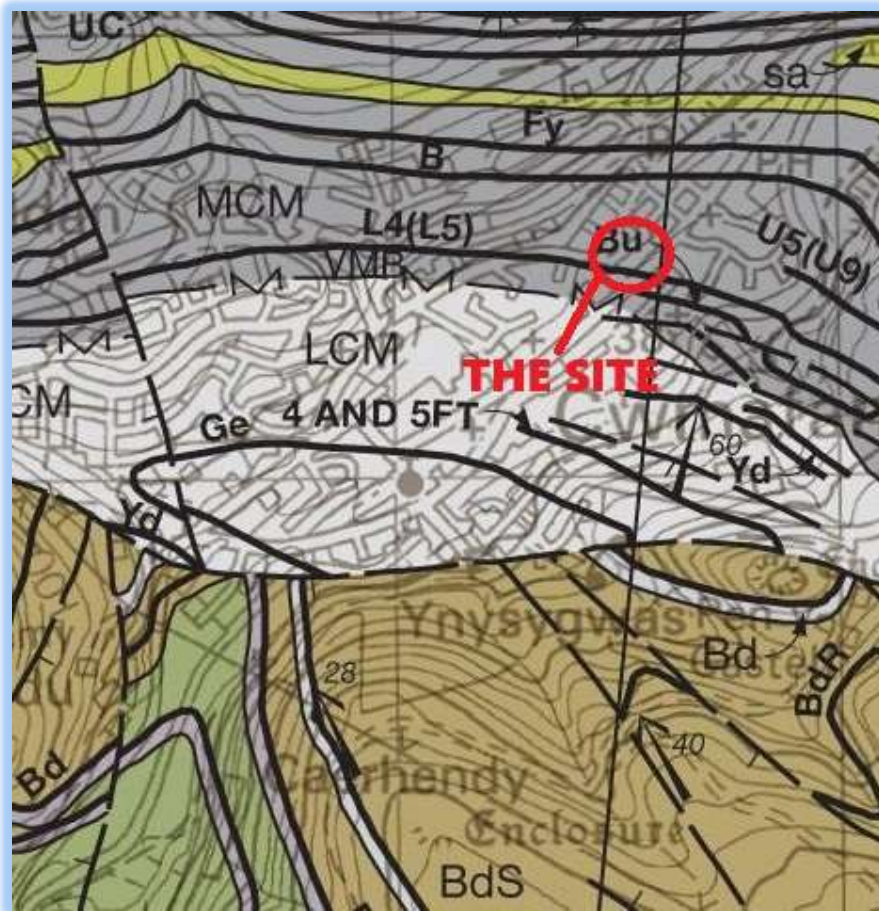
Information published by the British Geological Survey (BGS) suggests the site to be underlain by a sequence comprising;

Superficial Deposits

Alluvium - Clay, silt, sand and gravel. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.

Bedrock Geology

South Wales Middle Coal Measures Formation - Mudstone, siltstone and sandstone. Sedimentary bedrock formed between 318 and 309.5 million years ago during the Carboniferous period.



Drawing 22177/02: Geological Setting

2.4 Hydrology

The site lies to the west of the River Avan, with elevated ground to the west.

Thus, it is anticipated that the predominant groundwater flow is in an easterly direction.

3.0 CONTAMINATION TESTING

Contamination testing was undertaken on four samples, as shown in the Appendices.

Client Sample ID	Units	TP02	TP03	TP05	WS13			
Depth to Top		1.20	0.60	1.40	1.60			
Sample Type		Soil - ES	Soil - ES	Soil - ES	Soil - ES	S4UL/ C4SL Resi With	S4UL/ C4SL Resi Without	POS Resi
% Stones >10mm	% w/w	4.2	11.7	<0.1	3.3			
pH	pH	7.79	7.88	9.18	8.12			
Sulphate (water sol 2:1)	g/l	0.11	0.04	0.03	0.05			
Organic matter	% w/w	54	50.5	7.1	62			
Arsenic	mg/kg	69	31	2	35	37	40	79
Boron (water soluble)	mg/kg	<1.0	<1.0	<1.0	<1.0	290	11000	21000
Cadmium	mg/kg	1	<0.5	<0.5	<0.5	11	65	120
Copper	mg/kg	378	91	4	80	2400	7100	12000
Chromium	mg/kg	22	15	5	15	910	910	1500
Chromium Hex	mg/kg	<1	<1	<1	<1	6	6	7.7
Lead	mg/kg	327	334	4	63	190	310	630
Mercury	mg/kg	0.33	<0.17	<0.17	0.24	40	56	120
Nickel	mg/kg	49	35	2	41	180	180	230
Selenium	mg/kg	2	<1	<1	<1	250	430	1100
Zinc	mg/kg	285	121	9	166	3700	40000	8100
TPH total (>C6-C40)	mg/kg	119	58	117	76	48000	64000	
Asbestos in Soil (inc. matrix)								
Asbestos in soil		NAD	NAD	NAD	NAD			
Asbestos ACM - Suitable for Water Absorption Test?		N/A	N/A	N/A	N/A	Non detected		
PAH-16MS								
Acenaphthene	mg/kg	0.01	<0.01	<0.01	<0.01	1100	6000	
Acenaphthylene	mg/kg	0.07	0.05	<0.01	<0.01	920	6000	
Anthracene	mg/kg	0.12	0.04	<0.02	<0.02	11000	37000	
Benzo(a)anthracene	mg/kg	0.94	0.65	<0.04	<0.04	13	15	
Benzo(a)pyrene	mg/kg	0.88	2.03	<0.04	<0.04	3	3.2	
Benzo(b)fluoranthene	mg/kg	0.99	2.78	<0.05	0.08	3.7	4	
Benzo(ghi)perylene	mg/kg	0.53	1.68	<0.05	<0.05	350	360	
Benzo(k)fluoranthene	mg/kg	0.4	0.84	<0.07	<0.07	100	110	
Chrysene	mg/kg	0.81	1.32	<0.06	0.17	27	32	
Dibenzo(ah)anthracene	mg/kg	0.12	0.31	<0.04	<0.04	0.3	0.32	
Fluoranthene	mg/kg	1.48	0.56	<0.08	<0.08	890	1600	
Fluorene	mg/kg	0.02	0.01	<0.01	<0.01	860	4500	
Indeno(123-cd)pyrene	mg/kg	0.69	1.97	<0.03	0.05	41	46	
Naphthalene	mg/kg	<0.03	0.04	<0.03	<0.03	13	13	
Phenanthrene	mg/kg	0.43	0.17	<0.03	0.13	440	1500	
Pyrene	mg/kg	1.07	0.39	<0.07	<0.07	2000	3800	
Total PAH-16MS	mg/kg	8.56	12.8	<0.08	0.43	17761	60984	

Table 3.1: Soil Contamination Results

The results have been compared with current Environment Agency limits for Residential with and without homegrown produce and POS Resi Uses. Table 9.1 shows the recorded values, related to current Soil Guideline Values (SGVs)/S4UL, or other published values.

Thus, it is evident that most positions were within guidelines for Residential with and without plant uptake. However, values of arsenic at TP02 and lead at TP02 and 03, exceeded guidelines for residential end use. Both these locations are beneath areas of hardstanding or the buildings themselves and thus it is considered that no linkage will exist. Thus, no remediation strategy is required. However, these elevated values must be considered within the context of the site works and materials management plan.

4.0 REACTIVE STRATEGY

4.1 Introduction

A Reactive Strategy is developed so that site works are controlled to ensure that site workers and supervisors are aware of the potential risks associated with identifying contamination which has not yet been encountered.

The site works and soil laboratory testing have noted a thickness of Made Ground (between 0.70m and 2.00m thick) sourced from colliery and copperworks industrial processes.

Typically, these processes can develop increased levels of metals and hydrocarbons. Asbestos is unlikely due to the age of the industry.

Arsenic and Lead values were slightly elevated, and thus all groundworkers should take appropriate precautions as part of the Construction Management Plan. These should include standard PPE plus gloves and eye protection. Site hygiene must be adhered to with no smoking or eating other than in designated clean areas.

Staff should inform site management of any of the following;

- a) Unusual colours of soil, outside brown and black,
- b) Odours such as hydrocarbon or rotten egg,
- c) Sheens on exposed water surfaces,
- d) Fibrous materials,
- e) White furry inclusions.

Should any of these be noted, then SGS should be informed to inspect and determine identification and remediation.

Any excavated material is to be WAC tested and WM3 assessed. Material that cannot be re-used for landscaping is to be removed off site for disposal at a suitable licenced facility.

4.2 Neighboring Site Users and Passers-by

During site works adequate protection measures should be put in places to ensure that neighbouring site users and passers-by are not put at risk. Dampening down of soils is likely to prove the most effective method of control.

Similarly, appropriate measures should be taken for any materials being transported off site to prevent dust migration.

4.3 Site Workers

Robust health and safety risk assessments and method statements should be drawn up prior to commencement of any site activity. This should address the potential risks.

Emergency contingencies should be defined prior to commencement of site works.

COSHH Assessment will also be required as part of the health and safety assessment.

4.4 Protection of the Environment

During the construction period, there is a risk to the environment/adjacent sites from spills during any de-watering, excavations, moving potentially contaminated soil, drainage misconnections, discharges of perched groundwater to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washings and oil or chemical spills.

A drainage plan should be devised, identifying manholes to prevent pollutants accidentally reaching surface water sewers. Temporary drainage measures may need to be put in place.

Within the documentation prepared by the contractor(s), the following information should be provided, but not limited to:

- Project Description
- Key participants/contractor(s)
- Technical procedures
- Phasing of works and approximate timescales
- Site plans to scale
- Details of consents or license needed
- Emergency contingencies

In addition, the following precautions should also be taken.

- All potential chemicals and associated risks and emergency procedures for spills/leaks should be considered in a site risk assessment and the details provided to all site employees
- Any potential pollutant materials or chemicals/detergents used on site should be stored in suitable containers, with clear labelling.
- Any oil or hazardous substance containers and associated pipe works should be enclosed within a bund.
- Care taken during delivery of materials, with correct supervision and labelling detailing the substance and its quantities.
- All delivery drivers should be informed of procedures and restrictions
- Any materials on delivery should be covered to ensure no spillage from the vehicle.
- Any detergents, paints, chemicals etc should not be allowed to be discharged into surface drains or water courses
- Washing out and cleaning of concrete/cement plant should be carried out in a contained area with adequate measures to collect all run-off water.
- Security and prevention of vandalism, especially of oil drums/containers.

4.5 Management and Disposal of Excavated Materials

During site works there may be local excavations of the made ground in some locations, including from beneath proposed roads, foundations and from service trenches.

All materials excavated should be managed and stored appropriately in a controlled manner to ensure protection of site construction workers and neighbouring site users.

Material movement should be performed under an appropriate Permit or Exemption.

Material destined for off-site disposal should be classified in accordance with Environment Agency Document WM3 (V.1.1, 2018) to determine the European Waste Code for the material.

Waste transfer and disposal must be undertaken by an authorized person. A waste transfer note must accompany each load. Waste transfer notes should be retained for inclusion within any validation report.