



## APPENDIX 10.3 CONCEPTUAL SITE MODEL

### ***Environmental Issues***

Conclusions are drawn from information in terms of potential sources of contamination, possible receptors that may be affected by any sources of contamination and the pathways that exist between source and receptor. This basic risk assessment allows identification of the suitability of the site for its current and future use and evaluation of any potential environmental liability that may attach to the site. The issues can be broadly addressed as follows: land contamination, groundwater contamination, surface water contamination and ground gases.

The land use history has identified the following potentially significant sources of contamination both on the site and adjacent to the site.

#### ***Potentially Significant Contamination Source On Site:***

1. Potentially contaminative historic land use associated with opencast mine works;
2. Potentially contaminative historic land uses within site boundary as listed within the Groundsure Enviro Insight Report: colliery, old brick works, coal levels, unspecified disused mine and refuse heap/s;
3. Backfilled material (made ground) associated with known infilled ground, opencast or pond in south of northern portion of land and potentially infilled land within site boundary as listed within the Groundsure Enviro Insight Report unspecified disused mine, refuse heaps, colliery, old brick works and coal levels; and
4. Ground gas from backfill materials/made ground and mine gas from historical shallow mine workings.

#### ***Potentially Significant Contamination Source Off Site (within 250m of site):***

1. Works associated with opencast and shallow mine workings;
2. Backfilled material (made ground) within opencast workings;
3. Refuse heap/s including red ash tip western edge of site;
4. Former railway line adjacent to the west and north west of the site;
5. Tank located 80m west of site;
6. Brick works 150m north west of site; and
7. Infilled pond 80m north of the site.

As a result of the land use history, the site may have a number of sources of contamination. For land or groundwater to be designated as polluted a linkage must exist between:



- a source of contamination capable of causing significant harm;
- human or environmental receptors; and
- a pathway by which the contamination can reach the receptor.

The conceptual site model presented in **Table 1** overleaf details an initial assessment of all potential pollutant linkages.



**Table I: Preliminary Conceptual Site Model**

Source	Pathway	Receptor	Risk
<b>Human Health</b>			
<p>On-Site:</p> <ul style="list-style-type: none"> <li>Made ground / soil contamination associated with backfilling of historic opencast workings and other listed historic site uses Enviro Insight report colliery, old brick works, coal levels, unspecified disused mine and refuse heaps.</li> <li>Opencast operations – these include blasting explosives, lubricants/oils/fuels associated with site plant/vehicles, and potential flocculating agents</li> <li>Asbestos – potential for asbestos in the made ground.</li> </ul> <p>Off-Site:</p> <ul style="list-style-type: none"> <li>Made ground / soil contamination associated with backfilling of historic opencast workings and surrounding historic land uses related to mining (including former red ash tip).</li> <li>Former railway line adjacent to the west and north west of the site.</li> <li>Former tank identified 80m west of site in historic mapping.</li> <li>Infilled pond 80m north of site.</li> <li>Former brick works identified 150m north west of site in historic mapping.</li> </ul>	<ul style="list-style-type: none"> <li>Ingestion of soil</li> <li>Ingestion of dust</li> <li>Dermal contact with soil</li> <li>Dermal contact with dust</li> <li>Inhalation of fugitive soil dust</li> <li>Inhalation of vapours</li> <li>Inhalation of vapours</li> </ul>	Human health - construction and maintenance workers (low receptor sensitivity for proposed site end use)	Low
<b>Groundwater</b>			
<ul style="list-style-type: none"> <li>Made ground / soil contamination associated with backfilling of historic opencast workings and other listed historic site uses Enviro Insight report colliery, old brick works, coal levels, unspecified disused mine and refuse heap.</li> </ul>	<ul style="list-style-type: none"> <li>Leaching of made ground.</li> <li>Shallow groundwater migration within made ground.</li> </ul>	Controlled Waters (Secondary A Aquifer).	Low



Source	Pathway	Receptor	Risk
<ul style="list-style-type: none"> <li>Opencast operations – these include blasting explosives, lubricants/oils/fuels associated with site plant/vehicles, and potential flocculating agents. Offsite</li> <li>Made ground / soil contamination associated with backfilling of historic opencast workings and surrounding historic land uses related to mining (including former red ash tip).</li> <li>Former railway line adjacent to the west and north west of the site.</li> <li>Former tank identified 80m west of site in historic mapping.</li> <li>Infilled pond 80m north of site.</li> <li>Former brick works identified 150m north west of site in historic mapping.</li> </ul>	<ul style="list-style-type: none"> <li>Vertical migration to the underlying solid aquifers.</li> <li>Ingress of contaminated groundwater from identified off-site sources (either via superficial or solid aquifers).</li> </ul>		
<b>Surface Water</b>			
<ul style="list-style-type: none"> <li>Made ground / soil contamination associated with backfilling of historic opencast workings and other listed historic site uses Enviro Insight report colliery, old brick works, coal levels, unspecified disused mine and refuse heap.</li> <li>Opencast operations – these include blasting explosives, lubricants/oils/fuels associated with site plant/vehicles, and potential flocculating agents</li> </ul>	<ul style="list-style-type: none"> <li>Surface run-off and / or shallow groundwater flow.</li> <li>Groundwater baseflow within solid and/or bedrock aquifers.</li> </ul>	Drains/springs/rises/iss ues on site and within local surrounding area. Local river system.	Low
<b>Ground Gas</b>			
<ul style="list-style-type: none"> <li>Shallow made ground deposits within the backfilled material associated with historic site uses specifically opencast workings and refuse heap.</li> <li>Shallow mine workings – potential of mine gas migration.</li> <li>Infilled pond 80m north of site. Offsite</li> </ul>	<ul style="list-style-type: none"> <li>Vertical migration of any gas generated on site.</li> <li>Lateral gas migration within the superficial deposits from identified off-site gas sources.</li> </ul>	Human health during construction and site visits in open atmosphere / No buildings are proposed on the site area.	Low



Source	Pathway	Receptor	Risk
<ul style="list-style-type: none"><li>• Made ground / soil contamination associated with backfilling of historic opencast workings and surrounding historic land uses related to mining (including former red ash tip).</li><li>• Infilled pond 80m north of site.</li><li>• Former brick works identified 150m north west of site in historic mapping.</li></ul>			

## **APPENDIX 10.4 RELEVANT CORRESPONDANCE**

*Our ref: CA11620*

*Date: 10/06/2019*

Powys County Council,  
Ithon Rd,  
Llandrindod Wells,  
LD1 6AA

For the attention of: David Jones

## **Council Record Environmental Search Request – Bryn Henllys Extension**

### **1 INTRODUCTION**

#### **Instruction**

- 1.1 Wardell Armstrong have been commissioned by Lightsource BP to undertake the required works to comprise a geo-environmental and geotechnical desk study for the proposed development site located at Bryn Henllys, Upper Cwm-Twrch. The report will be produced to assess the site for future development as a commercial unit.

#### **Site Location**

- 1.2 The site is in Upper Cwm-Twrch, Ystradgynlais with the centre of the site situated at a National Grid Reference of 275917, 212511. The site comprises approximately 25 hectares of land which consists of fields and vegetation. The closest postcode to the site is SA9 2UX and a specific site location and boundary is shown in figure 1, overleaf.
- 1.3 The site is largely covered by vegetated areas, with grass occupying the majority of the site. There is a road connecting the northern and southern parcels of land. Former land use includes agricultural land and opencast mining.

### **2 DATA ENQUIRY**

- 2.1 To enable a sufficient review of the site, please can I request a high-level review of Local Authority records for the following:





- Summaries of notable sites (in terms of contamination) within the site boundary and within a search area of 500m radius, that you are aware of, including Part 2A sites or other important sites that the Council feels that the project should be aware of;
- The most recently produced Contaminated Land Strategy, if this is not freely available on your website;
- UXO/UXB records for the site and within a search area of 500m radius;
- Groundwater Abstraction records for the site and within a search area of 500m radius;
- A plan of the search area; and
- Any additional information you feel relevant for identifying potential contamination issues.



*Figure 1: The redline delineates the application boundary*

Yours sincerely

for Wardell Armstrong LLP

*B. Hallett*

**BETHAN HALLETT – Engineering Geologist**

**bhallett@wardell-armstrong.com**

## Hallett, Bethan

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**From:** Hallett, Bethan  
**Sent:** 10 June 2019 09:43  
**To:** david.jones1@powys.gov.uk  
**Subject:** Freedom of Information Request  
**Attachments:** Council Search Request.pdf

Dear David

Please find attached letter request for environmental information.

Please me know of any queries and about any payment.

Many thanks.

Kind regards,

**Bethan Hallett** | Engineering Geologist  
Wardell Armstrong LLP  
Tudor House, 16 Cathedral Road, Cardiff, CF11 9LJ  
t: 029 2072 9191 m:





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## APPENDIX 10.5 ASSESSMENT METHODOLOGIES

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### Ground Conditions & Contaminated Land

The following methodology was used to inform the Ground Conditions chapter included within this ES.

#### Scope of the Assessment

'Contaminated land' is defined by the Environmental Protection Act as *'any land which appears to the local authority in whose area it is situated to be in such condition, by reason of substances in, on or under the land, that: Significant Harm is being caused or there is a significant possibility of such harm being caused, or Pollution of Controlled Waters is being, or is likely to be caused.'*

Assessment of contamination uses a risk-based approach to determine the risk of harm or pollution of controlled waters and is based on a pollutant linkage being present. This 'complete linkage' requires the presence of:

- A source of contamination;
- A pathway for the contaminant source to move to the receptor; and
- A receptor affected by the contaminant, such as persons, controlled waters, ecology or the built environment.

#### Methodology

An assessment has been made of the potential ground and groundwater contamination issues associated with the Proposed Development in relation to both internal and external receptors and assessed for both construction and operation. This assessment is based on receptor sensitivity and the potential magnitude of the effect, as well as the probability of the effect occurring. This approach reflects the requirement of relevant legislation and guidance for contamination effects to be considered using a risk-based approach.

Broadly, this risk-based approach involves a tiered identification and investigation of potential contamination sources, pathways and receptors and the development and refinement of a Conceptual Site Model (CSM), in order to identify remediation/mitigation requirements.

The assessment methodology defines the baseline conditions as the potential sources, pathways and receptors present and then considers how these may affect future receptors during both the construction and operational phases, including consideration of changes to the CSM. These changes may include the introduction of new pathways, alterations to receptor type and sensitivity etc.

The significance of effects on a given receptor is a product of the sensitivity of that receptor and the potential magnitude of the effect. Sensitivity criteria for the receptors have been determined with consideration of guidance provided in CLR11 - Model Procedures for the Management of Land Contamination, CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice (2001) and in accordance with the EIA Scoping Report.

### Baseline Data

Available reports and published information have been reviewed with the aim of identifying the ground conditions within and surrounding the Proposed Development. This data review has established the geological conditions beneath the site, identified areas of potentially contaminated land and of potential land instability. The review also identified potential pollutant linkages and facilitated a risk assessment for each of the identified pollutant linkages.

Baseline data for the site has been obtained from the following sources:

- Environmental data sheets and historical, hydrogeological, geological and environmental mapping for the site provided by Groundsure Ltd within Insight Reports dated 6<sup>th</sup> June 2019;
- Published geological mapping for the area, electronically on the British Geological Survey (BGS) website;
- A review of nearby borehole records on the BGS website;
- BR211 Radon: Guidance on Protective Measures for New Buildings (2015);
- A review of publicly accessible aerial and street view photography for the site;
- A site walkover undertaken on 18<sup>th</sup> June 2019; and
- Internet based searches.

This information has been reviewed to assess the potential ground and groundwater contamination issues associated with the Proposed Development in relation to both internal and external receptors.



Significance Criteria

- The overall effect on each potential receptor during development has been evaluated as a function of receptor sensitivity with the potential magnitude of effects.
- The level of effect will be determined as a function of the magnitude and sensitivity, using Table 10.1. Effects assessed as moderate or high are considered to be ‘Significant’ in EIA terms (i.e. additional mitigation required), whilst those assessed as low or negligible are considered to be ‘Not-Significant’ (i.e. no additional mitigation required) although measures to reduce these to negligible should be considered where practically and economically feasible.
- Discipline-specific guidance, including Contaminated Land Risk Assessment: A Guide to Good Practice’ (2001) and Model Procedures for the Management of Land Contamination (CLR11) advocates the use of a ‘risk-based approach’ when considering potential land and Controlled Waters contamination effects.
- To integrate this requirement into the EIA methodology, output from Table 10.1 will be adjusted to reflect the probability of the effect occurring using Table 10.2, to provide an overall assessment of significance provided in relation to Table 10.3 (*also see Tables 10.4, 10.5 and 10.6*). The probability assessment will be based on professional judgment and consideration of the specific local circumstances relevant to the effect.

**Table 10.1: Significance of Effects**

Receptor Sensitivity	Magnitude of Effect				
		High	Medium	Low	Negligible
High		High	Moderate	Moderate	Low
Moderate		High	Moderate	Low	Low
Low		Moderate	Low	Low	Negligible
Very Low		Low	Negligible	Negligible	Negligible

**Table 10.2: Significance of Effects Adjusted for Probability of Effects Occurring**

Significance level (From Table 10.1)	Probability			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Negligible
Moderate	Major	Moderate	Minor to Moderate	Negligible
Low	Moderate	Minor to Moderate	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

- Those effects assessed as pertaining specifically to the Site (i.e. where the source or the receptor are onsite) are considered direct, whilst those where the source or receptor are offsite are considered to be indirect effects.



- The UK framework for the assessment of contamination on human health or controlled waters is based on there being significant harm or the significant possibility of significant harm. The framework does not include an assessment of whether an effect is temporary or permanent and therefore this is not considered further within this chapter.
- After developing an understanding of the baseline conditions, the significance of effects on contaminated land and identified physical effects is determined based on the methods described above. The classification of significance of effects is based on the criteria defined in Table 10.3.
- As outlined within Table 10.3, the effects of the Proposed Development identified are described as adverse/negative or beneficial/positive, major, moderate, minor or negligible, on the basis of the value of the receptor, area over which the effect may occur, whether the effect is direct, indirect or secondary, the duration of the effect (short, medium or long term), and whether the effect is permanent or temporary.



**Table 10.3: Criteria to determine Significance of Effects Classification**

Significance of Effects Classification	Typical Criteria
Major adverse	<ul style="list-style-type: none"> <li>• Complete permanent change in topography which impacts the local community.</li> <li>• Significant soil erosion, soil compaction or ground instability that is permanent in nature.</li> <li>• An increase in contamination impacts from the existing baseline conditions of 4 or 5 risk levels in the risk matrix, e.g. land that has a very low contamination risk in the baseline becomes a high or very high risk.</li> <li>• Land that does not meet the statutory definition of Contaminated Land in the existing baseline becomes capable of being determined under Part 2A.</li> <li>• The generation of significant volumes of soils classified as hazardous waste requiring off-site disposal to appropriate landfill.</li> </ul>
Moderate adverse	<ul style="list-style-type: none"> <li>• Partial long term (&gt; 10 years) change in topography which impacts the local community.</li> <li>• Moderate soil erosion, soil compaction, or ground instability that is either permanent or long term in nature.</li> <li>• An increase in contamination impacts from the existing baseline conditions of 2 or 3 risk levels in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate or high risk.</li> <li>• Land that does not meet the statutory definition of Contaminated Land in the existing baseline becomes capable of being determined under Part 2A.</li> <li>• The generation of a moderate volume of waste requiring off-site disposal.</li> </ul>
Minor adverse	<ul style="list-style-type: none"> <li>• Limited medium term (5 to 10 years) change in topography which impacts the local community.</li> <li>• Limited medium-term soil erosion, soil compaction, or ground instability.</li> <li>• An increase in contamination impacts from the existing baseline conditions of 1 risk level in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate/low risk.</li> <li>• The generation of a minor amount of waste soils.</li> </ul>
Negligible (neutral)	<ul style="list-style-type: none"> <li>• No measurable impact on topography, soil erosion, soil compaction, or ground instability or impacts that are only temporary in nature (&lt; 5 years).</li> <li>• Negligible change in contamination impacts.</li> <li>• No generation of waste soils as part of the development, materials are used sustainably.</li> </ul>
Minor beneficial	<ul style="list-style-type: none"> <li>• Limited medium term (5 to 10 years) change in topography which has a positive impact on the local community.</li> <li>• Limited medium-term reduction in existing soil erosion, soil compaction, or ground instability issues.</li> <li>• A reduction in contamination impacts from the existing baseline conditions of 1 risk level in the risk matrix, e.g. land that has a moderate/low contamination risk in the baseline becomes a low risk.</li> <li>• A minor amount of materials reuse as part of the development limiting the offsite disposal of waste soils.</li> </ul>
Moderate beneficial	<ul style="list-style-type: none"> <li>• Partial long term (&gt; 10 years) change in topography which has a positive impact on the local community.</li> <li>• Moderate permanent or long term reduction in existing soil erosion, soil compaction, or ground instability issues.</li> <li>• A reduction in contamination impacts from the existing baseline conditions of 2 or 3 risk levels in the risk matrix, e.g. land that has a high contamination risk in the baseline becomes a moderate/low or low risk.</li> <li>• Land that meets the statutory definition of Contaminated Land in the existing baseline is no longer capable of being determined under Part 2A.</li> <li>• A moderate amount of materials reuse as part of the development limiting the offsite disposal of waste soils.</li> </ul>
Major beneficial	<ul style="list-style-type: none"> <li>• Complete permanent change in topography which has a positive impact on the local community.</li> <li>• Significant permanent reduction in existing soil erosion, soil compaction or ground instability issues.</li> <li>• A reduction in contamination impacts from the existing baseline conditions of 4 or 5 risk levels in the risk matrix, e.g. land that has a very high contamination risk in the baseline becomes a low or very low risk.</li> <li>• Land that meets the statutory definition of Contaminated Land in the existing baseline is no longer capable of being determined under Part 2A.</li> <li>• Sustainable use of material including recycling/reusing on site material. No offsite disposal of waste soils to landfill.</li> </ul>

- Following the classification of an effect, a clear statement is made as to whether the effect is 'significant' or 'not significant'. As a general rule, major and moderate effects are significant and minor and negligible effects are not significant, in accordance with standard EIA practice. However, professional judgement is also applied to the circumstances of the effect, where appropriate

### Sensitive Receptors

- This assessment is based on the receptor sensitivity and the potential magnitude of the effect, as well as the probability of the effect occurring. This approach reflects the requirement of relevant legislation and guidance for contamination effects to be considered using a risk-based approach. The assessment of effects has been made based on the receptor sensitivity and the potential magnitude of the effect.
- This risk-based approach involves a tiered identification and investigation of potential contamination sources, pathways and receptors and the development and refinement of a Conceptual Site Model (CSM) in order to identify remediation (i.e. mitigation) requirements. The assessment methodology defines the baseline conditions as the potential sources, pathways, and receptors present and then considers how these may affect future receptors during both the construction and operational phases, including consideration of changes to the CSM (e.g. introduction of new pathways, alterations to receptor types and sensitivities, etc.).
- The following are the sensitive receptors which will be assessed in the following assessment:
  - *Site users – human health (current/pre-development). Current usage of the Site (disused allotment).*
  - *Site end users - human health (post-development) are also the potential receptor in relation to risks from ground gas, via accumulation in building basements, or other confined spaces, leading to asphyxiation or explosion.*
  - *Potential Controlled Waters receptors include the Principal and Secondary (A) Aquifers that underlie the site.*
- The significance of effects on a given receptor is a product of the sensitivity of that receptor and the potential magnitude of the effect. Sensitivity criteria for the receptors have been determined with consideration of guidance provided in CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice (2001) and in



accordance with the Environmental Scoping Report (Wardell Armstrong, March 2018). Receptor Sensitivity is provided in Table 10.4.

- The value / sensitivity of a geological receptor is considered when determining the consequence of a physical effect in the impact assessment. The value / sensitivity of each of the geological receptors has been determined using the classifications given in Table 10.5.



**Table 10.4: Receptor Sensitivity Criteria – Human Health & Environmental Resources**

Sensitivity	Criteria	Receptor Example
<b>High</b>	<ul style="list-style-type: none"> <li>Human health risk, where receptor characteristics promote exposure and/or vulnerability to soil contamination, ground gas or ground instability.</li> <li>Groundwater that is used for human consumption and/or is within geological units that display a high level of water storage.</li> <li>Surface water body with statutory designation e.g. SSSI. Groundwater that is used for human consumption.</li> </ul>	<ul style="list-style-type: none"> <li>Children using residential gardens or public recreation areas. Construction workers routinely exposed to soils and/or working in enclosed spaces, trenches, or excavations.</li> <li>Occupants of buildings that include small enclosed spaces that lend themselves to gas accumulation (e.g. residential properties).</li> <li>Controlled waters receptors of national and / or strategic importance for the purposes of potable water supplies (e.g. Principal Aquifer), Source Protection Zone.</li> <li>High sensitivity ecological receptors where the sensitivity is directly related to soil, surface water or groundwater conditions (e.g. Ramsar site).</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>Human health risk, where receptor characteristics provide limited potential for a significant contaminant linkage.</li> <li>Agricultural assets whose quality may be affected by exposure to contamination.</li> <li>Groundwater that is not currently used for human consumption, but which is within geological units that display a high level of water storage and may support water supply and/or river base flow on a strategic scale.</li> <li>Groundwater that is used for agricultural purposes (e.g. field irrigation) or public amenity.</li> <li>Non-designated surface water body of good chemical quality.</li> </ul>	<ul style="list-style-type: none"> <li>Workers in commercial premises (unless the buildings have features that lead to a high sensitivity in relation to gas accumulation).</li> <li>Construction / maintenance workers carrying out work that involves limited, infrequent ground disturbance. Users of adjacent land during the construction process (e.g. residents in adjacent developments).</li> <li>Secondary Aquifer outside SPZ or influencing zone of private groundwater supply abstractions.</li> <li>Crops or livestock.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Human health risk, where receptor characteristics significantly minimise the likelihood of a significant contaminant linkage.</li> <li>Groundwater that is not currently used for human consumption, but which is either (a) within geological units capable of supporting water supplies at a local scale, or (b) present as localised bodies of groundwater within generally non-water bearing strata.</li> <li>Groundwater that is abstracted for low sensitivity industrial purposes.</li> <li>Damage to buildings/infrastructure which does not pose a risk to human health.</li> </ul>	<ul style="list-style-type: none"> <li>Users of car parks and access roads.</li> <li>Controlled Waters receptors of negligible importance for the purposes of potable water supplies and / or ecosystems.</li> <li>Surface waters not used for abstraction, irrigation or flowing directly into surface water course used for same.</li> </ul>
<b>Very Low</b>	<ul style="list-style-type: none"> <li>Phytotoxic effects on non-agricultural plants.</li> <li>Groundwater that does not contribute towards baseflow and not used or have the potential to be used for drinking water supply.</li> <li>Unproductive strata, and no recorded abstractions.</li> </ul>	<ul style="list-style-type: none"> <li>Plants that have no economic value (note that ecological effects are outside the scope of land contamination assessment).</li> </ul>



**Table 10.5: Receptor Sensitivity Criteria – Geological Receptors in Relation to Physical Effects**

Sensitivity	Criteria	Receptor Example
<b>High</b>	<ul style="list-style-type: none"> <li>Attribute possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the Application Site/receptor.</li> <li>Attribute has a very low capacity to accommodate the proposed change.</li> </ul>	<ul style="list-style-type: none"> <li>Major topographic, ground stability, soil compaction or erosion hazards currently present at the Application Site.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>Attribute possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the Application Site/receptor.</li> <li>Attribute has a low capacity to accommodate the proposed change.</li> </ul>	<ul style="list-style-type: none"> <li>Moderate topographic, ground stability, soil compaction or erosion hazards currently present at the Application Site.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Attribute only possesses characteristics which are locally significant.</li> <li>Attribute has tolerance to accommodate the proposed change.</li> </ul>	<ul style="list-style-type: none"> <li>Small topographic, ground stability, soil compaction or erosion hazards currently present at the Application Site.</li> </ul>
<b>Very Low</b>	<ul style="list-style-type: none"> <li>Attribute possesses no significant characteristics.</li> <li>Attribute has tolerance to accommodate the proposed change.</li> </ul>	<ul style="list-style-type: none"> <li>No topographic, ground stability, soil compaction or erosion hazards currently present at the Application Site.</li> </ul>



**Table 10.6: Magnitude of Potential Effect**

Magnitude	Criteria	Potential Effect
<b>High</b>	<ul style="list-style-type: none"> <li>Short term (acute) risk to human health.</li> <li>Release of Priority Hazardous Substances or substances regulated under the '<i>Water Supply (Water Quality) Regulations 2010</i>' at concentrations that may present a direct/imminent risk to health.</li> <li>Physical effects on an aquifer that seriously restrict its viability as a recoverable resource.</li> </ul>	<ul style="list-style-type: none"> <li>Soil displaying highly elevated cyanide concentrations. Explosion or asphyxiation caused by ground gas (e.g. methane, carbon dioxide, hydrogen sulphide). Subterranean fires.</li> <li>For example, major spillage of oil from activities associated with the scheme affecting a water course or aquifer. Catastrophic ground failure occurring during the construction and operation phase.</li> <li>Total loss of major alterations to one of more of the key elements, features or characteristics of the baseline. The post-development situation will be fundamentally different.</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>Long term (chronic) risk to human health. Death or major health effects on livestock or significant direct damage to crops that is directly attributable to soil contamination.</li> <li>Release of Priority Hazardous Substances, substances regulated under the '<i>Water Supply (Water Quality) Regulations 2010</i>' or substances regulated under '<i>The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2000</i>' at concentrations that exceed regulatory compliance criteria, lead to substantial localised degradation in surface/groundwater quality. Concentrations may impair the taste and odour of drinking water supplies.</li> <li>Physical effects on an aquifer that limit its effectiveness as a resource.</li> </ul>	<ul style="list-style-type: none"> <li>Soil displaying contaminant concentrations in excess of generic or site-specific assessment criteria for chronic risk.</li> <li>Soils demonstrating long term soil creep and instability. Slow smouldering of colliery spoil leading to release of contaminants to atmosphere.</li> <li>Long term risk from leaching of contaminants to water resources.</li> <li>Partial loss or alteration to one of more of the key elements or characteristics of the baseline. The post-development situation will be partially changed.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Short-term, minor, fully reversible human health effects.</li> <li>Release of Priority Hazardous Substances or substances regulated under the relevant water regulations at concentrations that exceed regulatory compliance criteria and may lead to minor localised degradation in surface/groundwater quality.</li> <li>Minor damage to crops that is directly attributable to soil contamination.</li> <li>Damage to buildings/infrastructure resulting from long term ground settlement.</li> </ul>	<ul style="list-style-type: none"> <li>Minor damage to crops.</li> <li>Pollution of controlled waters leading to minor localised degradation in groundwater quality but have no potential to present a risk to abstractions.</li> <li>Minor loss or alteration to one or more of the key elements, features or characteristics of the baseline. Post-development, the change will be discernible but the underlying situation will remain similar to the baseline.</li> </ul>
<b>Negligible</b>	<ul style="list-style-type: none"> <li>No significant potential for adverse human health effects.</li> <li>No damage to crops or livestock.</li> <li>Release of Priority Hazardous Substances or substances regulated under the relevant water regulations at concentrations below regulatory compliance criteria, but greater than background concentrations.</li> </ul>	<ul style="list-style-type: none"> <li>Land contamination at concentrations below generic or site-specific assessment criteria for chronic risk.</li> <li>No measurable effect on the use or function of a watercourse.</li> <li>Very minor loss or alteration to one of more of the key elements, features or characteristics of the baseline, such that post-development, the change will be barely discernible, approximating to the "no change" situation.</li> </ul>

## **APPENDIX 10.7 EXPLOSIVE ORDNANCE ASSESSMENT**

## Hallett, Bethan

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**From:** Sven Leman <sven.leman@zetica.com>  
**Sent:** 12 June 2019 16:48  
**To:** Hallett, Bethan  
**Cc:** Research  
**Subject:** RE: UXO Preliminary Report

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Afternoon Bethan

Please find the PDSA below as requested. Any further queries, don't hesitate to contact us.

	
Pre-Desk Study Assessment	
<b>Site:</b>	Bryn Henllys Extension, Cwm-Twrch Uchaf, Wales
<b>Client:</b>	Wardell Armstrong LLP
<b>Contact:</b>	Bethan Hallett
<b>Date:</b>	12 <sup>th</sup> June 2019
<b>Pre-WWI Military Activity on or Affecting the Site</b>	None identified.
<b>WWI Military Activity on or Affecting the Site</b>	None identified.
<b>WWI Strategic Targets (within 5km of Site)</b>	The following strategic targets were located in the vicinity of the Site: ■ Transport infrastructure and public utilities.
<b>WWI Bombing</b>	None identified on the Site.
<b>Interwar Military Activity on or Affecting the Site</b>	None identified.
<b>WWII Military Activity on or Affecting the Site</b>	None identified.
<b>WWII Strategic Targets (within 5km of Site)</b>	The following strategic targets were located in the vicinity of the Site: ■ Transport infrastructure and public utilities.
<b>WWII Bombing Decoys (within 5km of Site)</b>	None.
<b>WWII Bombing</b>	During WWII the Site was located in the Rural District (RD) of Ystradgynlais, which officially recorded 6No. High Explosive (HE) bombs with a bombing density of 0.3 bombs per 405 hectares (ha).  No readily available records have been found to indicate that the Site was bombed.
<b>Post-WWII Military Activity on or Affecting the Site</b>	None identified.

Recommendation	A detailed desk study, whilst always prudent, is not considered essential in this instance.
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This summary is based on a cursory review of readily available records. Caution is advised if you plan to action work based on this summary.

It should be noted that where a potentially significant source of UXO hazard has been identified on the Site, the requirement for a detailed desk study and risk assessment has been confirmed and no further research will be undertaken at this stage. It is possible that further in-depth research as part of a detailed UXO desk study and risk assessment may identify other potential sources of UXO hazard on the Site.

Kind regards

*Sven*

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**Dr Sven Lemman**  
Risk Assessor  
Zetica Limited



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**From:** Sven Lemman  
**Sent:** 06 June 2019 15:12  
**To:** Hallett, Bethan  
**Cc:** Research  
**Subject:** RE: UXO Preliminary Report

Afternoon Bethan

That's not a problem. We'll get a PDSA completed for you as quickly as possible.

Kind regards

*Sven*

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**Dr Sven Lemman**  
Risk Assessor  
Zetica Limited



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**From:** Hallett, Bethan [mailto:bhallett@wardell-armstrong.com]  
**Sent:** 06 June 2019 15:10  
**To:** Sven Leman  
**Cc:** Research  
**Subject:** UXO Preliminary Report

Hello Sven,

Could I please request a preliminary UXO report for the following site:

Bryn Henllys Extension, Cwm-Twrch Uchaf, SA9 2UX.

The approximate grid reference for the site is 275917, 212511. Please find a screenshot of the site boundary attached.

Could you please also provide a cost if a detailed desk study is required?

Thank you.

Kind regards,

**Bethan Hallett** | Engineering Geologist  
Wardell Armstrong LLP  
Tudor House, 16 Cathedral Road, Cardiff, CF11 9LJ  
t: 029 2072 9191 m:



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