

Remediation Statement
For
The Former Glyn Ceiriog Highways Depot
New Road, Glyn Ceriog, Llangollen
Wrexham, LL20 7HE

Planning Reference P2012/0054

Introduction

In accordance with planning permission P2012/0054 dated 28th February 2012, the New Glyn Valley Tramway and Industrial Heritage Trust (the Trust) have permission for a change of use and renovations / alterations to the existing storage shed to create a heritage and interpretation centre (museum) and external works to create a replica station platform at the site.

This statement has been prepared to outline the options and recommended actions to minimise the risk to human health and the wider environment from the potentially hazardous materials that have been identified or which may potentially exist at the site during the renovations / alterations.

Contamination

Two intrusive chemical investigations have been undertaken at the site, the details of which are described in the '*Supplemental site investigation and contamination risk assessment*' completed by AC Environment Solutions on behalf of the Trust and dated October 2013.

The '*Phase 2 ground contamination investigation and risk assessment*' completed by Richards Moorhead & Laing in 2007 involved the mechanical excavation of 6 trial pits to depths of 1.5m and the chemical analysis of 9 soil samples, our reassessment of which identified isolated elevations in sulphate and sulphide and 2 isolated elevations in total polyaromatic hydrocarbons (PAHs) above currently accepted generic assessment criteria.

The 2013 supplemental site investigation undertaken by AC Environment Solutions involved the mechanical excavation of 7 trial pits to depths of between 1.20 and 2.80m, the collection of 18 soil samples, 17 of which were subjected to preliminary on site screening for volatile vapours followed by the chemical analysis of 10 soil and 2 river water samples. A further visit was subsequently undertaken to retrieve an additional 6 soils samples following the initial round of analysis.

The 2013 investigation identified elevated concentrations in speciated PAHs above their respective screening criteria within the topsoil beneath the area of rough grassland at the western end of the site (TP1A, TP1A/2 and TP1A/3) which is restricted to the top 0.21-0.30m and from within the soil mound extending along part of the south-eastern boundary of the site.

The chemical testing results from both investigations were assessed against criteria for residential use which may be considered to be slightly overly conservative bearing in mind the non-residential use of the site. However, the choice of assessment criteria was made because the proposed site layout includes some areas of open soft ground that may be frequented by members of the public, including young children.

No asbestos fibres were identified in any of the soil samples, although an old asbestos cement brake liner was found at TP7A.

Revised Conceptual Site Model

The revised conceptual site model and risk assessment for the proposed conversion of the site as a heritage and interpretation centre revealed a number of potentially viable pollution linkages, from which a number of unacceptable risks have been identified, warranting a number of remedial measures to break the various pollution linkages.

Remedial Measures

The required measures are presented as follows:-

1. Protection to Construction Workers From Contaminants

To protect construction workers from direct human contact with soil contaminants via direct contact or inhalation and ingestion, contractors must be required to use the appropriate personal protection equipment (overalls, gloves, hard hat and where warranted, a face mask) and adhere to good site hygiene practice with the use of washing facilities before the consumption of food. Notices should be issued advising adherence to this requirement to encourage compliance.

2. Surface Soils Contaminated with PAHs

It is understood that the area at the western end of the site is to remain as grass, from which a risk to site occupants and visitors from elevated PAHs in the topsoil extending to depths of 0.21-0.30m has been identified. The following options have been considered to mitigate the risk:

- a) Removal of surface soils (topsoil) from this end of the site down to 0.21-0.30 metre (equating to an approximate volume of 25m³ or 50 tonnes) by registered waste carrier for appropriate offsite disposal to a licensed waste management facility and replacement with imported certified clean topsoil which is grass seeded or natural stone gravel to a thickness of 150mm. Copies of the waste transfer documentation will need to be made available.
- b) Removal of the surface soils to another site known as the coal wharf which is also under the control of the Trust adjoining the river further upstream. Removal of material from the site means that it will be designated as waste. Details of this will therefore need to be discussed and agreed with the Contaminated Land Officer (CLO) of Wrexham CBC and Natural Resources Wales to ensure that the fill is suitable for use and does not create any new pollution linkages. A contamination risk assessment will therefore be required for the destination site. A waste exemption from the Environment Agency will also be required to permit the use of the 'waste' as a construction material at the destination site. A cover of certified clean topsoil would then need to be imported for grass seeding or natural stone gravel to a thickness of 150mm.
- c) Scraping away surface vegetation from across the area, eliminate any bumps and hollows and covering the exposed PAH contaminated topsoil with a high grade HDPE impermeable membrane which can then be covered with imported certified clean topsoil to a depth of 150mm for grass seeding. It is anticipated that the gradient within this part of the site from the north west to south east would permit drainage in this direction above the membrane.
- d) Scraping away surface vegetation from across the area, eliminate any bumps and hollows and covering the exposed PAH contaminated topsoil with a geogrid membrane (mesh) which can then be covered with natural stone gravel (compacted sub base) to a thickness of 150mm. It is

anticipated that the gradient within this part of the site from the north west to south east would permit a certain degree of drainage to take place as surface runoff in this direction.

- e) Removal of the surface soils for encapsulation within the proposed station platform. On the assumption that the proposed platform is to be constructed as a box structure in brick, block or stone, the soils could be compacted in layers before the impermeable platform top is added. It is believed that a HDPE membrane would not be required to line the floor and sidewalls of the platform chamber since the potential for leaching from the infill would be low (providing the platform surface is impermeable) and groundwater has not been encountered near the ground surface during the site investigations. However a waste exemption from the Environment Agency will be required to permit the use of the 'waste' soil as a construction material on site. A cover of imported certified clean topsoil or natural stone gravel to a thickness of 150mm would then need to be applied to the exposed sub-soils as in options a) and b).

In respect of options a), b) and e), if clean imported topsoil is to be used to reinstate the surface following removal of the contaminated topsoil, in order to minimise the intermixing of contaminated soils with the clean soils, the imported topsoil should be stockpiled well away from the contaminated soils and not placed in the designated area until the imported soils have been chemically validated to be suitable for use (see below) and the contaminated soils have been removed from the excavation area. It is understood that a source for the imported topsoil has not yet been identified.

Since the PAHs in surface soils described in point 2 (above) are believed to have originated from similar materials making up the mound (see point 3 below), if the first 2 options are followed (2.a and b), adding the soils to the mound should be allowed so that all the contaminated soils are stored at one location prior to being moved.

Reference has been made to the Welsh Land Contamination Working Group guidance document on the '*Requirements for the chemical testing of imported materials for various end uses and validation of cover systems*' dated May 2013.

Based on this, it will be necessary to verify that soils imported to fulfil the above and obtained from a single source other than from a retail outlet, are chemically clean by the analysis of 3 samples for the following suite of parameters (subject to confirming the nature of the source and following agreement with the CLO):

Validation Testing Suite For Imported Soils
Acidity / alkalinity (pH), metals (arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc), total phenols, speciated PAHs, TPHs (aliphatic / aromatic split to CWG), asbestos screen

The chemical testing results should be assessed against the same criteria described in paragraphs 13.41-13.44 of the '*Supplemental site investigation and contamination risk assessment*' completed by AC Environment Solutions and dated October 2013.

If natural stone gravel sourced from a retail outlet or a natural source was to be used as a cover in any of the above options, chemical testing would not be required, although proof of the source will be required. The depth of cover would also need to be validated. A minimum thickness of 150mm and 3 locations for thickness validation of the gravel or topsoil is suggested. Compacted stone gravel may also provide for easier maintenance and could include other features such as seating / picnic tables, although the use of gravel in this area represents a diversion from grass specified in

the planning application and therefore consultation with the Planning Officer on the use of gravel would be advised.

Based on a review of the above options, option 2.e) is advised based on its more sustainable approach and cost efficiency, but the selection of cover type (soils or gravel) will need to be weighed up against cost and what is allowed under the planning permission.

3. Soil Mound Contaminated with PAHs

Soils within the mound extending along part of the south-eastern site boundary have been identified to be slightly contaminated with PAHs. The mound comprises soils (with occasional brick and concrete rubble and larger pieces of concrete) believed to have originated from road gullies and road sweepings which were deposited by the Council between 1966 and 1973 to create a ramp for the loading of road salt. The brick and concrete boulders and larger pieces of concrete should be set aside for removal as uncontaminated waste or for reuse elsewhere on site subject to the granting of a permit for waste exemption.

The following options have been considered to mitigate risk:

- a) Removal by a registered waste carrier for appropriate offsite disposal to a licensed waste management facility (the same as 2.a). Copies of the waste transfer documentation would need to be made available.
- b) Removal of the mound to another site known as the coal wharf which is also under the control of the Trust adjoining the river further upstream (the same as 2.b). Removal of material from the site means that it will be designated as waste. Details of this will therefore need to be discussed and agreed with the CLO and Natural Resources Wales to ensure that moving the fill is suitable for use and does not create any new pollution linkages. A contamination risk assessment will therefore be required for the destination site. A waste exemption from the Environment Agency will also be required to permit the use of the 'waste' soil as a construction material at the destination site
- c) Placement, compaction and encapsulation of the soils within the proposed station platform in the same manner as 2.e). The estimated volume of the station platform (including the ramp) based on the planning application drawings 5509/L(9)01 and 5509/L(2)02 is approximately 28m³ which should be enough to accommodate the PAH contaminated surface soils (estimated to be approximately 25m³). To accommodate the soils from the mound (volume very crudely estimated to be approximately 25m³) the volume of the station platform would need to be increased. This could be achieved by a combination of deepening, widening or lengthening the station platform.

The proposed platform is located close to TP2A where 0.43m depth of limestone sub-base material was encountered during the 2013 investigation which is believed to be infill above a former track bed. If this material extends beneath the proposed station platform and providing that it is free of staining and not intermixed with any foreign materials, it could be excavated and reused elsewhere on site (the Trust has stated that this material would be suitable for use as a surfacing material within the proposed car parking area). It is estimated that removal of limestone fill from beneath the station platform could increase the soil storage capacity by 19m³.

It may also be possible to create additional storage capacity by widening and / or lengthening the station platform. However, since this would result in a change in the aerial extent of the platform and a deviation from the design for which planning consent was granted, consultation with the Planning Officer would be advised.

It should also be noted that a waste exemption will be required from the Environment Agency to permit the use of the soils for construction within the station platform and relocation of the limestone sub-base.

Based on a review of the above options, option 3.c) is advised based on its more sustainable approach. During the progression of the works, the volume of the contaminated soils reused on site in the manner described above should be calculated and the locations of the source and destination points recorded. The volume of any limestone sub-base materials excavated for reuse on site should also be calculated and the location of the source and destination points recorded. Any PAH contaminated soils that cannot be accommodated on site will need to be removed under options 3.a) or b) and if this becomes necessary, option 3.a) would probably be less onerous, but may need to be weighed up against cost.

4. Drinking Water Supply Pipes

Dee Valley Water has been consulted regarding the possible risk to the degradation of the onsite drinking water supply pipe from elevated PAHs beneath the area of rough grassland at the western end of the site close to where the existing drinking water supply pipe passes.

This revealed that if the existing drinking water supply pipe comprises lead or galvanised iron, there will be a minimal risk of pipe degradation and no further action would be required. Whilst pipes that are polyethylene or plastic have a higher risk of degradation from contamination, the contact advised that the risk from elevated PAHs on the degradation of polyethylene or plastic pipes is low which is why PAHs are not listed on Dee Valley Water's pipeline risk assessment for proposed new water supply pipes on brownfield sites. The same risk assessment also suggests that copper pipes are at risk of corrosion where soil pH exceeds pH8 which is the case at the western end of the site where a soil pH of 9.5 was determined from TP1A. It is therefore considered that action will only be required in the following circumstances:

- a) If the existing water supply pipe is lead - Purging of the water from the taps should be undertaken for a few minutes each day if used for drinking;
- b) If the water supply pipe is copper - Replacement of the pipe with a wrapped steel, ductile iron or polyethylene pipe.

5. Unexpected Significant Contamination

If during any excavations on site suspicious material is encountered indicating the possible presence of significant contamination not previously identified, the material should be sampled for chemical analysis. This may then be excavated and stockpiled so as not to delay progression of the works whilst awaiting the chemical analysis results.

If the chemical analysis results confirm the presence of significant contamination, depending on the nature and extent of the contamination, the material should either be removed to a licensed landfill or dealt with by an alternative method to be agreed with the CLO.

6. Sulphate Resistant Cement

A risk to building structures has been identified from elevated concentrations in sulphate beneath the area of existing hardstanding and within the inspection pit backfill suggesting that there is a need for sulphate resistant cement for any new construction.

7. Asbestos Containing Materials

A risk to construction workers has been identified from the proposed dismantling of the corrugated asbestos cement (chrysotile) sheet roof which is to be replaced with slate. Contractors should preferably be licensed for asbestos removal and be provided with the appropriate personal protection equipment (overalls, gloves, hard hat, face mask). The sheeting should be carefully dismantled for removal by a registered waste carrier to an appropriately licensed waste management facility for which copies of the waste consignment notes should be provided.

A slight risk to neighbouring residents has also been identified from potential windblown dust during dismantling of the roof which should be minimised by careful dismantling by experienced licensed contractors.

A risk to site occupants and visitors has been identified from potential asbestos containing materials that may be located elsewhere within the building fabric. A refurbishment and demolition survey for asbestos has therefore been advised in accordance with the Control of Asbestos Regulations 2012.

An isolated section of asbestos cement brake liner was encountered at a depth of 1.2 metres in TP7A. No asbestos fibres have been identified from laboratory screening of soil samples, but if any further asbestos containing materials are encountered during excavations on site, these should be double bagged and clearly labelled 'Asbestos' and removed to an appropriately licensed waste management facility for which waste consignment notes should be obtained.

8. Radon Gas

The site is located in a Radon Affected Area where between 10 and 30% of homes tested for radon within the 1 kilometre grid square in which the site is located, are anticipated to be above the Action Level for homes of 200 Bq m⁻³. Whilst it is recognised that the proposed use is not residential, any risk from radon to site occupants and visitors will be minimised by the natural ventilation afforded by the opening of the shed doors when in use. However, the construction of any completely enclosed partitioned units within the shed should be provided with adequate protection measures (usually radon sumps or room ventilation). It is also anticipated that radon protection measures for any future extension to the shed would involve the provision of a low permeability gas membrane, although the Building Control Officer should be able to advise further on this. Reference should also be made to the Building Research Establishment (BRE) for further information on radon protection measures (<http://www.bre.co.uk>). The Health and Safety Enforcement Team within Wrexham CBC may also be able to provide additional advice (the contact is Alison Watkin, Tel 01978 315776).

9. Verification Report

It will be necessary to maintain a detailed record of all remedial works (once agreed with the CLO) recording dates, parties and organisations involved, photographs, drawings, chemical testing results, waste transfer / consignment notes etc for inclusion in a report for submission to the CLO to verify that the agreed measures have been completed as specified in Condition 4 of the planning permission.

Prepared by

N F Pickard

Nick Pickard BSc CEnv MRICS
AC Environment Solutions Limited

Tel: 01709 711850 Mob: 07847 254463