PEAK ENVIRONMENTAL SOLUTIONS

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ENVIRONMENTAL SITE ASSESSMENT
PHASE I INVESTIGATION

FORMER MERIDIAN VEHICLES GARAGE
BUXTON ROAD
WHALEY BRIDGE
DERBYSHIRE
SK23 7JF

REPORT PREPARED FOR

Mr Philip Johnson
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PEAK ENVIRONMENTAL SOLUTIONS	Document Verification Schedule			
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1.0 INTRODUCTION

Peak Environmental Solutions Limited has been commissioned by Mr Philip Johnson to undertake a Phase I Environmental Site Assessment (contamination desk study) of a ~0.07 hectare former vehicle sales & refuelling site located at Buxton Road, Whaley Bridge, Derbyshire, SK23 7JF (centred on NGR 401050, 380530). A site location plan is shown on Figure 1 and the current site layout is reproduced in Figure 2.

This report has been written to support a forthcoming planning application to High Peak Borough Council (HPBC) for redevelopment of the site for residential landuse. The works undertaken as part of this Phase I report include a site walkover, interpretation of readily available environmental site information & historical mapping, development of a preliminary conceptual site model (CSM) and the completion of a qualitative land contamination preliminary risk assessment (PRA). Coal Authority & mining/ground stability data has also been obtained & considered as part of the Phase I Assessment.

The purpose of the report is to:

1. Determine the potential for onsite or offsite land contamination issues arising from the current or historical uses of the site and surrounding area; and

2. Provide an initial assessment of potential risks that any such land contamination may pose to sensitive receptors on the redeveloped site, including future site users, controlled waters and infrastructure.

The report has been produced in accordance with the umbrella framework laid out in NHBC/EA Publication R&D66 (*'Guidance for the Safe Development of Housing on Land Affected by Contamination'*), BSI 10175:2011 *'Investigation of Potentially Contaminated Sites'* Code of Practice and DEFRA/EA CLR-11 *'Model Procedures for the Management of Land Contamination'* (referenced in Section 5.0) as well as in general accordance with the National Planning Policy Framework 2012.

The report was finalised in October 2012 and should be read in the light of any subsequent changes in legislation, statutory requirements, statutory & non-statutory guidance, relevant research and industry practices, and should be read in conjunction with the documents detailed in Section 5.0.

Information obtained by Peak Environmental Solutions has been relied upon by Peak Environmental Solutions in good faith. This Phase I Report is subject to the standard terms & conditions of Peak Environmental Solutions and the limitations & exceptions detailed in Appendix A.

2.0 SCOPE OF WORK

2.1 Site Walkover & Desk Study

A site walkover was undertaken by Peak Environmental Solutions on the 21st September 2012 to assess the site environmental setting, review the site layout and check for visual evidence of contamination sources. The walkover survey did not include an assessment of asbestos containing materials (ACM) or an assessment of invasive weeds such as Japanese knotweed, Himalayan balsam or Giant hogweed. Selected photographs taken during the site walkover are presented in Appendix B.

The information considered as part of this Phase I desk study includes a Landmark historical map pack (Appendix C), Landmark Mining pack and review of a variety of data sources including geological maps, Environment Agency (EA) and Coal Authority & ground stability data (Appendix D) data. Where appropriate, third party information has been referenced in the report or reproduced in the Appendices, with additional references listed in Section 5.0.

The report includes a preliminary assessment for the potential for radon gas hazards. A detailed radon assessment falls outside of the scope of the report and the requirement for radon mitigation measures in the proposed development should be identified separately to the satisfaction of HPBC Building Control.

2.2 Preliminary Risk Assessment

The qualitative PRA presented in this report considers the proposed residential redeveloped landuse and includes development of a conceptual site model (CSM) to assess the significance of risks associated with relevant pollutant linkages (RPLs) identified by a source-pathway-receptor analysis. The assessment of risk is based on a consideration of the following:

- The probability of an event occurring, taking into account both the presence of the hazard and receptor and the plausibility of the pathway (where probability is defined as the chance of a particular event occurring in a given period of time); and
- The severity of the potential consequence, taking into account both the potential severity of the hazard and the sensitivity of the receptor (where severity or consequence can be defined as the adverse effects (or harm) arising from a defined hazard, which impairs the quality of human health or the environment in the short or longer term).

The PRA uses the risk matrix, consequence, likelihood and R&D 66 risk classification scheme (Very Low to Very High) detailed in Appendix E. For the purposes of the qualitative assessment, identified Very Low to Low risks will be considered acceptable for the redeveloped site uses.

2.3 Conclusions and Recommendations

The report presents the conclusions drawn from the Phase I study & risk assessment and makes recommendations for any further work likely to be necessary to support the proposed planning application.

3.0 REPORTING

The findings of the Phase I are presented in tabular form as outlined in Table 1.

Table 1: Report Overview

Tables & Sections	Aspect covered
Table 2: Site Description & Environmental Setting Table 3: Site Walkover Observations and Comments Table 4: Geology, Hydrogeology & Hydrology Table 5: Mining & Ground Stability	Site Location & Description Contemporary Site Activities Contemporary Neighbouring Landuse Geology Hydrogeology Hydrology Environmentally Sensitive Areas
Table 6: Permitted Operations & Pollution Incidents Table 7: On-Site Historical & Contemporary Landuse Table 8: Off-Site Historical & Contemporary Landuse	Pollution Incidents Permitted Operations Historical Site Landuse Historical Off-Site Landuse Contemporary Site Landuse Contemporary Off-Site Landuse
Table 9: Substances of Concern	Likely contaminants based upon history of site and neighbouring land
Table 10: Initial Conceptual Site Model & Preliminary Risk Assessment	Relevant Pollutant Linkage Assessment Preliminary Risk Assessment
Section 4.0	Conceptual Model Uncertainties Principal Contamination Issues Conclusions and Recommendations

Table 2: Site Description & Environmental Setting

Aspect	Comments	Sensitivity
Site Location	- The site is located to the west of the A5004 road (Buxton Road), from which the site is accessed. The site lies approximately 1km south of the centre of Whaley Bridge at NGR 401050, 380530. - A site location plan is presented in Figure 1.	Not applicable
General Site Description and Contemporary Site Activities	- The ~0.07 hectare site has a rectangular boundary shape, tapering to a point at the southern extent and measures a maximum of ~11m wide and ~80m long. The current site topography slopes slightly to north, with the centre of the site lying at 179m above Ordnance Datum. Reference to historical photographs of the site from the early 1900s indicates previous site topography sloping down to the west which has subsequently been filled & levelled. The western site boundary lies ~4.5m higher than the adjacent landuse, with the change in level managed by a vertical stone-built retaining wall. Further details are presented in Table 7. - The site surface comprises a mix of tarmac and concrete hardstanding in average to good condition. On-site structures are limited to a small (~8m x 3m) single story stone building, formerly used as a payment kiosk, and an associated ~3m high canopy; both of which are located in the northern extent of the site. - No fuel dispenser units remain on-site. Observations regarding on-site structures made during the site walkover are presented in Table 3. Photographs taken during the site walkover are presented in Appendix B. - Two underground storage tanks (USTs) and one above ground storage tank (AST) are known to exist on site; details of which are provided in Table 3. - All on-site services are understood to have been disconnected. Previous on-site services are understood to have comprised electricity, water, telecommunications and CCTV. The service feeds appear to have run onto the site from the commercial premises to the north of the site (also owned by Mr Philip Johnson). - Two Aco-style surface water drains run west to east across the northern part of the site. These are understood to run north beyond the site boundary to the adjacent vehicle fuelling/maintenance garage where they enter an underground interceptor tank. This landuse falls outside the site boundary. - Current on-site activities comprise use of the former forecourt as a display area for the parking & display of vehicles for sale.	Not applicable
Contemporary Neighbouring Landuse	- The site lies within a mixed commercial/residential setting. Adjacent land uses comprise: - North: Whaley Bridge Service Station with residential properties beyond. - East: A5004 single carriageway road (Buxton Road) with residential and agricultural land beyond. - South: Overgrown vegetated land associated with industrial land to the west. - West: Industrial estate supporting numerous small to medium sized companies including chemical manufacture & clothing distribution.	**Moderate-High**

Aspect	Comments	Sensitivity
Environmentally sensitive Areas	- No protected environmentally sensitive areas have been identified within 0.5 km of the site. - The closest identified environmentally sensitive area is Toddbrook Reservoir; a designated Site of Special Scientific Interest (SSSI) located ~550m northwest of the site.	**Low**
Proposed Site Use	- The current proposed redevelopment layout is presented in Figure 4 and includes the following: • Demolition of the kiosk building in the northern site area • Removal of former forecourt canopy • Creation of direct service corridors for utilities • Creation of two two-storey brick-built semi-detached dwellings with associated car parking for eight vehicles, hard & soft landscaping and garden areas.	**High**

Table 3: Site Walkover Observations and Comments

The following observations were made during the site walkover and during conversations with the site owner, who has over 25 years experience of the site. Observations relate to accessible areas and should be used with the figures & site photographs
- No fuel dispensers remain on site.
- Five removable covers relating to the UST in the centre of the site were observed. Running from north to south, the five covers conceal:
- 3 filling points for 6,800 litres, 6,800 litres and 13,600 litre diesel compartments
- 1 filling point for an 18,000 litre fuel compartment; marked as diesel but understood to have been used for petrol
- 1 filling point an 8,200 litre fuel compartment; marked as diesel but understood to have been used for petrol
- 1 filling point a 27,000 litre fuel compartment; marked as diesel but understood to have been used for petrol
- 1 former vapour recovery outlet (capped with an cement, thickness unknown)
- The discrepancy between marked & contained fuel types is understood to relate to alterations made by subcontractors during the decommissioning process
- Fuel vent pipes associated with the central site UST are present on the southern face of the kiosk building
- Three removable covers relating to the UST in the northern site area were observed beneath the forecourt canopy. A fourth smaller cover provides access to disused electricity cable runs.
- No stabilisation works are understood to have been undertaken for either of the USTs.
- A ~1.2m x 1.2m x 2.0m paraffin AST in present in the northwest site corner adjacent to the kiosk building. No stabilisation works are understood to have been undertaken for this tank.
- Surface scars in the southern site extent relate to the previous position of a temporary office structure in this area
- A ~1m x 8m strip of replacement tarmac was observed running along the southwestern site extent. This is understood to relate to reinstatement works undertaken ~30 years ago to address subsidence in this area. No subsidence has subsequently been reported.
- Excavations associated with a row of pre-fabricated garages ~75m southwest of the site are understood to have encountered an unknown thickness of made ground comprising ash deposits from an industrial chimney formerly located in this area. Anecdotal evidence also suggests that a mine adit was opened up in the vicinity of the garages in the early 1900s which subsequently collapsed due to the presence of ash fill materials.
- The nature of the made ground deposits used to level the site (including a ~4.5m land raise in the western site area) are unknown; however photographs taken during the installation of the southern UST appear to show mixed sands & gravel arisings rather than ash.

Table 4: Geology, Hydrogeology & Hydrology

Aspect	Comments	Sensitivity
Geology	- Information relating to the solid & drift geology of the area are shown on the British Geological Survey (BGS) 1:50,000 Geology Map Sheet 99 'Chapel-en-le-Frith & geological memoirs, along with supplementary on-line geological information. - Previous on-site excavation works undertaken to facilitate installation of below-ground fuel storage tanks indicate that the site is underlain by made ground mixed fill materials. Made ground deposits are assumed to be relatively thin in the eastern site adjacent to Buxton Road, thickening towards the western site boundary to an anticipated depth of ~4.5m below ground level (m bgl). The presence and differential thickness of made ground beneath the site is attributable to historical levelling processes undertaken to level the previously sloping site. The origin of the fill materials is unknown. - Superficial clay, silt, sand and gravel alluvial deposits are shown to underlie the site by published mapping data. Superficial Devensian Till deposits are indicated to the immediate east of the site. - The solid geology beneath the site comprises mudstones, siltstones and sandstones of the Pennine Lower Coal Measures Formation. No outcropping faces were observed during the site walkover. - Based on Health Protection Agency (HPA)/BGS radon maps, the site appears to fall within an area with between 1% and 3% of homes above the action level. The requirement for radon protection measures within the redeveloped site should be determined by the client to the satisfaction of HPBC Building Control.	**N.A.**
Hydrogeology	- Environment Agency-defined Aquifer maps indicate that the Pennine Lower Coal Measures Formation bedrock beneath the site comprises a 'Secondary A Aquifer'. The on-site indicated superficial alluvial are designated a 'Secondary B Aquifer' - The depth to groundwater was not determined as part of this assessment. - The site is not within EA-defined Source Protection Zone (SPZ). The closest SPZ (Zone 1) is ~7 km to the southwest. - No BGS-recorded borehole records have been identified within 250m of the site. The closest such identified log lies ~265m southeast of site and relates to a 25m deep borehole commissioned by British Gas Plc (Ref. SK08SW280).	**Low-Moderate** - The bedrock geology is designated a 'Secondary A' aquifer. - The superficial geology is designated a 'Secondary B' aquifer.
Hydrology	- The closest identified surface water feature is the River Goyt, which lies ~25m west of the site. - Chemical river quality monitoring is known to be undertaken for the River Goyt by the EA ~100m northwest downstream from site. The most recent data published on the Environment Agency website relates to monitoring undertaken in 2009, which recorded an 'A' (good) grade for chemical quality and a 'B' (average) grade for biological quality. - The EA website does not identify the site as lying within an area at risk of flooding from rivers. - The EA website identifies the western part of the site as lying within an area at risk of flooding from reservoirs. - The site does not lie within an area covered by EA flood warnings	**Moderate-High** - Closest identified surface water feature ~25m west of the site. - Quality testing undertaken downstream by the EA.

Table 5: Mining & Ground Stability

Aspect	Comments
BGS Recorded Mineral Sites	- One BGS recorded mineral site has been identified within 250m of the site, relating to Horwich End, a former opencast sand & gravel quarry located ~211m south of the site at Horwich End, Whaley Bridge.
Mine Entries	- There are no known coal mine entries within, or within 20 metres of, the boundary of the property
Opencast Coal Mining	- Past: The property is not within the boundary of an opencast site from which coal has been removed by open cast methods - Present: The property does not lie within 200m of the boundary of an opencast site from which coal is being removed by opencast methods. - Future: The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods. The site is not within 800m of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.
Mining & Natural Cavities	- The site lies within a Coal Authority-defined area that may be affected by Coal Mining. A Coal Authority report has been obtained for the site (Appendix D) - No man-made mining cavities have been identified within 500m of the site.
Ground Stability Data	- The site does not fall within a brine compensation area. - The site does not fall within a brine subsidence solution area. - Potential for collapsible ground stability hazards on-site: Very Low - Potential for compressible ground stability hazards on-site: Very low to moderate - Potential for landslide ground stability hazards on-site: Low - Potential for running sand ground stability hazards on-site: Low - Potential for shrinking or swelling clay ground stability hazards on-site: Very low - Envirocheck (Mining) Motion Map data has been obtained and does not indicated any records of known ground movement
Mining Hazards	- The property has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.
Mining Geology	- The Coal Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.
Coal Mining Subsidence	- The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50m, since 31st October 1994. - There is no current stop notice delaying the start of remedial works or repairs to the property. - The Authority is not aware of any request having been made to carry out preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.
Mine Gas	- There is not record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.
Referral Areas	- The site falls within a Coal Authority-defined Coal Mining Development Referral Area. See Section 4.6 for further details.

Table 6: Permitted Operations & Pollution Incidents

Aspect	Comments	Sensitivity
Permitted Sites	- One Industrial Operator (OPRA) record has been identified within 500m of the site; relating to Clover Chemicals Limited, located at Clover House, Macclesfield Road, Whaley Bridge, Derbyshire (Licence No. JP3635GY). This facility has been assigned Compliance Classification Score Band 'A' (in-year 2012 score).	**Moderate**
Waste Operations & Landfills	- No records of contemporary or historic landfill sites or waste operations have been identified within 1km of the site. - The closest identified operation of this type is located ~1.3km south of the site named 'Fernilee'. No records relating to accepted waste types or dates of operation are held on the EA website. - The next closest identified waste disposal site relates to Silk Hill Farm ~1.6 km northeast of the site which was operated by Shellabear-Price Limited. No records relating to accepted waste types or dates of operation are held on the EA website. - Anecdotal evidence suggests that land ~75m southwest of the site was historically used for the disposal of ash from a nearby industrial chimney, however the quantity/depth is unknown.	**Low-Moderate** - The closest recorded landfill site is >1km from the site and is unlikely to pose a significant risk to the proposed development. - Unlicensed landfill activities may have been undertaken in the vicinity of the site.
Industrial Pollution Incidents	- No pollution incidents have been identified within 500m of the site. - Two industrial pollution records have been identified within 500m of the site, both of which relate to Clover Chemicals Limited, an organic chemical manufacturer located ~100m west of the site. The most recent record relates to 2010 and lists a range of organic substances released to sewer. No notifiable releases are listed.	**Low** - Identified pollution records ~100m down gradient from site

Table 7: On-Site Historical & Contemporary Landuse

Aspect	Comments	Sensitivity
On-Site Landuse	- Selected Envirocheck Historical Maps spanning the years 1881-2012 are presented in Appendix C. - 1881/85: Site is shown as undeveloped open land lying within a mixed rural/industrial setting - 1885-1938: No significant changes shown. - 1968: Small structure shown in northwest site area (attributable to service kiosk). - 1985/87: Large rectangular structure shown in northern site area (attributable to forecourt canopy). - 1987-2012: No significant changes shown.	**High** - Potentially contaminative historical on-site landuses have been identified on-site.
Anecdotal Information		
- Anecdotal evidence was provided by the site owner during the walkover. - An aerial photograph taken during the early 1920s shows the undeveloped site sloping steeply down to the west away from Buxton Road. Historical site photographs have been reproduced in Appendix B. - The site is understood to have been developed during the late 1950s and early 1960s. It is not known precisely when the site was raised in the western half to facilitate levelling or the nature of the materials used. - The father of the current site owner acquired the site and land to the north (including the current vehicle servicing garage) in 1966/7. At this time, the site comprised an established vehicle filling station comprising pumps, the northern UST and a small kiosk building. - The kerosene AST in the northwest site corner is understood to have been installed during the mid 1980s. - The southern UST was installed in 1989, as the previously used UST did not provide sufficient fuel capacity. - Materials excavated to accommodate the southern UST comprised sand & gravels. No significant ash deposits were observed. - At the same time that the southern UST was introduced, the site surface drainage was modified, directing water into Aco-style drains running to a drainage interceptor installed to the north of the site. - The site ceased operation as a filling station in early 2004. The USTs were signed-off by a contractor, during which time the sections of the southern UST formerly used for petrol storage were designated as diesel storage. No tank stabilisation works are understood to have been undertaken. - The site has since been used to park vehicles intended for resale.	

Table 8: Off-Site Historical & Contemporary Landuse

Aspect	Comments	Sensitivity
Off-Site Landuse	- Selected Envirocheck Historical Maps spanning the years 1881-2012 are presented in Appendix C. - 1881/85: A saw pit is shown ~50m northwest of the site boundary. The Botney Bleach Works is shown ~25m southwest of the site, with an associated gasometer shown ~75m southwest of the site. An airshaft and well are shown 250m and 300m southwest of the site respectively. The L. & N. W. R. Cromford & High Peak railway is shown running north-northwest by south-southeast ~175m east of the site. - 1898/99: The Botney Bleach Works is shown to have expanded slightly; a chimney and tanks are now annotated. Shallcross Yard, a railway yard, is shown ~175m southeast of the site. An old shaft and surface ground workings are shown ~200m south of the site. - 1909: The Botney Bleach Works is shown to have expanded. A tramway is shown running south from the Botney Bleach Works towards the unannotated earthworks ~200m south of the site. - 1921: The Botney Bleach Works is shown to have expanded. Shallcross Hall Colliery is shown ~225m south-southeast of the site including a chimney and tanks. A tram/railway line links Shallcross Hall Colliery with Shallcross Yard. Mevril Springs Bleach Works is shown ~225m southeast of the site. - 1938: Additional tanks associated with Botney Bleach Works are shown ~35m west of the site and ~165m southwest of the site. Whaley Bridge Gas Works is shown ~90m northeast of the site and includes a ~25m diameter gasometer, a ~30m diameter gasometer and associated buildings. - 1968: The vehicle servicing garage adjacent to the northern site boundary is shown in position. The Botney Bleach Works is shown to have expanded. Shallcross Yard ~175m southeast of the site is now shown as an engineering works. The railway line ~175m east of the site is now shown as dismantled. The former Mevril Springs Bleach Works ~225m southeast of the site is now annotated 'Brick Works'. - 1985/87: The Botney Bleach Works is shown to have expanded. Brick Works ~225m southeast of the site is now annotated 'Works'. - 1994: Gasometers ~90m northeast of the site are no longer shown. - 1999/2000: Former gasworks land northeast of site shown as redeveloped. Botney Works understood to have ceased operation. - 2006: No significant changes observed. - 2012: Former Botney Works now annotated 'Rotary Business Park'.	**Moderate** - Evidence of potentially contaminative adjacent off-site uses has been identified by the desk study, the closest of which lie within 100m of the site.

Table 9: Substances of Concern

Group	Substances	Comments
Inorganic Substances	- Metals: semi metals & non metals: arsenic, cadmium, total chromium, copper, lead, inorganic mercury, nickel, selenium, vanadium, zinc - Asbestos	- Potential inorganic substances of concern include metals and asbestos which may be present in the made ground of unknown origin beneath the site.
Organic Substances	- Total petroleum hydrocarbons (TPH): aliphatic & aromatic fractions C5-C44. - Priority 16 polyaromatic hydrocarbons (PAH): naphthalene, acenaphthene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo-a-anthracene, chrysene, benzo-b-fluoranthene, benzo-k-fluoranthene, benzo-a-pyrene (BaP), dibenzo-a,h-anthracene, benzo-g,h,i-perylene, indeno-1,2,3-c,d-pyrene. - Volatile and Semi-Volatile Organic Compounds - Chlorinated & non-chlorinated Solvents	- TPH & PAHs contaminants may be present in the made ground, natural soils and groundwater beneath the site due to the composition of the imported made ground deposits beneath the site. - TPH & PAHs contaminants may be present in the made ground, natural soils and groundwater beneath the site due to previous and contemporary site landuse, including above and below ground fuel storage and vehicle storage. - A range of VOCs & SVOCs including chlorinated solvents may be present in soils & groundwater beneath the northern half of the site due to the proximity of the vehicle-servicing garage adjacent to the northern site boundary.
Ground Gases	- Ground gases : methane & carbon dioxide - VOC vapours (includes hydrocarbon/organic vapours) - Radon	- Potential ground gas generating materials may exist beneath the site due to the presence of made ground from an unknown origin, potential historical spillages/leakage and current site landuse. - The potential for naturally elevated radon levels has not been considered in detail as part of this assessment and the requirement for radon protection measures within the development should be determined to the satisfaction of HPBC Building Control.

Notes:
The selection of the potential specific substances and hazards of concern has been guided by our experience of brownfield sites, the site history, the primary sources present and information/guidance provided in published DOE industry profiles, CLR-8 (officially withdrawn, but still a valuable resource), Environment Agency publication R&D66:2008 and other relevant references. These documents have been used as an additional screening tool to help assess the significance of contaminants and contaminant/hazard groupings and help decide which contaminants/hazards warrant consideration by the ESA as potential substances and hazards of concern.

Table 10: Initial Conceptual Site Model & Preliminary Risk Assessment

Source	Pathway	Sensitive Receptor	Consequence	Likelihood	Risk Classification
Inorganic & organic substances in site soils & groundwater	Direct contact (Ingestion & Dermal) Inhalation of dust Inhalation of organic vapour	**Human Health** Future users	Medium to Severe	Likely	Moderate to High Risk
	Soils leaching to groundwater Perched water discharge to groundwater Lateral groundwater flow Discharge to surface waters Direct surface run-off	**Controlled Waters** Secondary A Aquifer beneath site, River Goyt ~25m west of site	Medium	Likely	Moderate Risk
	Direct contact Contact with contaminated pore water	**BBM&S** Buildings, building materials and services	Medium	Likely	Moderate Risk
	Ground gas & soil vapour accumulation in buildings & services	**BBM&S** Buildings and services	Medium to Severe	Likely	Moderate to High Risk

4.0 CONCLUSIONS & RECOMMENDATIONS

4.1 Overview

This Phase I ESA has been undertaken in support of a forthcoming planning application to High Peak Borough Council for the redevelopment of the site for residential landuse. Where detailed recommendations are required, these have been provided in Section 4.6. The report has fulfilled the primary objectives of the assessment to:

1. Determine the potential for onsite or offsite land contamination issues arising from the current or historical uses of the site and surrounding area; and

2. Provide an initial assessment of potential risks that any such land contamination may pose to sensitive receptors on the redeveloped site, including future site users, controlled waters and infrastructure.

Evidence of potentially contaminative historical on-site landuse has been identified, substances associated with which may have the potential to affect sensitive receptors.

4.2 Principal Contamination Issues

The principal contamination issues at the site are considered to relate the presence of the two below ground fuel storage tanks, the condition and integrity of which are unknown and which have the potential to impact underlying ground conditions, groundwater and the River Goyt. Spillages associated with historical tank filling and refuelling processes have the potential to impact sensitive receptors.

The origin and nature of the significant made ground deposits that were brought to site as part of the levelling processes undertaken between the 1920s and the 1960s are unknown and also have the potential to pose a risk to sensitive receptors.

Dissolved-phase contamination arising from the vehicle servicing garage adjacent to the northern site boundary has the potential to affect future site users despite being slightly down gradient of the site.

4.3 Principal Ground Stability & Mining Issues

Ground stability and Coal Authority data obtained for the site does has not indicated any significant risks to the site from historical or contemporary extractive industry or ground stability hazards. Whilst mining activities have historically been undertaken near the site, the principal ground stability issues are likely to relate to the on-site made ground deposits.

The geotechnical stability of the significant made ground deposits beneath the site and their suitability for supporting traditional foundations in unknown. Slight ground subsidence is known to have occurred in the southwest site area during the 1970s. In addition, photographs taken during the installation of the southern UST indicate stability issues around the excavation area.

4.4 Preliminary Risk Assessment

Based upon the findings of the Phase I desk study, the PRA indicates:

- There is a *Moderate to High Risk* to future site users from potential site contamination.
- There is a *Moderate Risk* to surface waters and groundwater (controlled waters) from potential site contamination.
- There is a *Moderate Risk* to BBM&S from direct contact with potential site contamination.
- There is a *Moderate to High Risk* to BBM&S from ground gas & soil vapours.

Principal contamination issues are discussed in Section 4.2.

4.5 Conceptual Model Uncertainties

Following the completion of the desk study and PRA, various uncertainties have been identified in the CSM that require clarification to enable a more accurate assessment of potential risk associated with the redeveloped site use. The main uncertainties are considered to comprise:

- The thickness, origin, composition and nature of made ground across the site
- The presence and composition of superficial geological deposits across the site that may have the ability to afford some protection to the underlying Secondary A Aquifer
- The presence of organic & inorganic substances of concern within made ground, shallow & deep site soils and shallow groundwater
- The presence of potential ground gas and volatile contaminant vapour generating materials beneath the site.

The identified uncertainties have the potential to affect the risk assessment findings and any conclusions subsequently drawn.

4.6 Recommendations

Based on the findings of the Phase I desk study and preliminary risk assessment, Peak Environmental Solutions recommend that a Phase II intrusive investigation be conducted to achieve the following objectives:

- Identify & assess potentially contaminated materials in made ground, shallow & deep site soils.
- Identify & assess of potential contamination of shallow groundwater beneath the site
- Allow assessment of potential risks from ground gases.
- Allow identification of risks posed by any identified contaminants to sensitive receptors through generic quantitative risk assessment (GQRA).
- Undertake a geotechnical assessment of ground conditions beneath the site to provide for preliminary foundation design
- Undertake a preliminary assessment of the suitability and practicality of disused tankage remaining in-situ on the developed site

The development scheme for the site should include:

- Production of a Remediation and Verification Strategy to include:

  - *Discovery Strategy for use during the redevelopment should impacted made ground deposits &/or natural soils and waste deposits be encountered. The strategy should include a protocol for characterising and dealing with any encountered contamination, including liaison with SBC.*

  - *Verification Strategy for shallow soils in garden and landscaping areas against relevant human health Generic Assessment Criteria (GACs) to demonstrate that relevant substances in shallow soils in exposed soil areas do not pose an unacceptable risk to human health.*

  - *Requirements for Verification report*

- Protection measure for site services (e.g. clean service corridors) and water supply services (e.g. complying with industry best practice for site development and supply of drinking water).

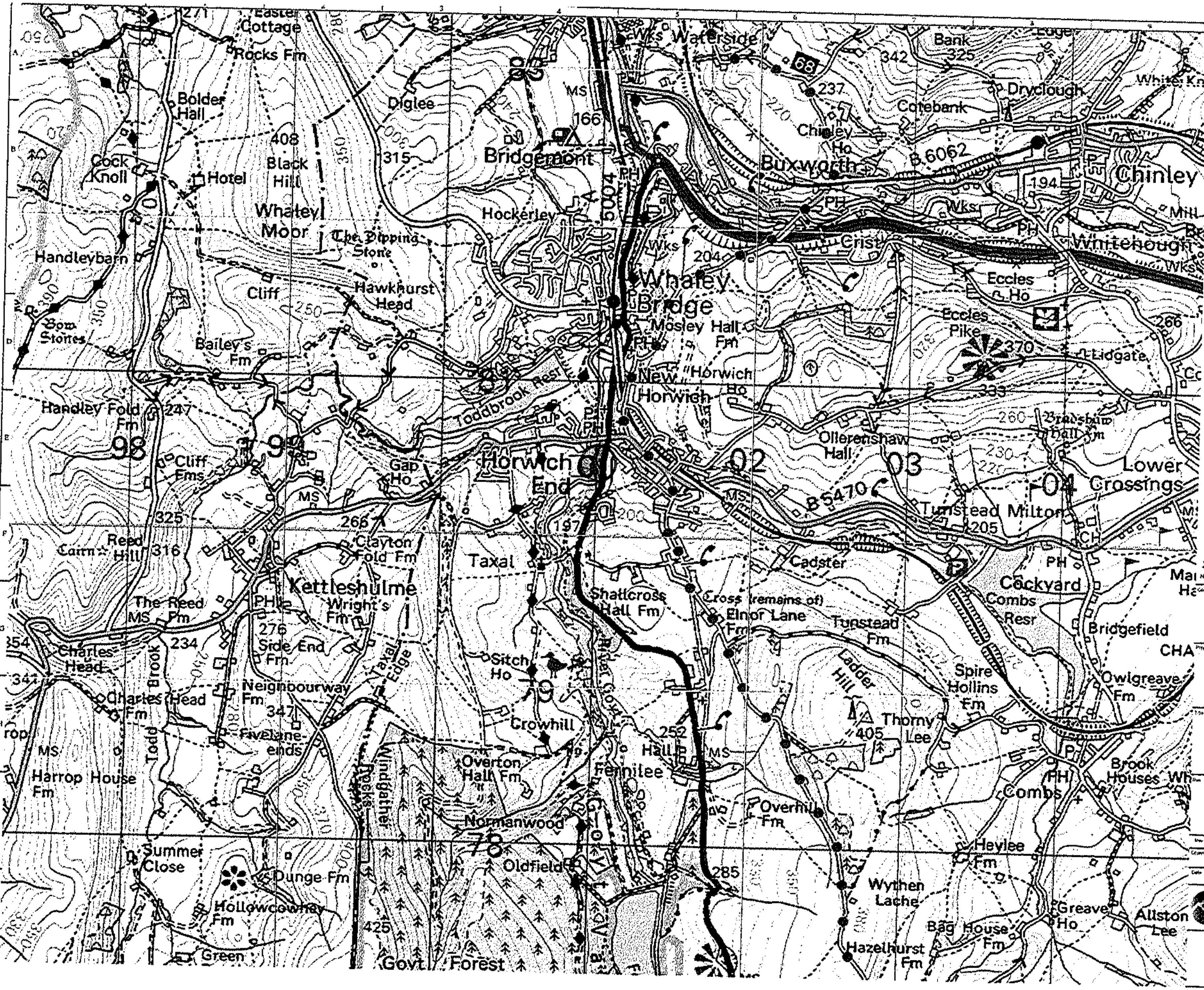
In addition to the works detailed above, the following aspects should be considered as part of the development:

- Risks posed to the site by radon emissions: we recommend liaison with building control to agree protection measures for structures.
- Risks posed by mining (site is within a Coal Authority referral zone): we recommend liaison with building control to agree if a mining risk assessment is required.
- We recommend that the presence of asbestos containing materials (ACM) within site structures be determined prior to demolition

It is assumed that these works, where deemed necessary by HPBC, would not be required to support a planning application for the site and would conditioned as part of any planning permission granted by HPBC.

5.0 ADDITIONAL REFERENCES

1. Environment Agency, 1994. CLR-2, Guidance on the Preliminary Site Inspection of Contaminated Land. Volumes 1 and 2.
2. National House Building Council (NHBC). 2000. Guidance for the Safe Development of Housing on Land Affected by Contamination. R&D P66
3. Environment Agency. 2004. Model Procedures for the Management of Land Contamination. Contaminated Land Report CLR-11
4. Department for Environment, Food & Rural Affairs (DEFRA) and the Environment Agency. 2002. Environment Agency R&D Contaminated Land Report CLR-8. Potential Contaminants for the Assessment of Land.
5. Natural Environment Research Council, 1971. Geology of the Country Around Chapel-en-le-Frith.
6. Environment Agency. 2001. Assessment and Management of Risks to Buildings, Building Materials and Services from Land Contamination. R&D P5-035/TR/01
7. Department for Communities and Local Government. 2012. National Planning Policy Framework.
8. Department for Communities and Local Government. 2012. Technical guidance to the National Planning Policy Framework.



Notes
NOT TO SCALE - DO NOT SCALE

Client
Whaley Bridge Service Station

Project
Former Garage Site, Buxton Road, Whaley Bridge Phase I

Title
Figure 1
Site Location Plan

Rev	Comment	Date

Drawn By	Authorised By	Original Scale
CT	CJD	1:25,000
Date	Date	Paper
Oct 2012	Oct 2012	A3

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LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

The Desk Study was conducted and this report has been prepared for the sole internal use and reliance of Mr Philip Johnson. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Peak Environmental Solutions limited. If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill. Findings & opinions conveyed in the services should only be used by competent persons acting on the behalf of the behalf of Mr Philip Johnson and the findings & opinions conveyed in the services should only be used for the intended use. Copyright of reports and documents remains with Peak Environmental Solutions Limited.

The findings and opinions conveyed via this Phase I Investigation Report are based on information obtained from a variety of sources, as detailed within this report, which Peak Environmental Solutions Limited believe to be reliable. Nevertheless, Peak Environmental Solutions limited cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

The report represents the findings and opinions of experienced geo-environmental consultants. Peak Environmental Solutions Limited does not provide legal advice and the advice of lawyers may also be required.

The opinions presented in this report are based on findings derived from a site inspection and walkover, obtained recorded & services, a review of provided records and historical sources. Peak Environmental Solutions Limited has found indicators that suggest that hazardous substances are present at the site at levels that may warrant mitigation or consideration appropriate to the end use stated by Mr Philip Johnson. Not finding such indicators does not mean that hazardous substances do not exist at the site.

The most recent site inspection/walkover survey was performed on 21st September 2012. Mr Philip Johnson is advised that the conditions observed by Peak Environmental Solutions limited are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance and may subsequently have become observable.

It is possible that Peak Environmental Solutions' research, while fully appropriate for the ESA, failed to indicate the existence of important information sources. Assuming such sources actually exist, their information could not have been considered in the formulation of Peak Environmental Solutions' findings and opinions.

Any interpretation of the results of the ESA have been based on the proposed site usage and the findings are not valid should the proposed land use and/or the regulatory regime/guidance change. Where interpretation is based on public domain guidance/protocols/models/software/code, Peak Environmental Solutions are not liable for errors in the guidance/protocols/models/software/code.

Peak Environmental Solutions Limited believes that providing information about limitations is essential to help Mr Philip Johnson identify and thereby manage its risks. These risks can be mitigated, but they cannot be eliminated, through additional research. Peak Environmental Solutions Limited will on request, advise Mr Philip Johnson of the additional research opportunities available, their impact on risk, and their cost.

In preparing this report, it has been assumed that all past and present occupants have provided all relevant and other information, especially relating to known or potential hazards. This report is not required to identify insufficiencies or mistakes in the information provided by the user/owner or from any other source, but has sought to compensate for these where obvious in the light of other information.

The work is also subject to Peak Environmental Solution's standard terms and conditions.