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Geo-Environmental Desk Top Study For A Proposed Development At Land off Burnside Avenue, Chapel-en-le Frith, SK23 0BA

On Behalf of Mr S. Robinson

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Report QA No. 12083
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1.0 INTRODUCTION

This report describes a Geo-Environmental Desk Top Study undertaken on behalf of Mr S. Robinson (The 'Client') on a site located on Burnside Avenue, Chapel-en-le-Frith, Derbyshire, SK23 0BA, as shown on the site location plan included in Appendix 1.

It is understood that the Client intends to redevelop the site and construct a block of apartments with associated parking area and soft landscaped areas, as shown on the proposed development layout presented in Appendix 2. This report is intended to assist in the discharge of planning conditions relating to contaminated land that require a Desk Study for the redevelopment.

The key objectives of this study are to:

- Identify potentially contaminative current and historical site uses.
- Identify potential areas of environmental liability associated with the site as a result of the ground conditions prevalent beneath the site and surrounding area.
- Identify potential constraints to redevelopment of the site due to the likely ground conditions prevalent beneath the site.

This report is based upon archival research including the analysis of historical maps, geological and hydrological data and other relevant Third Party environmental information that Peak Associates have taken to be correct, and no liability can be accepted for any inaccuracies contained within the Third Party information referenced.

This report has been produced on behalf of the Client, and no responsibility is accepted to any Third Party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Peak Associates. If any unauthorised Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

2.0 SITE DESCRIPTION

The site comprises a 0.12 Hectare, approximately triangular shaped plot of land, off Burnside Avenue, Chapel-en-le-Frith, High Peak, Derbyshire (SK23 0BA, NGR 405990, 381280), as shown on the location plan.

Photographs of the site and surrounding area are presented in Appendix 3.

The site generally comprises a small, grasses area and woodland bounded to the north and east by Burnside Avenue, to the south and west by Black Brook. A tributary of

the Black Brook, recorded on historical maps as the Smithy Brook, has its confluence with the Black Brook at the southern site boundary as shown on site location drawing 481/001A.

Beyond the site boundaries the wider area comprises residential land use to the north, east and south and some industrial buildings to the west.

The highest point on the site appears to be located in the northern corner adjacent to the back of footpath on Burnside Avenue. From this point, the ground slopes steeply down to the brook to the south west and this may present an issue for the proposed car parking in this area (6 car parking spaces), without raising levels and retaining wall construction. This essentially affects the northern corner of the site, beyond the telegraph pole (refer to Photographs 4 and 5).

The remainder of the site is lower than Burnside Avenue, but the slope from Burnside Avenue becomes less severe towards the south east, and the site is generally level towards the brook. However, there is a steep bank down to the brook through the mature trees that line the bank of the Black Brook within the site boundary (Photographs 4, 5 and 7). The wooden telegraph pole is located within the northern part of the site (Photographs 4 and 5).

A small pit to 0.4m below ground level was dug by Peak Associates member of staff during the site walkover. A clayey topsoil was encountered, extending to a depth of 0.1m bgl, overlying made ground consisting of sandstone cobbles, brick and glass fragments in a clay matrix.

3.0 SITE HISTORY

A review of the site history has been undertaken in order to identify any previous potentially significantly contaminative uses, located either on-site, or in the surrounding area.

Potential on-site contamination sources may present a risk to future users of the site, and also off-site receptors, potentially including controlled waters.

Neighbouring potentially contaminative activities may present a risk to the site through on site migration of contamination, or through the deposition of waste materials on the site.

The history of the site is recorded over selected periods by inspected maps, copies of which are presented in Appendix ‘4’. The account presented below in Table 3.1 over page is restricted by specific time periods represented by these maps only.

Table 3.1 Historical mapping summary table

Dates	On Site Use	Off-Site Uses	Potential For Contamination To Affect The Site
1880	The site appears to be within a rural setting. The most southerly corner of the site comprises the confluence of two brooks: Black Brook and Smithy Brook.	There are two mills within 250m of the site. 'Bowdenhay Mill' to the east (which produced wadding) with an associated mill race and sluice; and 'New Hyde Mill' to the south which spun cotton. The Peak Forest Tramway runs from north west to south east and bypasses the site approximately 50m north east of the site. A gas works is shown approximately 150m south of the site. The wider area comprises fields with a small collection of residential properties near to the gas works approximately 100m south and 75m north west.	None anticipated
1882-1883	No significant development shown	An Iron foundry and forge is located approximately 600m south east of the site. A railway line runs north to south approximately 400m west of the site.	None anticipated
1898	No significant development shown	No significant development shown	None anticipated
1899	No significant development shown	No significant development shown	None anticipated
1921	No significant development shown	Some additional residential properties are now present in the wider area.	None anticipated
1923-1924	No significant development shown	No significant development shown	None anticipated
1938	No significant development shown	Sovereign Mills (Brake & Clutch & Co.) is now located 100m south west of the site and comprises a large industrial complex including a number of buildings. Additional residential development has taken place in the area south of the site. The Peak Forrest Tramway now appears dismantled.	None anticipated
1948 (Partial)	No significant development shown	No significant development shown	None anticipated
1955	No significant development shown	An electrical substation is now shown 20m south of the site.	None anticipated
1969	No significant development shown	Expansion of the Sovereign Mill complex has taken place to the west and north west of the site including changes to the road layout of Hayfield road. An electric telegraph pylon in now positioned approximately 20m north of the site and an above ground electricity line crosses from west to east approximately 20-50m north of the site.	None anticipated
1974-1991 (Partial)	No significant development shown	No significant development shown	None anticipated
1978-1984	A footpath or access road way is now shown around the southern and western sides of the site.	No significant development shown	None anticipated

1988-1989	No significant development shown	'Works' are shown approximately 70m east of the site and 100m north of the site. The nature of these is not indicated on the plans.	None anticipated
1991-1992	No significant development shown	No significant development shown	None anticipated
1993	No significant development shown	No significant development shown	None anticipated
1994 (Partial)	Site not shown	No significant development shown	None anticipated
1995 (Partial)	Site not shown	No significant development shown	None anticipated
1996 (Partial)	Site not shown	No significant development shown	None anticipated
2006	No significant development shown	The land immediately north and east of the site has been developed with residential properties.	None anticipated
2012	No significant development shown	No significant development shown	None anticipated

In summary, the Ordnance Survey historical mapping reveals no potentially contaminative industrial activities having been undertaken on the site, itself. However during the site walkover Peak Associates staff dug a small inspection pit (hand dug pit), which comprised a made ground of clayey soil including fragments of brick and glass at a depth of 0.1m bgl. This suggests that some importation of soils to the site has been undertaken.

The large Sovereign Mill works 100m to the south west of the site produced brake and clutch linings which would have likely produced asbestos containing dusts. Given the prevailing wind direction and distance to the site, it is possible that historically such dusts could have conceivably escaped and deposited asbestos on the surrounding land. It is noted that residential development has been undertaken in the area adjacent to the site in recent years and this is likely to have been given some consideration by the Local Authority and it is recommended that this potential issue is discussed with thte Local Authority Environmental Health Officer to establish if they consider the Sovereign Mill operations to have presented a risk from asbestos dust escape in the past and whether any investigation is necessary in relation to the proposed development.

4.0 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

The Geological Report within the Landmark EnviroCheck Report in Appendix 5 shows that there is no record of made ground beneath the site or in the surrounding areas.

Superficial deposits beneath the site are shown to comprise alluvial deposits. The wider area predominantly comprises glacial till.

The bedrock beneath the site is recorded to belong to the Namurian Millstone Grit Series. The wider area is shown to be underlain by Millstone Grit Series, Shale Grit Series and Kinderscout Grit Series strata.

A fault within the bedrock geology is recorded to pass through the most southern part of the site within the Millstone Grit trending north west to south east. This fault also

extends north west through the Kinderscout Grit series and south east into the Shale Grit series.

The site is within a lower probability radon risk area as less than 1% of homes are above the action level therefore no radon protective measures are reported to be necessary.

The site is recorded to be within an area that might not be affected by coal mining and the risk of non-coal mining activities is recorded as highly unlikely and rare.

The site is not shown to lie within an area affected by historical underground features derived from the historical mapping.

The potential for ground dissolution is recorded as 'no hazard' in the Envirocheck report.

The potential for collapsible ground stability or ground collapsibility hazards on the site is recorded as 'no hazard'.

The potential for compressible ground stability hazards on the site is recorded as 'moderate'. Running sands stability hazards on and around the site are recorded as 'low'.

Potential for landslide ground stability hazards are recorded as 'very low'.

The potential for shrinking or swelling clay ground stability on the site are recorded as 'very low'.

The superficial deposits and bedrock strata beneath the site are classified as a 'Secondary A' aquifer.

The site is not shown to be located within a groundwater abstraction source protection zone.

The groundwater vulnerability at the site is classified as 'Low' (L). The soil is recorded as soils in which pollutants are unlikely to penetrate the soil layer because water movement is largely horizontal or they have large ability to attenuate diffuse pollutants.

There is one groundwater water and five surface water abstraction licenses within 1000m of the site. The groundwater abstraction licence is recorded to be operated by Ferodo Ltd, 114m south west of the site, with the abstraction used for cooling and manufacturing.

A surface water abstraction licence is held by Sam Longson Ltd 526m south east of the site however the location of the abstraction is recorded as 'Borehole At Premises' suggesting that this may in fact be a groundwater abstraction.

There are two surface water abstractions from the Black Brook 540m north west of the site, one from Hall Ford Brook 602m north of the site and one from a reservoir 904m north west of the site.

There is river quality data for the nearest surface water course (Black Brook), recorded 23m north east of the site which is graded 'C' in 2000 indicating a moderate to good standard of river quality. The results are graded from A ('Very Good') to F ('Bad').

5.0 KEY ENVIRONMENTAL CONSIDERATIONS

The Landmark Envirocheck report presented in Appendix 5 contains a summary of statutory data held on public registers, identifying potential sources of contamination surrounding the site, and also environmentally sensitive sites/receptors within the vicinity of the site. The most salient information is summarised below:

Environmental Permits, Incidents and Registers

There is one discharge consents within 500m of the site located 219m north of the site operated by United Utilities Plc. discharging storm sewage overflow into the Black Brook.

There are three Integrated Pollution Prevention and Controls (IPPCs) in place within 500m of the site all registered to Federal Mogul Friction Products Ltd 242m north west of the site for processes involving asbestos within the mineral industry, the use of inorganic chemicals and solvent emissions. It is also recorded that Federal Mogul Friction Products used to have Integrated Pollution Controls (IPCs) registered for similar activities however these permits are now all revoked or superseded by the IPPCs detailed above.

There are two Local Authority Pollution Prevention and Controls in place within 500m of the site. One at Moss View Service Station 399m south of the site and the other at Town End Motors 423m south east of the site.

Seventeen pollution incidents to controlled waters are recorded by the Environment Agency within 500m of the site the closest of which is 13m north of the site in 1997 where a road traffic accident is recorded have caused a spill of petrol/oils to be released into Black Brook causing a category 3 –(Minor Incident) pollution incident. The majority of incidents are recorded as category 3 –(Minor Incident) and are not considered likely to impact the site. The category 2 -(Significant Incidents) are detailed below.

- An oil release, details not specified, to Black Brook is recorded 181m south east of the site in 1992 no further details area given.
- A miscellaneous pollutant release to the Black Brook is recorded 205m north west of the site in 1997 no further details area given.
- An unknown sewage release to the Black Brook is recorded 462m south east of the site in 1993 no further details area given.

Two prosecutions relating to an authorised process are recorded one 65m south of the site relating to the loss of a radioactive source after it became dislodged from its lead shielding in 1999. The other is recorded 148m south east of the site for failure to ensure that a competent person and failure to prevent loss of registered source in 1999, this is assumed to be related to the previous prosecution.

There are no COMAH, NIHHS (notification of installations handling hazardous substances), Explosive sites or planning hazardous substances consents of enforcements reported in the Envirocheck search data.

Landfills and Other Waste Sites

There is one historical landfill site within 250m of the site at recorded as land off the A6, 233m north east of the site specified wastes include household. A Local Authority Recorded Landfill is also recorded 226m north east of the site, specified wastes include domestic. It is considered likely but not confirmed that these are the same site.

One licensed waste management facility is located within 101m of the site off Hayfield Road registered to Federal Mogul Friction Products. This licence is recorded to be surrendered.

One registered waste treatment or disposal site is registered to Ferodo Ltd, Hayfield Road, Chapel-en-le-Frith, authorised wastes include asbestos, drummed liquid from Ferodo Ltd only and solid resin distill. from Ferodo Ltd only.

High Peak Borough Council provided landfill data and Derbyshire County Council reported that all their data relating to landfills had been passed to the Environment Agency and therefore would be incorporated into their reports.

Current Land Uses

There are twenty six recorded current industrial activities within 500m of the site however there none are considered to be close enough to be causing a contaminative impact to the site that requires consideration in relation to the proposed development.

Flooding

The southern and western site boundary is located adjacent to the Black Brook and the confluence of the Smithy Brook with the Black Brook and part of the site along these boundaries appears to be on an Environment Agency indicative Zone 2 or Zone 3 floodplain which indicates extreme flooding rom rivers or sea without defences.

The site is not located within a flood storage area or benefits from flood defences.

Designated Environmentally Sensitive Sites

The site is not located 490m north west of an area of adopted green belt but is not within 500m of any other environmentally sensitive sites.

6.0 PRELIMINARY CONCEPTUAL SITE MODEL

6.1 Introduction

A **Site Conceptual Model** is a simplified representation of the ground conditions beneath the site that enables a quantitative risk assessment to be carried out. The Site Conceptual Model identifies the potential sources of contamination, the potential contaminant migration pathways and the potential receptors of contamination.

Sources of contamination include contaminating current or historical uses, activities, events or substances at the site or within the surrounding area that may impact on underlying soils or groundwater.

Contaminant Migration Pathways are the routes that contaminants follow from sources to receptors.

Receptors of contamination include human and non-human organisms, controlled waters (groundwater or surface water) and building materials (concrete or plastic) that experience adverse effects on exposure to contaminated materials.

A **Pollutant Linkage** occurs when a contaminant is able to travel from a source, via a pathway, to a receptor. Each element may exist in isolation and pose no environmental risk. It is only when all three elements are linked to each other that a pollutant linkage exists, and poses an environmental risk.

6.2 Potential Sources of Contamination

Potential on-site contamination sources may present risks to human health and/or controlled waters (groundwater and surface water) at the site and/or through cross boundary migration of contamination off the site.

Potential off-site contamination sources may present similar risks through cross boundary migration of contamination onto the site.

The following potentially significant on-site sources of contamination have been identified:

- Possible made ground identified on the site in the near surface soils during the site walkover. This may be foundation arisings from the nearby housing development off Burnside Avenue or waste from one of the surrounding industrial operations.
- Natural alluvial deposits beneath the site are a potential source of ground gases such as methane and carbon dioxide.

Adjacent properties or surrounding properties or activities considered to have the potential to cause significant contamination, now or in the past includes: -

- A historic and local authority recorded landfill is recorded 226m north of the site which is recorded to contain wastes (domestic) that can potentially cause landfill or ground gas.
- The Sovereign Mills Brake and Clutch Works 100m south west of the site, which may potentially have released asbestos containing dusts in the past.

6.3 Potential Contaminant Migration Pathways

Contaminants in soil, if present, may be ingested directly (accidently or on purpose), or through soil attached to home grown vegetables. The dust derived from the contaminated soil may be inhaled, and the soil can enter the body through direct skin contact. In addition, the consumption of home grown vegetables can lead to ingestion of contaminants taken up by the vegetables.

Ground gases can migrate through permeable strata and enter buildings collecting in poorly ventilated voids and creating potentially toxic, explosive or asphyxiating atmospheres.

6.4 Potential Receptors of Contamination

The following potential human health and environmental receptors have been identified:

- Future site users i.e. residents of the new development.
- Construction workers

The significance of the above potential pollutant linkages is discussed in further detail below in Section 7.0 of this report.

7.0 ENVIRONMENTAL CONSIDERATIONS

With the exception of a historic landfill located 233m north of the site and a local authority recorded landfill located 226m north of the site (which are likely to be the same site), neither the historical mapping nor the environmental data provided by Landmark show evidence of any current or historical potentially contaminative activity on the site which may have impacted the soils beneath the site. .

There has been industrial activity in the area, but there is no reason to suspect widespread deposition of wastes associated with these industries on the site. However, the Sovereign Mills works to the south west is likely to have used asbestos containing materials in the production of brake linings and the current operator (Federal Mogul Friction Products Ltd) currently holds three Integrated Pollution Prevention and Controls (IPPCs) for processes involving asbestos within the mineral industry. However, under the IPPC emissions should be tightly controlled, hence the risk is considered to result from pre-IPPC, historic operations.

Both of the recorded landfills are reported to have received domestic or household waste. No information is reported for either landfill regarding their current

operational status or closure date, however the historic landfill is assumed to be closed.

If the landfills have not been operational (receiving waste) for a significant amount of time e.g. circa 50 years or more it is likely that they are no longer generating sufficient volumes of landfill gas to cause a significant risk to the proposed development site.

Further details of the landfills including the last date of tipping should be requested from the local authority in order to fully assess any potential risk of ground gas from the landfill.

It is also noted that the land surrounding the proposed development has been recently developed for residential land use. It may also be helpful to request any ground gas monitoring or data relating the gas protection installed in the residential properties along Burnside Avenue adjacent to the site.

In addition the site is located on natural alluvium which presents a low level of risk from ground gases such as methane and carbon dioxide generated by degrading organic matter deposited within the silts and sediments that make up alluvial deposits.

In order to address both of these issues it may be prudent to include basic gas protection with in the building design including a ventilated sub-floor void and gas resistant membrane. However, it is likely that the Local Authority may still require gas monitoring for landfill type gases (methane and carbon dioxide) associated with the former landfill and the alluvial deposits beneath the site to confirm that basic landfill gas protection measures are appropriate.

Shallow made ground was encountered in an excavation made by hand digging during the site walkover, which extends to a depth of 0.4m below ground level, and consists of a clayey sub soil including occasional fragments of brick and glass. It is possible that the soil, brick and glass may be wastes from left over from the construction of the adjacent housing estate, and is essentially inert.

However, it would be prudent to undertake an inspection the soils across the site to confirm that any made ground is free of contamination based on visual or olfactory examination and afford the opportunity to collect and test samples should any potentially made ground be encountered

8.0 PRELIMINARY GEOTECHNICAL OBSERVATIONS

The strength and compressibility of the alluvial soils beneath the site should be taken into account in relation to the design of foundations. Such deposits may to too soft and deep for traditional strip footings.

These soils are also likely to be shrinkable and hence the depth of foundations should also take into account the presence of trees and other significant vegetation (either existing to remain, or existing vegetation to be removed).
The change in levels from Burnside Avenue onto the site and from the site down to the brook, particularly in the north western corner of the site, should be given careful consideration in relation to the proposed development layout, as retaining structures may be required to accommodate the current change in levels across the site. Flood levels may also result in the need to raise site levels, and it is understood a flood risk assessment has been commissioned.

An intrusive geotechnical investigation is recommended to enable foundation and road pavement design and construction, establish groundwater levels, likely stability of excavations and potential for soakaways to provide a solution for storm water drainage.

The investigation would also afford the opportunity to examine the made ground and sub-soils for evidence of potential contamination, and recover some near surface samples from areas of proposed soft landscaping to test for fibrous materials including asbestos containing material.

9.0 RECOMMENDATIONS

The following works are recommended for the site prior to any future site development:

i. Undertake an intrusive investigation of the soils to determine the nature of any made ground in relation to potential contamination. Should made ground be encountered that is potentially contaminated these soils should be tested for a suite of contaminants including heavy metals, hydrocarbons, polyaromatic hydrocarbons and fibrous materials which includes asbestos containing materials.

ii. Sample and test near surface soils within the proposed soft landscaped areas for fiberous materials including asbestos containing materials (wind blown dust historically deposited from the adjacent Sovereign Mills).

iii. Carry out further enquiries to the Local Authority regarding the active status of the recorded landfills north of the site, to assess the potential risk to the development from ground gas, and in relation to the potential risk from asbestos fibres associated with the historic operation of the Sovereign Mills site to the south west of the site.

iv. Should it be agreed that the risk of ground gas from the recorded landfills north of the site and from the alluvial deposits beneath the site is low, it may be possible to agree to install basic gas protection measures within the building foundation design, including essentially a ventilated sub floor void and gas resistant membrane. However, the Local Authority may insist on some level of confirmatory monitoring.

v. Submission of this report to the Local Authority Planning Officer and Environmental Health Officer for approval.

vi. Undertake geotechnical investigations to establish the bearing capacity of the ground for foundations, to establish groundwater levels and confirm the stability of excavations.

vii. Establish if existing trees and vegetation may impact on proposed foundations or if future foundation construction may impact on any existing trees and vegetation.

It is understood that a flood risk assessment has been commissioned.

APPENDIX 1
Site Location Plan

APPENDIX 2
Architect's Proposed Development Layout

APPENDIX 3
Photographs

APPENDIX 4
Historical Ordnance Survey Plans
Landmark Envirocheck Report

APPENDIX 5
Environmental Data Sheets
Landmark Envirocheck Report