

Appendix B  
Coal Mining Report

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By

David Bellis  
CONSULTING SURVEYORS

## Coal Mining Search Report

Incorporating Cheshire Brine Enquiries



David Bellis Consulting Surveyors Ltd. – Registered in England no. 5034580  
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**Serial Number 322234**

**Client detail :**

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Search produced by M J Peace

**Property details:**

Field Head  
Shepley  
Huddersfield  
HD8 8DR

**Your ref :** B20651

**Purchaser :**

**Vendor :**

**In accordance with your instructions received 07 Jul 2015 we have inspected plans and records of coal mine workings and have made enquiries with respect to Cheshire brine extraction in relation to the above property and can report as follows :**

- 1. SEAM DETAILS FOR PAST UNDERGROUND COAL MINING :** In relation to the property the undermentioned seam(s) have been worked within the likely zone of physical influence on the surface.

Seam	Depth (m)	Sect (cm)	Date	Remarks
See Remarks				No previous recorded coal workings

- 2. SEAM DETAILS FOR CURRENT AND FUTURE UNDERGROUND COAL MINING :** The undermentioned seam(s) are currently being worked, or licenses to work are being determined, or have been granted to work, within the likely zone of physical influence on the surface in relation to the property.

Seam	Depth (m)	Sect (cm)	Date	Remarks
				Coal in reserve - no workings currently planned.

**3. UNDERLYING GEOLOGY :**

The property is situated in an area of Sandstone over Middle Coal Measures, shales and mudstones.

**4. OPENCAST COAL MINING :**

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Past Opencast Workings : The property is not situated within the boundary of a former opencast coal mining site.

Present Opencast Workings : The property is not situated within 200m of the boundary of a currently operating opencast coal mining site.

Future Opencast Workings : The property is not situated within 800m of the boundary of an opencast site for which a license to extract coal by opencast methods has been granted or a license to do so is currently being determined.

**5. SHAFTS, ADITS (MINE ENTRIES) AND ADDITIONAL INFORMATION :**

We have no knowledge of any shafts or adits within 20 metres of the property or the boundary of the property.

There are no tips or lagoons in the vicinity of the property.

**6. NOTICES IN RELATION TO FUTURE COAL MINING ACTIVITY :**

We have no knowledge of any intention to work coal by underground methods within influencing distance on the surface in the vicinity of the property for which notices have been issued under the Coal Mining Subsidence Act 1991.

**7. PAST COAL MINING RELATED SUBSIDENCE :**

Our investigations have shown no evidence of coal mining related subsidence claims in relation to the property in the past 10 years.

**8. CONCLUSION (COAL MINING) : In the light of the above facts we conclude that in relation to coal mining :**

In our opinion it is unlikely that coal will be worked in the foreseeable future.

**COAL MINING RISK LEVEL : We recommend that the transaction is treated as :**

Where this report is to be used for development purposes particular attention is drawn to the paragraphs below concerning the ownership of in situ coal, coal workings and the risks from mine gases.

**Please note that the overall coal mining risk level above is based upon an assessment of the detailed information contained in the body of the report. The risk assessment must be used in conjunction with the detailed report.**

**If development of the property is being considered then all necessary enquiries and investigations should be completed prior to the commencement of works to ensure that proposals follow good engineering practice for development in mining areas. The Coal Authority has ownership of in situ coal, coal mines (both current and disused) and coal mine shafts and adits. Activities that intersect, enter or disturb any of the Coal Authority's interests require the written permission of the Authority.**

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**Any development proposals should consider risks to the development, or adjacent property, of generating or displacing underground gases where coal seams or former mining works are disturbed. The need for effective measures to prevent gasses entering public properties should be assessed and properly addressed. These actions are necessary due to the public safety implications of development in these circumstances.**

#### **CHESHIRE BRINE EXTRACTION INFORMATION :**

The property lies outside the Cheshire Brine Compensation District as prescribed by the Cheshire Brine Pumping (Compensation for Subsidence) Act 1952.

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With respect to coal mining there is nothing to prevent a claim being made under the provisions of the Coal Mining Subsidence Act 1991 and subsequent legislation, but it must not be inferred that the Coal Authority or their licensees will necessarily accept that any damage has been caused as a result of mining subsidence.

If you require any further information or amplification please contact CoalSearchPlus+ on 01423 529911 or via our website [www.coalsearch.plus.com](http://www.coalsearch.plus.com).

This report is prepared in accordance with the CoalSearchPlus+ terms and conditions as published on the CoalSearchPlus+ website ([www.coalsearch.plus.com](http://www.coalsearch.plus.com)) on the date of issue of this report.

This is a Coal Mining Search Report and is not to be interpreted as being part of an Environmental Assessment of the property.

We cannot be held responsible for the accuracy of the information provided to us by third party organisations.

The information and/or material supplied is composed from data based in many cases on measurements and records of various standards of reliability and age. We cannot be held responsible for the accuracy of such information.

This search report is based upon the privately owned CoalSearchPlus+ mining record database and plans and records publicly available at the time of inspection from the Coal Authority, including British Geological Survey and Ordnance Survey data. Organisations reserve the right to vary their proposals and intentions as to their future mining operations without prior notice save as provided in the Coal Mining (subsidence) Act 1991 and the Coal Industry Act 1994.

Coal Authority Address : The Coal Authority, 200 Lichfield Lane Berry Hill, Mansfield, Nottinghamshire, HG18 4RG  
British Geological Survey Address : British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham NG12 5GG

The information contained in this report relates to the property address given by the individual or organisation ordering the report. Where a plan indicating the property location and boundary is supplied with the instruction the report is based on that information. Where no plan is supplied the report is based on the property location as defined in publicly available mapping data. At all times it remains the responsibility of the instructing organisation or individual to define the boundary of the property.

#### **Additional notes applicable to Residential Coal Mining Reports only :**

David Bellis Consulting Surveyors Ltd is not aware of any personal or business relationship between the person conducting or preparing the search and any person involved in the sale of the property.

This report is a desk study of existing published geological and coal mining records and the CoalSearchPlus+ coal mining database. In order to compile this report enquiries have been made relating to the following :

**Past Coal Mining** – the existence of any previously worked seams of coal within influencing distance on the surface in relation to the property including an indication of the location, depth and age of the workings,

**Present Coal Mining** - the existence of any currently worked seams of coal within influencing distance on the surface in relation to the property including an indication of the location, depth and age of the workings. The existence of coal that could be worked at some time in the future will be enquired into and detail of any relevant licenses disclosed where available.

**Underlying Geology** - the underlying geology of the property will be reviewed and briefly described in relation to coal mining.

**Opencast Coal Mining** - the existence of past present and future opencast coal mining, specifically :

- if the property is situated within the boundary of a former opencast site. In the case of old opencast workings it must be understood that records are often unclear regarding the site boundary and/or worked areas. Published records will be reviewed to give our opinion of the existence of relevant former opencast coal workings.
- if the property is situated within 200m of the boundary of a currently operating opencast site.

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- if the property is situated within 800m of the boundary of an opencast for which either a license to extract coal by opencast methods has been granted or a license to do so is currently being determined.

Shafts, Adits (Mine Entries) and Additional Information – the existence of any mine entries within 20m of the property or the boundary of the property and its associated land and buildings (the definition of the boundary of the property is the responsibility of the individual or organisation ordering this report). Where a mine entry is found to exist the approximate location of the mine entry will be indicated on a plan to be provided by the instructing organisation or individual. The existence of unworked coal will be enquired into and our opinion regarding the likelihood of it being worked at some time in the past will be given where relevant. Any other relevant coal mining related features discovered will be noted.

Notices in relation to future coal mining activity – the existence of notices indicating an intention to work coal by underground methods in the future.

Past coal mining related subsidence – if any publicly available records indicate coal mining related subsidence affecting the property in the past 10 years.

Coal Mining Risk Level – the opinion of David Bellis Consulting Surveyors of the risk posed to the property from coal mining given all the information contained in the report. The risk to the property is given in relation to the majority of the housing stock in the immediate area.

Cheshire Brine – the location of the property in relation to the Cheshire Brine Compensation District and any relevant information to the property regarding brine extraction.

Additional information, including answers to many frequently asked questions, can be found on the CoalSearchPlus+ website, [www.coalsearch.plus.com](http://www.coalsearch.plus.com)

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If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs):

Tel: 01722 333306, E-mail: [admin@tpos.co.uk](mailto:admin@tpos.co.uk)

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision.

Complaints should be sent to:

Mr M. Peace, Director, David Bellis Consulting Surveyors Ltd, 8 Morningson Terrace, Harrogate, North Yorkshire, HG1 5DH  
Tel : 01423 529911 Fax : 01423 529922 Email : [contact@coalsearch.plus.com](mailto:contact@coalsearch.plus.com)

Date : 10 Jul 2015

Signed :

**Serial Number 322234****Important Consumer Protection Information**

This search has been produced by David Bellis Consulting Surveyors Ltd, 8 Mornington Terrace, Harrogate, HG1 5DH (T: 01423 529911, F: 01423 529922, E: [contact@coalsearch.plus.com](mailto:contact@coalsearch.plus.com)) which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered firms maintain compliance with the Code.

**The Search Code:**

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- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

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- Conduct business in an honest, fair and professional manner.
- Handle complaints speedily and fairly.
- Ensure that all search services comply with the law, registration rules and standards.
- Monitor their compliance with the Code.

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**TPOs Contact Details:**

The Property Ombudsman scheme  
Milford House  
43-55 Milford Street  
Salisbury  
Wiltshire SP1 2BP  
Tel: 01722 333306  
Fax: 01722 332296  
Email: [admin@tpos.co.uk](mailto:admin@tpos.co.uk)

You can get more information about the PCCB from [www.propertycodes.org.uk](http://www.propertycodes.org.uk).

**PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE**

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  - c) The Third Party Provider is any Organisation from which the Service Provider obtains data and/or information on behalf of the Applicant in the normal course of fulfilling the Applicants Request.
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**Issue Record**

Job Number: B20651

Prepared By:

Ben Jagger  
MEng (Hons)  
Engineer

Checked By:

Stuart Evans  
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Senior Partner

Date: 24 July 2015

Revision	Change Overview	Reason for Change	Date

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**APPENDICES**

Appendix 1	ENVIROCHECK REPORT
Appendix 2	COAL MINING REPORT

## **DESK TOP STUDY REPORT**

**B20651: Field Head, Shepley, Huddersfield, West Yorkshire, HD8 8DR**

### **1 INTRODUCTION**

This report is required to accompany a Planning Application for a residential development of the above site.

#### **1.1 Sources of Information**

Information on the above site has been obtained from a full Envirocheck Report centred on the site, examination of all the currently available historic maps of the site, examination of the 1:50,000 British Geological Survey map of the area, Mining Report and a walkover survey.

### **2 THE SITE**

The site is a rectangular plot of land directly adjacent to Field Head Road just north of the centre of the village of Shepley outside Huddersfield, and is an area of adopted green belt land. It is approximately 2400m<sup>2</sup> in area (0.24Ha). The site is currently green field and for the most part is unoccupied with the exception of a shed along it's north-west boundary.

#### **2.1 Present Land Use/Walk Over Survey/Trees**

The site is on Field Head Road opposite Field Way Road. The site was inspected on Friday 17<sup>th</sup> July 2015 and the following observations were made.

Existing buildings on the site comprise of 3 No. wooden sheds in disrepair. Two of the sheds are located along the north west boundary. Whilst the third shed is located in the south eastern corner of the site. See Figures 4 to 6.

Site is overgrown and numerous trees are located on site including a row of trees and bushes bordering the north east boundary.

There is also a large amount of fly-tipped waste on the site in a variety ranging from a car bonnet to a bath tub to a large number of tyres. See Figures 7 to 9.

The site is surrounded by a stone wall to the south west and north west, trees to the north east and a wooden fence around the remainder. Residential housing is adjacent on two sides with a field to the north east and the road to the south west.



**Figure 1: Site Layout.**



**Figure 2: Overview of site from Field Head road.**



**Figure 3: Overgrown bushes, western corner.**



**Figure 4: Small dilapidated shed, south east corner.**



**Figure 5: 2 No. dilapidated shed, north west boundary.**



**Figure 6: Larger of two sheds on north west boundary.**



**Figure 7: Assorted refuse dumped in southern corner.**



**Figure 8: Car bonnet, timber and tyres in southern corner of site.**



**Figure 9: Tyres, bathtub and other objects dumped adjacent to the larger shed on north west boundary.**



**Figure 10: View towards the north west boundary.**



**Figure 11: Tree located close to south west corner of the site.**



**Figure 12: Trees in north corner of site and along north east boundary.**

### 3 SITE HISTORY

Examination of the published Ordnance Survey maps of the area revealed the following:

Map		Features	
Year	Scale	On Site	Off Site
1851-1854	1:10,560	Site is a field bordered by Field Head Road to the SW and fields on remaining boundaries.	Farm and house adjacent to site. Houses to S&E with fields and woods to N&W. Train line 300m to N and Shepley Station 350m NE.
1893	1:2,500	No Change.	No Change.
1894	1:10,560	No Change.	Reservoir 900m SSE. Saw mill 450m NE with Victoria Mills and Reservoir 400m SE. Gas works 450m E.
1906	1:2,500	No Change.	No Change
1907-1908	1:10,560	No Change.	Saw mill 370m E. Reservoir and Sewage works 750m SSE.
1916	1:2,500	No Change.	Residences adjacent to Site.
1932-1933	1:10,560	No Change.	Gas works no longer shown. Increase in residences in Shepley village to S of Site. Sewer works 1000m NNW.
1948	1:10,560	No Change.	No Change.
1958	1:10,000	No Change.	No Change.
1960	1:2,500	No Change.	No Change.
1967-1968	1:10,000	No Change.	Quarry 800m N.
1969-1976	1:2,500	No Change.	Residences adjacent to Shepley and Shelley Station.
1970-1979	1:10,000	No Change.	Quarry notes as disused.
1975	1:2,500	No Change.	No Change.
1978-1987	1:2,500	No Change.	No Change.
1980-1985	1:10,000	No Change.	Greater number of residence in Shepley village.
1984	1:2,500	No Change.	No Change.
1992	1:2,500	No Change.	No Change.
1992-1993	1:10,000	No Change.	No Change.
1994	1:2,500	No Change.	No Change.
1996	1:2,500	No Change.	No Change.
2006	1:10,000	No Change.	No Change.
2015	1:10,000	No Change.	No Change.

#### 3.1 Site History Summary

The historic map study shows that the site has been an unoccupied green field since 1851. The surrounding area has developed and steadily become more populated as shown by the increase in residential housing in and around Shepley and Shelley. However, land to the north and west of the site has also remained green field.

## **4 GEOLOGY, HYDROLOGY AND HYDROGEOLOGY**

### **4.1 Geology**

Examination of the British Geological Survey map of the area indicates that the site is situated on an area of Grenoside Sandstone.

### **4.2 Mining History**

A Mining Report for the area was obtained and this states that there are no coal workings under the site in the likely zone of physical influence on the surface.

The property is **not** situated within the boundary of a former opencast coal mining site, within 200m of a currently operating opencast coal mining site or 800m of the boundary of a future opencast coal mining site.

There is no knowledge of any shafts or adits within 20m of the site and no evidence of coal mining related subsidence claims in relation to the property in the past 10 years.

### **4.3 Hydrology /Hydrogeology**

The Environment Agency ground water vulnerability map records the bedrocks in this area to be a Secondary A Aquifer.

The Environment Agency define a 'Secondary A Aquifer as

'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'

The nearest surface water feature is 137m south-east of the site and is a secondary river.

The nearest water abstraction licence is 421m to the south-east of the site at Eastfield Mills and is used for bottling of the water for food and drink purposes.

### **4.4 Soil Chemistry**

British Geological Survey (BGS) soil chemistry data sheets were obtained which present information on the topsoil concentration of five potentially harmful elements (PHEs) which under certain circumstances can pose a significant health risk to plants, animals and humans.

#### **4.4.1 Arsenic**

The estimated Arsenic values for the site are 25-35mg/kg. The recommended Soil Guideline Value (SGV) for residential end use is 32mg/kg. Soil chemical testing will determine the risk (if any) of Arsenic contamination.

#### **4.4.2 Cadmium**

The estimated Cadmium values for the site are <1.8mg/kg. The recommended Soil Guideline Value (SGV) for residential end use is 10mg/kg.

#### **4.4.3 Chromium**

The estimated Chromium values for the site are 60-90mg/kg. The recommended Soil Guideline Value (SGV) for residential end use is 200mg/kg.

#### **4.4.4 Lead**

The estimated Lead values for the site are <150mg/kg. The recommended Soil Guideline Value (SGV) for residential end use is 450mg/kg.

#### **4.4.5 Nickel**

The estimated Nickel values for the site are 15-30mg/kg. The recommended Soil Guideline Value (SGV) for residential end use is 130mg/kg.

### **5 INFORMATION HELD BY STATUTORY AUTHORITIES**

This section details any relevant information held in the registers maintained by statutory bodies as identified in the Envirocheck Report.

#### **5.1 Landfill Sites**

There is one historical landfill site 587m east of the site for deposited waste including inert and industrial waste.

#### **5.2 Waste Management Facilities**

There are no waste management facilities within 2000m of the site.

#### **5.3 Contaminated Land Register Entries and Notices**

The Envirocheck Report does not identify any Contaminated Land Register Entries and Notices within 2000m of the site.

#### **5.4 Local Authority Pollution Prevention and Controls**

There is one Local Authority Pollution Prevention and Control 384m east of the site. This is an air pollution control on Shepley Coach Works at Abbey Road in Shepley, for the specific action of respraying vehicles. Due to the distance from site, and circumstances to which the control is applied, contaminants are unlikely to reach the site.

#### **5.5 Integrated Pollution Control (IPC) Authorisations**

There are no Integrated Pollution Control (IPC) Authorisations within 2000m of the site.

#### **5.6 Integrated Pollution Prevention and Control Permits (IPPC)**

There are no Pollution Prevention and Control Permits (IPPC) within 2000m of the site.

#### **5.7 Pollution Incidents**

There is one pollution incident to controlled waters within 250m of the site, three between 250m and 500m from the site and nine between 500m and 1000m from the site. All but two of which were minor incidents. The two significant incidents occurred in 1992, 407m and 479m east of the site, and involved both industrial effluent and diesel fuel respectively. Due to the time elapsed since the incident it is likely that contaminants will have sufficiently dissipated.

#### **5.8 Discharge Consents**

There are two discharge consents within 400m of the site. These are a septic tank at Shepley Outfitters (387m) discharging into the land via a soakaway and a trade effluent discharge at Trans-Continental Goldfish Co (398m), discharging into a river/stream. The authorisation for the Trans-Continental Goldfish Co discharge was revoked in 1991, therefore sufficient time has elapsed since the termination of this license for contaminants to dissipate. No further information is provided regarding the license held by Shepley Outfitters, however it is located on the opposite side of the river and therefore contaminants are unlikely to reach the site.

### **5.9 Contemporary Trade Directory Entries**

There are 3 contemporary trade directories within 250m of the site, 5 between 250m and 500m from the site and 4 between 500 and 1000m from the site. All three within 250m of the site are inactive, as are 3 of the remaining 9 entries. The nearest active Contemporary Trade Directory Entry is 264m south of the site, and is classified as sheet metal working equipment and supplies. This is located on the other side of the nearest river therefore, it is safe to assume any contaminants would not reach the site.

### **5.10 Fuel Sites**

There are no fuel stations with 2000m of the site.

### **5.11 Radon**

The site is situated in an area in which the British Geological Survey states that less than 1% of homes are above the action level. No Radon protection measures are necessary in the construction of new dwellings or extensions.

### **5.12 Environmentally Sensitive Areas**

#### **5.12.1 Flooding**

The agency and hydrological (flood) map shows that the site is not in an area that is affected by flooding from rivers or seas.

#### **5.12.2 Nitrate Vulnerable Zones**

There are no nitrate vulnerable zones within 2000m of the site.

## **6 ADDITIONAL INFORMATION**

### **6.1 Services**

These have not been examined as part of the Phase 1 report. Enquiries should be made to ensure that the site can be fully serviced and that there are no restrictions or easements across the site which would impede the proposed development.

### **6.2 Site Investigation**

No intrusive investigations have been undertaken.

## **7 SUMMARY**

From the walk over survey, historic map study and examination of information held by the statutory authorities it is summarised that the site has remained green field since 1851. Three storage sheds have been erected on site in recent history but have fallen into disuse and disrepair along with the rest of the site. There is an array of items fly-tipped onto the site, however, they will be removed as part of the development process and therefore will have a negligible potential as a source of contamination. The surrounding area has slowly developed and grown both residentially and industrially which, due to their locations relative to site, will not pose a risk of contamination.

## **8 UK CONTAMINATED LAND LEGISLATIVE FRAMEWORK**

### **8.1 Legislation on Contaminated Land**

This section provides a conceptual model and qualitative assessment of the potential risks posed to human health and environmental receptors from potential on-site and off-site sources of contamination. The assessment is presented as a 'source-pathway-receptor' model in accordance with Part IIA of the Environmental Protection Act 1990.

Part IIA of the Environment Protection Act, 1990, which was enacted by section 57 of the Environment Act 1995 and the associated Contaminated Land (England) Regulations (SI 2000/227) was introduced on 1 April 2000. It created a new statutory regime for the identification and remediation of land where contamination poses and unacceptable risk to human health and environment.

Part IIA provides a statutory definition of contaminated land:

*'any land which appears to the Local Authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that significant harm is being caused, or that there is a significant possibility of significant harm being caused, or that pollution of controlled waters is being or is likely to be caused'.*

To determine whether land falls under the Part IIA definition of contaminated land the site should be evaluated in the context of a risk based framework. The assessment of contaminated land is typically a two-phase process which is initially based on a qualitative assessment of the likelihood of complete pollution linkages, with a quantitative element which seeks to determine the degree and the significance of the harm. Land is only defined as 'Contaminated Land' if a 'significant pollutant linkage' is present.

A pollutant linkage must comprise the following:

**Source** - a contaminant at a concentration capable of causing adverse health or environmental effects.

**Receptor** - there must be a human or environmental receptor present, which may be at risk of harm or impact from the source.

**Pathway** - there must be an exposure pathway through which the receptor comes into contact with the contamination source.

Each of these elements can exist independently but they create risk only when they are linked together, so that a particular contaminant affects a particular receptor through a particular pathway.

The responsible authority then needs to consider whether the identified pollution linkage:

- is resulting in significant harm being caused to the receptor in the pollutant linkage;
- presents a significant possibility of significant harm being caused to that receptor;
- is resulting in the pollution of controlled waters, which constitute the receptor; or is likely to result in such pollution.

If a pollutant linkage is demonstrated, then the Part IIA legislation provides powers for remedial action to be enforced by the Local Authority in whose area the contaminated land is situated.

## 9 CONCEPTUAL MODEL

### 9.1 General

This section uses information the sources noted in section 1.1 to provide a conceptual model and qualitative assessment of the potential risks posed to human health and environmental receptors from potential on-site and off-site sources of

contamination. The assessment is presented as a 'source-pathway-receptor' model in accordance with Part IIA of the Environmental Protection Act 1990.

**9.2 Potential On-site Sources of Contamination**

There are no potential on-site sources of contamination.

**9.3 Potential Off-site Sources of Contamination**

There are no potential off-site sources of contamination.

**9.4 Receptors**

The primary receptors, considered to be potentially at risk from any identified contamination are as follows:

**Human Health**

- Construction workers during the redevelopment phase.
- Residential end users.

**Controlled Waters**

- The nearest controlled surface water being 137m from site.
- Groundwater stored within the Minor Aquifer underlying the site.

**9.5 Pathways**

Potential contaminant migration pathways considered relevant to the site are:

**Human Health**

- Ingestion of contamination soils and dust particles.
- Direct physical contact with near surface soils and contaminated dust particles.
- Inhalation of wind blown contaminated dust.
- Inhalation of vapours and gases, migrating vertically into the atmosphere.
- Inhalation of vapours and gases, migrating vertically into buildings and accumulating in confined spaces.

**Controlled Waters**

- Contaminants in Made Ground impacting groundwater underlying the site via vertical leaching mechanisms.
- Contaminants in Made Ground impacting surface water downhill of the site via lateral leaching mechanisms.

**9.6 Pollutant Linkages**

A 'pollutant linkage' describes the relationship between a contaminant, a pathway and a receptor, a 'pollutant' being the contaminant in a pollutant linkage. A contaminant, pathway and receptor must all be present for a pollutant linkage to exist, which forms the basis for determination that a piece of land is Contaminated Land. Potential sources, pathways and receptors have been assessed to present below a list of potential significant pollutant linkages to be considered.

**Potential Source-Pathway-Receptor Linkages for Human Health Risk Assessment**

Source	Pathway	Receptor	Risk
Contaminated soils	Ingestion of soil	On site female child – 6yrs old	NO
		On site construction worker	NO
	Ingestion of household dust	On site female child – 6yrs old	NO

Source	Pathway	Receptor	Risk
	Ingestion of contaminated vegetables	On site female child – 6yrs old	NO
	Ingestion of soil attached to vegetables	On site female child – 6yrs old	NO
	Dermal contact	On site female child – 6yrs old	NO
		On site construction worker	NO
	Dermal contact with household dust	On site female child – 6yrs old	NO
	Inhalation of fugitive soil dust	On site female child – 6yrs old	NO
		On site construction worker	NO
	Inhalation of fugitive household dust	On site female child – 6yrs old	NO
	Inhalation of vapours in outdoor air	On site female child – 6yrs old	NO
		On site construction worker	NO
	Inhalation of vapours in indoor air	On site female child – 6yrs old	NO
	Direct contact	Services and Infrastructure	NO
On site female child – 6yrs old		NO	
On site construction worker		NO	
Ground Gas and Mine Gas	Vertical and lateral Migration	End Users	NO
		Residential Housing	NO
		Services and Infrastructure	NO

#### Potential Source-Pathway-Receptor Linkages Controlled Water Risk Assessment

Source	Pathway	Receptor	Risk
Contaminated soils	Leaching Mechanisms	Groundwater stored in the Minor Aquifer. Nearby watercourse.	NO
Contaminated groundwater	Vertical migration	Groundwater stored in the Minor Aquifer. Nearby watercourse.	NO

The conceptual model has been refined and the plausible pollutant linkages evaluated against generic criteria in accordance with CLR 11 – ‘Model Procedures for the Management of Land Contaminations’.

Sources are not considered to be present at the site and hence pollutant linkages are not active.

#### 9.7 Risk

The risk in this case is expected to be **LOW** in terms of contamination.

Soil chemical testing will determine the risk (if any) to the proposed development.

#### 10 CONCLUSIONS OF THE DESK STUDY

- A review of the historic maps highlights that the site has always been undeveloped.
- There are no potential on-site sources of contamination.
- There are no potential off-site sources of contamination.
- The soil chemistry data sheets show estimated natural values for Arsenic, Cadmium, Chromium, Lead and Nickel in the top soil to be below the recommended SGVs for residential end use.
- The nearest landfill site is 587m from the site.
- The site overlies a Secondary A aquifer.

- The Environmental Agency hydrological (flood) map shows that the site is not in an area that is affected by flooding from rivers or seas.
- No Radon protection measures are necessary
- Active pollutant linkages at the site are not considered to be present

## 11 RECOMMENDATIONS

1. Trial pits will be required to determine the near surface soils and depth to suitable foundation for the proposed structure. If the subsoils are granular in nature it may be necessary to investigate the site by boreholes to obtain SPT values for assessing the allowable bearing pressures.
2. The Desk Study has not identified any sources of contamination and the report concludes that the risk of contamination to the site is low. It may be worth considering, as a precautionary measure, contamination testing of the top soil to ensure it is suitable for residential end use. Samples should be taken from the near surface soils and testing should comprise of a full contaminations suite which will include CLEA Metal Suite plus Copper and Zinc, the Inorganic Suite, hydrocarbons (speciated PAH and carbon bonded TPH).
3. Soils at proposed foundation level should be tested for sulphates and pH, in order to determine the concrete classes of buried concrete.
4. Any water encountered within the trial pits should be sampled and taken for contamination testing.
5. Should clay soils be encountered, then these should be tested for Atterberg Limit and Moisture Content.
6. Foundations of any existing structures in close proximity to the proposed structure should be exposed, in order to determine their influence on each other.
7. Provision should be made for locating existing services beneath the site during the intrusive investigations. The hand digging of the top metre should be considered.
8. During construction and reduced level dig, careful observation should be made to identify any signs that the soils could be contaminated in terms of appearance or odour. Should this be encountered, then the Engineer must be informed immediately.
9. Should any soils be imported on to site, then these should come from a supplier who can provide necessary testing certificates or the soils should be sampled and tested, to verify that the soils are suitable for their intended use.
10. Construction workers should be protected from exposure to contaminated soils with the provision of all necessary personal protective equipment.