

CONTAMINATED LAND RISK ASSESSMENT
PHASE 1 DESK TOP STUDY AND SITE WALKOVER SURVEY

Blackmores Ltd

**Lock Street
Dewsbury**



Our Ref: SES/BL/LSD/1#1

Date: 3rd September 2012

Client:

Blackmores Ltd
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CONTAMINATED LAND RISK ASSESSMENT

PHASE 1 DESK TOP STUDY AND SITE WALKOVER SURVEY

**Lock Street
Dewsbury**

A report prepared on behalf of *Soil Environment Services* by:



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INSTITUTE OF PROFESSIONAL SOIL SCIENTISTS

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1. INTRODUCTION AND OBJECTIVES

The purpose of this assessment is to examine specifically the current and potential risks to human, ecological and ground and surface water receptors associated with possible contamination of the ground at the site located at:

Land south of Lock Street
Dewsbury
West Yorkshire
WF12 9BZ

Grid ref: 424860, 419870

The site is to be developed for residential purposes.

The site was visited on the 29th August 2012 to undertake a site walkover survey in order to assess current site conditions, particularly with respect to potential sources, pathways and receptors.

Evaluation of the risks is given and subsequently, if needed, recommendations made with regard to further (Phase 2) investigation and/or remediation.

General guidance used:

BS 10175:2011 Investigation of potentially contaminated sites. British Standards Institution, London.

CLR 11: Model procedures for the management of land contamination. Environment Agency.

Environment Agency Guiding Principles for Land Contamination (GPLC).
(2010) Environment Agency.

2. SITE CHARACTERISATION AND FORMER INVESTIGATIONS

Current setting and condition (Drawing 1)

The site assessed for this investigation currently comprises approximately 2.51 ha of land located off Lock Street, Dewsbury. A road bounds the site to the north, with canals to the east and south, and residential properties to the west (Photo 1).

The site is currently occupied by a scrap yard (Photos 2 and 3), with a car service garage to north-west (Photos 4 & 5), wrought iron and gate paint works to the north (Photos 6 and 7), and a car breakers yard on the east (Photo 9). The dismantled railway located running along the western boundary of the site (from the north-west to the south) is at a higher elevation than the rest of the site (Photo 11). The site surface is covered with crushed rock and gravel.

The site slopes down to the south-east. The car breakers yard area has been built-up to the south with natural stone from Huddersfield Quarry, therefore surface run-off flows from the south-west to the north-east.

Photo 1. (This photo may be several months out of date)



Photo 2.(View E to W towards MOT garages.)



Photo 3 (View centre W to E towards car-beakers)

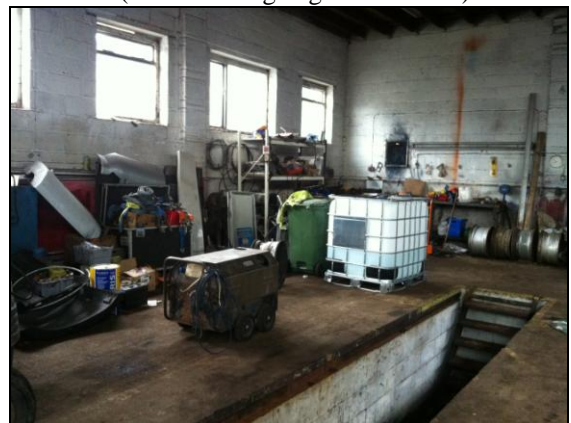


Tyres, detergents, oils, paints, machinery and tools were located in the service garages on the north-west of the site (Photo 5).

Photo 4.(View of MOT garages to NW)



Photo 5 (View inside garages to the NW)

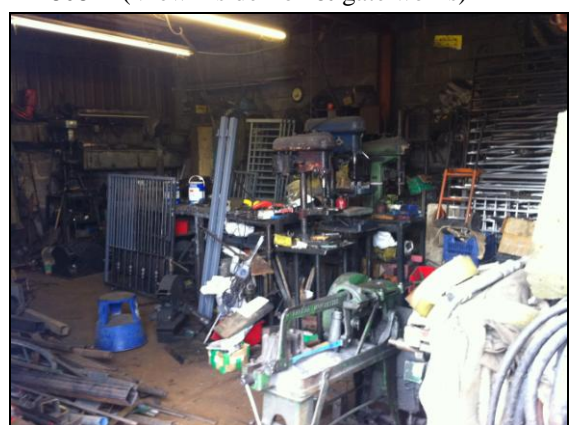


Paints, tools and machinery were situated in the wrought iron and gate works on the centre-north of the site (Photos 6 and 7).

Photo 6.(View of iron & gate works to N)



Photo 7 (View inside iron & gate works)



An electricity substation was noted on the north-east of the site (Photo 8). Minor spillages of oils were evident on the ground in the car-breakers area (Photo 9).

Photo 8 (Electric sub station located NE of site)



Photo 9 (View NE to SW- car breakers)



The railway embankment on the site consisted of clay and shale (Photo 11).

Photo 10 (Waste oil located to centre east)



Photo 11 (View centre W to E up to dismantled rail)



Site history (see Historical maps – Appendix A)

Land use	Direction	Distance (m)	Notes
On-site			
Mill (1893-1907)	On-site (NE)	0	Building constructed on NE
Laundry (1907-1954)	On-site (NE)	0	Building extended c. 1938
Railway (1922-1965)	On-site(W)	0	Marked as dismantled 1965
Electrical substation (1954-current)	On-site (NE)	0	
Additional buildings constructed c. 1955	On-site (E)	0	
Scrap metal yard/works (1965-current)	On-site	0	Building constructed on NW and N (1965)
Car breakers (current)	On-site (E)	0	The walkover revealed a car-breakers to the E
Vehicle service garage	On-site (NW)	0	
Wrought iron works	On-site (N)	0	
Waste treatment/disposal site (Appendix B)	On-site	0	Appendix B indicates waste permitted is vehicles
Off site			
Mills (1855-1922)	SW	121	
Railway (1855-current)	N	20	
Quarry (1893-1922)	SW	5	
Carriage and wagon works (1907-1972)	NE	25	
Gas works (1893-1922)	NE	123	
Pond (1954-1965)	NE	119	
Tanks 130 m (1965-1978)	NE	130	
(Cement) depot (1972-current)	N	23	
Depot (1972-current)	NW	95	
Electrical substation (1972-current)	NW	64	
Pollution incident 1990 (Appendix B)	E	107	Category 2 - Algae
Pollution incident 1991 (Appendix B)	NE	115	Category 3 - Oils
Pollution incident 1990 (Appendix B)	NE	150	Category 3 - Oils
Historical landfill (Appendix B)	NW	84	Waste included inert, industrial
Two waste management facilities	SE	248	Vehicle dismantlers

Local authority information relating to the site history has been requested. A response was received by the Senior Environmental Health Officer on the 3rd September 2012 stating that information can be provided however all queries are chargeable.

Current soils, geology and hydrology

BGS maps indicate that the site is located on mudstone, siltstone and sandstone from the Pennine Lower Coal Measures Formation to the north and the Emley Rock Formation consisting of sandstone from the Langstettian era on the south of the site. Two areas of artificial ground are mapped within a 250 m radius of the site.

Flow to groundwater may occur through the soils finding a possible route to the aquifer at depth.

Surface water was accumulating on site.

The site is on a Secondary A Bedrock aquifer and is not in a groundwater source protection zone.

Former investigations

No former investigations have taken place.

Current environmental data search

Environmental data (Appendix B) indicates the following:

The site is on a Secondary A Bedrock aquifer

The site is not in a groundwater source protection zone.

No active landfill sites within 250 m

One historical landfill site 84 m north-west

Two waste management facilities 248 m south-east

One waste treatment/disposal on-site

Three pollution incidents 107 m east, 115 m north-east and 150 m north-east

Radon is considered not to be a risk

No fuel sites within 250 m

3. CONCEPTUAL SITE MODEL

The conceptual site model detailed here is by a written and diagrammatical (Drawing 1) description of the sources, pathways and receptors. A cross section is included if this will aid interpretation.

3.1 Sources

<u>Risks from possible sources</u>			
Source location	Direction	Distance (m)	Potential Contaminants
On-site			
Mill (1893-1907)	On-site (NE)	0	Hydrocarbons
Laundry (1907-1954)	On-site (NE)	0	Hydrocarbons, detergents
Railway (1922-1965)	On-site(W)	0	Metals, hydrocarbons
Electrical substation (1954-current)	On-site (NE)	0	PCB's, mineral oils
Scrap metal yard/works (current)	On-site	0	Metals, hydrocarbons
Car breakers (current)	On-site (E)	0	Metals, hydrocarbons
Vehicle service garage	On-site (NW)	0	Hydrocarbons, paints, solvents
Wrought iron works	On-site (N)	0	Metals, hydrocarbons, paints, solvents
Waste treatment/disposal site (App B)	On-site	0	Metals, hydrocarbons
Off site			
Mills (1855-1922)	SW	121	Hydrocarbons
Railway (1855-current)	N	20	Metals, hydrocarbons
Quarry (1893-1922)	SW	5	Methane gas, carbon dioxide
Carriage and wagon works (1907-1972)	NE	25	Metals, hydrocarbons
Gas works (1893-1922)	NE	123	Metals, hydrocarbons, inorganic compounds
Pond (1954-1965)	NE	119	Methane gas, carbon dioxide
Tanks 130 m (1965-1978)	NE	130	Hydrocarbons
(Cement) depot (1972-current)	N	23	Metals, hydrocarbons
Depot (1972-current)	NW	95	Metals, hydrocarbons
Electrical substation (1972-current)	NW	64	PCB's, mineral oils
Pollution incident 1990 (Appendix B)	E	107	Algae (Category 2 incident)
Pollution incident 1991 (Appendix B)	NE	115	Oils (Category 3 incident)
Pollution incident 1990 (Appendix B)	NE	150	Oils (Category 3 incident)
Historical landfill (Appendix B)	NW	84	Methane gas, carbon dioxide, leachates
Two waste management facilities	SE	248	Metals, hydrocarbons

Receptors

Humans

- Residents in the proposed residential developments
- Residential in adjacent properties

Controlled waters

- The site is on a Secondary A Bedrock aquifer
- The site is not in a groundwater source protection zone

Ecology

- Animals and plants are considered to be possible receptors.

3.2 Pathways and plausible pollutant linkages (See Table 1)

Pathways to and from the site could exist via service channels.

Human health

The main pathways considered possible are:

1. Ingestion of soil
2. Ingestion of dust
3. Ingestion of contaminated vegetables
4. Ingestion of soil attached to vegetables
5. Dermal contact with soil
6. Dermal contact with dust
7. Inhalation of fugitive soil dust
8. Inhalation of fugitive dust
9. Inhalation of vapours outside
10. Inhalation of vapours inside
11. Ingress to water supplies is also considered

3.3 Controlled waters

Flow to groundwater may occur through the soils finding a possible route to the aquifer at depth.

Surface water was accumulating on site.

The site is on a Secondary A Bedrock aquifer and is not in a groundwater source protection zone.

TABLE 1. Plausible pollutant linkage/pathway matrix Y = yes, N = no, Blank = not possible											CSM	Ref	No.	1	Version	a		
SOURCE	Chemicals		RECEPTORS															
	Type	Possible present 1 yes, 0 no	On site							Off site								
			Current workers	Future workers	Dev,ment workers	Current residents	Future residents	Ground water	Surface water	Ecology	Current workers	Future workers	Dev,ment workers	Current residents	Future residents	Ground water	Surface water	Ecology
ON SITE																		
Mill	Hydrocarbons	0	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Laundry	Hydrocarbons	0	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Detergents	0	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Railway	Metals	0	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Hydrocarbons	0	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Electricity substation	PCB's	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Mineral oils	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
Scrap metal works	Metals	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Hydrocarbons	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
Car breakers	Metals	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Hydrocarbons	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
Car breakers	Hydrocarbons	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Solvents	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Paints	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
Iron works	Metals	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Hydrocarbons	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Paints	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Solvents	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
Waste disposal site	Metals	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
	Hydrocarbons	1	Y	N	Y	N	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	Y
OFF SITE																		
Former clay mill	Hydrocarbons	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Railway	Metals	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Hydrocarbons	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Former quarry	Methane gas	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Carbon dioxide	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Wagon works	Metals	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Hydrocarbons	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Gas works	Metals	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Hydrocarbons	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Inorganic compounds	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Former pond	Methane gas	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Carbon dioxide	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Tanks	Hydrocarbons	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Depots	Metals	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Hydrocarbons	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Electricity substation	PCB's	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Mineral oils	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Pollution incidents	PCB's	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Mineral oils	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Waste management facilities	Metals	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
	Hydrocarbons	0	N	N	N	N	N	N	N	N	NA	NA	NA	NA	NA	NA	NA	NA
Notes	For sources and contaminants see Section 3.1 of the report.																	
	For receptors and plausible linkages see Sections 3.2 and 3.3 of the report.																	
	For risks from sources on-site and sources off-site see Section 4 of the report.																	

4. RISK ASSESSMENT

4.1 Human health

The scrap metal works, service garages, iron works, car breakers and electric substation may result in current risks from contamination (Table 2).

Source location	Direction	Distance (m)	Potential Contaminants	Risk	Reason
On-site					
Mill (1893-1907)	On-site (NE)	0	Hydrocarbons	No	Natural attenuation
Laundry (1907-1954)	On-site (NE)	0	Hydrocarbons, detergents	No	Natural attenuation
Railway (1922-1965)	On-site(W)	0	Metals, hydrocarbons	No	Length of track not involving servicing of the train
Electrical substation (current)	On-site (NE)	0	PCB's, mineral oils	Yes	Leaks and spillages may have occurred
Scrap metal yard/works (current)	On-site	0	Metals, hydrocarbons	Yes	Leaks and spillages may have occurred
Car breakers (current)	On-site (E)	0	Metals, hydrocarbons	Yes	Oil spillages were evident on-site
Vehicle service garage	On-site (NW)	0	Hydrocarbons, paints, solvents	Yes	Leaks and spillages may have occurred
Wrought iron works	On-site (N)	0	Metals, hydrocarbons, paints, solvents	Yes	Leaks and spillages may have occurred
Waste disposal site (App B)	On-site	0	Metals, hydrocarbons	Yes	Leaks and spillages may have occurred
Off site					
Mills (1855-1922)	SW	121	Hydrocarbons	No	Natural attenuation
Railway (1855-current)	N	20	Metals, hydrocarbons	No	Railway is at a lower elevation than the site
Quarry (1893-1922)	SW	5	Methane gas, carbon dioxide	No	Time resulting in natural attenuation of gases
Carriage and wagon works	NE	25	Metals, hydrocarbons	No	Former works is at a lower elevation than the site
Gas works (1893-1922)	NE	123	Metals, hydrocarbons, inorganic compounds	No	Distance restricting pathways
Pond (1954-1965)	NE	119	Methane gas, carbon dioxide	No	Time resulting in natural attenuation of gases
Tanks 130 m (1965-1978)	NE	130	Hydrocarbons	No	Distance restricting pathways
(Cement) depot (1972-current)	N	23	Metals, hydrocarbons	No	Depot is at a lower elevation than the site
Depot (1972-current)	NW	95	Metals, hydrocarbons	No	Distance restricting pathways
Electrical substation (current)	NW	64	PCB's, mineral oils	No	Distance and roads restricting pathways
Pollution incident 1990 (App B)	E	107	Algae (Category 2 incident)	No	Distance restricting pathways
Pollution incident 1991 (App B)	NE	115	Oils (Category 3 incident)	No	Classed as a Category 3 (minor risk)
Pollution incident 1990 (App B)	NE	150	Oils (Category 3 incident)	No	Classed as a Category 3 (minor risk)
Historical landfill (Appendix B)	NW	84	Methane gas, carbon dioxide, leachates	No	Distance restricting pathways *
Two waste management facilities	SE	248	Metals, hydrocarbons	No	Distance restricting pathways
Notes: Last waste accepted was in 1999, therefore some natural attenuation of ground gases is expected to have occurred.					

4.2 Controlled Waters

The site is considered to pose a possible risk to controlled waters due to potential sources existing on the site.

4.3 Ecology

The site is considered to pose a possible risk to the ecology due to potential sources existing on the site.

5. UNCERTAINTIES AND PHASE 2 PROPOSALS

Significant uncertainties are considered to exist and therefore a Phase 2 investigation is considered to be needed.

The main issues for concern are:

- 1 Leaks and spillages from the use of hydrocarbons, solvents and paints on the site.
- 2 Leaks and spillages of hydrocarbons from car-breaking activities
- 3 Metals and metal compounds from workshop repair activities.

The Phase 2 intrusive investigation should include eight boreholes to assess the ground for PAHs, aliphatic and aromatic compounds, metals, and VOC's. Ground water wells should be inserted to assess water quality.

Human health

Risk assessment reporting will focus on potential contaminant concentrations in relation to the proposed re-development of the buildings into residential use.

Controlled waters

Risk assessment will focus on the possibility of contaminants reaching the canal to the south-east of the site.

DRAWING 1

Current site location and cross section

NOTES:

 Site boundary

Soil Environment Services Ltd

Contaminated Land Risk Assessment

Tel.: 0191 243 0686

www.soilenvironmentalservices.co.uk

Drawing Title: Current site location & cross section

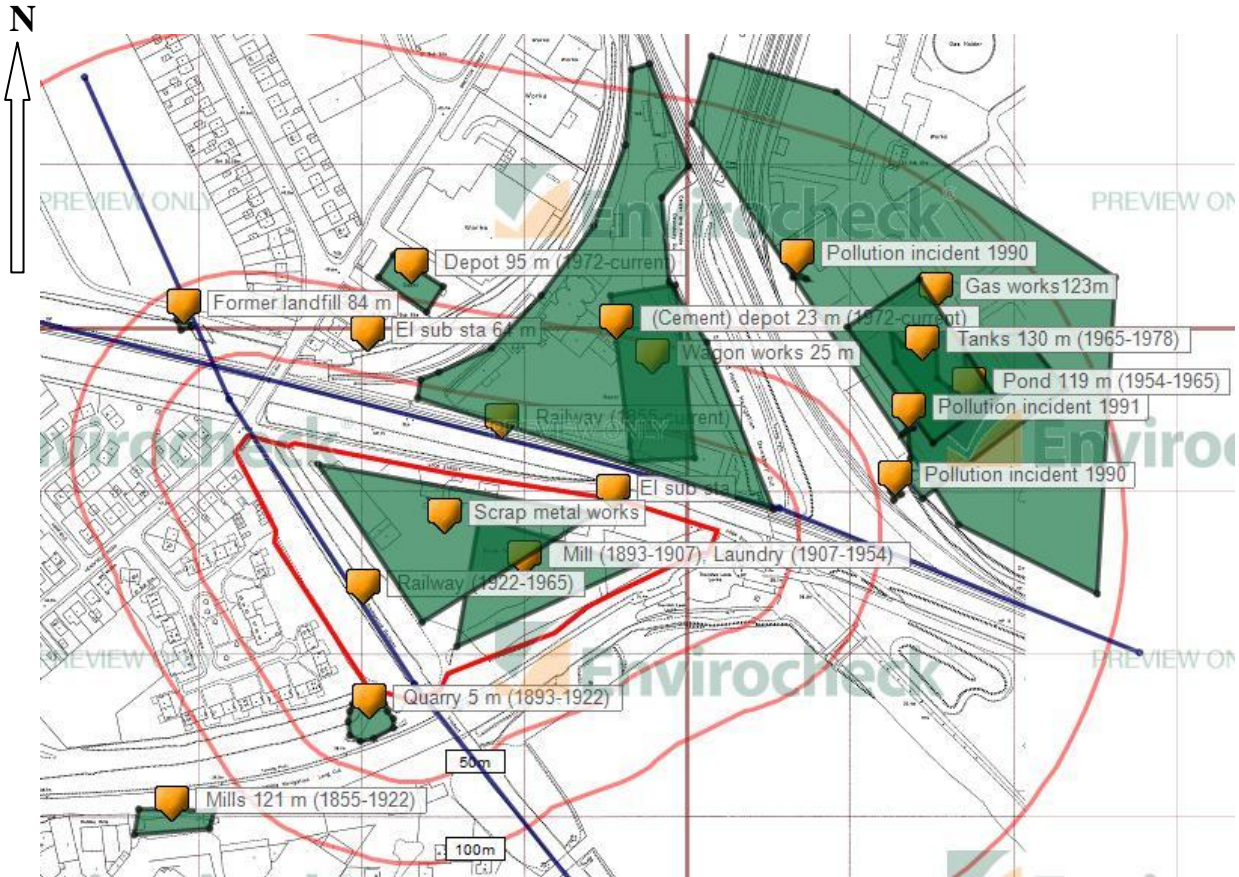
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Client: Blackmores Ltd

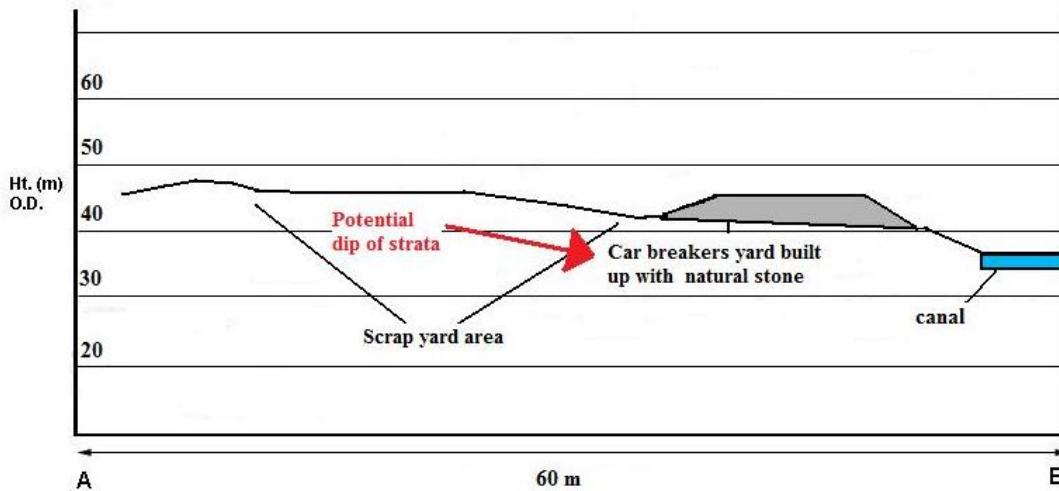
Project: Lock Street

Scale: 1:2500

Date: 21st August 2012



Cross Section



APPENDIX A

Historical maps

APPENDIX B

Environmental data