

PROPOSED DEVELOPMENT SITE
LAND OFF WENTWORTH ROAD
MAPPLEWELL
BARNSELY
PRELIMINARY RISK ASSESSMENT



11-B-9849

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Note - This report was originally compiled in November 2011. The report has since been reviewed and is still regarded as accurate and valid in April 2013, without any requirement for alteration. However, a Phase 2 has since been commissioned and completed.

1. Introduction

1.1 Appointment

Carley Daines & Partners has been commissioned by Seddon Construction Ltd to carry out a Preliminary Risk Assessment (PRA) for a parcel of land off Wentworth Road, Mapplewell.

1.2 Proposed Development

It is proposed to develop land for a residential end use with gardens.

1.3 Objectives

The objectives of this report are to identify any potential constraints to the proposed development with respect to contaminated land. The report will facilitate the design of future geotechnical and environmental ground investigations of the site, and support a Planning Application for the proposed development.

1.4 Scope of Report

The scope of activities included in the production of this study are:

- purchase and assessment of geo-environmental information;
- assessment of historical and current mapping;
- a site walkover
- production of a preliminary conceptual site model; and
- recommendations for intrusive ground investigation

1.5 Previous Investigations

Carley Daines & Partners has not carried out any previous investigations on this site. However, Carley Daines & Partners have been supplied with a copy of a report dated 14th December 2006 prepared by Encia on behalf of McInerney Homes Ltd. A brief summary of the report is as follows;

- There is made ground typically 1.5 to 3.0 metres across the site (requiring abnormal foundations) and a potential source of in-ground contamination.
- There is firm and natural sandy clay elsewhere on the site.
- The report recorded elevated concentrations of contamination in respect of arsenic, chromium, lead and zinc, and also isolated elevated levels of benzene, diesel and lubricating oil. It recommended that a clean cover level 600mm deep is placed over all soft landscaped areas.
- With respect to ground gases, the report advised that basic radon protection measures are required. In addition, the report confirmed that ground gas monitoring was being carried out, though the final results were not available.
- The site is in an area where deep coal mining has been carried out, and there is also the possibility of shallow workings beneath the site. Three rotary boreholes to a depth of 30 metres did not prove the presence of any voids or broken ground.

- The site is classified by the Environment Agency as being outside the extent of flooding.

1.6 Sources of Information

The following sources of information have been used in the compilation of this report;

- Ordnance Survey Maps at various scales; and
- Site Specific Environmental Report and historical mapping provided by Envirocheck
- Coal Authority Report

2. Site Location and Description

2.1 Site Location

The site location and description is summarised in the Table 1 below.

Table 1 – Site Description		
Site Location	Wentworth Road, Mapplewell, Barnsley S75 6BL	
Site Description	Irregular shaped plot of land, predominantly vacant. Disused buildings on site.	
Grid Reference	NGR 422390,409510	
Site Area	0.48ha	
Site Setting / Description	Current Land use:	Vacant – disused Industrial Site
	Surrounding area:	North – Commercial/Industrial/Residential East – Open ground South – Residential West – Residential

Site location and site layout plans are presented in Appendix A.

2.2 Site Walkover

A full site walkover was not possible, but the site was viewed from Wentworth Road on 15th November 2011. At the time of our site visit, the site gate was locked. The weather at the time was clear and sunny. The site is accessed off Wentworth Road, Mapplewell, immediately to the east. The site is of irregular shape, and appears to be predominantly covered in hardstanding, particularly disused industrial buildings and concrete slabs. The site has various old structures, particularly retaining walls, concrete plinths, and also rough un-managed vegetation. There are no obvious water courses on site. The site is predominantly surrounded by housing to the south and west, and a large row of Poplar Trees is located along the south west boundary. Much of the site is surrounded by a concrete blockwork wall, approximately 2 metres high. The open ground immediately to the east of the site is, we understand, an infilled disused quarry. The development on the north side of the site consists of a small number of residential units, together with a small commercial/industrial estate.

The site is indicated on current plans as being a scrap yard.

2.3 Site History

The historic maps indicate the site has been developed since at least 1892. The earliest available mapping (1854 – 1855) indicates the site at this stage to be apparently un-developed. In 1854, a quarry is indicated on the east side of Wentworth Road.

By 1892, unknown buildings and woodland are shown on site. Blacker Hill Quarry is present on the east side of Wentworth Road, and numerous collieries (a large colliery immediately to the north west of the site, together with shafts) are in evidence.

In 1906, no significant changes were noted on site, though there has been further colliery development to the north west, and residential development on Wentworth Road.

In 1931, no significant changes are apparent on site, though there has been further residential development to the north site, and further extension of North Gawber Colliery. The quarry on the east side of Wentworth Road is still present.

No significant changes were noted in 1938.

In 1962, there had been no significant changes on site. Off site, the terraced housing immediately to the north of the site has been cleared, and the quarry to the east of Wentworth Road appears to have been infilled. North Gawber mine to the west of the site has been expanded, and there are unknown earth works to the south west of the site.

In 1974, the site is noted as a vehicle scrap yard. The area of former residential housing to the north of the site is also noted as a vehicle scrap yard. The quarry to the east of the site appears to have been totally infilled and landscaped, and North Gawber colliery has been further developed. Substantial residential development is also present to the north east of the site on Wentworth Crescent. An overhead conveyor runs in a south east/north westerly direction to the main colliery immediately to the south of the site.

In 1989, the site is still noted as a vehicle scrap yard, and an industrial building has been added at the south west corner. The former quarry on the east side of Wentworth Road is now designated as a refuse tip, and a disused tip is noted immediately to the north west of the site. There is also a spoil heap noted to the south west of the site.

In 1993, the site is still noted as a scrap yard, with further industrial buildings added. The area of the former major colliery to the north west of the site is now indicated as a disused spoil heap. A large spoil heap also exists immediately to the south east of the site.

By 2000, the site has been surrounded on the south and west sides with residential development, further expanded by 2006.

2011 plans show no significant changes

Table 2 – On-Site History		
Potentially Contaminative Past Uses	Map Date	
	From	To
None	1854	1962
Vehicle scrap yard	1974	Present

Table 3 – Off Site History (within 250 metres)		
Potentially Contaminative Past Uses	Map Date	
	From	To
Quarry 10 metres to east	1854	1931
Colliery 150 metres to north west	1854	1989
Spoil Tip 150 metres to north west	1989	Present
Spoil Tip 250 metres to south west	1989	Present
Refuse Tip 10 metres to west	1962	Present
Industrial Estate 30 metres to north	1974	Present

Made ground is likely to be present across the site as a result of historic land use. There also exists the possibility of underground and above surface tanks and pits. Vehicle inspection pits may also be present within the disused buildings and it is possible that fuel may have been stored on site.

The most significant source of off-site contamination includes the refuse tip and other spoil tips immediately on the east side of Wentworth Road and in the general vicinity.

3. Environmental Information

In compiling this section, environmental, geological and ground stability reports produced by Envirocheck were reviewed. Copies of these reports are presented in Appendix B. A summary of the environmental setting is provided in Table 4 below.

Table 4 – Summary of Environmental Information

Made Ground	No records of made ground, however due to the history of the site it is anticipated that made ground deposits are present.
Drift Geology	On Site: None
	Surrounding Area: Glacial Till to the west, and fluvial deposits in the river valley to the south.
Solid Geology	On Site: Generally rocks of the Pennine Middle Coal Measures formation.
	Off Site: Generally rocks of the Pennine Middle Coal Measures formation.
Faults	Fault immediately to the south east of the site, with coal seam outcropping immediately to the north of the site.
Hydrology	There are no significant surface water features other than minor drains within 50 metres of the site. The River Dearne is approximately 600 metres south of the site.
Hydrogeology	The underlying superficial geology is classified as an unproductive Aquifer. The underlying solid geology is classified as a secondary (S) Aquifer.
Groundwater Abstractions	There are no ground water abstractions within 500 metres of the site boundary.
Flood Risk	The site is not within an indicative flood plain. The closest flood risk to the site is in the River Dearne Valley approximately 600 metres to the south.
Pollution Incidents	There have been two pollution incidents within 250 metres of the site, both categorised as minor incidents most recently in 1998.
Mineral and Coal Extraction	The site is located within an indentified mining area. The Coal Authority Report indicates that the property is in a zone of influence from workings in four seams of coal at depths of between 100 metres and 190 metres, last worked in 1949. In addition, the site is in an area where the Coal Authority believe there is coal at or close to the surface which may have been worked at some time in the past. The Coal Authority indicate that there are no coal mine entries within or within 20 metres of the boundary of the site.
Radon Gas	The site is indicated as being within an area affected by Radon, and Radon protection measures are recommended.
Hazardous Installations	None indicated within 250 metres.

Table 4 – Summary of Environmental Information (continued)

Waste Management Facilities	The previous owner of the site, Mapplewell Auto Salvage, is recorded as a registered licence waste management facility. There are no other waste management facilities within 250 metres of the site, but there is a further licensed waste management facility approximately 500 metres from the site.
Historic and Current Landfill Sites	There are numerous areas of landfill immediately around the site, comprising spoil tips and refuse tips. The closest is indicated as 13 metres from the site, and comprises the infilling of the former Blacker Hill Quarry, immediately to the east side of Wentworth Road.

4. Environmental Risk Assessment

4.1 Preliminary Conceptual Site Model

A conceptual site model (CSM), which supports the identification and assessment of contamination-pathway-receptor pollutant linkages, is integral to the overall process of risk assessment. A CSM provides a foundation for hazard identification and risk estimation. For a risk to be present, all three components of an identified pollutant linkage must be present. The potential risks have been assessed with respect to the most sensitive land use, residential with plant uptake.

Risk estimation is based upon consideration of magnitude, probability, and consequence of a contaminant-pathway-receptor linkage occurring. This is in line with best practice and guidance described in CLR11¹.

4.1.1 Possible Sources of Contamination

Based upon a review of historical maps and available environmental information, there is potentially a risk from contamination at this site with respect to the proposed development. It is likely that made ground is present across the site. Specific sources of contamination noted from historical maps include the former usage of the site as a vehicle scrap yard, together with the possibility/probability of oils, lubricants, and fuels stored in above ground/underground tanks. Former vehicle inspection pits may have also been affected by oil/diesel spillages.

Potential contaminants including inorganic contamination such as metals, and organic contamination including polycyclic aromatic hydrocarbons (PAH's), petroleum hydrocarbons and volatile and semi volatile organic compounds. Asbestos may also be present in soils following demolition of the buildings on site.

There are also several potential sources of ground gas (methane and carbon dioxide). Significant landfilling has occurred, possibly on site, but more importantly immediately adjacent to the site, most notably the infilling of the quarry on the east side of Wentworth Road. In addition, made ground across the site and the underlying coal measures may also present a source of ground gases.

4.1.2 Possible Pathways

In our assessment of potential exposure pathways, we have used a residential with gardens land use scenario.

- Ingestion of soil and soil derived indoor dust;
- Ingestion of home grown produce and spoil attached to home grown produce;
- Dermal contact with soil and soil derived indoor dust;
- Inhalation of indoor and outdoor dust (on and off site);
- Inhalation of indoor and outdoor vapours;
- Migration of mobile contaminants in groundwater; and
- Migration of ground gas

4.1.3 Potential Receptors

Based upon development of the site to a residential with gardens end use, the following potential receptors have been identified:

- Site users (residents and visitors);
- Construction workers;
- Buildings;
- Drinking water supply pipes;
- Secondary (A) aquifer

A summary of the potential pollutant linkages is presented as a CSM in the following Table 5.

Table 5 – Summary of Environmental Information

Potential Source	Pathways	Potential Receptor
Made ground across the site (Metals, PAH, Hydrocarbons, VOC/SVOC, asbestos)	Ingestion Dermal Contact Inhalation of dust Inhalation of vapours	Human health – future site occupants.
	Infiltration and migration through permeable strata	Groundwater-Secondary (A) Aquifer
Vehicle Breaking (metals, hydrocarbons, PAH)	Ingestion Dermal Contact Inhalation of dust Inhalation of vapours	Human Health (future site users)

Table 4 – Summary of Environmental Information (continued)

	Infiltration and migration through permeable strata	Groundwater-Secondary (A) Aquifer
	Direct contact	Construction materials Drinking water pipes
Ground Re-Grading (metals, PAH, hydrocarbons, PAH)	Ingestion Dermal Contact Inhalation of dust Inhalation of vapours	Human Health (future site users)
	Infiltration and migration through permeable strata	Groundwater-Secondary (A) Aquifer
	Direct Contact	Construction materials Drinking water pipes
Ground Gas from: Surrounding refuse heaps/infilling Made ground Coal measures	Inhalation of gas	Human Health-future site users
	Migration through permeable strata and preferential pathways into confined spaces	Future buildings on site

5. Conclusions and Recommendations

5.1 Conclusions

Carley Daines and Partners has completed a Preliminary Risk Assessment for the site at Wentworth Road, Mapplewell, which is to be developed for residential end use.

The purpose of the report was to identify possible constraints to the proposed development, and to provide appropriate information to form part of any future planning submission.

Based upon an assessment of the available information and development of the conceptual site model, it is considered likely that several potential pollutant linkages may be relevant to the site which require further investigation and assessment. In addition to the identified sources, there may be localised areas of contamination present as a result of unidentified activities at the site.

5.2 Recommendations

At this stage, it would be normal practice to recommend an intrusive ground investigation to investigate the potential pollutant linkages that have been identified. The purpose of this would be to provide sufficient data to enable a robust site specific risk assessment and to identify potential remedial requirements and to enable an appropriate waste disposal management. It would also be normal practice to recommend that the ground investigation should include a geotechnical assessment to confirm the ground conditions, with respect to appropriate foundations/sub-structure design. As indicated early in this report, a significant amount of intrusive investigation has already been undertaken by Encia. It is therefore recommended that the following activities be undertaken:

- Further review of the full Encia Report with contamination assessment upgraded to current Soil Guideline Values (SGV's).
- Full assessment of ground gas monitoring, already undertaken (if appropriate). If not already undertaken, then ground gas monitoring should be carried out.
- Further additional trial pitting and contamination sample collection, particularly in areas close to buildings, vehicle inspection pits and near to fuel/oil lubrication tanks.
- Review of deep rotary boreholes to 30 metres.
- Survey of existing buildings to check for the presence of asbestos.

The ground investigation and remedial recommendations should be submitted to the Local Authority for Approval.

SIGNED

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APPENDIX A

SITE PLANS

A P P E N D I X B

ENVIROCHECK REPORT