Proposed Aldi Store

High Street, Royston, South Yorkshire

Phase I Geo-Environmental Assessment

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13690	1	A Cooper	16/9/2013	C Brewster	17/9/2013

Client:
Aldi Stores Ltd.
Faverdale Industrial Estate
Darlington
County Durham
DL3 0UW

3e Consulting Engineers Ltd
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel : 01924 240420

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EXECUTIVE SUMMARY

Land Use	The site is unoccupied following the demolition of a factory leaving rough rubble hardstanding and occasional patches of concrete slab. The north eastern part of the site is heavily overgrown with bushes. The eastern, western boundaries comprise mature and semi mature trees and either chain link or wooden fence. The south western portion of the site boundary is formed by a buttressed masonry retaining wall, approximately 2m high. Abutting the southern boundary fence is a modular concrete retaining structuring running the full length of the boundary within the rear gardens of the housing bounding the site. Overall the site falls steeply from the highest point in the north west to the lowest point in the south east.
Site history	The site comprised a farm and open fields until 1956 after which the site was developed for a Spring factory, which has recently been demolished. The factory went through several phases of extension between 1962 and 2006 gradually developing southward across the site. The surrounding area has supported a quarry, residential properties, a farm and a primary school.
Environmental setting	• Geological information indicates the site is likely to be underlain by Mexborough Rock (sandstone). No superficial deposits are indicated • 6 coal seams have been exploited beneath the site at depths between 240m and 540m, together potential that there are shallow coal seams which may have been worked in the past. • Site does not lie in a flood risk area. • No landfills recorded within 250m. • The nearest recorded watercourse is some 139m south. • The underlying strata are classified as a Secondary A aquifer. • There are no abstractions within 1000m. • There are 2 discharge consents 189m to SW for storm water overflow • Radon protection measures are not required for future developments. • There are no Local Authority Pollution and Prevention Controls within 250m. • There are no petrol stations within 250m.
Contamination	Based on the site history, it is considered that the site presents a low environmental risk with respect to contamination.
Mining	The site is in the likely zone of influence from workings in 6 coal seams have been exploited beneath the site at depths between 240m and 540m, together potential that there are shallow coal seams which may have been worked in the past.
Ground Gas	The risk of ground gas is low to moderate and gas protection measures are currently considered necessary.
Foundations	It is anticipated that pad, strip or trench fill foundations will be appropriate, terminating in the glacial till or bedrock, which is anticipated within 2.5m of the surface. Foundations must extend below the previous foundations and that obstructions should be anticipated from the former buildings. Ground bearing floor slabs are likely to be suitable following some ground improvement of any made ground.

Ground Investigation	A ground investigation is required to confirm the site conditions. This is likely to include: trial pits or mini percussive boreholes to establish the shallow ground conditions and allow samples to be recovered for geotechnical and chemical laboratory analysis. Gas monitoring may be required if significant made ground or putrescible deposits are encountered during the investigation. Rotary probe holes to assess the depth of potential shallow coal workings.

1 INTRODUCTION

1.1 3e Consulting Engineers Ltd (3e) were commissioned by Aldi Stores Ltd to carry out a Phase I Geo-Environmental Assessment for a proposed development on land adjacent to High Street in Royston, South Yorkshire. The location of the site is shown in **Figure 1** and an outline site plan is provided in **Appendix A**. This report highlights ground related environmental and geotechnical considerations in relation to the proposed development of a new Aldi store.

1.2 The objectives of this assessment were:

- To establish the historical development of the site and surrounding area.
- To establish the environmental setting of the site.
- To assess the potential impact of subsurface mining on the proposed development.
- To determine if historical or current activities could give rise to significant ground contamination.
- To assess the potential for hazardous ground gas.
- To determine the potential risks posed by contamination arising from historical or current activities on or in the vicinity of the site.

1.3 To this end the study has included a site walkover carried out on the 10th September 2013, an inspection of historical maps, geological data and a review of environmental information held on publicly available registers and other sources as indicated within the report.

1.4 This report presents the factual information available during this appraisal, interpretation of the data obtained and recommendations relevant to the scope of works outlined above. It has been assumed in the production of this report that the site is to be redeveloped for a commercial end use.

1.5 The comments and opinions presented in this report are based on the findings of the available desk study investigation carried out by 3e. Responsibility cannot be accepted for any conditions not revealed by this desk study and which have not been taken into account by this report.

1.6 This report has been prepared for the sole use of Aldi Stores Ltd. No other third party may rely upon or reproduce the contents of this report without the written approval of 3e. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk and 3e do not owe them any Duty of Care or Skill.

2 THE SITE

Location and Description

2.1 The site, centred on National Grid Reference 435890, 411370, is located approximately 300m west of Royston village centre. The site occupies an area of 1Ha, is approximately rectangular in shape and lies at an elevation of approximately 70m AOD.

2.2 Land uses in the vicinity of the site are summarised below:

- **North:** High Street with residential properties and Working Men's Club.
- **East:** Residential properties.
- **South:** Residential properties and public open space.
- **West:** Primary School and residential properties.

2.3 The site is unoccupied following the demolition of a factory leaving rough rubble hardstanding and occasional patches of concrete slab. The north eastern part of the site is heavily overgrown with bushes. The eastern, western boundaries comprise mature and semi mature trees and either chain link or wooden fence. The south western portion of the site boundary is formed by a buttressed masonry retaining wall, approximately 2m high. Abutting the southern boundary fence is a modular concrete retaining structuring running the full length of the boundary within the rear gardens of the housing bounding the site. The site is secured by a large earthen bunded along the northern boundary.

2.4 Overall the site falls steeply from the highest point in the north west at 74.6m AOD to the lowest point in the south east at 65.3m AOD. The current site features and levels as indicated on **Figure 2** and Site Photographs are present in **Figure 3**.

3 SITE HISTORY

3.1 In order to establish the site's history, an inspection of historical maps dating between 1856 and 2013 and obtained as part of an Envirocheck report has been made (Ref. 49048552_1_1 dated 10 September 2013). A summary of the information is provided below and a copy of the maps is included as **Appendix B**.

Map Dates	On-Site Features	Relevant Off-Site Features
1893 - 1956	Farm house and yard in north of site.	N: Housing and farm S: Open land E: Open land and woodland W: Woodland Open quarry indicated 100m to NE
1956 - 1962	Long thin building indicated in northern part of site with two outbuildings in north and west replacing majority of farm buildings	Housing developed to west
1962 – 1970	Building footprint expanded and indicated as works	Housing developed to north
1970 – 1976	Building indicated as #Spring Manufacturing Works' footprint expanded in southerly direction Boundary wall indicated in southern part of site, north of current retaining wall.	Housing developed to east
1976 – 2006	Further phases of building extension by 1993 and 2006.	School developed to SW
2006 -2013	Site cleared and unoccupied.	Housing developed to south

3.2 In summary, the site comprised a farm and open fields until 1956 after which the site was developed for a Spring factory, which has recently been demolished. The factory went through several phases of extension between 1962 and 2006 gradually developing southward across the site. The locations and timescales of the historical site features are shown on **Figure 4**.

3.3 Within the surrounding area, land uses have included a quarry, residential properties, a farm and a primary school.

3.4 Potential sources of contamination include the imported made ground from associated with the development of the site, however, significant contamination is not anticipated.

4 ENVIRONMENTAL SETTING

4.1 This section is based principally upon a search of information available on public registers through an Envirocheck search (Reference 49048552_1_1 dated 10 September 2013) included as **Appendix C**, together with other sources as indicated.

Geology and Mining

4.2 A summary of the site geology, based on available published information, is provided below.

Sources of Information	British Geological Survey (BGS) map; Barnsley, Sheet 87, 1:50,000 scale, Solid and Drift edition.
Made Ground	None recorded although given the previous developments some made ground is anticipated.
Superficial Deposits (drift)	None recorded
Solid Geology	BGS records indicate Upper Carboniferous Mexborough Rock (sandstone). The strata dip to the SE beneath the site. The shallowest seam indicated is and unnamed seam very close to the southern boundary of the site.
Mining	A Coal Authority mining report indicates that the site is in the likely zone of influence from workings in 6 seams of coal at 240m to 540m depth which was last worked in 1980. Any ground movement from these coal workings should have stopped by now. The Coal Authority considered there are shallow coal seams which may have been worked in the past. No mine entries are recorded on site or within 20m of the boundary. The property immediately beyond High Street to the north was subject to a subsidence claim. The Coal Authority information indicates the claim was rejected after inspection. A copy of the mining report and addition information are included in **Appendix D**.
Quarrying	Former quarry 100m NW 1893 survey part of which is still indicated on 2013 survey.

Hydrology and Hydrogeology

4.3 A summary of available information pertaining to hydrology, hydrogeology, flood risk potential, water abstractions, discharge consents and pollution incidents to controlled waters is provided below.

Watercourses	The nearest watercourse is recorded 139mm south flowing west to east.
Flood Risk	The site does not lie within a fluvial flood plain considered to be at risk of flooding.
Groundwater Classification	Solid Geology: Secondary A aquifer. Superficial Geology: Soils of high leaching potential.
Source Protection Zones	NR
Springs	NR
Wells	NR
Licensed Surface Water Abstractions	NR within 1000m.
Licensed Groundwater Abstractions	NR within 1000m.
Discharge Consents	2 consents 189m to SW for storm water overflow
Pollution Incidents	NR within 250m

NR – None Recorded

Landfill Sites and Waste Management

4.4 A summary of information regarding landfill sites (historical or current) and waste management facilities is provided below.

Local Authority Recorded Landfills	NR within 250m.
BGS / EA Recorded Landfills	NR within 250m.
Other Waste Management Facilities	NR within 250m.

NR – None Recorded

Pollution Controls and Industrial Land Use

4.5 A summary of Pollution Control records and potentially polluting activities (fuel stations) is provided below.

Integrated Pollution Controls (IPC)	NR within 250m.
Integrated Pollution Prevention and Control (IPPC)	NR within 250m.
Pollution Prevention and Controls (PPC)	NR within 250m.
Petrol Filling Stations	NR within 250m.

NR – None Recorded

Radon

4.6 Inspection of the BRE publication BR211 (2007), "Radon: Guidance on protective measures for new buildings" indicates that the site is not in a radon affected area and radon protection measures are not required in the construction of new dwellings.

Other

Other sensitive land uses or potentially contaminative activities are listed below. The entries relate to activities within approximately 250m of the site.

- Two inactive contemporary trade registered for the site L&P Springs and Chiltern Springs.
- Two active services garages registered within 250m

5 CONCEPTUAL SITE MODEL

5.1 Based on the available desk study information, a conceptual site model (CSM) has been developed for the proposed future land use (commercial). This summarises the understanding of the existing site and its historical development, the site geology, the potential contaminant sources, transport pathways and receptors in order to assess potential pollutant linkages. In assessing the potential contaminants present at the site, reference has also been made to the relevant sections of CLR 8, the Department of the Environment Industry Profile reports and any other relevant supporting documentation.

5.2 Based on the available information, a summary of the potential contamination sources, pathways and receptors is provided below.

Sources of Contamination

- Imported made ground associated with the past development for a factory.

Potential Pollution Pathways

- Humans: direct contact, soil ingestion and dust inhalation.
- Controlled waters: Lateral and vertical migration of leachable/mobile contamination.
- Adjacent Properties: Lateral migration of leachable/mobile contamination.

Receptors

- Site end users.
- Construction workers.
- Underlying Secondary A aquifer.
- Nearby property.

Pollutant Linkage Assessment

5.3 A qualitative risk assessment has been made of the likelihood of any pollutant linkage operating and its potential significance, as summarised in the table below:

Contamination Source	Pathway	Hazard	Potential Receptors	Linkage Complete
Contaminants associated with made ground on site (associated with previous development)	Direct contact, ingestion and dust inhalation	Human health risk	Site construction workers	Yes. However, significant contamination is not anticipated and the risk can be removed by the use of appropriate PPE and limited exposure.
			Site end users	Unlikely as the proposed development will comprise a majority of hardstanding which will break the pathway to end users.
	Vertical or lateral migration	Leaching of contamination in permeable soils	Aquifer	Unlikely, significant contamination is not anticipated.
	Lateral migration	Leaching of contamination in permeable soils. Mobile contamination (oils)	Adjacent properties	Unlikely, significant contamination is not anticipated.

6 ENVIRONMENTAL RISK ASSESSMENT

6.1 The potential environmental risk has been assessed based on the 'source-pathway-target' pollutant linkages identified in the Conceptual Site Model, which requires that for a liability to arise each stage of the pollutant linkage must be present. References to risk classifications are made according to the following definitions:

- **Low risk** – it is unlikely that an issue will arise with respect to causing significant harm to human heath or controlled waters.

- **Medium risk** – it is possible that an issue could arise with respect to causing significant harm to human heath or controlled waters.

- **High risk** – it is likely that an issue will arise with respect to causing significant harm to human heath or controlled waters.

6.2 Having evaluated the information gathered during this study and described in the previous sections the following risk assessment has been produced.

ENVIRONMENTAL RISK ASSESSMENT		
	Risk rating	**Reason**
Contamination potential for:		
On-site contamination	Low - Med	Some made ground anticipated, however, significant contamination is not anticipated.
Contaminants migrating off site	Low	Significant contamination is not anticipated.
Contaminants migrating onto site	Low	Surrounding land use is residential.
Other environmental issues giving rise to concern	Low	None identified.
OVERALL RISK	**Low**	

Ground Gas Risk Assessment

6.3 Based on the above information gained through the Envirocheck report, the risk of ground gas emissions is considered to be low to moderate. The following summarises the gas risk for the site:

Potential Gas Source	Hazard	Risk Rating	Justification
Offsite sources	Humans: health risk Buildings: explosion	Low	Landfills or former quarries are not present within 250m of the site.
Made ground on site (CH_4, CO_2)	Humans: health risk Buildings: explosion	Low to Moderate	The site has been previously development, including, therefore, significant made ground which could contain a putrescible fraction.
Coal and historical mining	Humans: health risk Buildings: explosion	Low to Moderate	Worked coal seams located at depth and potential shallow unrecorded coal working.
Radon	Humans: health risk	N/A	No precautions required.
Overall Risk		**Low to Moderate**	

7 GEOTECHNICAL CONSIDERATIONS

7.1 The following geotechnical considerations are given as preliminary guidelines only based on the available data on the ground conditions. Consequently, the following should not be taken as design criteria without further geotechnical data obtained from a suitably designed ground investigation.

Mining

7.2 The site lies in an area with a significant history of coal mining and shallow reserves may exist which may have been exploited but not recorded.

Foundations and Floor Slabs

7.3 Foundations are likely to comprise strip, pad or trench fill foundations terminated in the glacial till or shallow bedrock, which is anticipated to be present at less than 2.5m depth. Foundations must extend below the previous foundations and that obstructions should be anticipated from the former buildings.

7.4 Ground bearing floor slabs are likely to be possible subject to re-engineering of any made ground.

Pavements

7.5 It is anticipated, subject to the findings of a ground investigation, that standard construction techniques can be utilised although low CBR values should be anticipated for preliminary pavement design on made ground.

Gas Protection Measures

7.6 The preliminary ground gas risk assessment identifies a low to moderate risk to the development from ground gas/vapour and protection measures are unlikely to be necessary. However, it would be prudent to carry out gas monitoring if significant made ground or putrescible deposits are encountered during the investigation.

Drainage

7.7 Soakaway drainage may be considered suitable if weathered sandstone is encountered at shallow depth, subject to findings of initial site investigation. However, if weathered mudstone is encountered the likelihood of soakaways functioning is considered to be very low.

8 FURTHER INVESTIGATIONS

8.1 An intrusive investigation will be required for the proposed development to address the ground related issues discussed above. A summary of the likely scope of works, which should not be taken as an exhaustive list, is provided below.

- Trial pits or mini percussive boreholes to assess the shallow soil profile and allow samples to be recovered for laboratory analysis.
- Rotary probe holes to assess the depth of potential shallow mine workings.
- Laboratory chemical and geotechnical testing.
- Ground gas assessment.

Figures



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consulting engineers

4 calder close
calder park
wakefield
WF4 3BA

t 01924 240420
f 01924 240421

www.3econsult.com

Project	Land off High Street, Royston For Aldi Stores Ltd.		
Title	Site Location Plan		
Scale 1:25000	Drawn AHC	Checked ACV	Date Sept '13
Job No. 13690	Drawing No. Figure 1		Rev 0