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KEYLAND DEVELOPMENTS LTD

NORTH BIERLEY WWTW

PHASE I ENVIRONMENTAL ASSESSMENT

NOVEMBER 2017

your earth our world



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KEYLAND DEVELOPMENTS LTD**NORTH BIERLEY WWTW****PHASE I ENVIRONMENTAL ASSESSMENT****PREPARED BY:**

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DRAWINGS

Drawing No	Title	Scale
SH10534-001	Site Location Plan	1:50,000
SH10534-008	Site Investigation Development Plan	1:2,500

1 EXECUTIVE SUMMARY

- 1.1 This report is prepared for an outline planning application for redevelopment of the site and in accordance with instructions from L Axe of KeyLand Developments Ltd. The site is North Bierley WWTW and comprises approximately 24Ha of former waste water treatment works. A summary of pertinent information relating to the site along with a qualitative assessment of the potential risk is provided in Table I.

TABLE I: Summary of Overall Risk			
Issue	Summary	Risk Category	
		Humans	Property/ Environment
Present and past site use.	Sewage Works/WWTW, Valley Pit, Mill Pit, Old Coal Pit.	Moderate	Moderate
Adjacent land uses.	Oak Mill, Chemical Works (200m), Rifle Range, historic landfill (209m).	Moderate	Moderate
Environmental setting.	There are 13 pollution incidents and 32 discharge consents within influencing distance of the site predominantly related to the site's former use.	Low	Low
Asbestos	Asbestos has been tentatively identified in the buildings on site.	Low to Mod.	Low to Mod.
Soil	There is no risk to human health from soils on site given the proposed commercial/industrial land use.	Low	Low
Geology and Mining	Shallow mining is present beneath the south of the site at approximately 11.5mbgl to 16mbgl. There are ten recorded mine entries on or within influencing distance of the site.	Low	Moderate
Geotechnical	Made ground is likely to be unsuitable as a founding medium without ground improvement.	n/a	n/a
Groundwater and surface water	This site is situated on a Secondary A aquifer. The nearest graded surface watercourse is the Hunsworth Beck on the eastern site boundary. Groundwater monitoring has indicated a low to moderate risk to controlled waters.	Low	Low to Mod.
Flooding	The majority of the site does not lie within a designated floodplain. A small area to the east of the site lies within Flood Zone 3 and a small area in the centre of the site is within Flood Zone 2.	Low	Mod. to High

TABLE I: Summary of Overall Risk			
Issue	Summary	Risk Category	
		Humans	Property/ Environment
Infrastructure Risk	Two intermediate gas pressure mains cross the site, a foul water rising main runs along the eastern boundary of the site and overhead electricity lines pass over the centre of the site.	Low	Low to Mod.
Recommended further work	Further investigation of mining issues affecting the development. An asbestos survey will be required for the buildings on site prior to demolition.	n/a	n/a
Overall Risk:	Low to Moderate		

- 1.2 The executive summary forms part of the overall report and should not be considered in isolation.

2 INTRODUCTION

Instructions

- 2.1 This report is prepared in accordance with instructions from L Axe of KeyLand Developments Ltd dated 14 November 2017. This follows a proposal dated 14 November 2017 by Wardell Armstrong.

Site Location

- 2.2 The site is North Bierley WWTW, and is located as shown on the site location plan, Drawing No. SH10534-001 (1:50,000 scale), and more detailed site plan SH10534-008 (1:2,500 scale). The site is located approximately 6km south of Bradford city centre, adjacent to the junction of the M606 and M62 motorways and comprises approximately 24ha of a disused wastewater treatment works and fields. The site is bounded by the M606 motorway to the west, Hunsworth Beck to the east, the M62 motorway to the south and fields to the north.

Scope and Objectives

- 2.3 The purpose of this report is to identify and examine in broad terms readily available information relating to the:
- past and current uses of the site and surrounding area;
 - environmental setting including geology, mining, hydrogeology and hydrology;
 - potential contamination sources, pathways and receptors as part of a preliminary conceptual model;
 - potential stability and contamination constraints and liabilities that may arise in connection with the present use or proposed use of the site; and
 - requirement or otherwise for future studies including potential intrusive site investigation prior to redevelopment.
- 2.4 The report has been produced in general accordance with the first incremental stage of a Land Quality Statement as set out by the Royal Institution of Chartered Surveyors (RICS) in their publication "Contamination, the Environment and Sustainability" dated April 2010. The report also draws on Environment Agency Report 11 entitled "Model Procedures for the Management of Land Contamination" dated September 2004. Further background to government guidance on contamination and the purpose and use of Land Quality Statements in assessing the risk of contamination at a site is described at Appendix II.

- 2.5 The report does not constitute or contain a valuation nor is it a full rigorous environmental audit. In this instance the report is prepared to support a planning application for redevelopment of the site.

Proposed Site Use

- 2.6 It is proposed that the site is redeveloped for commercial/light industrial land use.

3 PREVIOUS REPORTS

URS Corporation Ltd. Phase I Environmental Site Assessment, October 2006

- 3.1 A Phase I Environmental Site Assessment was carried out by URS Corporation Ltd in November 2006 (report ref. 44320048). At the time of the report the site was an operational WWTW. Historical plans show that a sewage works was present on part of the site in 1893. The Valley Pit Coal and Ironstone workings were also present in the west of the site at this time along with an Old Coal pit in the south. A tramway is reported extending across the western part of the site. By 1908 the pits were reported to be closed and the sewage works had expanded. Subsequent maps show further expansion and changes to the layout up until 2004.
- 3.2 The site is situated on Lower Coal Measures which are considered a minor aquifer. Alluvium drift deposits are indicated as likely to be present along the eastern boundary associated with the Hunsworth Beck. It is also likely that made ground of an unknown nature and thickness will be present on the site associated with the collieries and former layouts.
- 3.3 The Hunsworth Beck is located adjacent to the eastern site boundary. This was given a quality grading of Grade E (poor) in 2000. The report indicates that eastern parts of the site lie within an area at risk of extreme flooding (Flood Zone 3).
- 3.4 The conceptual model identifies potential sources of contamination from former on-site operations (contamination resulting from settlement tanks, sludge beds, organic matter, fuels), nearby off-site operations (chemical works, rope works, cotton mill, mills, garages, coal pits etc) and made ground.

Wardell Armstrong Phase II Geo-Environmental Assessment, June 2012 (revised November 2015)

- 3.5 Wardell Armstrong completed an intrusive investigation based on the findings of the URS desk study. The findings of this assessment are summarised below.

Site Works

- 3.6 Within the site investigation boundary, a total of seven cable percussion boreholes (to a maximum depth of 10.7mbgl), three of which had rotary follow-on (to a maximum depth of 30mbgl), ten window sample boreholes (2.0m to 5.0mbgl) and nineteen trial pits (1.4m-3.6mbgl) were completed. Observations from the intrusive work have confirmed the presence of made ground between 0.15m and 8.3m thick over the majority of the site. This was underlain by soft to stiff, orange-brown mottled grey,

sandy, gravelly clay which was locally cobbly with rare boulders and mudstone bedrock of the Middle Coal Measures geology.

Geochemical Results

- 3.7 Soil and groundwater samples were tested for a suite of potential contaminants. The soil concentrations for all contaminants were below their respective GAC for commercial land use. In addition, no asbestos fibres were detected in soil samples.
- 3.8 No significantly elevated concentrations of contaminants were identified in groundwater. Therefore, the risk to surface water and groundwater can be considered to be low.

Ground Gas

- 3.9 High concentrations of methane were reported in one borehole, BH5, and moderate concentrations of carbon dioxide were reported across the remainder of the site. A gassing regime of Characteristic Situation 1 (CS1) can be attributed to the site. However, given the high levels of methane recorded in the south of the site, it was recommended that the classification in this area (BH's 4, 5 and 6) was increased to Characteristic Situation 2 (CS2) as a precaution.

Coal Mining

- 3.10 A Coal Authority report for the site was obtained for the site and a visit was also made to the Coal Authority abandoned mine records office at Mansfield.

Shallow Underground Workings

- 3.11 From the enquiries made, examination of the geological information and site investigation observations there was evidence of shallow underground mining activity beneath the south of the site. Reference to the abandonment plans indicated that these shallow workings are likely to be in the Shertcliffe Bed.
- 3.12 No intact coal seams were encountered during the investigation. However, there was evidence of broken/soft ground accompanied by loss of flush which may indicate the presence of workings. The broken/soft ground was observed at depths of between 11.3m and 16.7mbgl in borehole BH6. Further investigation and stabilisation of the underground conditions with respect to mining was recommended in this area of the site.

Mine Entries

- 3.13 The Coal Authority report has indicated that there are ten recorded mine entries on or within influencing distance of the site. Only one of the mine entries is noted to have had any treatment; entry 417427-005 (to the north west of the site) was treated on behalf of the Coal Authority with mass concrete following its collapse in 1997. It was recommended that prior to development the mine entries will require location, investigation and stabilisation.

Geotechnical and Foundation Design

- 3.14 The geology of the site was relatively homogenous and comprised made ground (up to 8.4m bgl to the south of the site) underlain by sandy, gravelly clay with occasional layers of very sandy, very clayey gravel of weathered Coal Measures which is in turn underlain by weak to moderate strong mudstone and sandstone of the Coal Measures.
- 3.15 Provided that some degree of settlement could be accommodated within the structure, pad or raft foundations should be satisfactory for structures on site founded on the weathered Coal Measures or on the made ground after ground improvement. Ground bearing floor slabs should be constructed to allow for some differential movement of the ground where pad foundations are employed.
- 3.16 Geotechnical testing indicated that the made ground would be unsuitable as a founding medium in its current condition due to its variability and the loose nature of some of the fill materials. Therefore, some form of ground improvement would be required, either by excavation and recompaction or dynamic compaction, where foundations cannot be placed on the solid Coal Measures.
- 3.17 Geotechnical testing indicated that the weathered Coal Measures across the majority of the site would be suitable as a founding medium in their current condition.

4 SITE HISTORY AND CURRENT LAND USE

Data Sources

- 4.1 The history of the site and the surrounding land has been investigated by consultation with a range of archive sources as summarised at Appendix III. The topographical and environmental data is based primarily on an Envirocheck report prepared by the Landmark Information Group and dated 14 November 2017.
- 4.2 In addition, the desk study report by URS and Phase II report by Wardell Armstrong, reviewed in Section 3, have been used.

Site History

- 4.3 Historic maps and previous desk study information have been used to identify previous land uses, including any significant potentially contaminative uses. Where other features that may have an effect on development of the site have been identified, they are described.
- 4.4 Table II summarises the history of the site and its immediate vicinity from about 1852 to the present day.

TABLE II: Summary of Land Use		
Date	Site Land Use	Adjacent Land Use
1852-1854	The site is predominantly agricultural fields. Mill Pit is located on the north west of the site.	The site is surrounded by agricultural fields. Hunsworth Beck forms the eastern boundary of the site. Hanging Wood is located adjacent to the site to the east. Oakenshaw Mill is located adjacent to the north west of the site.
1893-1894	A Sewage Works is located in the north of the site. Valley Pit (Coal and Ironstone) is located on the west of the site. The south of the site is occupied by an Old Coal Pit and associated railway sidings. Mill Pit is no longer identified.	Oakenshaw Mill is identified as Oak Mills (Disused). A Chemical Works is located 200m south of the site.
1908	Valley Pit is no longer identified. The Sewage Works has expanded to incorporate the majority of the east of the site.	Oak Mill is identified as being in use again. A Rifle Range is located adjacent to the site to the north.
1938	The Sewage Works consists of tanks, Storm Tanks, Precipitation Tanks, Filter Beds, Sludge Beds and Settling Tanks.	Grove Rope Works is located 100m south of the site.
1955-1958	No significant change.	The Rifle Range is no longer identified.
1967	No significant change.	No significant change.

TABLE II: Summary of Land Use		
Date	Site Land Use	Adjacent Land Use
1974-1976	No significant change.	The M606 and M62 motorways have been built to the west and south of the site respectively.
1984-1992	No significant change.	No significant change.
2004	No significant change.	No significant change.
2006	No significant change. The site is reported as still being operational.	No significant change.
2010	The Sewage Works is no longer operational.	No significant change.
Present day	The site is a former wastewater treatment works and open grassland. Two vacant buildings remain on site as well as disused filtration tanks, disused filter beds and disused settlement tanks.	No significant change.

Current Site Use

4.5 The site was visited on 16 November 2017. At the time of the visit the site comprised a former wastewater treatment works and open grassland. The following points are of note:

- The site was accessed off Cliff Hollins Lane to the north;
- The site boundary was defined by metal palisade fencing around the former WWTW to the east and wooden fencing and hedges to the north, west and south;
- The site generally sloped down from west to east and from north to south;
- Existing Yorkshire Water infrastructure was observed adjacent to the site;
- Two buildings, one brick and one concrete, remain on site. Both buildings were observed to be in poor condition;
- Disused filtration tanks, settlement tanks and filter beds were observed on site;
- Marker posts for gas mains were observed on the site;
- Above ground pipework associated with the Yorkshire Water rising main runs along the eastern boundary of the site;
- Trees and hedges were observed along the western boundary of the site and woodland was adjacent to the site to the east; and
- Hunsworth Beck formed the eastern boundary of the site.

4.6 A site visit record is attached at Appendix IV.

Asbestos

- 4.7 The Health and Safety at Work Act, the Control of Asbestos Regulations and the Construction (Design and Management) Regulations impose duties upon employers, site owners, their agents and contractors in respect of hazardous materials including asbestos. Other health and safety and welfare regulations place duties on Employers to undertake appropriate risk assessments. This could include the commissioning of surveys, identification and management of hazardous materials including any proposals for remedial work.
- 4.8 A site walkover survey has been completed. However, the walkover survey does not constitute an asbestos survey and not all areas of the site may have been visited or made available for inspection.
- 4.9 Asbestos has not been identified on site during our site walkover. However, asbestos is likely to be present in buildings on the site and could be present in the made ground at the site associated with past historical use although none was identified in soil samples tested during the SI. In the event that any asbestos is identified in the future or if it is considered that there is a risk that asbestos exists in the building, a full asbestos survey should be carried out. Guidance on the need for asbestos surveys and the method of carrying them out are given in HSE Publication HSG264.

Ecology

- 4.10 Ecology surveys for the site were carried out by a third party in July 2013 and June 2015. These surveys have not been reviewed as part of this report and therefore ecological issues are not considered as part of this report.

Environmental Management

- 4.11 As the site is non-operational, no issues relating to environmental management were identified during the site visit.

5 GEOLOGICAL AND HYDROGEOLOGICAL SETTING

Geology

- 5.1 The assessment of the geology of the site is based on the published geological mapping sheet (Yorkshire Sheet No 231NE and 232NW (Solid and Drift Edition) 1:10,560 scale) supplemented by the geological memoir, topographical plans, a site visit and site investigation information. A summary of relevant geological information is provided below in Table III.

TABLE III: Summary of Relevant Geological Data	
Strata	Description
Topsoil.	Topsoil was observed to the west and south of the site and varied in thickness from 0.1m to 0.5m.
Made ground.	Made ground has been identified across the site and varied in thickness from 0.15m, in the north of the site, to 8.3m in the south of the site. The made ground was variable and was described as sandy gravelly clay, sandy gravel or gravelly sand.
Natural superfcials.	The natural superfcials comprised sandy gravelly clay interpreted as weathered Coal Measures and varied in thickness from 1.4m to 7.4m.
Solid strata.	Mudstone and sandstone of the Middle Coal Measures were proven to 30mbgl.
Ground stability.	British Geological Information Services indicates a moderate potential for compressible ground stability hazards on site.

Hydrogeology

- 5.2 Hydrogeological information has been obtained from a review of:
- a LIG Envirocheck report;
 - Groundwater Protection Policy and Groundwater Vulnerability maps published by the Environment Agency;
 - Hydrogeological maps published by the British Geological Survey; and
 - Groundwater Protection: Policy and Practice (Environment Agency, 2006).
- 5.3 This information indicates a small area to the east of the site to be underlain by superficial deposits which is classified as a Secondary A Aquifer. The underlying solid strata is classified as a Secondary A Aquifer.

- 5.4 There are five active groundwater abstraction licences within influencing distance of the site. The closest is 321m south (NGR: 417901 426699) and is operated by Cleckheaton & District Golf Club which is licensed to abstract an unspecified amount of groundwater per year for 'Golf Courses: Spray Irrigation - Direct' purposes.

Sensitive Groundwater Locations

- 5.5 The site does not lie within a source protection zone.

Soil Vulnerability Classification – Leaching Potential

- 5.6 The soil vulnerability classification groups the many different soil types of England and Wales into three soil vulnerability classes and six sub-classes. Each is based on the physical and chemical properties of the soil, which affect the downward passage of water and contaminants. This classification is not applied to soil above non-aquifers. Soil information for urban areas is based on fewer observations than elsewhere. A worst case vulnerability is therefore assumed until proved otherwise.
- 5.7 The soil has a low leaching potential (L), which indicates that the pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants. Lateral flow from these soils may contribute to groundwater recharge elsewhere in the catchment.

Hydrology

- 5.8 The nearest graded surface watercourse is the Hunsworth Beck, which forms the eastern boundary of the site. The Environment Agency has given Hunsworth Beck a General Quality Assessment (Chemistry) rating of E (Poor).
- 5.9 The Environment Agency maintains national flood maps based on ground levels, predicted flood levels, information on flood defences and local knowledge. The flood maps show the predicted likelihood of flooding in an area in the context of current and also the proposed land use considered in development planning.
- 5.10 For existing land use purposes, the likelihood of flooding is classed as very low, low, medium or high based on the Environment Agency map entitled Risk of Flooding from Rivers and Sea.
- 5.11 The majority of the site is within a Very Low risk area. The chance of flooding each year is between less than 1 in 1,000 (0.1%). A small area to the east of the site is within a Medium risk area. The chance of flooding each year is between 1 in 100 (1%) and 1

in 30 (3.3%). In addition, a small area in the centre of the site is within a Low risk area. The chance of flooding each year is between 1 in 1,000 (0.1%) and 1 in 100 (1%).

- 5.12 For planning purposes, the likelihood of flooding is classed as low, medium or high based on flood zones identified in National Planning Policy Guidance (2014) attached to the National Planning Policy Framework (2012) and the EA map entitled Flood Map for Planning (Rivers and Sea). The Flood Map for Planning only applies if the site is intended for redevelopment.
- 5.13 The majority of the site is within Zone 1 and has a low probability of flooding. The chance of flooding each year is less than 0.1% (1 in 1,000). A small area to the east of the site is within Zone 3 and has a high probability of flooding. The chance of flooding each year is 1.0% (1 in 100) or greater. In addition, a small area in the centre of the site is within Zone 2 and has a moderate probability of flooding. The chance of flooding each year is between 1.0% (1 in 100) and 0.1% (1 in 1,000).
- 5.14 There is one active surface water abstraction licence within 1km of the site. The closest is 824m north west (NGR: 416800 428300) and is operated by City of Bradford Metropolitan Council, which is licensed to abstract 8,600m³ of surface water per year for 'Unclassified (other)' purposes. A further surface water abstraction licence is listed within 1km of the site but has been revoked.

6 MINING AND QUARRYING

- 6.1 The mining setting at the site has been examined in previous reports and through site investigation. A summary of these findings is presented below.
- 6.2 A Coal Authority report for the site has been obtained, dated 23 November 2010 and is attached at Appendix VI, a visit was also made to the Coal Authority abandoned mine records office at Mansfield on 25 November 2010.

Shallow Underground Workings

- 6.3 From the enquiries made, examination of the geological information and site investigation observations there is evidence of shallow underground mining activity beneath the south of the site. Reference to the abandonment plans indicate that these shallow workings are likely to be in the Shertcliffe Bed.
- 6.4 No intact coal seams were encountered during the investigation. However, there was evidence of broken/soft ground accompanied by loss of flush which may indicate the presence of workings. This broken/soft ground was observed at depths of between 11.3m and 16.7mbgl in borehole BH6. Due to collapse of the borehole, drilling was terminated at 16.7mbgl. Further investigation and stabilisation of the underground conditions with respect to mining is likely to be necessary in this area of the site.

Mine Entries

- 6.5 The Coal Authority report has indicated that there are ten recorded mine entries on or within influencing distance of the site. Only one of the mine entries is noted to have had any treatment; entry 417427-005 (to the north west of the site) was treated on behalf of the Coal Authority with mass concrete following its collapse in 1997. Prior to development the mine entries will require location, investigation and stabilisation.
- 6.6 Mining constraints on development are indicated on Drawing No. SH10534-008.

7 ENVIRONMENTAL SETTING AND CONSULTATIONS

Statutory Sources

- 7.1 Information from various statutory sources has been summarised from the LIG report prepared specifically for this site and abridged at Appendix V. A full copy of the LIG report is available on request. The results from a site visit have also been considered as part of this assessment.

Contaminated Land Register Entries and Notices

- 7.2 No contaminated land entries or notices are identified within 1km of the site.

Waste Management

- 7.3 Information supplied has indicated the presence of four historic landfill sites within 1km of the site boundary, these records have been duplicated as one BGS recorded landfill site and three Registered Landfill sites. There is also one Registered Waste Transfer Site. The closest recorded facility of each type is shown in Table IV.
- 7.4 In addition to the recorded/licensed landfilling activities in the vicinity of the site, the possibility, although remote of there being unrecorded landfilling activities within influencing distance of the site cannot be entirely discounted. If at some time in the future, the presence of such an unrecorded landfill is revealed then its potential influence on the site may need to be investigated and dealt with as necessary.

TABLE IV: Historical Landfill Sites	
Location	Details
Site Name: Chatts Wood Site Location: Cliff Hollins Lane, Bradford, Yorks. Grid Ref: 418148 427865 Distance from Site: 209m NE	Provider Reference: EAHLD31572 First Input Date: 31 st December 1960 Waste Type: Deposited Waste included Inert and Industrial Waste

Radon

- 7.5 Radon can be a hazard within built developments and especially within enclosed or confined spaces. The Health Protection Agency and British Geological Survey document "Indicative Atlas of Radon in England and Wales" (2007) provides a summary of the number of homes in a given area above the "Action Level" for radon. Although the radon atlas relates directly to measurements taken from homes or

dwelling, it is also relevant to employers assessing risks for enclosed underground and groundfloor work places.

- 7.6 The BRE document "Radon: guidance on protective measures for new buildings" (2015) provides guidance for reducing the concentration of radon in new buildings and a two stage procedure using accompanying maps needed to determine the level of protection for a given site.
- 7.7 These documents have been consulted and the site is shown to lie in an area where no protection against radon is needed should development of residential dwellings or new structures of similar form of construction and compartmentation occur.

Environmental Issues

- 7.8 As a result of research mainly via the LIG report, there are no records of pollution controls, prosecutions or enforcements relating to authorised processes.
- 7.9 The Environment Agency data via the LIG report records the following environmental issues at or in the vicinity of the site:
- 13 No. category one and two (significant and major) pollution incidents to controlled waters; and
 - 32 No. discharge consents.
- 7.10 The majority of the pollution incidents and discharge consents within the vicinity of the site relate to the sites former use as a wastewater treatment works.

Archaeology

- 7.11 Preliminary examination of historical maps indicate no apparent features of significant archaeological interest in the general vicinity of the site.

Unexploded Ordnance

- 7.12 A Zetica regional unexploded ordnance (UXO) risk map has been reviewed. The map shows the site to be in a Moderate risk area. However, historical plans show no evidence of potential UXO on site and site investigation works did not encounter any UXO.

8 CONCEPTUAL SITE MODEL

Environmental Issues

- 8.1 Conclusions are drawn from the preceding information in terms of potential sources of contamination, possible receptors that may be affected by any sources of contamination and the pathways that exist between source and receptor. This basic risk assessment allows identification of the suitability of the site for its current and future use and evaluation of any potential environmental liability that may attach to the site. A description of past or existing uses and any chemicals of potential concern is attached at Appendix VII. The issues can be broadly addressed as follows: land contamination, groundwater contamination, surface water contamination, ground gases and air pollution.
- 8.2 The land use history has identified the following potentially significant sources of contamination both on the site and adjacent to the site.

Potentially Significant Contamination Source On Site:

1. Former Sewage Works/WWTW (tanks, storm tanks, sludge beds, settlement tanks, precipitation tanks and filter beds).
2. Former Valley Pit (Coal and Ironstone).
3. Former Mill Pit.
4. Former Old Coal Pit.
5. Former tramway and sidings.
6. Made ground present across the site.
7. Potential asbestos containing material.
8. Coal seams (ground gas).

Potentially Significant Contamination Source Off Site:

9. Surrounding industrial properties including Oak Mill, Chemical Works and Rifle Range.
 10. Historic landfill (209m).
- 8.3 As a result of the land use history presented in previous sections of this report the site may have a number of sources of contamination. For land or groundwater to be designated as polluted a linkage must exist between:
- a source of contamination capable of causing significant harm;
 - human or environmental receptors; and
 - a pathway by which the contamination can reach the receptor.

- 8.4 A conceptual site model was presented in the desk study carried out by URS and a revised conceptual site model was presented in the Wardell Armstrong Phase II report based on the findings of the site investigation. Although a number of potential sources of contamination have been identified through desk study research the previous site investigation work has demonstrated that the only potential contamination source on site for the proposed use is ground gas. Therefore, as there have been no significant changes to the condition of the site since the site investigation works were carried out, the revised conceptual site model presented in the Phase II report is still applicable. The conceptual site model is presented below in Table V.

TABLE V			
Source	Pathway	Receptor	Risk
Ground gases (carbon dioxide, methane)	Lateral and vertical migration of gases and inhalation	Construction workers and future occupiers	Low to Moderate

9 ENVIRONMENTAL RISK ASSESSMENT

Introduction

9.1 The main issues considered in the risk assessment are:

- The environmental risks identified, if any, that may have implications for the current and the proposed use of the site.
- How likely it is that the environmental risks identified may affect the site. This is considered against a background of continuation of the current use and potential for the site to be redeveloped in accordance with the proposed use.
- Other areas of primary concern from a ground engineering and environmental viewpoint that may have been revealed as a result of the research carried out. These features are limited to the scope of work/research carried out and may not cover such factors as the wider planning constraints, archaeology, ecology etc.

9.2 The Model Procedures for the Management of Land Contamination (CLR 11) states that, *“Risk is a combination of the probability or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.”*

9.3 For ease of reference and understanding the risks are assessed against 3 possible levels/categories:

- **Low risk** - site considered suitable for use and environmental setting. Contaminants may be present but unlikely to have an unacceptable impact on key targets. Action unlikely to be needed;
- **Moderate risk** - site may not be suitable for use and environmental setting. Contaminants probably or certainly present and likely to have an unacceptable impact on key targets. Action may be needed in the medium term; and
- **High risk** - site probably or certainly not suitable for use and environmental setting. Contaminants probably or certainly present and very likely to have an unacceptable impact on key targets. Urgent action needed in short term.

9.4 Under each of the categories the environmental issues which have been identified have been assessed with regard to a wide range of topics including (where appropriate):

- the 'source-pathway-receptor' concept;
- the behaviour of potential contaminants within the environment;
- environmental processes;
- industrial operations and best practice;

- current environmental legislation;
- the views and practices of the environmental regulators;
- the likelihood of environmental notices, orders or other enforcement action;
- any requirements to remove waste, contaminated or hazardous materials;
- the health and safety of occupiers or neighbours;
- any redevelopment plans for the site;
- effects on the fabric of buildings caused by contamination; and
- financial and cost implications.

Qualitative Risk Assessment

- 9.5 From the combination of the foregoing information a qualitative assessment of the potential geo-environmental risk is provided in Table VI. Where indicated, these risks may need to be considered for any future redevelopment of the land.
- 9.6 The effect of the present site use on the surrounding area is assessed with regard to the possible contaminant migration from the site off site and with regard to the general environmental setting and land quality of the surrounding area in order to put the on site assessment in context.

TABLE VI			
Issue	Summary	Risk Category	
		Humans	Property/ Environment
Contamination Potential:			
Present site use.	Former North Bierley WWTW.	Low	Low to Mod.
Past site use.	Sewage Works/WWTW, Valley Pit, Mill Pit, Old Coal Pit.	Moderate	Moderate
Impact to site from past and present adjacent land uses.	Oak Mill, Chemical Works, Rifle Range, historic landfill.	Moderate	Moderate
Mining history.	Shallow mining is present beneath the south of the site at approximately 11.5mbgl to 16mbgl. There are ten recorded mine entries on or within influencing distance of the site.	Low	Moderate
Emissions, pollution incidents, discharges etc.	There are 13 pollution incidents and 32 discharge consents within influencing distance of the site predominantly related to the site’s former use.	Low	Low
Asbestos	Asbestos has been tentatively identified in the buildings on site.	Low to Mod.	Low to Mod.
Environmental Sensitivity:			

TABLE VI			
Issue	Summary	Risk Category	
		Humans	Property/ Environment
Geology.	Made ground overlying sandy, gravelly clay interpreted as weathered Coal Measures and mudstone and sandstone of the Pennine Middle Coal Measures.	n/a	n/a
Groundwater vulnerability.	This site is situated on a Secondary A aquifer. The closest active groundwater abstraction licence is 321m south.	Low	Low
Surface water vulnerability.	The nearest graded surface watercourse is the Hunsworth Beck on the eastern site boundary. The closest surface water abstraction licence is 824m north west.	Low	Low to Mod.
Geological constraints:			
Made ground	Made ground is likely to be unsuitable as a founding medium without ground improvement.	n/a	n/a
Risks relating to other constraints (miscellaneous):			
Services	Two intermediate gas pressure mains cross the site, a foul water rising main runs along the eastern boundary of the site and overhead electricity lines pass over the centre of the site.	Low	Low to Mod.
Flooding.	The majority of the site does not lie within a designated floodplain. A small area to the east of the site lies within Flood Zone 3 and a small area in the centre of the site is within Flood Zone 2.	Low	Mod. to High
Liability Issues:			
Risk of liability with past use of site.	Sewage Works/WWTW, Valley Pit, Mill Pit, Old Coal Pit.	Moderate	Moderate
Risk of liability with current use of site.	Former wastewater treatment works.	Low to Mod.	Moderate
Risk of liability for proposed use of site.	The proposed use of the site is redevelopment to commercial/industrial use.	Low	Low
Overall Risk for Site:	Low to Moderate		

10 CONCLUSIONS AND RECOMMENDATIONS

- 10.1 Based on the available desk study information summarised in this report the site is considered to present an overall Low to Moderate risk from past use, adjacent operations, ground instability. However, site investigation information has shown that there is no risk to human health from soils on site and there is a low risk to controlled waters at the site. Therefore, it is considered that there is a Low risk to human health and the environment from redevelopment of the site for commercial/industrial land use.

Mining

- 10.2 Further investigation of the mining setting of the site is recommended. This is likely to take the form of further rotary open-hole drilling to the south of the site and exploratory excavation of areas around potential mine shaft locations. Drawing No. SH10534-008 shows the location of shafts and likely shallow mining.

Ground Gas

- 10.3 Gas protection measures are recommended as a precaution in the southern area of the site (CS2) to address high levels of methane recorded in this area. No gas protection measures are considered necessary over the remainder of the site.
- 10.4 Depending on the development type in the residential area, ground gas protection measures area may be required in this area.

Asbestos

- 10.5 An asbestos survey will be required for the buildings on site prior to any demolition works being carried out.

Flooding

- 10.6 Areas of the site have been designated as being in Flood Zones 2 and 3. It is understood that a Flood Risk and Drainage Strategy has been carried out by a third party and this should be consulted prior to redevelopment of the site.

A P P E N D I X I

Standard Terms and Conditions and Limitations to Reports

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The conclusions and recommendations contained in this Report are based upon information provided by others including details supplied by the client and/or professional advisors on the assumption that all relevant information from whom it has been requested and/or supplied is accurate. Information so provided and/or supplied has not been verified independently by Wardell Armstrong LLP, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by Wardell Armstrong LLP in providing the services are outlined in this Report. The work described in this Report is based on the conditions and information as stated at the date the Report was completed. The scope of this Report and the services are accordingly limited by these circumstances. The findings outlined in the Report together with any opinions expressed and recommendations made are considered to be valid and appropriate at the time of preparation and for the specific purpose or purposes intended. Whilst a walk over site visit may have been carried out as part of the work this has been limited to observations only and no other physical investigations, sampling and testing work has been carried out as part of this work.

Wardell Armstrong LLP disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report which may come or be brought to Wardell Armstrong LLP's attention after the date of the Report. Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Where any site observations have been carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results from any site observations made may vary and further confirmatory work should be made after the issuance of this Report. Wardell Armstrong LLP does not guarantee or warrant any estimates or projections contained in this Report.

APPENDIX II

Guidance on Contamination and Land Quality Statements

CONTAMINATION

Environmental Protection Act Part IIA

Contaminated land was defined for the first time under Part IIA of the Environmental Protection Act 1990. Part IIA was inserted into the 1990 Act by section 57 of the *Environment Act 1995*. The regime came into effect in England on 1 April 2000, Scotland on 12 July 2000 and Wales on 15 September 2001.

Contaminated land is defined as “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:

- (a) significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) significant pollution of the water environment is being caused or there is a significant possibility of such pollution being caused.”

Harm is described in the EPA 1990 as being “*harm to the health of living organisms or other interference with ecological systems of which they form part and, in the case of man, includes harm to his property*”.

There are a number of important government policies and priorities underlying the Act. The first priority is to prevent the creation of new contamination by use of this Act and other controls such as Environmental Permitting (formerly regulated by Integrated Pollution Prevention and Control and Waste Management licensing). The second is to identify and remove unacceptable risks to human health and the environment. In addition there is a desire to bring contaminated land back into beneficial use whilst seeking to ensure that the cost burdens faced by individuals, companies and society as a whole are proportionate, manageable and economically sustainable.

Under Part II(a), Local Authorities are responsible for the inspection of contaminated land and for ensuring that remediation is undertaken where necessary. Local Authorities also maintain a Public Register detailing the regulatory actions that they have implemented. The Environment Agency has a complementary role and acts as the enforcing Authority for designated special sites.

The policy objectives are underlain by the “suitable for use” approach to the remediation of contaminated land, which the Government considers is the most appropriate approach to

achieving sustainable development. This approach recognises that the risks presented by any given level of contamination will vary greatly on a site by site basis.

In general the responsibility for paying for remediation will, where feasible, follow the "polluter pays" principle. In the first instance, any person who caused or knowingly permitted the contaminating substance to be in, or under the land will be the appropriate person(s) to undertake the remediation and meet its costs. If it is not possible to find such a person, responsibility will pass to the current owner or occupier of the land.

Planning Regime

Land contamination, or the possibility of it, is a material consideration for the purposes of town and country planning. This means that the planning authority has to consider the potential implications of contamination both when it is developing structure or local plans and when it is considering individual applications for planning permission. Under the suitable for use approach, risks should be assessed and remediation requirements set, on the basis of both the current use and its proposed new use.

Model Procedures for the Management of Contaminated Land - CLR 11

The Model Procedures for the Management of Contaminated Land (CLR11) was published by the Environment Agency and DEFRA in September 2004. It provides a technical framework for applying a risk management process when dealing with land affected by contamination in a way that is consistent with government policies and legislation within the UK.

The approach presented is designed to be applicable to a range of regulatory and non-regulatory contexts including:

- i. Development or redevelopment of land under the planning regime;
- ii. Regulatory intervention under Part IIA of the EPA 1990;
- iii. Voluntary investigation and remediation; and
- iv. Managing potential liabilities of those responsible for individual sites or a portfolio of sites.

The definition of contaminated land is based upon the principles of risk assessment. *"Risk is a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence"*.

CLR 11 uses the concept of "pollutant linkage" and identifies that there are three essential

elements for any risk:

- A **contaminant** – a substance that is in, on or under the land and has the potential to cause harm or cause pollution
- A **receptor** – something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body; and
- A **pathway** – a route or means by which a receptor can be exposed to, or affected by, a contaminant.

Each of these elements can exist independently, but they only create a risk when all three are present and linked together.

CLR 11 is structured as follows:

Chapter 1 Overview of Model Procedures		
Chapter 2 Risk Assessment	Chapter 3 Options Appraisal	Chapter 4 Implementation of the Remediation Strategy
Preliminary Risk Assessment	Identification of feasible remediation options	Preparation of the implementation plan
Generic quantitative risk assessment	Detailed evaluation of options	Design, implementation and verification
Detailed quantitative risk assessment	Developing the remediation strategy	Long term monitoring and maintenance
Chapter 5 References and Glossary		

A Phase I Environmental Assessment provides the first stage of the risk assessment (Preliminary Risk Assessment in the table above). Further risk assessment (described in Chapter 2) and the subsequent sections (Chapters 3 and 4) of CLR11 are dealt with through site investigation and any subsequent remediation reports.

CLR11 defines the purpose of the Preliminary Risk Assessment to “*develop an initial **conceptual model** of the site and establish whether or not there are potentially unacceptable risks*”. It identifies that during a preliminary risk assessment “*the assessor collects and reviews largely desk-based information to prepare an initial conceptual model to identify possible*

pollutant linkages. The assessor then evaluates the possible linkages, using criteria appropriate to the risk assessment context”.

CLR 11 states that *“Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process”*. The Conceptual model presents the characteristics of the site in diagrammatic or written form and shows the possible relationships between potential contaminants, pathways and receptors. This then forms the basis of the further risk assessment and any site investigation or other works.

RICS Guidance Note: Contamination, the environment and sustainability (GN13/2010)

The document is intended to provide guidance to chartered surveyors (members of RICS). It supersedes an earlier document "Contamination and its implications for Chartered Surveyors" (September 1997) which promoted the concept of a Land Quality Statement (LQS) as the written output of an environmental risk assessment.

In addition to contamination, the document provides a summary and guidance on other factors which might affect land value and environmental duties and/or liabilities. These factors assist with the overall assessment of the site and often provide valuable information to consider within the conceptual model required in CLR11. These factors include, but are not limited to, flooding and flood risk management, invasive species, mineral workings, shallow mining subsidence, natural subsidence risk and radon.

Section 11.8 of the RICS guidance note which sets out what is usually incorporated within a Land Quality Statement as follows:

- *a detailed description of the site and its location, by reference to a plan;*
- *a description of the current uses of the land and of the adjacent land;*
- *a summary of the site history, produced by reference to historical maps, archive records, and statutory, local authority and water authority registers and records;*
- *identification of potential contaminants associated with existing and previous uses, or with geological and hydrogeological features, through site investigation reports and the specialists’ own observations;*
- *identification of other relevant issues, including those pertaining to archaeology, ecology, sites of special scientific interest (SSSIs), human population exposure and characteristics*

of off-site locations that could have an environmental impact or be sensitive to effects from the subject site;

- *conclusions as to:*
 - *whether remedial treatment is necessary or prudent to enable the continued use of the property for its current use without undue risk to the health of persons using the property;*
 - *whether remedial treatment is necessary or prudent to reduce the risk of damage to a third party's health or property, or damage to the environment, which may give rise to a claim for damages, prosecution or action by the appropriate regulatory authorities;*
 - *if remedial treatment is not warranted, whether a residual risk of future claims from third parties and regulatory authorities remains;*
 - *whether concern regarding the risks associated with the known or suspected presence of contamination restricts the prudent use of the property compared with its likely range of possible uses if the site were uncontaminated;*
 - *if the property is to be redeveloped for a specified purpose, how much additional expense would be incurred in investigating contamination of the property further, and in carrying out any necessary remedial work, as compared with an uncontaminated property. Estimates produced prior to intensive investigations are often extremely broad; and*
 - *whether there is a likely implication from the foregoing for the value and/or the viability of development.*

Further information is available from a range of public and professional bodies including central government, local Council and the Environment Agency. Pertinent documents for additional information include Safe Development of Housing on Contaminated Land, 2014; , Managing and Reducing Land Contamination: Guiding Principles, 2010 and the Water Framework Directive (2000/60/EC, 23 October 2000).

A P P E N D I X I I I

Sources of Information

The following principal sources of information have been consulted in the preparation of this report:

- Landmark Envirocheck report dated 14 November 2017 (*a review of information provided by Landmark Information Group Ltd who were commissioned to provide an “Envirocheck” report consisting of published historical plans, environmental data sheets and environmental sensitivity plans;*
- Ordnance Survey County and National Grid Series Plans;
- Trade Directories;
- Other library archive as relevant;
- British Geological Survey published maps and memoirs;
- Environment Agency/NRA Groundwater Vulnerability Map Series;
- British Geological Survey borehole database;
- Environment Agency;
- Coal Authority;
- Other Mining Archives including the Mining Instability Study of GB prepared by Ove Arup;
- Inhouse Wardell Armstrong archives;
- Client information - copies of historical articles, leases, maps;
- Reports by URS Corporation Ltd and Wardell Armstrong LLP;
- Statutory Undertakers; and
- Local Planning Offices.

APPENDIX IV

Site Visit Record

SITE VISIT RECORD

Date of Visit: 16th November 2017
Client: KOL
Site Name: NORTH BIERLEY
Refer to Drawing No:
Visited by: ABDUL REHMAN
Job No: SH10534
Site Contact Name: -
Access (key required): YES
Site Area (Ha):

GENERAL SITE DETAILS

Relevant Identification (names of buildings, roads etc): Site entrance off Cliff
Hollins Lane, 2 buildings on Site

Present Land Use: UNUSED - OPEN YARD AREA
- PART GRASSLAND
- FILTRATION TANKS

Adjacent Land Uses: RESIDENTIAL to N & NW
OFFICES to W

Adjacent public highways, roads leading to / crossing / servicing the site:

- - MOTORWAY M62 to S and E
M606 to W

Site Access (main access points, dimensions, by rig/excavator etc, footpaths):

Cliff Hollins Lane

Site Boundary (hedges, walls and fences open etc):

- Fence around the compound area

Topography (general site setting, land gradients, slopes etc):

- Slopes to the south from the site entrance
- Cross fall across the site from W to E

EVIDENCE OF LAND USE:

Archaeology (old buildings, monuments, mounds, ditches, artefacts in soil, pottery/glass):

Site Relics (evidence of past land use, building remains, roads, humps, bumps, hollows etc):

- Yorkshire Water Infrastructure part of previous waste treatment works

Buildings (general condition/construction, eg: brick/steel framed, asbestos, pits / basement, use):

2 Buildings - Brick - Concrete

Storage Facilities (eg: tanks/drums/chemicals/ capacity/condition/bunding/containment):

Activities/Processes on Site (past and present/materials/equipment):

Past - Filtration Tanks
- Press house

Observable Environment (noise/dust/odours/emissions):

- Background noise from motorway

Waste Management (fly tipping/waste disposal/fires):

Underground Services (evidence of manholes, grates, culverts, water supply, telephone):

- GAS MAIN
- Pipes associated With Rising MAIN
- Further pipes part of previous treatment works

Overhead Services (overhead cables/pipes etc):

- Rising Main adjacent to the Eastern Site Boundary

EVIDENCE OF GROUND CONDITIONS

Vegetation (description and condition, tree, frequency and age, bare patches, saplings, new growth):

- unmanaged grassland
- young trees
- occasional hedges between field boundary

Ecology (woodland, trees, hedges, ponds, running water, water loving plants, wild flowers, wildlife):

- Trees along western boundary - trees are young
- Hanging Wood immediately east of site boundary

Soil Cover (vegetated/unvegetated soil/made ground/hardstanding/condition/cracks/staining):

- Grassland 80%
- Open Yard + Buildings 20%

Evidence of Geological Setting (made ground, natural superfcials and underlying rock):

- None Observed

Groundwater and Drainage (ponding, streams, springs, wells, marshes, tides, rivers, etc):

Hunsworth Beck Adjacent to eastern site
Boundary

Subsidence (fissures, abrupt changes in slope, collapse, tilting trees/posts, property damage):

NONE OBSERVED

Evidence of Mining (surface features, shafts, trenches, tunnels, caves, wells, boreholes, gas, etc):

NONE OBSERVED
NOTE : KNOWN AREA FOR HISTORIC MINING

HAZARDS identified:

- GAS MAIN - OVERLAND RISING MAIN
- OVERHEAD POWER LINES
- RISING MAIN

Additional Remarks:

Photographs/Video: TAKEN

APPENDIX V

Data from Landmark Report

STATUTORY SOURCES OF INFORMATION

Information from the Landmark Information Group Ltd has been summarised in the Table below.

The site sensitivity map and full copy of the Envirocheck data is available on request.

Distance from an Approximate Central Point on Site*			
Agency & Hydrological	On Site	0 to 250m	251 to 500m (*up to 1000m)
BGS Groundwater Flooding Susceptibility	Yes	Yes	Yes
Contaminated Land Register Entries and Notices			
Discharge Consents	19	13	3
Prosecutions Relating to Controlled Waters		n/a	n/a
Enforcement and Prohibition Notices			
Integrated Pollution Controls			
Integrated Pollution Prevention and Control			
Local Authority Integrated Pollution Prevention and Control			
Local Authority Pollution Prevention and Controls			3
Local Authority Pollution Prevention and Control Enforcements			
Nearest Surface Water Feature	Yes		
Pollution Incidents to Controlled Waters	3	23	18
Prosecutions Relating to Authorised Processes			1
Prosecutions Relating to Controlled Waters			
Registered Radioactive Substances			
River Quality	1	3	1
River Quality Biology Sampling Points			
River Quality Chemistry Sampling Points			
Substantiated Pollution Incident Register	1	3	3
Water Abstractions		1	3(*3)
Water Industry Act Referrals			
Groundwater Vulnerability	Yes	n/a	n/a
Drift Deposits		n/a	n/a
Bedrock Aquifer Designations	Yes	n/a	n/a
Superficial Aquifer Designations	Yes	n/a	n/a
Source Protection Zones			
Extreme Flooding from Rivers or Sea without Defences	Yes		n/a
Flooding from Rivers or Sea with Defences	Yes		n/a
Areas Benefiting from Flood Defences			n/a
Flood Water Storage Areas			n/a
Flood Defences			n/a
Detailed River Network Lines			n/a
Detailed River Network Offline Drainage			n/a
OS Water Network Lines	8	27	42
Waste	On Site	0 to 250m	251 to 500m (*up to 1000m)
BGS Recorded Landfill Sites		1	
Historic Landfill Sites		2	2
Integrated Pollution Control Registered Waste Sites			
Licensed Waste Management Facilities (Landfills Boundaries)			
Licensed Waste Management Facilities (Locations)			
Local Authority Landfill Coverage	2	n/a	n/a
Local Authority Recorded Landfill Sites			
Potentially Infilled Land (Non-Water)	3	10	13
Potentially Infilled Land (Water)	5	7	5
Registered Landfill Sites			3
Registered Waste Transfer Sites		1	
Registered Waste Treatment or Disposal Sites			

Hazardous Substances	On Site	0 to 250m	251 to 500m (*up to 1000m)
Control of Major Accident Hazards Sites (COMAH)			
Explosive Sites			
Notification of Installations Handling Hazardous Substances (NIHHS)			
Planning Hazardous Substance Consents			
Planning Hazardous Substance Enforcements			
Geological	On Site	0 to 250m	251 to 500m (*up to 1000m)
BGS 1:625,000 Solid Geology	Yes	n/a	n/a
BGS Estimated Soil Chemistry	Yes	Yes	Yes
BGS Recorded Mineral Sites	4	11	17
BGS Urban Soil Chemistry			
BGS Urban Soil Chemistry Averages			
CBSCB Compensation District		n/a	n/a
Coal Mining Affected Areas	Yes	n/a	n/a
Mining Instability	Yes	n/a	n/a
Man-Made Mining Cavities			
Natural Cavities			
Non Coal Mining Areas of Great Britain	Yes		n/a
Potential for Collapsible Ground Stability Hazards	Yes		n/a
Potential for Compressible Ground Stability Hazards	Yes	Yes	n/a
Potential for Ground Dissolution Stability Hazards			n/a
Potential for Landslide Ground Stability Hazards	Yes	Yes	n/a
Potential for Running Sand Ground Stability Hazards	Yes	Yes	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	Yes	Yes	n/a
Radon Potential - Radon Affected Areas	Yes	n/a	n/a
Radon Potential - Radon Protection Measures		n/a	n/a
Industrial Land Use	On Site	0 to 250m	251 to 500m (*up to 1000m)
Contemporary Trade Directory Entries		12	16
Fuel Station Entries			
Points of Interest - Commercial Services		2	10
Points of Interest - Education and Health			
Points of Interest - Manufacturing and Production	10	1	2
Points of Interest - Public Infrastructure	10	4	1
Points of Interest - Recreational and Environmental		1	
Gas Pipelines			
Underground Electrical Cables			
Sensitive Land Use	On Site	0 to 250m	251 to 500m (*up to 1000m)
Ancient Woodland	1	2	
Areas of Adopted Green Belt	2		1
Areas of Unadopted Green Belt			
Areas of Outstanding Natural Beauty			
Environmentally Sensitive Areas			
Forest Parks			
Local Nature Reserves			
Marine Nature Reserves			
National Nature Reserves			
National Parks			
National Sensitive Areas			
Nitrate Vulnerable Zones	1		
RAMSAR Sites			
Sites of Special Scientific Interest			
Special Areas of Conservation			
Special Protection Areas			
World Heritage Sites			

*The distances recorded are approximate and measured from the site boundary.

** Where 'Yes' and 'No' are referred to this indicates the presence or absence of data and does not imply a potential risk or hazard.

APPENDIX VI

Coal Authority Report

Issued by:

The Coal Authority, Mining Reports Office, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire NG18 4RG
ON-Line Service: www.groundstability.com - Phone: 0845 762 6848 - DX 716176 MANSFIELD 5

CUSTOMER SERVICES,
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DEVON,
EX2 7HY

Person dealing with this matter:	Darren Moody
Our reference:	00052445-10
Your reference:	33198658
Electronic Ref:	EME_00014987250003_005
RRUID:	005.00014987250003
Date of your enquiry:	23 November 2010
Date we received your enquiry:	23 November 2010
Date of issue:	24 November 2010

This report is for the property described in the address below and the attached plan.

Non-Residential Coal and Brine Report

Site At, North Bierley Works, Bradford Road, Oakenshaw, Bradford, West Yorkshire

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	Yes
Brine Compensation District	No

Information from the Coal Authority

Underground Coal Mining

Past

The property is in the likely zone of influence from workings in 3 seams of coal at shallow to 120m depth, and last worked in 1929.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

Within, or within 20 metres of, the boundary of the property there are 10 mine entries, the approximate positions of which are shown on the attached plan.

Coal Authority records disclose the following information:

418427-005. No treatment details.

417427-001. No treatment details.

417427-002. No treatment details.

417427-015. No treatment details.

417427-005. after collapsing in 1997 was plugged with mass concrete by IMC Ltd. on behalf of the Coal Authority in September 1997 .

418427-011. No treatment details.

417427-004. No treatment details.

417427-003. No treatment details.

417427-014. No treatment details.

417427-016. No treatment details.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

Coal-mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast Coal Mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal-mining subsidence

The Coal Authority has not received a damage notice or claim for the property since 1 January 1984. There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of Support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working Facilities Orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to Owners of Former Copyhold Land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Comments on Coal Authority information

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/ former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

The attached plan shows the approximate location of the disused mine entry/entries referred to in this report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan. Property owners have the benefit of statutory protection (under the Coal Mining Subsidence act 1991*). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0845 762 6848 or online at www.coal.gov.uk/services/subsidence. If you wish to discuss the relevance of any of the information contained in this report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source

plans from which the information has been taken these are normally available at our Mansfield office, free of charge, by prior appointment, telephone 01623 637233. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.

*Note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

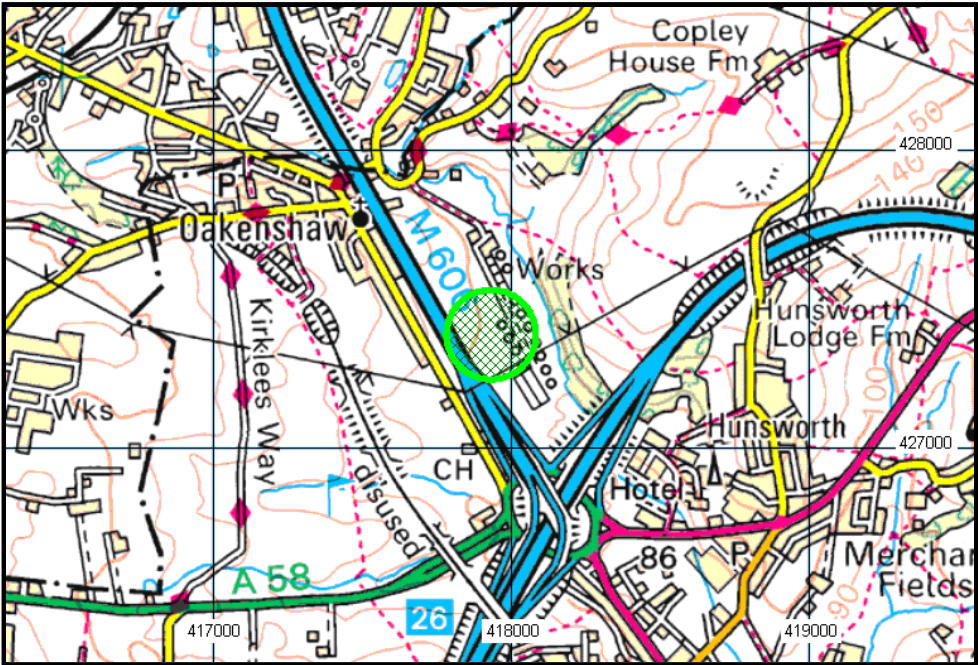
Additional remarks

This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions 2006. The report is compliant with Home Information Pack requirements.

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Location map


Approximate
position
of property



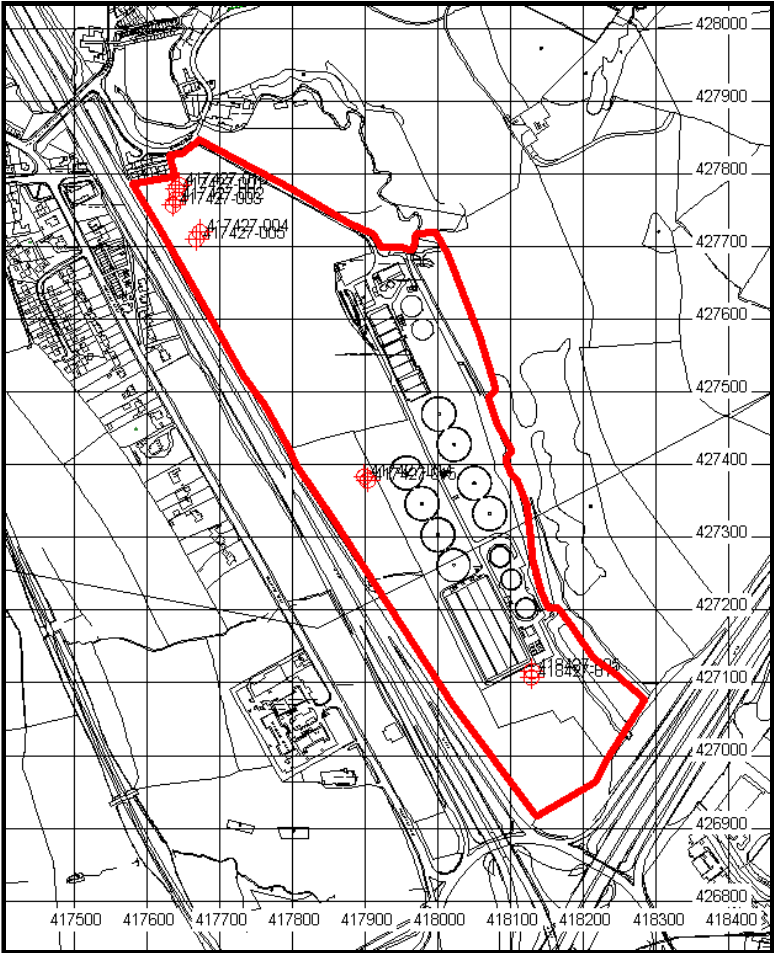
Enquiry boundary

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Key
Approximate position of enquiry boundary shown



Disused Adit or Mineshaft



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The Coal
Authority

Resolving the **impacts** of mining

CON29M Non-Residential Mining Report

MILL CARR HILL ROAD
OAKENSHAW BRADFORD
WEST YORKSHIRE



Date of enquiry: 05 April 2016
Date enquiry received: 05 April 2016
Issue date: 05 April 2016

Our reference: 51001130942001
Your reference: 83821126_1 |

CON29M Non-Residential Mining Report

This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

LANDMARK INFORMATION GROUP LIMITED

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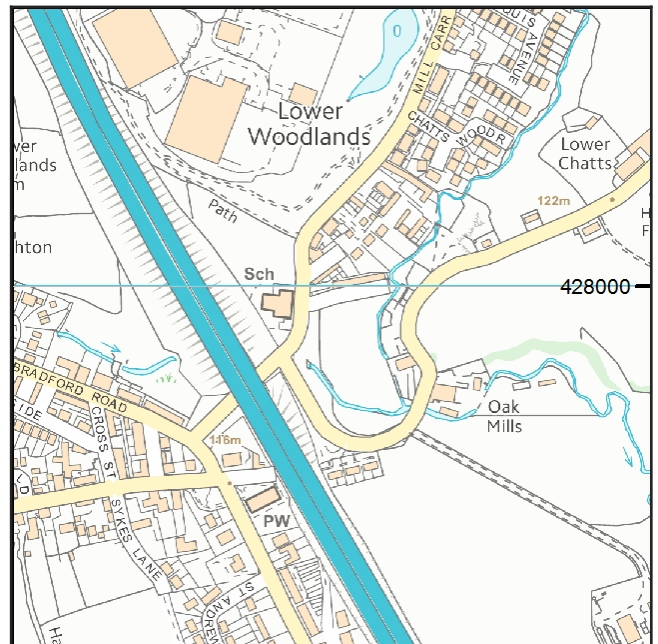
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[in](#) /company/the-coal-authority

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Approximate position of property



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Summary

Has the enquiry boundary identified evidence of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	Yes
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 2 seams of coal at 50m to 80m depth, and last worked in 1903.

Any movement in the ground due to coal mining activity should have stopped.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

5. Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13. Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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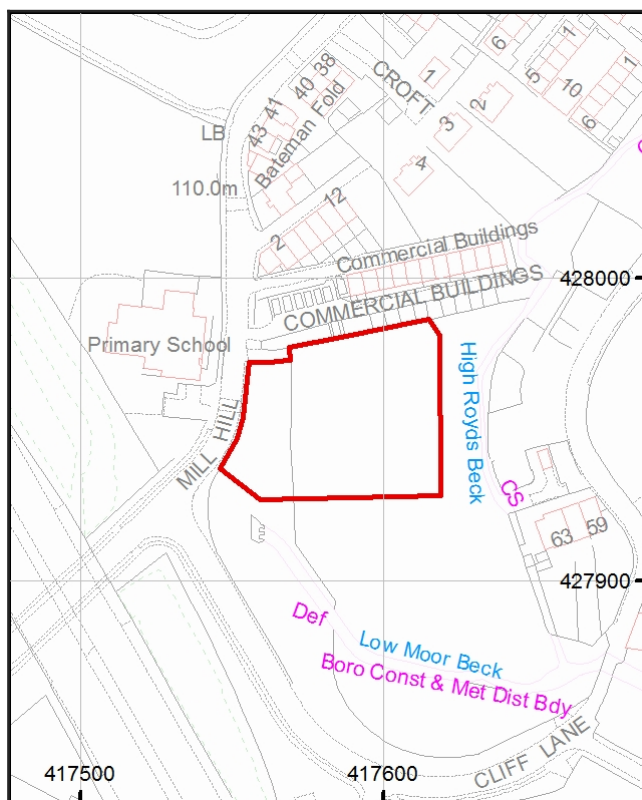
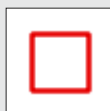
Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



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APPENDIX VII

List of Land Uses and Associated Chemicals of Potential Concern

Industry	Metals and non-metals						Inorganics				Organics					Other chemicals and compounds	
	Common metal suite (Cd, Cr, Cu, Ni, Pb, Zn)	Hg	As	B	Se	CN	Nitrate	Sulphate	Asbestos	pH	Phenol	Acetone	Hydrocarbons	PAHs	Chlorinated hydrocarbons		PCBs
Airports	✓					✓			✓	✓		✓	✓		✓		Dieldrin
Animal and animal products processing works	✓		✓								✓		✓	✓	✓		
Asbestos manufacturing works	✓								✓				✓	✓	✓		
Ceramics, cement and asphalt manufacturing works	✓	✓	✓			✓	✓		✓	✓		✓	✓	✓	✓		
Charcoal works	✓								✓	✓			✓	✓	✓		Ba, S, organotin compounds
Coatings (paints and printing inks) manufacturing works	✓								✓	✓	✓		✓	✓	✓		Ba, chloro-phenol, dioxins/furans
Cosmetics and toiletries manufacturing works	✓								✓	✓	✓		✓	✓	✓		Ba
Disinfectants manufacturing works	✓								✓	✓	✓		✓	✓	✓		Ba
Explosives, propellants and pyrotechnics works	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓		V, dioxins/furans
Fertiliser manufacturing works	✓								✓	✓			✓	✓	✓		Ba
Fire chemical manufacturing works	✓	✓	✓	✓					✓	✓			✓	✓	✓		organotin compounds
Inorganic chemicals manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		Ba
Linoleum, vinyl and bitumen-based floor coverings	✓	✓	✓						✓	✓	✓		✓	✓	✓		V
Mastics, sealants, adhesives, roofing felt works	✓	✓	✓						✓	✓	✓		✓	✓	✓		chloro-phenol, hexachloro-cyclohexane, Dieldrin, dioxins/furans, organotin
Organic chemicals manufacturing works	✓	✓	✓						✓	✓	✓	✓	✓	✓	✓		
Pesticides manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		S, Zn
Pharmaceuticals manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		hexachloro-cyclohexane
Rubber processing works (including tyres)	✓								✓	✓			✓	✓	✓		
Soap and detergent manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		
Dockyards and dockland	✓	✓	✓						✓	✓			✓	✓	✓		
Dry cleaners	✓	✓	✓						✓	✓			✓	✓	✓		
Aircraft manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		
Electrical and electronic equipment works	✓	✓	✓						✓	✓			✓	✓	✓		V, Be
Mechanical engineering and ordnance works	✓	✓	✓						✓	✓			✓	✓	✓		S
Railway engineering works	✓	✓	✓						✓	✓			✓	✓	✓		organotin compounds
Shipbuilding repair and shipbreaking	✓	✓	✓						✓	✓			✓	✓	✓		
Vehicle manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		V, S
Fibreglass and fibreglass resin manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		
Gasworks, coke works and coal carbonisation plants	✓	✓	✓						✓	✓			✓	✓	✓		
Glass manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		
Electroplating and other metal finishing works	✓	✓	✓						✓	✓			✓	✓	✓		V, S
Iron and steelworks	✓	✓	✓						✓	✓			✓	✓	✓		V
Lead works	✓	✓	✓						✓	✓			✓	✓	✓		organolead compounds
Non-ferrous metals (excluding lead works)	✓	✓	✓						✓	✓			✓	✓	✓		V, Ba, Be
Precious metal recovery works	✓	✓	✓						✓	✓			✓	✓	✓		hexachloro-cyclohexane, dioxins/furans
Oil refineries and bulk storage	✓	✓	✓						✓	✓			✓	✓	✓		V
Photographic processing industry	✓	✓	✓						✓	✓			✓	✓	✓		organolead compounds
Power stations (excluding nuclear power stations)	✓	✓	✓						✓	✓			✓	✓	✓		V, Ba, Be
Printing and bookbinding works	✓	✓	✓						✓	✓			✓	✓	✓		hexachloro-cyclohexane, dioxins/furans
Pulp and paper manufacturing works	✓								✓	✓			✓	✓	✓		V
Railway land	✓								✓	✓			✓	✓	✓		organolead compounds
Road vehicle: garages and filling stations	✓								✓	✓			✓	✓	✓		V, S, organolead compounds
Road vehicle: transport and haulage centres	✓								✓	✓			✓	✓	✓		Dieldrin
Sewage works and sewage farm	✓	✓	✓						✓	✓			✓	✓	✓		chloro-phenol, hexachloro-cyclohexane, Dieldrin, organotin
Textile works and dye works	✓	✓	✓						✓	✓			✓	✓	✓		V, Ba, hexachloro-cyclohexane, Dieldrin
Timber products and manufacturing works	✓	✓	✓						✓	✓			✓	✓	✓		dioxins/furans
Timber treatment works	✓								✓	✓			✓	✓	✓		Ba
Drum and tank cleaning and recycling plants	✓								✓	✓			✓	✓	✓		
Hazardous waste treatment plants	✓	✓	✓						✓	✓			✓	✓	✓		
Landfills and other waste treatment/disposal sites	✓	✓	✓						✓	✓			✓	✓	✓		
Solvent recovery works	✓								✓	✓			✓	✓	✓		
Metal recycling sites	✓	✓	✓						✓	✓			✓	✓	✓		

* The information in this table is indicative only and does not present a comprehensive review. The data is summarised from R&D Publication CLR 8, Potential Contaminants for the Assessment of Land, DEFRA and EA, 2002. Assessment of individual sites requires knowledge of historic land use and specific site processes. Irrespective of the information present above there are several contaminants of concern such as hydrocarbons and PCBs, that can be found on any industrial site of significant size.

DRAWINGS



DO NOT SCALE FROM THIS DRAWING

A2

REFERENCE

SITE INVESTIGATION BOUNDARY

DEVELOPMENT AREA BOUNDARY

APPROXIMATE LOCATION OF SHELL & AUGER BOREHOLE TO A NOMINAL DEPTH OF 10m BGL

APPROXIMATE LOCATION OF SHELL & AUGER BOREHOLE TO A NOMINAL DEPTH OF 10m bgl WITH ROTARY FOLLOW ON TO 30m BGL

APPROXIMATE LOCATION OF WINDOW SAMPLE BOREHOLE TO A NOMINAL DEPTH OF 5m BGL

(BOREHOLES SHOWN HIGHLIGHTED HAVE INSTALLATIONS)

APPROXIMATE LOCATION OF TRIAL PIT EXCAVATION

APPROXIMATE LOCATION OF TRIAL PIT EXCAVATION WITH SOAKAWAY

APPROXIMATE ROUTE OF FOUL SEWER WITH EASEMENT

APPROXIMATE ROUTE OF SW SEWER WITH EASEMENT

APPROXIMATE ROUTE OF WATER WITH EASEMENT

APPROXIMATE ROUTE OF ELECTRICITY WITH EASEMENT

APPROXIMATE ROUTE OF O/H ELECTRICITY WITH EASEMENT

APPROXIMATE ROUTE OF GAS WITH EASEMENT

POSSIBLE AREA OF SHALLOW MINING

GEOLOGY:

SHERTCLIFFE BED COAL OUTCROP

FAULT

SHAFT (after BGS) WITH 15m RADIUS ZONE OF UNCERTAINTY

SHAFT (after CA) WITH 15m RADIUS ZONE OF UNCERTAINTY

BH2

BH4

WS101

TP102

TP101

NOTES

1. APPROXIMATE LOCATION OF YORKSHIRE WATER APPARATUS (TAKEN FROM YW DRG No C411-05/104) SHOWN IN RED.

2. DEVELOPMENT LAYOUT TAKEN FROM ILLUSTRATIVE MASTER PLAN DATED 26.09.17

C	Layout Revised.	08/10/17	DP	JL	JS
B	Layout Revised.	18/04/16	DP	PAL	GW
A	First Issue	25/11/15	DP	JL	GW

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D

CLIENT

KEYLAND DEVELOPMENTS LTD

PROJECT

NORTH BIERLEY WWTW

DRAWING TITLE

SITE INVESTIGATION DEVELOPMENT PLAN

DRG No.	SH10534-008	SCALE	1:2500 @ A2	DATE	22/05/15
DRAWN BY	DP	CHECKED BY	JL	APPROVED BY	GW

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☐ WEST BROMWICH	TEL 0121 580 0909	☐ SHEFFIELD	TEL 0114 245 6244
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