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Phase 1 Geo-environmental Report

ON

PROPOSED DEVELOPMENT

AT

WOMBWELL LANE, ALDHAM

FOR

RISEHOLM INVESTMENT LTD

JANUARY 2015

**E14/6049/R001C
REV C**

Prepared by

M.Huddleston MEng

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1.0 INTRODUCTION

- 1.1 This report is commissioned to examine the risk of contamination for the above site in line with the recommendations of Part II of the Environmental Protection Act 1990 PPS 23. It is based on information provided by both the client and statutory bodies in both written and verbal format. It is assumed that all information given is correct and factual at the time of writing this report. No liabilities can be accepted for information provided by third parties and subsequently found to be in error.

2.0 THE SITE

- 2.1 The site is located to the east of Wombwell Lane, Barnsley and is situated around Ordnance Survey grid reference 438653, 404468. A site location plan is included in Appendix A.
- 2.2 The site is irregularly shaped. The south western boundary is formed by Wombwell Lane, and the north western boundary by Old Farm Lane. To the north east is a dismantled rail track and to the south east is the Rive Dove. There is residential development to the west, a warehouse to the south west and wooded areas and open field in the remaining directions. The site area is approximately 0.60ha.
- 2.3 The majority of the site is hard paved, with a covered forecourt for the filling station in the western third, and single storey brickwork commercial units in the northern third. To the south of the commercial units is a hard paved area currently being used as a carwash with temporary cabins. In the south east and north east of the site are wooded areas. The site appears to be fully drained, and discharges to a combined sewer in Old Farm Lane.
- 2.4 To the south of the main garage building, there are a number of manholes associated with the underground fuel tanks. To the west of the garage there is a manhole access to a petrol interceptor, which treats the surface water run-off before it enters the combined sewer in Old Farm Lane.
- 2.5 Two outfall pipes from the south of Wombwell Lane discharge into a concrete channel adjacent Wombwell Lane in the south east of the site that then discharges into the River Dove.

2.6 The western and northern boundaries of the site are formed by an approximately 1m high brick wall, which also retains the land to the north. There is a knee high metal post and rail fence on the boundary to Wombwell Lane with gated vehicular access. On the eastern boundary is a 2m high concrete post and chicken wire fence.

2.7 The site generally falls from the south-east to the north-west. A high point of approximately 100.76m is located in the south eastern corner of the site and a low point of approximately 99.40m in the north western corner. The site steeply banks down to the River Dove on the eastern boundary, which is approximately 2-3m below site levels. The dismantled railway banking to the north of the site is retained approximately 1m above the level of the site. A complete survey of the proposed development was not available at the time of writing the report.

3.0 SITE HISTORY

A number of historical Ordnance Survey plans from 1850-2012 have been consulted. These are contained for reference within Appendix C to the rear of the report. Below is a brief description outlining the significant developments that may effect future construction of the site.

Date	Historical uses on site	Historical findings within 100m perimeter of the site	Historical findings further than 100m perimeter of the site
1850	i). Site is shown as open field. ii). Wombwell Lane on western boundary. iii). Railway line on eastern boundary. iv). River Dove on southern boundary.	i). Dearne & Dove canal 25m to the south. ii). Aldham Mill (Corn) 100m to the south.	i). Mitchell Main colliery 750m to the south east.
1890-1893	i). The on-site features are similar to the previous sheet.	i). Residential buildings to the north. ii). Air shaft 90m to the south.	i). No significant features within 500m of the site.
1904-1906	i). The on-site features are similar to the previous sheet.	i). The features within 100m of the site are similar to the previous sheet.	i). Glass bottle works 500m to the south west.
1931	i). The on-site features are similar to the previous sheet.	i). Residential development to the north west of the site. ii). Sludge bed and tanks 25m to the north east on far side of railway line.	i). Colliery workings extended to within 300m of east of site.
1932-1960	i). The on-site features are similar to the previous sheet.	i). The features within 100m of the site are similar to the previous sheet.	i). No significant developments further than 100m from the site
1961-1966	i). Garage shown in north corner of site.	i). Further residential development to the west of the site. ii). Air shaft no longer shown 90m south of site.	i). Mitchell Main colliery no longer labelled. ii). Textile factory 250m to the south east.
1970-1977	i). Several buildings shown to east of garage on site.	i). Canal no longer shown, labelled as drain. ii). Warehouse 25m west of site.	i). Opencast workings 400m east of site. ii). Residential development 150m south of site.
1982-1987	i). Three large buildings now shown in north of site as part of garage.	i). Railway line to east dismantled.	i) Industrial estate 200m to the east. ii). Opencast workings to east of site now labelled as disused tip.
1988-2012	i). The on-site features are similar to the previous sheet.	i). The features within 100m of the site are similar to the previous sheet.	i) No significant developments further than 100m from the site

4.0 SITE GEOLOGY & MINING

- 4.1 The BGS Digital Geological Map of Great Britain at 1:50,000 scale has been consulted and we would report as follows:-
- 4.2 The site is shown to be underlain by superficial deposits of Alluvium consisting of Clay and Silt. There is a moderate hazard rating for compressible deposits associated with the Alluvium.
- 4.3 The site is underlain by the Oaks Rock formation consisting of Sandstone.
- 4.4 The nearest fault line is recorded 176m south east of the site heading to the south east.
- 4.5 The Coal Authority Report states that the property is in the likely zone of influence from workings in 7 seams of coal at 100m to 600m depth, and last worked in 1985. Any ground movement from these coal workings should have stopped by now.
- 4.6 The online Coal Authority resources indicates there are no coal outcrops in the vicinity of the site.
- 4.7 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.
- 4.8 There are no known coal mine entries within, or within 20 metres of, the boundary of the property.
- 4.9 There are no subsidence claims within 50 metres of the site.
- 4.10 There are no BGS boreholes recorded on, or in the immediate vicinity of, the site.

5.0 ENVIRONMENTAL CONSIDERATIONS

5.1 Radon

The property is in a Radon Affected Area, as between and 1 and 3% of properties are above the Action Level.

No Radon Protective Measures are necessary.

5.2 Landfill Sites

There are no recorded historical or current landfill sites within 250m of the site.

However, there are historical workings and possible areas of made ground associated with a former canal 13-40m south of the site and railway cuttings 138-144m north west of the site.

5.3 Flood Risk

The site lies within currently designated Environment Agency Zone 2 and Zone 3 floodplains.

There is a designated Flood Storage Area immediately to the east of the site.

The Flood Risk Assessment for the site specifies minimum floor levels for the development, and the requirement for a compensatory flood storage area to mitigate effects of the proposed development on the surrounding area.

5.4 Groundwater

The superficial Alluvium strata and Sandstone bedrock underlying the site are classified as Secondary (A) Aquifers. Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

There are no groundwater abstraction licences recorded within 250m of the site.

There are three recorded discharge consents within 250m of the site. Two are recorded 104m south west of the site discharging to the land, and a third is 119m to the west discharging to Dob Sike.

There are no recorded surface water abstractions within 250m of the site.

There are no recorded pollution incidents in controlled waters within 250m of the site.

The site is not in a source protection zone.

The River Dove runs along the southern boundary of the site from west to east, this is classified as a Primary River. An un-named Secondary River flows into the River Dove at the southern corner of the site.

5.5 Historical Site Usage

The site has been historically used as a petrol filling station.

Documentation has been obtained from the Fire Service detailing the location of the underground petrol tanks and is included to the rear of the report.

The storage tanks are understood to be empty and capped.

6.0 PRELIMINARY CONCEPTUAL SITE MODEL

- 6.1 The initial stage in assessing the risks posed from contaminated land during the redevelopment of a site is to prepare a conceptual model. A generalised conceptual model can be developed highlighting the main pollutant linkages through a contaminant ► pathway ► receptor model for a commercial development. In order to prepare the conceptual model for a particular site the following parameters need to be reviewed as discussed below.
- 6.2 Contamination of existing land can be caused by a number of factors, including:-
- i) Possible historical/current industrial activities.
 - ii) Disposal of waste materials.
 - iii) Storage of materials.
 - iv) A number of natural processes can also lead to hazardous gases and elevated heavy metals.
- 6.3 Potential pathways can include ground and surface water, permeable strata, existing services providing a conduit and voided ground. Potential receptors can include human health, ecosystems, controlled waters and building structures. There are a number of ways that a receptor can be exposed to the contaminant these include, inhalation, direct contact, ingestion, dermal contact and uptake.
- 6.4 Sources of potential contamination, that could affect the proposed development, from either on or off site activities would include the following:-
- i) Possible leakage/spillage of fuels/hydrocarbons from underground tanks.
 - ii) Construction materials used within filling station construction.
 - iii) Possible made ground used to level the hard paved areas.
- Based on the above activities the potential for some contamination to exist on site is considered to be low/moderate.
- 6.5 Considering the proposed residential end use, there will be two possible human receptor groups exposed to the existing onsite contamination:-
- a) Site operatives during development.
 - b) End users, future site residents (the critical receptor is a 17 year-old female).
- 6.6 Human receptors may be exposed to site contamination by a number of possible pathways. These pathways are summarised in Table 1 below.

Table 1- Potential Human Exposure Pathways

<u>Human Exposure Pathway</u>	<u>Site Residents</u>	<u>Construction Workers</u>
Soil Ingestion	YES	YES
Consumption of Home Grown Vegetables	NO	NO
Dermal Contact	YES	YES
Dust Inhalation	YES	YES
Gases/Vapours	YES	NO

- 6.7 The construction workers will come into contact with any contaminated soil to a far greater extent than future residents. The exposure pathways are generally through dermal contact and indirect ingestion. However their exposure will be for a limited time and the provision and correct use of personnel protective equipment and adequate welfare facilities during construction should restrict their risks to acceptable levels
- 6.8 The risk of pollution to controlled waters by existing contamination is considered low. River Dove is located on the southern boundary and is classified as a primary river. There are no recorded incidents of pollution to the river, and the site is reported to be underlain by relatively impermeable silts and clays. The superficial and bedrock strata are classified as Secondary (A) aquifers. There are no licensed ground water abstractions within 250m of the development.
- 6.9 No specific areas of ecological importance have been identified in the initial desk top study. Therefore the site is considered to be in a low risk environmental setting. The potential for phototoxic materials to exist at shallow depth should be considered, these could pose a potential risk to new planting and soft landscaping areas within the proposed development.
- 6.10 The proposed planning drawings indicate commercial properties to be constructed. The presence of elevated sulphates and hydrocarbons could affect the long term integrity of buried concrete structures, including foundations and drainage pipes. Plastic water supply pipes can also be damaged by the presence of hydrocarbon contamination.

7.0 CONCLUSIONS

- 7.1 The site was developed for use as a garage/filling station in the 1960s, and has seen little development since. There are records of fuel storage tanks beneath the site. There is residential development to the west, and a warehouse to the south west. To the north east and east there are wooded areas and fields. We therefore believe the site has a low/moderate risk of ground contamination being present.
- 7.2 We would recommend that a Stage II Ground Investigation is undertaken. Trial pitting should be undertaken on site to enable the underlying strata to be confirmed and foundations for the new development to be specified.
- 7.3 Prior to demolition works commencing on site, an asbestos survey should be undertaken to determine if the existing properties on site contain asbestos, and a suitably qualified contractor employed to remove any materials identified. Following demolition, samples of the exposed surface strata should be taken to confirm the successful removal of any asbestos from site.
- 7.4 The fuel storage tanks should be inspected to confirm the existing treatment undertaken and the condition of the tank structure. Similarly, the Petrol Interceptor should be investigated to confirm its condition. In addition to this, samples of the natural soil strata to the perimeter of the storage tanks and petrol interceptor should be taken to confirm/validate that no leakage has taken place and the existing tanks are intact.
- 7.5 If the storage tanks are to remain in-situ, they should be infilled with concrete to prevent possible future collapse.
- 7.6 Should the fuel tanks and petrol interceptor be removed from site, samples should be taken from the base and perimeter of the excavation to confirm the natural strata is clean and suitable to remain. Where heavy contamination is found, a further volume of material should be excavated and removed from site. This process should be repeated until testing proves that the remaining material is suitable to be retained on-site.
- 7.7 The risk of ground gas from the former canal to the south west is considered to be very low as it was backfilled in excess of 30 years ago. It is likely that this has been infilled with inert material. However, if any organic materials have been used, these

tend to reduce in productivity of ground gas approaching 30 years of activity. Any possible sources of ground gas located within the infill material are likely to be unproductive now and pose low risk to the future users of the development site.

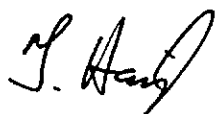
- 7.8 Soil samples from any made ground present or areas showing visual/olfactory signs of contamination should be taken for contamination testing for the normal ICRL, asbestos and total TPH. If any contamination is found, a site remediation report should outline the most effective method of dealing with the contamination and any validation requirements.

Prepared by



M. Huddleston. MEng

Checked by



T. Haigh. BSc.,C.Eng.M.I.C.E.

January 2015

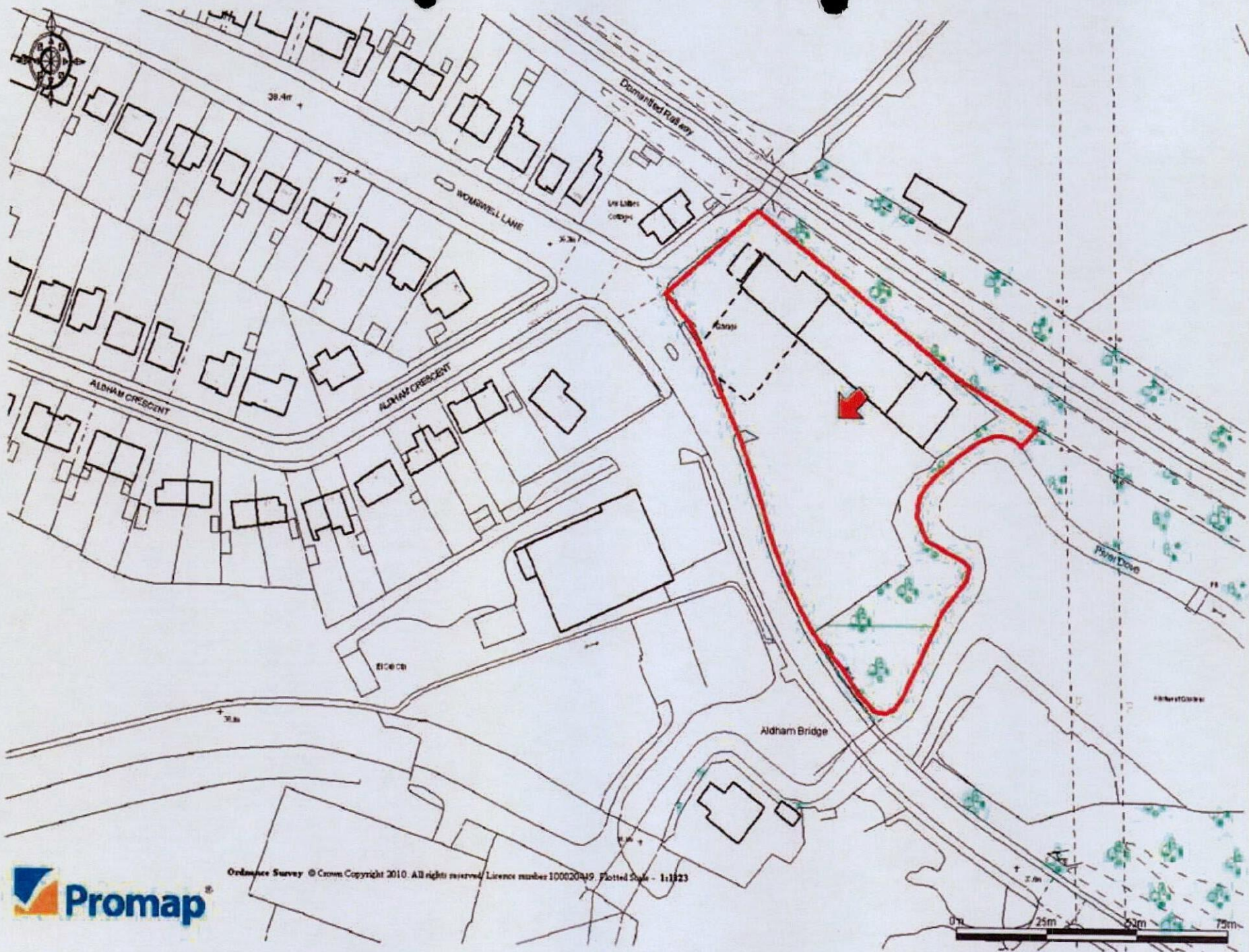
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APPENDIX A

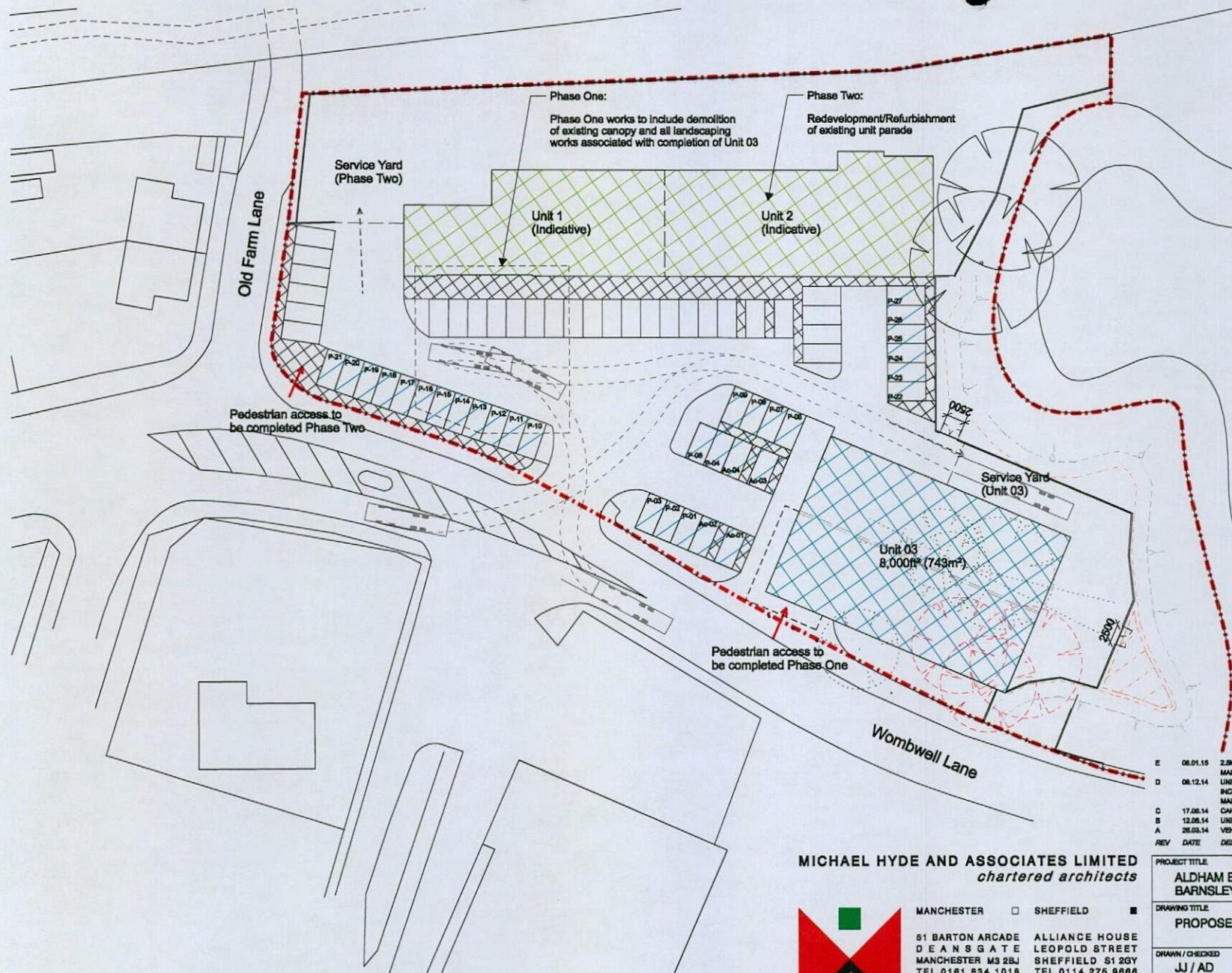
LOCATION PLAN

PLANNING LAYOUT

FIRE SERVICE FUEL TANK RECORDS



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Parking:

New Unit 03

Parking bays 37
Acc. bays 03

Overall parking 30 (inc. Acc)

--- Denotes 2m strip adjacent to top to river bank for maintenance access by EA

□ Denotes minimum area of 20m² adjacent to the river for maintenance access by EA. Area shown larger than 20m² and accessed through service yard to Unit 03

Trees:

- ⊙ Existing trees retained
- ⊙ Existing TPO trees (T4, T5, T6, T7) permission obtained for removal
- ⊙ Existing TPO trees (T1, T2, T3) to seek permission for removal
- ⊙ Indicative new trees proposed

--- Denotes site boundary

--- Denotes vehicle delivery route to and from Unit 03

E	06.01.15	2.5M WIDE DOUBLE GATED ACCESS POINTS ADDED FOR EA MAINTENANCE REQUIREMENTS	AD	AD
D	06.12.14	UNIT 03 REPOSITIONED TO ACCOMMODATE EA REQUIREMENTS, INCLUSION OF 2M STRIP TO TOP OF RIVER BANK AND 30M MAINTENANCE AREA FOR EA	AD	AD
C	17.06.14	CAR PARKING REPOSITIONED (ALLOCATED)	AD	AD
B	12.06.14	UNIT 03 INCREASED TO 8,000SQ FT AREA	AD	AD
A	26.03.14	VEHICLE TRACKING ADDED	JJ	AD
REV	DATE	DESCRIPTION	DRN	CHD

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PROJECT TITLE ALDHAM BRIDGE, WOMBWELL LANE BARNSELY		
DRAWING TITLE PROPOSED SITE PLAN - PHASE 1		
DRAWN / CHECKED JJ / AD	DATE MAR 2014	SCALE 1:500 @ A3
JOB No 3RI1	DRAWING 3RI1-0-100	REVISIONS E

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LICENCE TO KEEP PETROLEUM SPIRIT AND

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(hereinafter called
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2	2	18000	Diesel
3	3	Nominal Quantity for Breathing State Licence	
4	4	Nominal Quantity for Breathing State Licence	
5	5	Nominal Quantity for Breathing State Licence	

on the premises situated at: Aldham Bridge Service Station
Wombwell Lane
Wombwell
Barnsley
S73 8EP

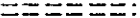
(hereinafter called
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for the period of 12 months until 02 April 1999

The Licence is granted subject to the conditions included within.

Dated 01 April 1998

..... J. Od
CHIEF FIRE OFFICER MS

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	VENT PIPE STACK
	ELECTRIC AIR MACHINE
	DRAINAGE CHANNEL
	OFFSET FILL POINT
	SAND OR OTHER ABSORBENT
	FIREMANS SWITCH
	TANKER STAND
	GAUGES
	CANOPY