

GEO-ENVIRONMENTAL AUDIT

PHASE 1 Preliminary Risk Assessment

PHASE 2 Site Investigations

PHASE 3 Remediation Statement

Proposed Residential Development

Land off Belfield Lane

Rochdale

OL16 5AY

Author: Daniel Slattery
Client: Jurnni International Ltd
Reference: rep-tjba-JI-land off belfield ln-phs1,2,3env-041023.docx

Revision	Date	Reason
0	March 2019	Original to support planning application.
1	Oct 2023	Phs 1 updated, Phs 2 & 3 added to support planning predev discharge application.

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1. PHASE 1 - PRELIMINARY RISK ASSESSMENT

1.1. Introduction

T. J. Booth Associates have been appointed by Mr Javed Iqbal of Jurnni International Ltd to undertake a Phase 1, 2 & 3 Geo-environmental Audit to a Site off Belfield Lane, Rochdale.

The Development Site is located in a semi-urban area close to the town centre, and is predominantly residential, although there is some commercial land use to the wider local area.

The Site currently comprises a vacant plot of land, which is overgrown with vegetation and felled trees nestled between Belfield Lane, the Lancashire/Yorkshire railway & residential dwellings & gardens.

The original Phase 1 version of this report was authored by T J Booth Associates in March 2019 to support a planning application for residential development.

A planning application was subsequently submitted in March 2019 & obtained in April 2023 under reference No: 19/00038/FUL; for "Residential development for the erection of 8 dwellings – Resubmission of 18/00172/FUL".

Condition No. 7 on the planning permission related to environmental assessment of the Site as follows:

- 7 No development shall take place until an investigation and risk assessment (in addition to any assessment provided with the planning application) has been submitted to and approved in writing by the Local Planning Authority. The assessment shall investigate the nature and extent of any contamination on the site (whether or not it originates on the site). The assessment shall be undertaken by competent persons and a written report of the findings submitted to and approved in writing by the Local Planning Authority before any development takes place.

The submitted report shall include:

- i) a survey of the extent, scale and nature of contamination
- ii) an assessment of the potential risks to:
 - o human health,
 - o property (existing or proposed) including buildings, crops, livestock, pets, woodland, and service lines and pipes,
 - o adjoining land,
 - o groundwaters and surface waters,
 - o ecological systems,
 - o archaeological sites and ancient monuments;
 - iii) where unacceptable risks are identified, an appraisal of remedial options and proposal of the preferred option(s) to form a remediation strategy for the site.

The development shall thereafter be carried out in full accordance with the duly approved remediation strategy and a verification report submitted to and approved in writing by the Local Planning Authority before any of the buildings hereby approved are first occupied.

This report provides a desk-based study & intrusive ground investigation based on current UK guidance for environmental investigation within the construction industry. Principal to the assessment is the potential for contamination pollutant linkages via the CLR-11 source-pathway-receptor methodology. Assessment of potential pollution linkages is primarily undertaken in strict accordance with BS 5930:2015, BS 10175:2011+A2:2017, CIRIA C665, and BS 8485:2015+A1:2019 et al.

1.2. Proposed Development

It is proposed to redevelop the Site for a residential end use. It will be accessed via the southeast corner which is where the level difference between the general Site level and highway is at its lowest. The new access will rise up into the Site creating a cul-de-sac.

The proposed development is for 4No. blocks of 3 storey semidetached dwellings, totalling 8No. dwellings.

Each property will have a driveway to the front/sides, and soft landscaped garden areas to the front and rear.

There will be an area at the front of the Site which will comprise public open space.

1.3. Historic Maps

DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
c1850	Site is part of agricultural land. No structures to note. Land contours indicate the Site is relatively level with an embankment sloping off down towards highway at the east side.	Off-site nominally 10m north, land elevation slopes off down towards the bottom of the railway embankment. The railway is approx. 25m north. There is a small sandpit 110m north. Some residential dwellings, cottages & farm houses in the wider area. Stanney Brook is 350m E with some mill reservoirs noted nearby.
c1890	No change.	Newbold Cotton Mill approx 250m northeast. Some additional development in the wider area.
c1910	Maps now show that the embankment to the north side of the Site has moved closer to within the north Site boundary. This is due to a new cutting/roadway between the Site and the railway, linking Belfield Mill Lane (east) to Marshall Street (west).	Maps now show that the embankment to the north side of the Site has moved closer to within the Site boundary, due to a cutting/roadway between the Site and the railway, linking Belfield Mill Lane & Marshall Street to the west. Textile Machinery Works noted 110m northeast. Shafts to the northeast now noted as old.
c1930	Southern boundary of the site delineated.	Expansion of Newbold Textile Machinery Works to the northeast to with crane & chimney within approx 35m of the site. Made ground noted to the north & west sides of the works. Garages/sheds noted to the south. Sand pit 80m north. Further made ground etc noted to the north side of the railway.
c1937	No change.	Further residential development in the wider area.
c1960s	Building/structure noted to the northwest corner of the site.	Further expansion of Newbold Textile Machinery Works to the northeast. Further made ground noted to the north of the railway and to what is now Waithlands historic landfill to the north. Air shafts noted approx 160m west.
c1990	No change.	Much of Waithlands to the north now indicated as filled ground. Whitworth branch railway line now dismantled.

1.4. Present Day Maps

Site boundaries, outlines of structures and buildings:	The Site comprises a vacant rectangular plot of land which is nestled between the scrub & railway land to the north, Belfield Mill Lane to the east, residential gardens & garages to the south, and vegetated land to the west. There are no permanent structures on the Site. The local area is predominantly residential to the east, west & south of the Site. Across the railway to the northwest is an industrial area.
Ground contours, natural drainage features:	The Site is on a plateau with embankment slopes to the north and east sides. A level survey has been undertaken revealing the following levels: Site plateau between 101.35 northwest corner & 102.13 southeast corner. Belfield Lane is 100.00 southeast & 97.06 to the northeast corner adjacent to the cutting. The cutting rises approximately 99.10 at the northwest Site corner. Locally natural drainage features are to the north towards the Roch Valley. The local area is developed and thus benefits from sewerage systems.

Water courses:	The closest watercourse is Stanney Brook 350m northeast. The River Roch is approx 450m northwest.
Below ground obstructions:	None noted on current maps/plans.

1.5. Geology

Bedrock geology:	Site is underlain by Westphalian Carboniferous Pennine Lower Coal Measures. Strata dips gently to the southeast. The south boundary of the Site is delineated by a fault running northeast-southwest dipping to the N.
Superficial geology:	The Site & local area are underlain by glaciofluvial sand & gravel.
Coal seams.	The only coal seams outcropping locally are to the northeast. The closest is separated from the Site by faulting. The bedrock below the Site does not contain any shallow seams.
Radon.	The Site is in radon area with between 1-3% of homes at or above the action level. No protective measures required.

1.6. Boreholes Records

There were no relevant boreholes noted locally.

1.7. Planning Data

No relevant applications that are pertinent to the environmental assessment.

1.8. Environment Agency Records

Flood zone:	Site is within Flood zone 1.
EA Recorded Landfill:	3 landfill sites within a 250m radius of the Development Site as follows: Rochdale-Leeds Railway 40m NW Sept 1989 Dec 1990 Wastes tipped include: inert & industrial wastes. Land off Belfield Lane 70m N Dec 1942-Unknown Wastes tipped include: inert & industrial wastes. Waithlands 200m NW Dec 1922-July 1985 Wastes tipped include: inert, industrial, commercial, household & liquids/sludges.
Groundwater source protection zone:	Not in a source protection zone.
Superficial aquifer:	Secondary A.
Bedrock aquifer:	Secondary A.

1.9. Coal Authority

Mine Shafts, Pits, Adits/Entries:	No coal entries within 20m of the site boundaries. Closest is approximately 250m northeast.
Past Recorded Underground Mining.	No recorded workings noted beneath the Site.

Present/Future Mining.	Underground	Not known to be a risk.
Unrecorded Shallow Underground Workings:	Probable/Potential	The map indicated there is a conjectured coal outcrop close to the SW off site which could potentially have been worked. However, no probable workings are shown within the Site boundaries.
Past/Present/Future Mining/Opencast:	Surface	None noted locally.
Mining Geology and Subsidence:		Not noted.
Hazards and Mine Gas:		Unknown.
Development High Risk Area:		The Site is NOT within a Development High Risk Area.
Abandonment Plan Data:		No data available.

1.10. Industry Profiles

N/A.

1.11. Site Reconnaissance

Details of existing structures:	The Site was accessed via a grassed ramp to the SE corner. It was raised in respect to Belfield Lane and to the cutting to the north side sloping down to each side in the order of between 2-4/5m. The Site was vegetated primarily comprising overgrown grass with brambles/shrubs and nettles to the perimeters. There were some felled juvenile trees to the centre of the Site, and a stump was noted close to an area of brick/stone northeast of the Site centre. Fencing was noted around the north & west perimeters. No structures/buildings were noted.
Adjacent properties:	The Site is surrounded by residential garden and garage areas to the south, open land to the west, and Belfield Lane to the east side. There was a cutting to the north approx 4-5m lower than the Site, which then rises back up to the railway.
Water levels, directions of flow and rates in rivers:	None noted.
Old mine or quarry workings:	None noted.
Obvious/immediate hazards to health/safety:	None noted.
Areas of discoloured soil, polluted water, vegetation, and significant odours:	A small excavation was noted approx 1.2m deep. The soil profile comprised approx 400mm dark brown/black ashy silty sandy stony topsoil/MADE GROUND above orange/brown SAND & GRAVEL.
Relevant ground levels, ground water levels, positions of wells and springs:	Site is relatively level, however at its greatest there is a fall to neighbouring land in the order of approx 4-5m to the N side/NE corner.

1.12. Identification of Source-Pathway-Receptor.

1.12.1. Summary & Discussion.

The Site is located in a semi-urban part of Rochdale. Historically, it has always remained as agricultural/vacant open space & more recently as private land/garden. There was a small outbuilding or shed to the NW corner of the plot but this was gone by the 1990s.

From historic mapping, the Site appears to have sloped gently to the north from early map contours with a natural bank close to the north boundary of the Site and the railway bank. However, by 1910 maps, a cutting was introduced at lower level between the Site and the railway embankment.

On reconnaissance, a small excavation was noted to the south side, and which enabled the profile of the shallow ground profile to be logged. The geology comprised approximately 400mm of MADE GROUND above SAND & GRAVEL.

The local area has seen both residential and commercial uses. The closest historically has been the railway to approx 25m north and the Newbold Textile Works to the east across Belfield Road.

There was a sand pit to the north beyond the railway, which was expanded and later infilled leaving 2No. historic landfill sites: "Adjoining Rochdale-Leeds Railway", and "Land off Belfield Lane". The Waithland Tip further to the north is also an EA historic landfill site. All three are within 250m of the Site boundary.

Coal mining has occurred in the wider area but does not affect the Site.

The Site is not within a radon protection area and thus no radon protection measures are required.

1.12.2. Potential Contaminants.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED SOURCE	CONTAMINANT/S
Upper MADE GROUND.	N/A.	Metals, PAHs, sulphates, asbestos (CH ₄ , CO ₂ if any putrescible materials noted).
Ground gas migration.	Recorded historic landfill sites to the north.	Ground gas (CO ₂ & CH ₄)

1.12.3. Potential Pathways.

The potential pathways to/from the Development Site include (not an exhaustive list but a summary of the main points):

PATHWAY	MEDIA
Soil and dust ingestion	Soil and indoor dust
Consumption of home-grown fruit and vegetables	Produce
Skin contact (indoors)	Indoor dust
Skin contact (outdoors)	Soil
Inhalation of dust (indoors)	Air
Inhalation of dust (outdoors)	Air
Vapours (indoors)	Air
Vapours (outdoors)	Air

1.12.4. Potential Receptors.

Receptors include future owners/residents, and workers in the construction phase.

Controlled waters: no receptors.

1.13. Preliminary Conceptual Model.

CURRENT SOURCE/S		ORIGINAL ASSOCIATED USAGE / LOCATION	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK
CHEMICAL (SOLID)	Existing made ground - surface/sub-soil.	Minor made ground noted across the Site. No specific original source.	Metals, PAHs, sulphates, asbestos.	Direct ingestion, aerial ingestion, dermal contact, drinking water.	Site construction operatives & future occupants. Site buildings.	Historical made ground will have to be investigated but may comprise common contaminants above threshold values allowed for a residential usage.	Medium.	Likely.	Moderate risk.
	Geological ground gas.	Radon sources in deep Namurian deposits underlying the Site.	Rn.	Diffusion through soil, substructure s, aerial inhalation.	Future occupants. Explosion, suffocation.	Within a 1-3% area. No protective measures are required.	Medium.	Unlikely.	Low risk.
GROUND GAS RISK (VAPOURS)	Anthropogenic ground gas sources.	Historic landfill sites in the wider area.	CH ₄ , CO ₂ , other trace gases.			Historic landfill sites in the local area are considered to pose a risk. Three landfill sites have been noted within a 250m radius of the site, and the area is covered with glaciofluvial sand & gravel deposits which could provide a pathway for ground gas migration towards the Site.	Medium.	Low likelihood.	Moderate to low risk.
	Existing made ground - surface/sub-soil.	Minor made ground noted across the Site. No specific original source.	Metals, PAHs, sulphates.	Permeation through soil into ground water, local watercourse s, or aquatic habitats.	Contaminated ground / surface water. Controlled Waters such as watercourses, canal, aquatic habitats & associated wildlife.	Unlikely to pose a risk. No particular source of mobile or leachable contamination, and minor contamination if found is only likely to be associated with a thin layer of made ground with negligible contamination which would only pose a minor risk to human health. No specifically vulnerable aquifer. Not in an SPZ. No groundwater extractions locally.	Medium.	Unlikely.	Low risk.

2. PHASE 2 - SITE INVESTIGATIONS & ASSESSMENT.

2.1. Site Investigations

2.1.1. 10.10.2023.

Site Investigations were undertaken by T J Booth Associates and comprised 4No. machine excavated trial holes (THs 1-4), undertaken with a 3.5t back acting excavator.

Trial holes were located in a grid format around the Site to gain an understanding of the geology for future geotechnical design, and particularly to assess for potential shallow soil contamination due to the lack of specific contaminant sources noted in the data search.

4No. soil samples (S1-4) were taken from the upper made ground horizon in each trial hole.

Trial hole logs were as follows:

TH1 (101.6m aSD)

0-200	Black silty slightly sandy gravelly topsoil MADE GROUND. Gravel is occasional brick, slate & stone etc. (S1).
200-400	Limestone MOT MADE GROUND.
400-1000	Orange/brown medium dense SAND & GRAVEL.
1000-1600	Orange/brown medium dense SAND.

TH2 (101.45m aSD)

0-200	Dark brown silty slightly gravelly topsoil MADE GROUND. Gravel is occasional brick & MOT. (S2).
200-1100	Orange/brown medium dense slightly gravelly SAND.
1100-1200	Orange/brown medium dense SAND.

TH3 (101.60m aSD)

0-100	Dark brown silty slightly gravelly topsoil MADE GROUND. Gravel is occasional brick & MOT. (S3).
100-400	Limestone MOT MADE GROUND.
400-1200	Orange/brown medium dense SAND & GRAVEL.

TH4 (102.10m aSD)

0-200	Black silty slightly gravelly topsoil MADE GROUND. Gravel is limestone MOT. (S4).
200-400	Limestone MOT MADE GROUND.
400-1300	Orange/brown medium dense SAND & GRAVEL.
1300-1500	Orange/brown medium dense SAND.

Soil samples were sealed in 1kg white plastic snap top containers & amber jars & vials and sent to Envirolab Ltd to be tested for a range of common contaminants.

Each sample was tested for contaminants suites including metals, speciated PAH, inorganics & sulphates, SOM, & asbestos screening in accordance with the conceptual model.

No groundwater was encountered and there are no watercourses local to the Site. No water samples were taken.

No borehole or gas monitoring wells have been installed at the Site.

2.2. Final Risk Assessment.

2.2.1. Human Health Risk.

2.2.1.1. *Shallow soil contamination.*

On return the samples were assessed by TJ Booth Associates to common threshold comparison data, specifically the Defra Category 4 Screening Levels (C4SLs), then to LQM/CIEH (S4ULs).

Testing of made ground revealed contaminant levels above residential threshold values with elevated levels of the following contaminants of concern, (refer to testing certificates, and full analysis spreadsheets in the Appendix):

Trial Hole/Soil Sample	Made ground horizon	Mitigation/Action
TH1/S1	Lead, zinc	FURTHER ACTION
TH2/S2	Lead	FURTHER ACTION
TH3/S3	No elevated contaminants of concern	PASS
TH4/S4	Lead	FURTHER ACTION

Due to above elevated levels noted, existing Site soil is considered to comprise minor contamination above threshold levels allowed for a residential end use.

The existing soils will not be suitable for reuse with regard to human receptors and a suitable cover system will need to be employed.

2.2.1.2. *Water pipes.*

No particular contaminative risk included within the source-pathway-receptor methodology has been noted on-site either historically or presently, including industrial or other historic uses which would have introduced organic contaminants which would affect new potable water pipes.

As no sources of the risk chemicals in the PSRAS tables have been identified, there is no pollutant linkage.

Testing for PSRAS contaminants is therefore NOT advised or required in accordance with UK environment risk methodology or UU water supply pipe guidance.

Minor made ground across the Site is relatively thin, noted at maximum 400mm; and water pipes will be buried in virgin glaciofluvial sand & gravel or sand.

Normal PE pipe will suffice for potable water supplies.

2.2.2. Controlled Waters Risk.

Surface water/river sampling results are generally compared against the Environment Quality Standards for Freshwater (EQS), and groundwater samples against the EQS & also drinking water standards (UK DWI 2016 & WHO 2022).

2.2.2.1. *Groundwater.*

No groundwater noted on Site.

Risk was noted as low in the preliminary risk assessment.

No samples

2.2.2.2. *Watercourses.*

No watercourses noted in the local area.

Risk was noted as low in the preliminary risk assessment.

No samples taken.

2.2.3. Ground Gas Risk.

2.2.3.1. *Historic landfill Sites.*

The closest historic landfill Site is approximately 40m to the north, although the records for this site indicate that it was only infilled with inert & industrial wastes. The landfills further to the north were recorded as including wastes such as inert, industrial, commercial, household & liquids/sludges. The landfill sites are considered to be a potential source of ground gas generation.

In addition to the above, there pathways to the Site are plausible. The Site and local area are underlain by glaciofluvial sand & gravel which naturally has pore space & permeability to enable potential ground gas to migrate towards the Site. There are no geological barriers or significant clay strata which can be used as mitigation.

It is considered that there is a risk to the Site that will need to be mitigated by gas protection included within the building foundation envelope.

2.2.3.2. *On-site refuse tips/infilled ponds/infilled land.*

No infilled land was noted within the Site boundaries.

No credible risk is attributed to this source.

2.2.3.3. *Radon.*

The Site is within an 1-3% radon area, and as such, radon protective measures is not required in new development.

2.2.3.4. *Alluvium.*

No alluvial material noted local to the Site.

2.3. Final Conceptual Model.

CURRENT SOURCE/S		ORIGINAL ASSOCIATED USAGE / LOCATION	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK	MITIGATION PROPOSED
CHEMICAL (SOLID)	Existing made ground - surface/sub-soil.	Minor made ground noted across the Site. No specific original source.	Metals.	Direct ingestion, aerial ingestion, dermal contact.	Site construction operatives & future occupants. Site buildings.	Chemical analysis of on-site made ground has revealed contaminant values above residential threshold values. A source-pathway-receptor pollutant linkage is noted to exist that will need to be broken to make the Site safe for a residential end use.	Medium.	Likely.	Moderate risk.	Either removal of source material made ground), or min 600 cover soils placed above any made ground will need to be employed as a remedial measure.
	Anthropogenic ground gas sources.	Historic landfill sites in the wider area.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	Historic landfill site in the local area are considered to pose a risk. Three landfill sites have been noted within a 250m radius of the site, and the area is covered with glaciofluvial sand & gravel deposits which could provide a pathway for ground gas migration towards the Site.	Medium.	Low likelihood.	Moderate to low risk.	Characteristic Situation 3 gas protection measures (2 levels of protection) in accordance with BS8485 should be installed to the development to mitigate the risk.

3. PHASE 3 - REMEDIATION STATEMENT

3.1. Basic Site Details

Full details included in the Phase 2 Site Investigation Introduction & subsequent sections.

3.2. Site & Remedial Objectives

Site investigations undertaken as part of the Phase 2, comprised trial holes & soil sampling methods, with historic made ground recorded to max 400mm.

There are currently two remedial objectives for the Site:

- General soil remediation for soft landscaped areas.
- Potential for ground gas migration.

The risk is specific to the end user.

3.3. Conceptual Model (Final) & Relevant Pollution Linkages

Refer to Phase 2 Site Investigation and Assessment section of the report for Final Conceptual Model.

A pollutant linkage was identified regarding the minor contamination of upper Site soil with metals noted.

There is a pollutant linkage with respect to ground gas production and migration. This will need further characterisation or protective measures.

To break the pollution linkage, either the source must be removed, or the pathways mitigated. It is not appropriate in this case to modify behaviour of or remove receptors.

3.4. Recommended Remediation:

Made Ground/Soil Risk:

Made ground was noted to be lightly contaminated with metals above allowable limits for a residential end use. However, remediation is only required to garden areas and other soft landscaped areas of the Site. Made ground may remain beneath permanent hardstandings such as buildings, roads, pavements & pathways etc.

To mitigate the risk of contaminated soils, it is advised that garden areas and other soft landscaped areas comprise the following remediation, comprising EITHER:

- all made ground to be removed beneath soft landscaped area, and replaced with clean inert imported soil,
OR
- a 600mm cover layer of clean inert soil may be imported above the made ground.

The 600mm cover system is adopted for the following reasons:

- Root systems for shrubs are typically up to 600 mm;
- Excavations are unlikely to be deeper than 600 mm in typical gardening activities;
- Bio-turbation is typically limited to the top 600 mm of the soil profile;
- Excavations by children or pets are unlikely to exceed 600 mm.

Imported soil should be clean/inert and free from deleterious materials and should be suitable for use in a residential end use setting. It should be able to pass testing of metals, speciated PAH, inorganics & sulphates, SOM, and asbestos screening to current Defra Category 4 Screening Levels (C4SLs) where available, and then to the LQM/CIEH (S4ULs), for use in a residential end use setting.

Gas Risk:

Due the potential for ground gas migration from off site sources, it is recommended that in lieu of gas monitoring, gas protection measures should be included in the development.

In accordance with BS8485:2019, CS3 gas protection measures can be provided to comply with a minimum score of 4.5 (from at least two sources), as follows:

CS3 GAS PROTECTIVE MEASURES		BS8485:2019 score required: 4.5
FOUNDATION TYPE: traditional foundation.		
SLAB	Ground bearing slab.	0.5
MEMBRANE	Reinforced gas membrane Alderprufe GRA comprising <40ml/day/m ² CH ₄ transmission rate, >0.4mm thick. All joints and penetrations sealed to manufacturers details & specifications.	2
VOID/SUBSPACE	No fines gravel layer with gas drains to vents.	2.5
VENTS	1500mm ² /m wall (<15m wide building), 2000mm ² /m for larger buildings. Both account for regulations up to CS3.	

3.5. Verification (Phase 4 requirements)

Verification of the imported soil may be required for Planning or Building Control/Building Regulations submission. Should this be required, it will need to be undertaken by suitably qualified consultants and comprise the following:

- Import source material.
- Characterisation & suitability of material.
- Soil sampling should be undertaken as per YALPAG Guidelines as per the following ratios:
 - Virgin quarried materials, 1-2 samples to confirm inert nature.
 - Crushed hardcore, stone, brick, min 1 sample per 500cum.
 - Greenfield/manufactured, generally 1 sample per 250cum (min 3 samples).
 - Brownfield, generally 1 sample per 50cum (min 6 samples).

Samples should be tested for the following contamination suites: metals, inorganics, PAH USEPA16 speciated, and asbestos screening. Results will be analysed against Defra Category 4 Screening Levels (C4SLs) where available, and then to the LQM/CIEH (S4ULs), for use in a residential end use setting.
- Verification Depth.
- Reporting (including photographic evidence).
- Independent gas protection measures inspection.

3.6. Additional Notes

Before any further work is undertaken, this report should be submitted to and agreed by the Local Planning Authority Contaminated Land Department/Building Control Department as necessary.

We trust that the above clear, but should you require further advice please contact the undersigned.

Signed.....



D.S. Slattery BSc (Hons).

T J Booth Associates.

Authorised...

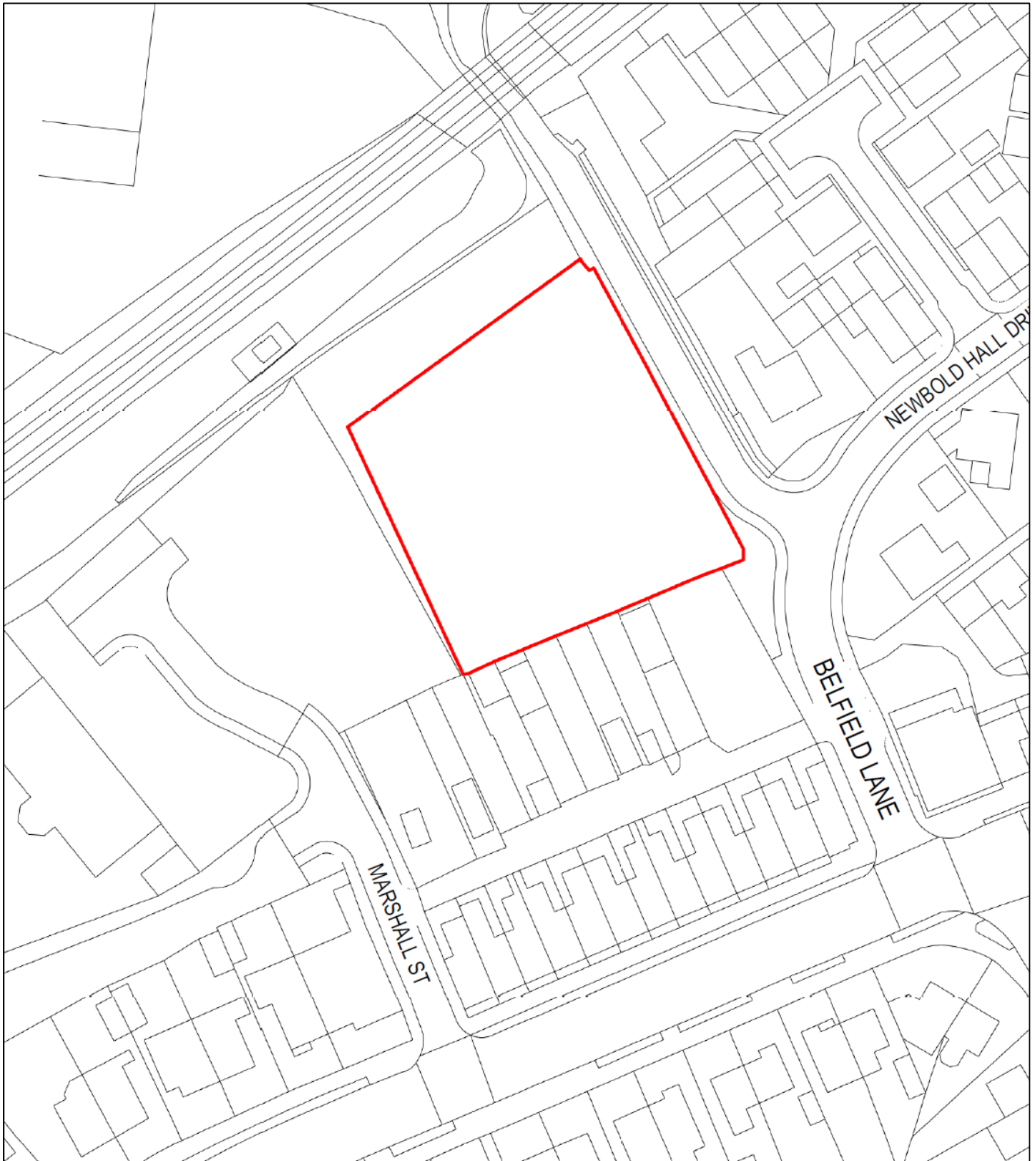


T J Booth BSc (Hons), C. Eng. C. Env. MICE.

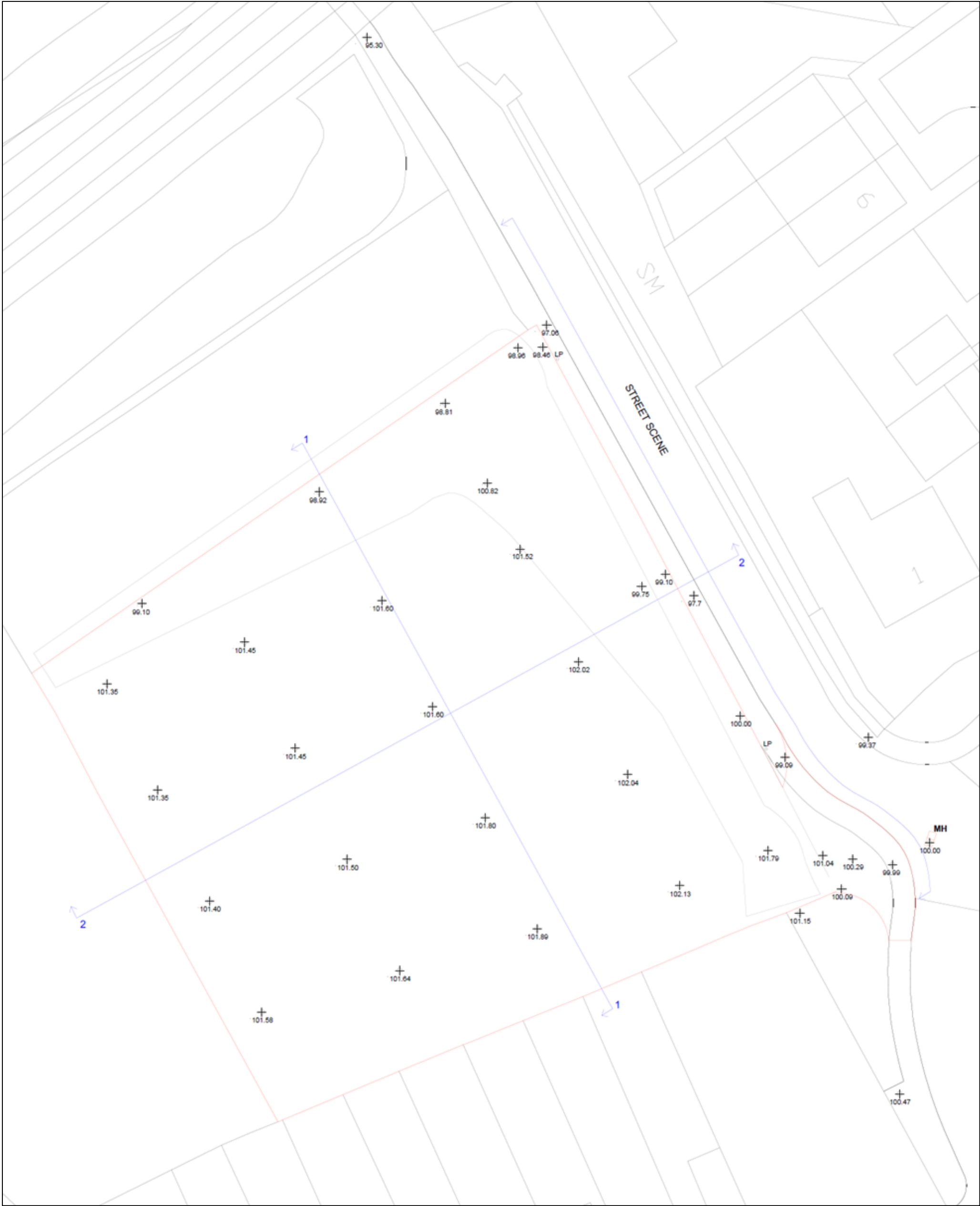
T J Booth Associates.

4. APPENDIX A: FIGURES

4.1. Location Plan

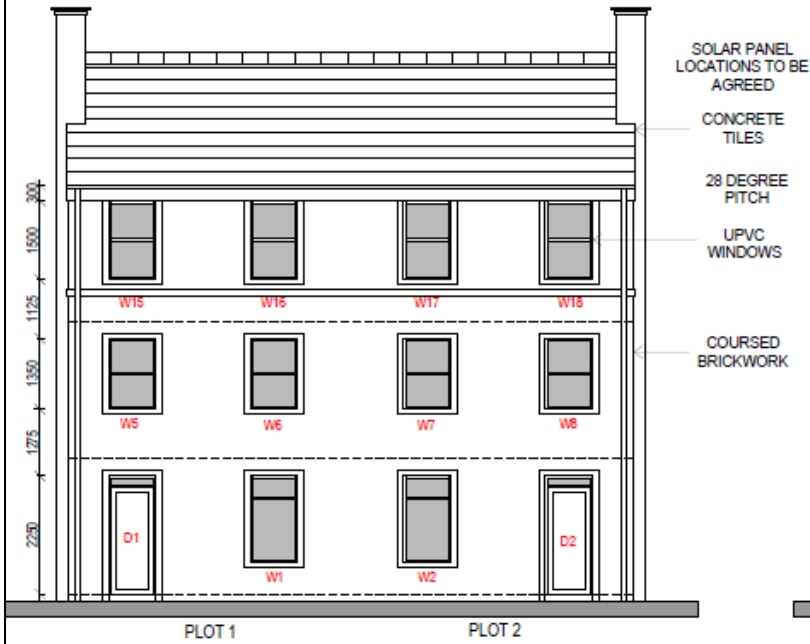


42. Ex Site Plan/Topographic Survey

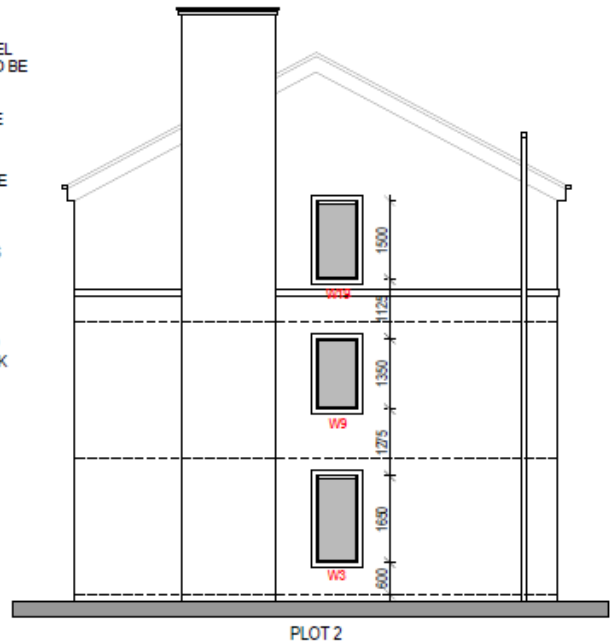


4.3. Proposed Development

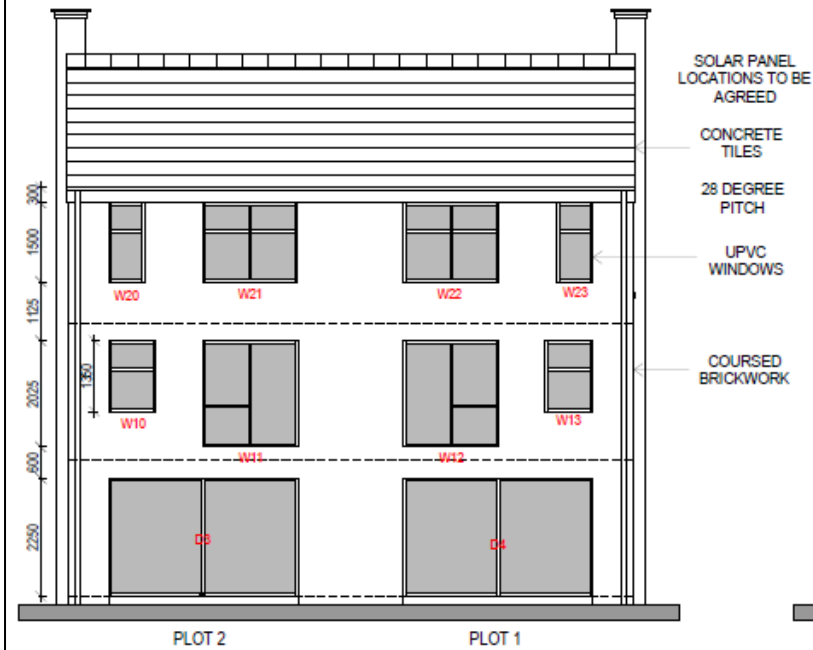




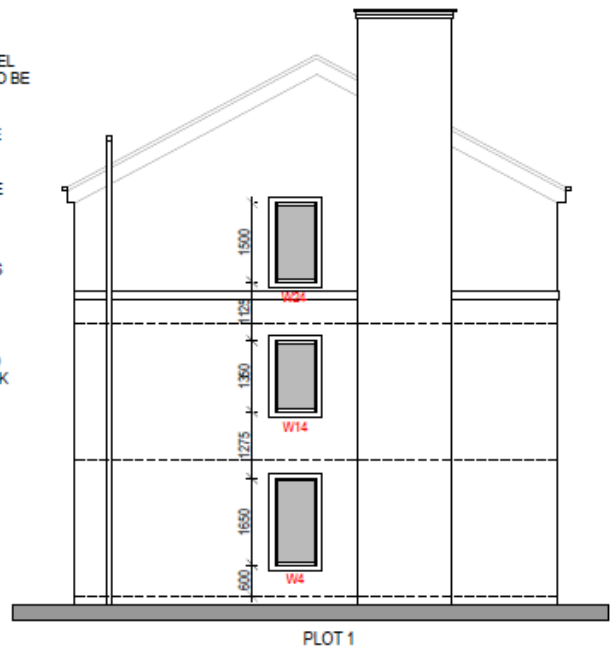
FRONT ELEVATION



SIDE ELEVATION



REAR ELEVATION



SIDE ELEVATION

4.4. Site Investigation Plan



4.5. TJBA Soil Analysis

Client / Site:		Iqbal - Belfield Lane, Rochdale						
Sample Type:		SOILS						
Sampling Date:		20.10.2023						
Contaminant		No	Max	Mean	t 95	RESIDENTIAL (with or without plant uptake)		
							Pass/Fail	Comment
METALS	Arsenic as As, dry weight	4	25	14.25	23.35	37	PASS	
	Boron as B, hot water sol dw	4	1.2	1.075	1.185	290	PASS	
	Cadmium as Cd, dry weight	4	11.9	3.55	10.25	22	PASS	
	chromium as Cr(III) dry weight	4	53	30.25	48.65	910	PASS	
	Chromium as Cr(VI), dry weight	4	1	1	1	21	PASS	
	Copper, as Dry Weight	4	622	253.75	560.5	2400	PASS	
	Lead, as Dry Weight	4	1290	477.25	1132.95	200	FURTHER ACTION	S1, S2, S4
	Mercury as Hg, dry weight	4	0.17	0.17	0.17	1.2	PASS	
	Nickel as Ni, dry weight	4	36	27.5	35.25	130	PASS	
	Selenium as Se, dry weight	4	1	1	1	250	PASS	
	Zinc as Zn, dry weight	4	4380	1191.25	3746.4	3700	FURTHER ACTION	S1
INORGANIC	Cyanide (Total)	4	1	1	1	34	PASS	
	Sulphate (Total) as SO4	4	0.14	0.10775	0.14	0.24	PASS	
	pH	4	7.73	6.8125	7.6745	6 to 8	NORMAL	
	Sulphur (Elemental)	4	7	5.75	6.85	100	PASS	
	Asbestos Identification	4	0	0	0	0	PASS	
ORGANIC	SOM	4	6	6	6			
	PAH acenaphthene	4	0.57	0.1725	0.495	1100	PASS	
	PAH acenaphthylene	4	0.02	0.0125	0.0185	920	PASS	
	PAH anthracene	4	0.57	0.17	0.495	11000	PASS	
	PAH benzo[a]anthracene	4	1.9	0.5875	1.654	13	PASS	
	PAH benzo[a]pyrene	4	1.36	0.44	1.1935	5	PASS	
	PAH benzo[b]fluoranthene	4	1.87	0.605	1.639	3.7	PASS	
	PAH benzo[g,h,i]perylene	4	0.62	0.215	0.548	350	PASS	
	PAH benzo[k]fluoranthene	4	0.75	0.2575	0.6585	100	PASS	
	PAH chrysene	4	2.07	0.6625	1.8105	27	PASS	
	PAH dibenz[ah]anthracene	4	0.15	0.0675	0.1335	0.3	PASS	
	PAH fluoranthene	4	4.47	1.3575	3.885	890	PASS	
	PAH fluorene	4	0.29	0.0875	0.2525	860	PASS	
	PAH indeno[123-cd]pyrene	4	0.77	0.26	0.68	41	PASS	
	PAH naphthalene	4	0.19	0.07	0.166	13	PASS	
	PAH phenanthrene	4	3.18	0.9375	2.754	440	PASS	
	PAH pyrene	4	3.83	1.175	3.332	2000	PASS	
	SVOC phenol	4	0.2	0.2	0.2	380	PASS	

4.6. Envirolab Ltd Certificates

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 23/10398
Issue Number: 1
Date: 08 November, 2023

Client: T J Booth Associates
20a East Gate Street
Rochdale
Rochdale
Greater Manchester
UK
OL16 1DH

Project Manager: Daniel Slattery
Project Name: Javed - Belfield Lane, Rochdale
Project Ref: Not specified
Order No: N/A
Date Samples Received: 20/10/23
Date Instructions Received: 23/10/23
Date Analysis Completed: 08/11/23

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 23/10398

Client Project Name: Javed - Belfield Lane, Rochdale

Client Project Ref: Not specified

Lab Sample ID	23/10388/1	23/10388/2	23/10388/3	23/10388/4						
Client Sample No	81	82	83	84						
Client Sample ID	TH1	TH2	TH3	TH4						
Depth to Top	0.00	0.00	0.00	0.00						
Depth To Bottom	0.20	0.20	0.10	0.20						
Date Sampled	20-Oct-23	20-Oct-23	20-Oct-23	20-Oct-23						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	8AE	8AE	8AE	4AE						
								Units	Limit of Detection	Method ref
% Stones >10mm _A	<0.1	<0.1	<0.1	8.2				% w/w	0.1	A-7-044
pH ₂₅ TM	7.73	6.79	6.37	7.38				pH	0.01	A-7-021a
Sulphate (acid soluble) ₂₅ TM	1400	880	1400	630				mg/kg	200	A-7-025a
Cyanide (total) _A TM	<1	<1	<1	<1				mg/kg	1	A-7-042/1 CN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2				mg/kg	0.2	A-7-085a
Sulphide _A	<5	<5	<5	<5				mg/kg	5	A-7-043-a
Sulphur (elemental) ₂₅ TM	<5	8	7	<5				mg/kg	5	A-7-025a
Organic Matter ₂₅ TM	18.8	9.8	28.2	9.6				% w/w	0.1	A-7-022a
Arsenic ₂₅ TM	11	7	14	26				mg/kg	1	A-7-024a
Boron (water soluble) ₂₅ TM	1.1	<1.0	1.2	<1.0				mg/kg	1	A-7-027a
Cadmium ₂₅ TM	11.9	0.8	0.8	0.8				mg/kg	0.5	A-7-024a
Copper ₂₅ TM	822	87	114	212				mg/kg	1	A-7-024a
Chromium ₂₅ TM	63	21	24	23				mg/kg	1	A-7-024a
Chromium (hexavalent) ₂₅	<1	<1	<1	<1				mg/kg	1	A-7-045a
Lead ₂₅ TM	1280	243	168	220				mg/kg	1	A-7-024a
Mercury ₂₅	<0.17	<0.17	<0.17	<0.17				mg/kg	0.17	A-7-024a
Nickel ₂₅ TM	38	20	31	23				mg/kg	1	A-7-024a
Selenium ₂₅ TM	1	<1	<1	<1				mg/kg	1	A-7-024a
Zinc ₂₅ TM	4380	137	168	92				mg/kg	5	A-7-024a



Envirolab Job Number: 23/10398

Client Project Name: Javed - Belfield Lane, Rochdale

Client Project Ref: Not specified

Lab Sample ID	23/10388/1	23/10388/2	23/10388/3	23/10388/4						
Client Sample No	S1	S2	S3	S4						
Client Sample ID	TH1	TH2	TH3	TH4						
Depth to Top	0.00	0.00	0.00	0.00						
Depth To Bottom	0.20	0.20	0.10	0.20						
Date Sampled	20-Oct-23	20-Oct-23	20-Oct-23	20-Oct-23						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	8AE	8AE	8AE	4AE						
Asbestos In Soil (inc. matrix)										
Asbestos In soil ₁₀	NAD	NAD	NAD	NAD						A-1-065
Asbestos Matrix (visual) ₁₀	-	-	-	-						A-1-065
Asbestos Matrix (microscope) ₁₀	-	-	-	-						A-1-065
Asbestos ACM - Suitable for Water Absorption Test? ₁₀	N/A	N/A	N/A	N/A						A-1-065

Envirolab Job Number: 23/10398

Client Project Name: Javed - Belfield Lane, Rochdale

Client Project Ref: Not specified

Lab Sample ID	23/10398/1	23/10398/2	23/10398/3	23/10398/4						
Client Sample No	S1	S2	S3	S4						
Client Sample ID	TH1	TH2	TH3	TH4						
Depth to Top	0.00	0.00	0.00	0.00						
Depth To Bottom	0.20	0.20	0.10	0.20						
Date Sampled	20-Oct-23	20-Oct-23	20-Oct-23	20-Oct-23						
Sample Type	SOIL	SOIL	SOIL	SOIL						
Sample Matrix Code	8AE	8AE	8AE	4AE						
PAH-16MS										
Acenaphthene _A ^{MS}	<0.01	0.07	0.04	0.67				mg/kg	0.01	A-1-03a
Acenaphthylene _A ^{MS}	<0.01	<0.01	<0.01	0.02				mg/kg	0.01	A-1-03a
Anthracene _A ^{MS}	<0.02	0.07	<0.02	0.67				mg/kg	0.02	A-1-03a
Benzo(a)anthracene _A ^{MS}	<0.04	0.28	0.16	1.90				mg/kg	0.04	A-1-03a
Benzo(a)pyrene _A ^{MS}	<0.04	0.26	0.11	1.38				mg/kg	0.04	A-1-03a
Benzo(b)fluoranthene _A ^{MS}	<0.06	0.33	0.17	1.87				mg/kg	0.06	A-1-03a
Benzo(ghi)perylene _A ^{MS}	<0.06	0.14	<0.06	0.82				mg/kg	0.06	A-1-03a
Benzo(k)fluoranthene _A ^{MS}	<0.07	0.14	<0.07	0.76				mg/kg	0.07	A-1-03a
Chrysene _A ^{MS}	<0.08	0.34	0.18	2.07				mg/kg	0.08	A-1-03a
Dibenzo(ah)anthracene _A	<0.04	<0.04	<0.04	0.16				mg/kg	0.04	A-1-03a
Fluoranthene _A ^{MS}	<0.08	0.67	0.31	4.47				mg/kg	0.08	A-1-03a
Fluorene _A ^{MS}	<0.01	0.04	<0.01	0.29				mg/kg	0.01	A-1-03a
Indeno(123-cd)pyrene _A ^{MS}	<0.03	0.17	0.07	0.77				mg/kg	0.03	A-1-03a
Naphthalene _A ^{MS}	<0.03	<0.03	<0.03	0.19				mg/kg	0.03	A-1-03a
Phenanthrene _A ^{MS}	<0.03	0.34	0.20	3.18				mg/kg	0.03	A-1-03a
Pyrene _A ^{MS}	<0.07	0.61	0.29	3.83				mg/kg	0.07	A-1-03a
Total PAH-16MS _A	<0.08	3.23	1.62	22.8				mg/kg	0.01	A-1-03a

Report Notes

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received within the same delivery, will be disposed of six weeks after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and Interpretations expressed are outside our scope of accreditation.

The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.

A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Key

Superscript "H"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "AA"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
N/A	Not applicable

Asbestos

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing, and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs

Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.

Soil Chemical Analysis:

All results are reported as dry weight (~40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as % stones >10mm.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.

Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.

Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 1290µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the accreditation range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envirolab.co.uk

Client: T J Booth Associates, 20a East Gate Street, Rochdale, Rochdale, Greater Manchester, UK, OL16 1DH
Project: Javed - Belfield Lane, Rochdale
Clients Project No:

Project No: 23/10398
Date Received: 23/10/2023 (am)
Cool Box Temperatures (°C): 12.2

Lab Sample ID	23/10398/1	23/10398/2	23/10398/3	23/10398/4
Client Sample No	S1	S2	S3	S4
Client Sample ID/Depth	TH1 0.00-0.20m	TH2 0.00-0.20m	TH3 0.00-0.10m	TH4 0.00-0.20m
Date Sampled	20/10/23	20/10/23	20/10/23	20/10/23
Deviation Code	F			

Key

F

Maximum holding time exceeded between sampling date and analysis for analytes listed below

HOLDING TIME EXCEEDANCES

Lab Sample ID	23/10398/1	23/10398/2	23/10398/3	23/10398/4
Client Sample No	S1	S2	S3	S4
Client Sample ID/Depth	TH1 0.00-0.20m	TH2 0.00-0.20m	TH3 0.00-0.10m	TH4 0.00-0.20m
Date Sampled	20/10/23	20/10/23	20/10/23	20/10/23
Sulphide	✓	✓	✓	✓

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples $5 \pm 3^{\circ}\text{C}$), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

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Envirolab Analysis Dates

Lab Sample ID	23/10398/1	23/10398/2	23/10398/3	23/10398/4
Client Sample No	S1	S2	S3	S4
Client Sample ID/Depth	TH1 0.00-0.20m	TH2 0.00-0.20m	TH3 0.00-0.10m	TH4 0.00-0.20m
Date Sampled	20/10/23	20/10/23	20/10/23	20/10/23
A-T-019s	30/10/2023	30/10/2023	30/10/2023	30/10/2023
A-T-024s	02/11/2023	01/11/2023	01/11/2023	01/11/2023
A-T-027s	01/11/2023	01/11/2023	01/11/2023	01/11/2023
A-T-028s	02/11/2023	02/11/2023	02/11/2023	02/11/2023
A-T-029s	02/11/2023	02/11/2023	02/11/2023	02/11/2023
A-T-031s	01/11/2023	01/11/2023	01/11/2023	01/11/2023
A-T-032s	06/11/2023	06/11/2023	06/11/2023	06/11/2023
A-T-040s	01/11/2023	01/11/2023	01/11/2023	01/11/2023
A-T-042sTCN	08/11/2023	08/11/2023	08/11/2023	08/11/2023
A-T-043-s	31/10/2023	31/10/2023	31/10/2023	31/10/2023
A-T-044	30/10/2023	30/10/2023	30/10/2023	30/10/2023
A-T-045	25/10/2023	25/10/2023	25/10/2023	25/10/2023
A-T-050s	06/11/2023	06/11/2023	06/11/2023	06/11/2023

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

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5. APPENDIX B: PHOTOS



View towards northwest – 06.09.2017.



View towards southeast – 06.09.2017.



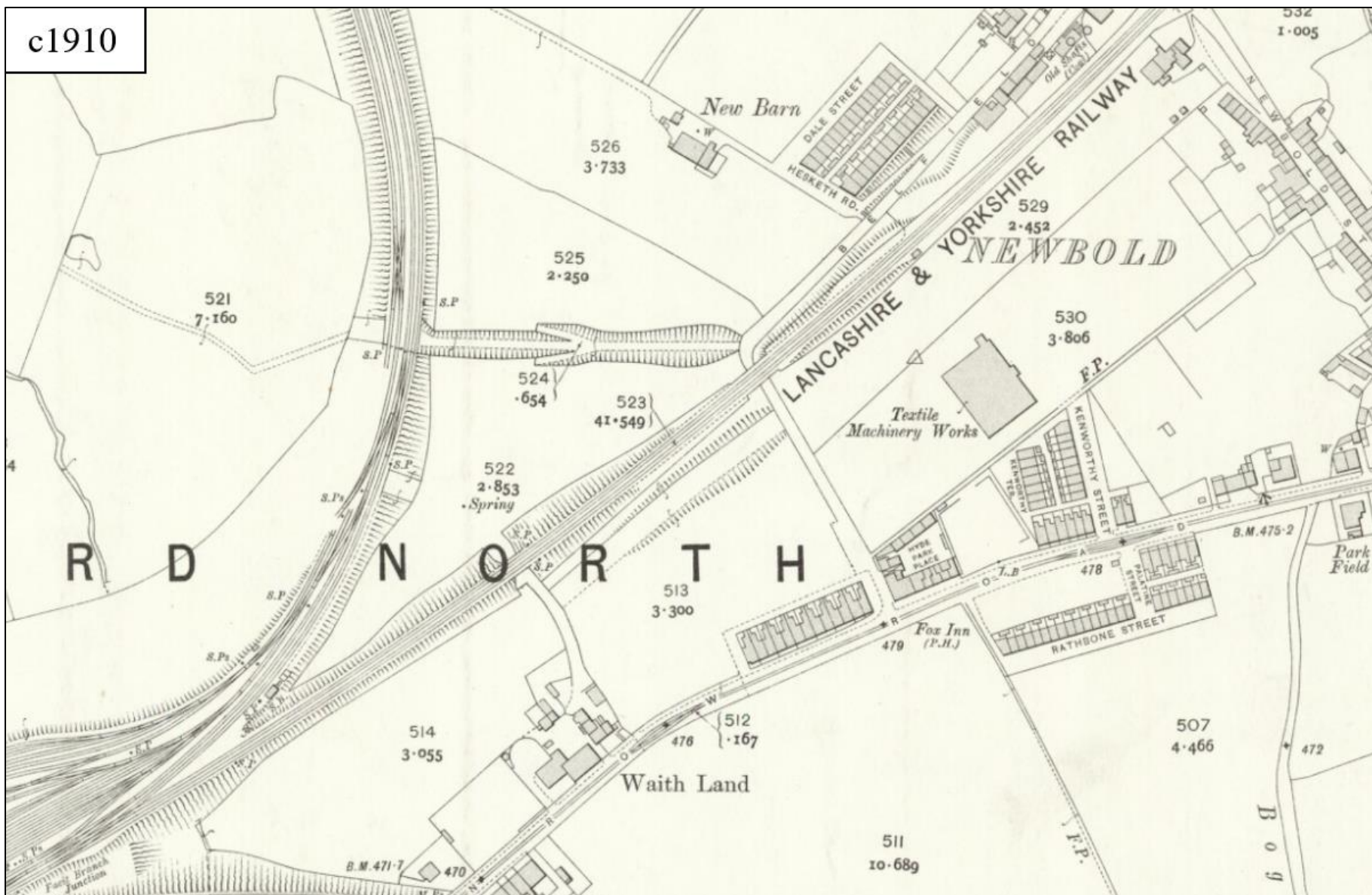
Small excavation/fox hole showing sand & gravel – 06.09.2017.

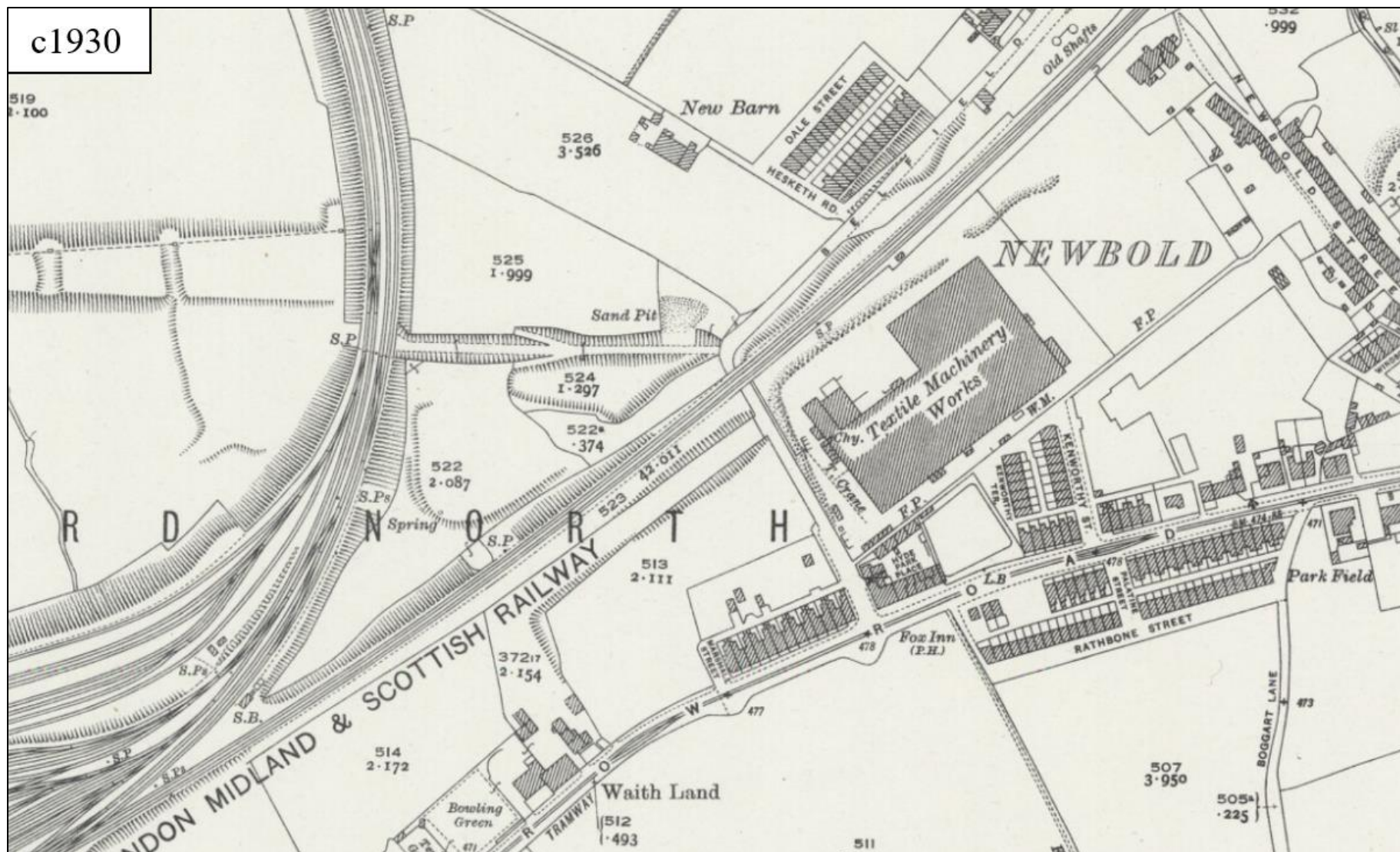


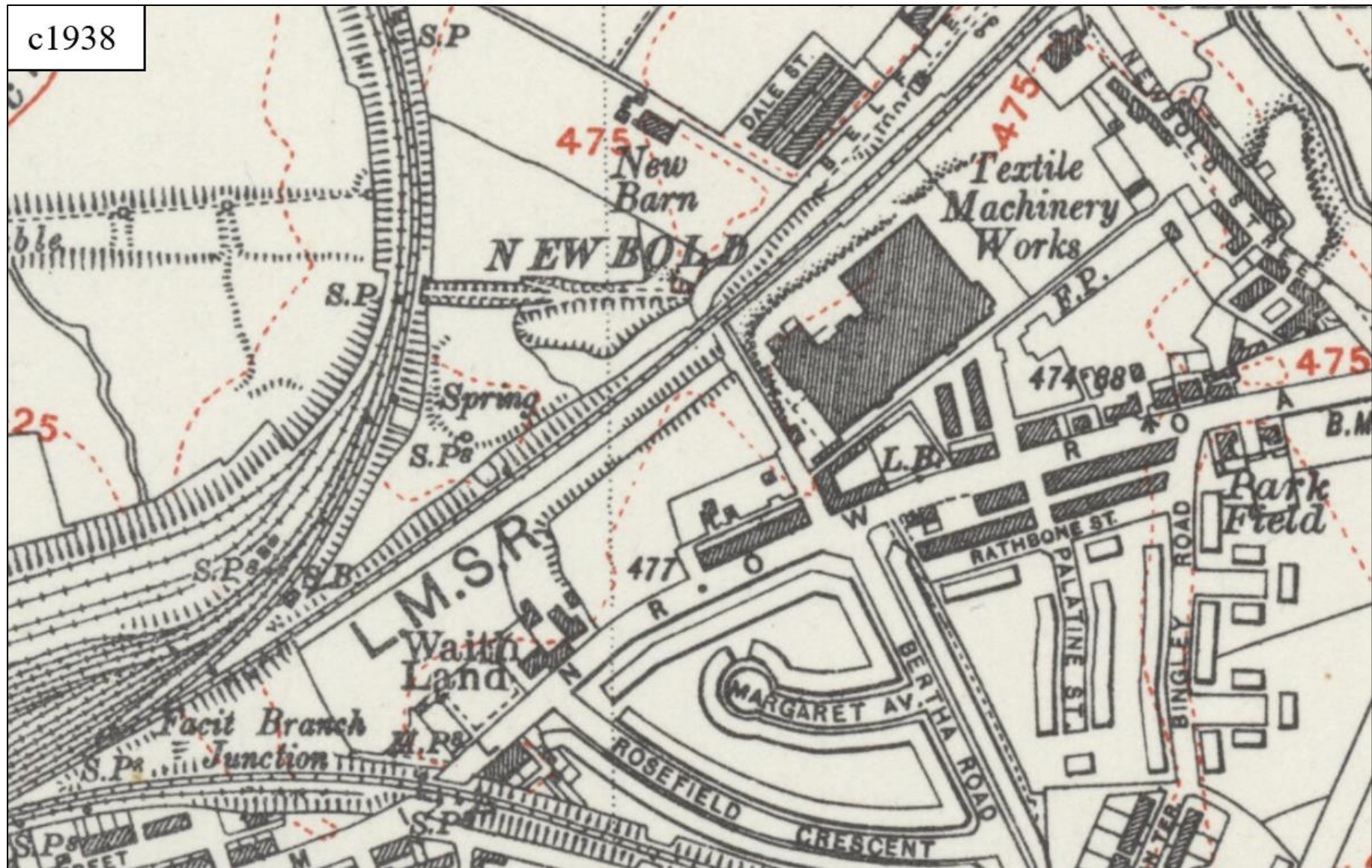
View of the north boundary down the bank and towards the railway cutting.

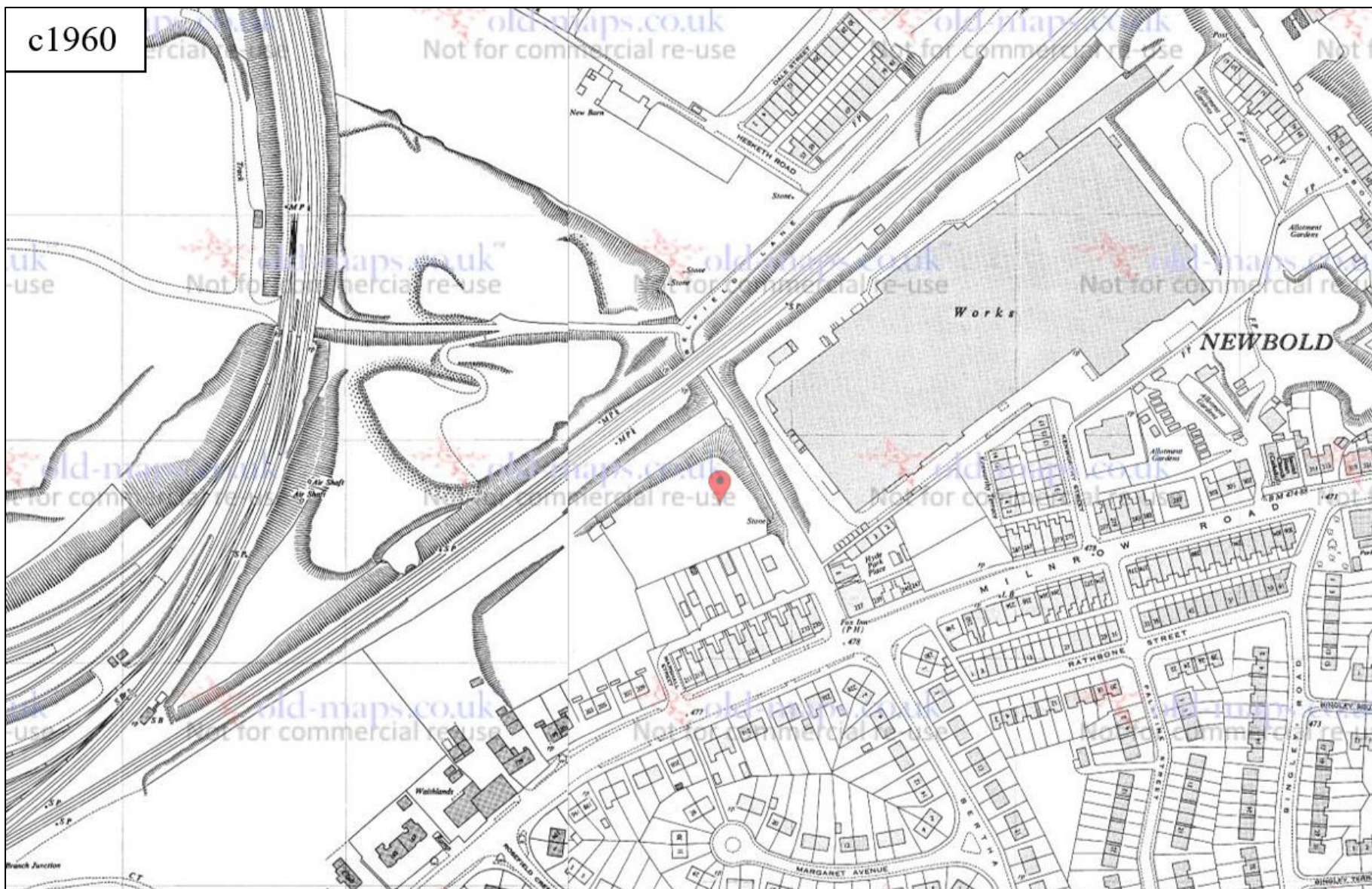
6. APPENDIX C: LANDMARK ENVIROCHECK

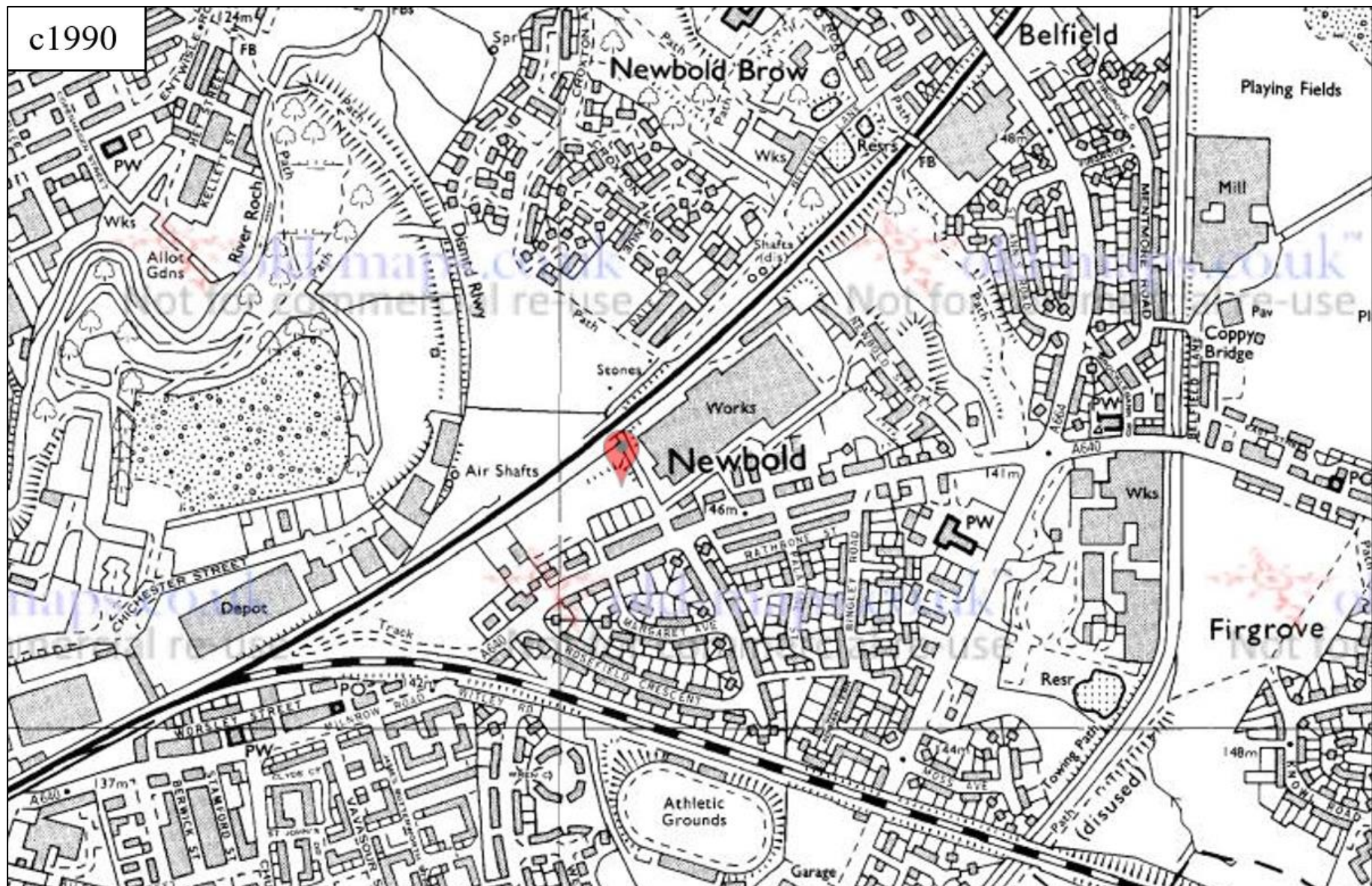


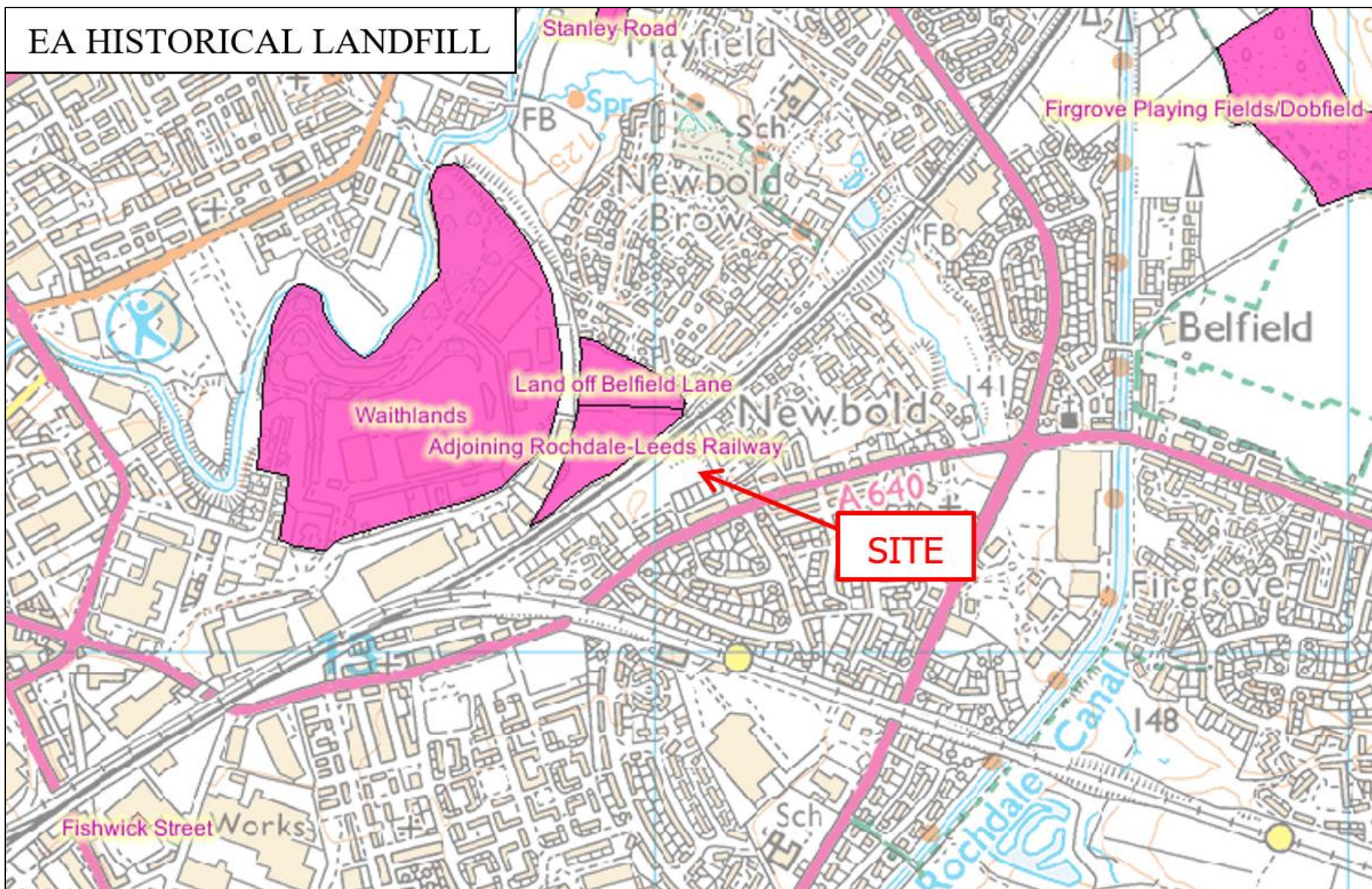


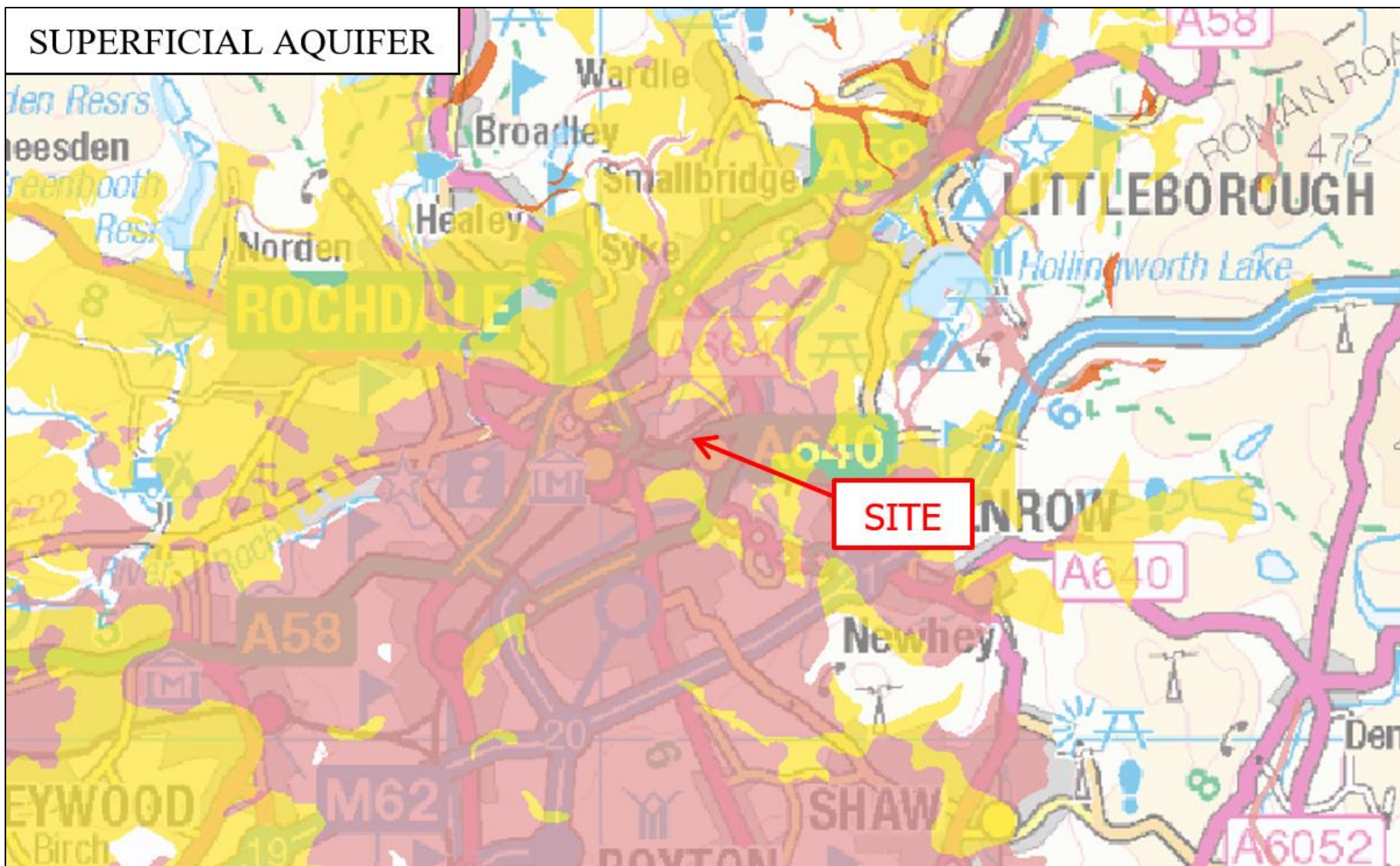












BEDROCK AQUIFER

