

GEO-ENVIRONMENTAL AUDIT

PHASE 1 Preliminary Risk Assessment

PHASE 2 Site Investigations

Proposed Residential Development

The Red House

13 Broadhalgh Avenue

Bamford

Rochdale

OL11 5LW

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0	Aug 2022	Original.

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 13 Broadhalgh Avenue
 Bamford
 Rochdale
 OL11 5LP

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1. PHASE 1 – PRELIMINARY RISK ASSESSMENT

1.1. Introduction.

T. J. Booth Associates have been appointed by Mr Mark Sharples to undertake a Phase 1 Geo-environmental Audit to plot of land to support a Town & Country Planning application for a residential end use.

The Application Site currently comprises part of the former garden area to No.13 Broadhalgh Avenue which is a large red brick masonry building. The existing dwelling is located to the N part of the Site complete with associated outbuildings and driveway. To the S side of the building is a large private garden, predominantly lawn with mature trees around the perimeter and hedging and smaller trees to the southern half in the location of the proposed dwellings.

As part of the development proposals, No.13 Broadhalgh Avenue is to be renovated but has planning permission under 15/01450/FUL.

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 BS5930:2015, BS 10175:2011+A2:2017, CIRIA C665, and BS 8485:2015+A1:2019 et al.

1.2. Proposed Development

The proposed development is for the erection of 2No. two-storey, detached residential dwellings nominally located to the S side of the development. The properties will each have detached garages, driveways, and soft landscaped garden areas.

The dwelling will be accessed via a new access road to the E side of the Site.

1.3. Historic Maps

DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
c1851	Site is part of agricultural land.	Tram road approx 50m E trending SE-NW and leading to Chadwick Hall Colliery approx 600m N. Local & wider area made up of agricultural land with Broadhalgh and Field Head/Oulder Hill hamlets nominally 300m W & E respectively.
c1890-93	No change.	Smithy noted to the N of the Site on the opposite side of Broadhalgh Ave. Chadwick Hall Colliery noted to have moved to within 50m of the Site to the NE, but now noted as old. Shaft still shown. Another shaft is noted to the SE nominally 150m distant.
c1910	No change.	Small pond noted to the N nominally 50m distant. Colliery to the NE now removed from mapping data. No shafts shown locally or in the wider area.
c1930	Current house now noted on Site with associated garage to the W side, and outbuildings to the N side.	Some development locally on Broadhalgh Avenue, Oulder Hill to the E, and around Bury Road to the S.
c1957-59	Greenhouse noted to the garden.	Much of the current estates constructed to the E & S, Rugby club to the N.
c1966-88	No change.	Complete urban infill to the E, S, & W locally much as in the present day.
c1972-90	No change.	No overall change.

1.4. Present Day Maps

Site Boundaries, Outlines of Structures and Buildings:	The Site is bound by Broadhalgh Avenue to the N, and surrounded by residential dwellings and associated garden areas to the E, S, and W sides. The original dwelling and outbuildings still remain as described in the historic mapping data, except from the greenhouse previously noted to the garden area.
Ground Contours, Natural Drainage Features:	Topographic mapping data indicates there is a fall over the Site in the order of approximately 2.5m (152.66m aOD to Broadhalgh Avenue, and 150.00 to the S boundary).
Water Courses:	None noted locally.
Below Ground Obstructions:	None noted.

1.5. Geology

Bedrock Geology:	The site is underlain by Milnrow Sandstone of the Carboniferous Westphalian Coal Measures. The local stratigraphic dip is approx 10 degrees SE.
Superficial Geology:	The BGS maps show glacial till, which generally comprise firm to stiff clay in the local area. There are sand & gravel deposits in the wider area but none closer that 150m.
Coal Seams.	Coal seams do underlie the Site at depth. The closest seam to subcrop is the Upper Mountain Mine seam approximately 500m NW. Incidentally, the Chadwick Hall Colliery noted within 50m of the Site is shown, and the depth of the shaft is noted as 285feet to the Lower Mountain Mine seam (approx 85m).

1.6. Boreholes Records

Closest borehole is 500m distant and is therefore not relevant to the immediate local geology

1.7. Planning/Other Data.

N/A.

1.8. Groundsure Environmental Data

1.8.1. AGENCY & HYDROLOGICAL

Discharge Consents:	No records within a 250m radius.
Pollution Incidents to Controlled Waters:	2 records within a 250-500m radius of the Site.
Groundwater Vulnerability:	Classified soils as high leaching potential.
Bedrock Aquifer Designation:	Secondary A Aquifer.
Superficial Aquifer Designation:	Secondary Undifferentiated Aquifer.
Superficial aquifer:	Secondary Aquifer – undifferentiated.
Source Protection Zones:	Not within a Source Protection Zone.
Flooding from Rivers & Sea:	Not within a flood zone.

1.8.2. WASTE

BGS recorded landfill sites:	None noted within a 250m radius.
EA Historic landfill sites:	None noted within a 250m radius.
Licensed waste management facilities:	None noted within a 250m radius.
Registered landfill sites:	None noted within a 250m radius.

1.8.3. HAZARDOUS SUBSTANCES

Planning hazardous substance consents:	No records within a 250m radius of the Site.
Planning hazardous substance enforcements:	No records within a 250m radius of the Site.

1.8.4. GEOLOGICAL

Mining Instability:	Within a coal mining area.
Potential for Collapsible Ground Stability Hazards:	Very low risk.
Potential for Compressible Ground Stability Hazards:	No hazard.
Potential for Ground Dissolution Stability Hazards:	No hazard.
Potential for Landslide Ground Stability Hazards:	Very low risk.
Potential for Running Sand Ground Stability Hazards:	Very low risk.
Potential for Shrinking or Swelling Clay Ground Stability Hazards:	Very low risk.
Radon Potential - Radon Affected Areas:	The property is within a lower probability radon area (<1% of homes estimated to be at or above the action level).
Radon Potential - Radon Protection Measures:	No radon protection measures are required.

1.9. Coal Authority

Mine Shafts, Pits, Adits/Entries:	Closest pit to the Site is approximately 50m NE of the Site boundary.
Past/Present Recorded Underground Mining.	Underground working noted at depth, rate of dip ~9deg SSE.
Probable/Potential Shallow Underground Workings & Outcrops:	The Coal Authority data indicates that no unrecorded shallow workings potentially exist beneath the Site.
Outcrops:	The closest seam was the Upper Mountain Mine seam subcropping approximately 500m NW.
Development High Risk Area:	The Site is not within a Development High Risk Area.

1.10. Industry Profiles

N/A.

1.11. TJBA Site Reconnaissance – May 2021.

Details of Existing Structures & Features:	The Site was accessed from Broadhagh Avenue through a private driveway to the rear of the house. The house was red brick masonry with outhouses (formerly WC and a store),
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	to the N side. A garage was noted to the W side. Around the E side of the dwelling was a garden and pathway. Numerous manholes/inspection chambers were noted which were part of the private drainage system. Lifting manholes revealed these flowed to the outbuildings to the N side of the dwelling, presumably before connecting to a sewer main in Broadhalgh Ave. The garden to the S side of the dwelling comprised an area of approximately 0.65 acres. It was lined with mature tall deciduous trees to the W & S boundaries (such as ash etc), and smaller trees vegetation to the E boundary and within parts of the garden (too numerous to list).
Adjacent Properties:	Residential dwellings to the W, S, & E. Further dwellings and the Rochdale Rugby Club to the N beyond Broadhalgh Avenue.
Water Levels, Directions of Flow and Rates in Rivers:	None noted.
Areas of Discoloured Soil, Polluted Water, Vegetation, and Significant Odours:	None noted. (See below for Site Investigations).
Relevant Ground Levels, Ground Water Levels, Positions of Wells and Springs:	There is approx 0.5m fall from the N to the S side of the dwelling, a further 0.5m fall from the path at the rear of the swelling to the grass garden, and a further 1.5m fall to the S boundary.

1.12. Identification of Source-Pathway-Receptor.

1.12.1. Potential Contaminants.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED SOURCE	CONTAMINANT/S
General made ground/upper soil across the Site.	Past use of the Site, former outbuildings, demolition/construction materials.	Metals, PAHs, sulphates.

1.12.2. 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

1.12.3. Potential Receptors.

Receptors mainly comprise workers in the construction phase, and residential users for the proposed end use.

1.13. Preliminary Conceptual Model.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED USAGE	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK
Site surface /sub soil.	Various – see potential contaminants section.	Metals, PAHs, asbestos, sulphates & inorganics.	Direct ingestion, aerial ingestion, dermal contact, drinking water. Contact with potential hazards.	Site construction operatives & future occupants. Site buildings.	POTENTIALLY PRESENT – There is a low likelihood of minor contamination at the Site which may be above threshold values for a residential end use. Samples will be taken to ensure the existing soil is suitable for the proposed end use.	Medium.	Low likelihood.	Moderate to low risk.
Geological ground gas.	Coal seams & radon sources, peat.	CH ₄ , CO ₂ , Rn, other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	NOT PRESENT – No coal seams of coal mining legacy features in the local area, and the Envirocheck report has indicated the Site is within a lower radon risk area.	Medium.	Unlikely.	Low risk.
Anthropogenic ground gas.	Historic landfill Sites within 250m.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	NOT PRESENT – There are no landfill sites within a 250m radius of the Development Site boundary.	Medium.	Unlikely.	Low risk.
Contaminated ground /surface water. Controlled Waters.	Made ground.	Chemical contamination. Hydrocarbons.	Permeation through soil into ground water, local watercourses, or aquatic habitats.	Watercourses, canal, aquatic habitats & associated wildlife.	NOT PRESENT – The Site is not expected to have significant contamination which would pose a risk to ground water.	Minor.	Unlikely.	Very low risk.

2. PHASE 2 - SITE INVESTIGATION & RISK ASSESSMENT

2.1.1. Ground/Soil Contamination Risk

There is no major contaminative risk associated with the Site, but existing soil should be sampled and proven to be suitable for the proposed end use.

BS10175:2011+A1:2013 & R&D TECHNICAL REPORT P5-066/TR considers the upper 500mm is sufficient to categorise the ground profile for development with respect to:

- human/animal intake arising from ingestion and dermal contact;
- potential for wind entrainment leading to inhalation (of contaminated soils and dusts);
- or deposition onto neighbouring land;
- surface water run-off (e.g. due to flash flooding);
- uptake by shallow rooting plants (e.g. crops, ornamental and wild species);
- surface leaching to groundwater.

There is no definitive guidance on the number of samples required for soil representation in current guidance. However, R&D TECHNICAL REPORT P5-066/TR indicates that sample spacing should be between 10-25m for residential applications.

Considering the proposed area for soft landscaping, and the land available (not as hardstanding) predevelopment; nominally 3-4 soil samples representative of the upper 500mm of MADE GROUND would satisfy guidance criteria for sampling.

Soil samples should be tested for contaminant suites including: metals, speciated PAH, inorganics & sulphates, SOM, and asbestos screening. Samples should be analysed against common threshold comparison data, specifically the Defra Category 4 Screening Levels (C4SLs) where available, then to the LQM/CIEH (S4ULs) thereafter.

All TJBA Soil analysis will use the LQM/CIEH S4ULs, and the DEFRA C4ULs. The LQM/CIEH S4UL data is the most current and comprehensive list of contaminant exposure level based on proposed end use, however, contaminant levels within S4ULs are considered 'low risk' and exceedance of S4ULs may warrant further analysis to ensure suitability for the specified end use.

A limited site investigation was undertaken to assess the potential for shallow soil contamination to the S side of the existing garden area where the proposed dwellings are to be located.

2.1.2. Gas Monitoring

No ground gas risk has been noted to the Site and therefore no ground gas investigations are required.

2.1.3. Soil Sampling May 2021

The investigations comprised soil sampling nominally to the upper 500mm of topsoil noted on Site. Four soil samples (S1-4) were hand excavated, refer to appendix for locations. The samples comprised dark brown, occasionally rooty, slightly sandy, slightly gravelly, silty TOPSOIL.

Samples S1, S2, & S4 were located in lawned areas of the garden. Sample S3 was nominally located to in the proximity of a former greenhouse – now demolished.

Although there was no visual or olfactory evidence of contamination in samples S1, S2, & S3, there were some minor coal/ash inclusions noted in S3.

Samples were sealed in 1kg white plastic snap top containers and amber jars where appropriate, and sent to Concept Life Sciences Ltd to be tested for a range of common contaminants associated with made ground found on Site. Each sample was tested for metals, speciated PAH, inorganics & sulphates, SOM, and asbestos screening.

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

Results indicated contaminant levels were below that for a residential setting in samples S1, S2, and S4. Lead was elevated in sample S3, however the mean for the Site was below residential C4SL threshold levels.

Refer to TJ Booth Associates Soil Analysis Table and Concept Life Sciences sample certification in the appendix..

2.1.4. Trial Hole Investigations

Trial hole investigations were undertaken in July 2022 with a 13t back acting excavator, and comprised THs 1 & 2.

TH1

0-500	Brown slightly sandy silty TOPSOIL
500-1100	Orange-brown/grey mottled stiff CLAY
1100-2300	blue-grey/brown firm to stiff CLAY becoming gravelly (shale) towards bottom.

TH2

0-400	Brown slightly sandy silty TOPSOIL
400-700	Very pale brown sandy desiccated hard CLAY
700-2000	Orange-brown/grey mottled very stiff to hard CLAY
2000-2700	brown shale BEDROCK

2.2. Environmental Site Risk Summary/Conclusions

Historic records for the local area c1850s indicate a coal tramway close to the Site, linking Chadwick Colliery to the N with Bury Road. Later, c1890, Chadwick Colliery moved to within 50m NW of the Site. There were no mills etc noted within 250m of the Site boundaries.

The Site itself was part of agricultural land until between 1910 & 1930 when it was developed for its current residential use, along with other dwellings to Broadhalgh Avenue. There was a greenhouse noted on to the S garden area on historic mapping data but other than that the red line boundary which forms the application Site has only been used for the dwelling to the N side of the Site, and for gardens to the centre & S sides.

Upon reconnaissance the Site was noted to comprise a lawned garden area with some plant beds and mature trees to the W & S perimeters. Younger trees were noted within the Site and to the E boundary. No structures were encountered.

A limited soil sampling regime was undertaken to assess for the potential for upper soil contamination. No made ground was encountered and soil appeared to be original topsoil free from visual or olfactory evidence of contamination. Soil samples (S1-4), were undertaken and results indicated a clean topsoil over the Site, with some minor inclusions found in sample S3, around the location of the former greenhouse – but not representative of the general Site topsoil.

Trial hole investigations have been undertaken as of July 2022 for geotechnical purposes, and revealed virgin ground through the site stratigraphy from topsoil to bedrock.

In the wider area, although there was a colliery in close proximity to the Site, no coal seams lie at shallow depth. The closest seam to the surface was that Lower Mountain Mine at approx 85m depth. The site is also underlain by massive sandstone strata.

The Site and local area is not within 250m of historic landfill sites, and is not within a radon area.

2.3. Final Conceptual Model.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED USAGE	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK
Site surface /sub soil.	Various – see potential contaminants section.	Metals, PAHs, asbestos, sulphates & inorganics.	Direct ingestion, aerial ingestion, dermal contact, drinking water. Contact with potential hazards.	Site construction operatives & future occupants. Site buildings.	NOT PRESENT – The upper topsoil horizon has been tested for potential contaminants of concern usually associated with made ground. Samples revealed no source within the soil and therefore no pollutant linkage for the proposed end use.	Medium.	Unlikely.	Low risk.

3. PHASE 3 - REMEDIATION

3.1. Basic Site Details

The Site currently comprises area to a residential dwelling in a predominantly residential area. The Site itself has not had a contaminative usage historically.

Site investigations were undertaken as a precaution only.

It is worth noting that the Site has planning permission for 2 dwellings approved under 15/01450/FUL, and the previous revision of this report is understood to have been passed for that application.

This report will support a new application for revision/alteration to the approved dwellings.

3.2. Conceptual Model (Final) & Relevant Pollution Linkages

All pollutant linkages are broken and there is not considered to be a residual environmental risk.

3.3. Site & Remedial Objectives

The Site and upper soil is considered to be suitable for the proposed end use.

There is no gas risk to the development.

3.4. Recommended Remediation

No remediation is required, no contamination noted.

3.5. Verification (Phase 4 requirements)

Not required.

3.6. Additional Notes

Should any suspected unidentified contamination be encountered throughout the groundworks or construction phase of the development, the suspect area/s should be isolated, advice sought from a suitable qualified environmental professional, and the LPA informed.

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. REFERENCES.

BS 8485:2015+A1:2019. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.

BS 10175:2011+A2:2017. Investigation of potentially contaminated sites. Code of practice.

BS5930:2015. Code of practice for site investigations.

CL:AIRE. 2012. Research Bulletin-RB17-A Pragmatic Approach to Ground Gas Risk Assessment.

CIRIA. Report C665.

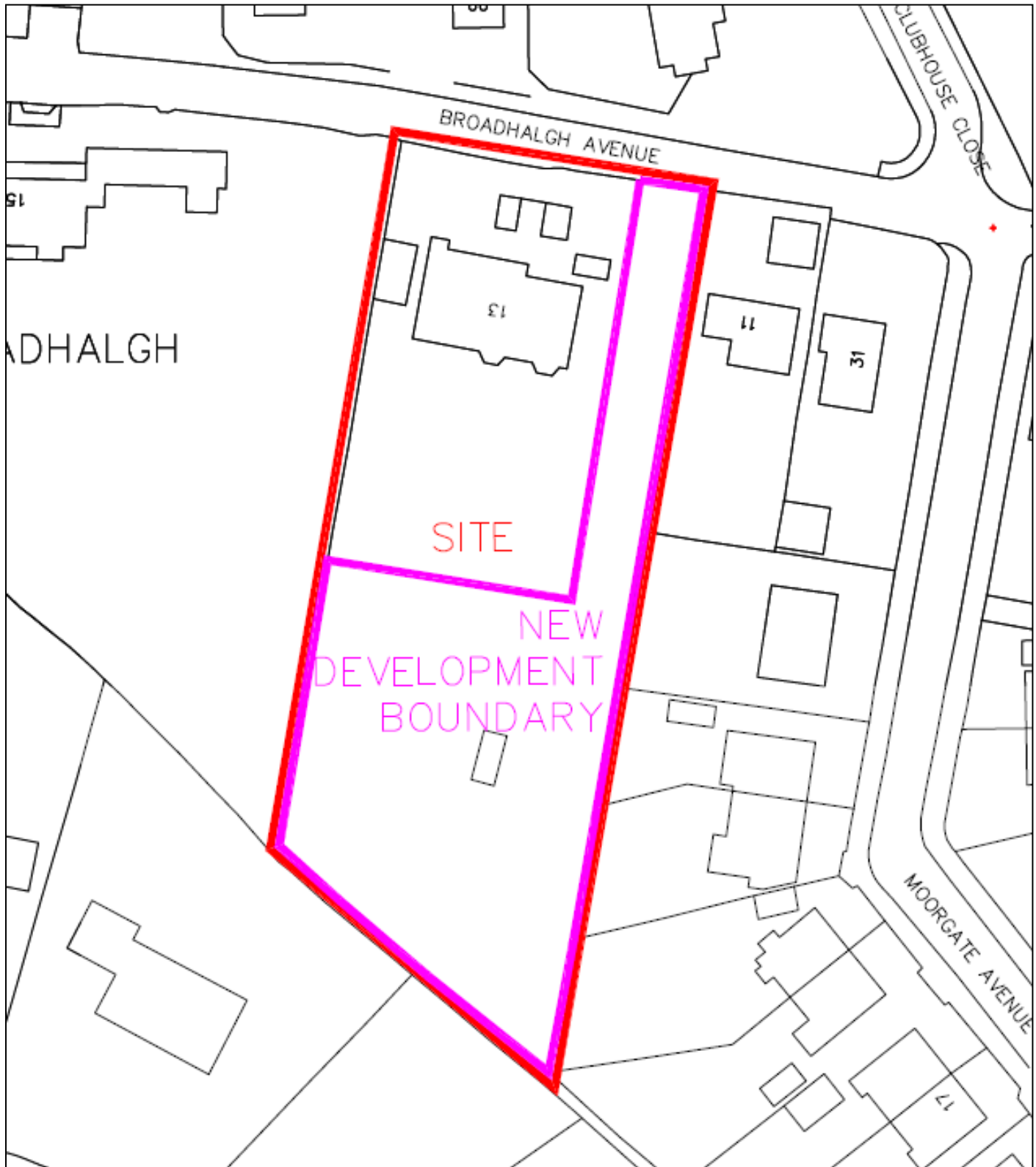
Environment Agency. 2005. Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination. R&D Technical Report P5-066/TR.

ICE Manual of Geotechnical Engineering Volume I. 2012.

CIRIA. Report SP32.

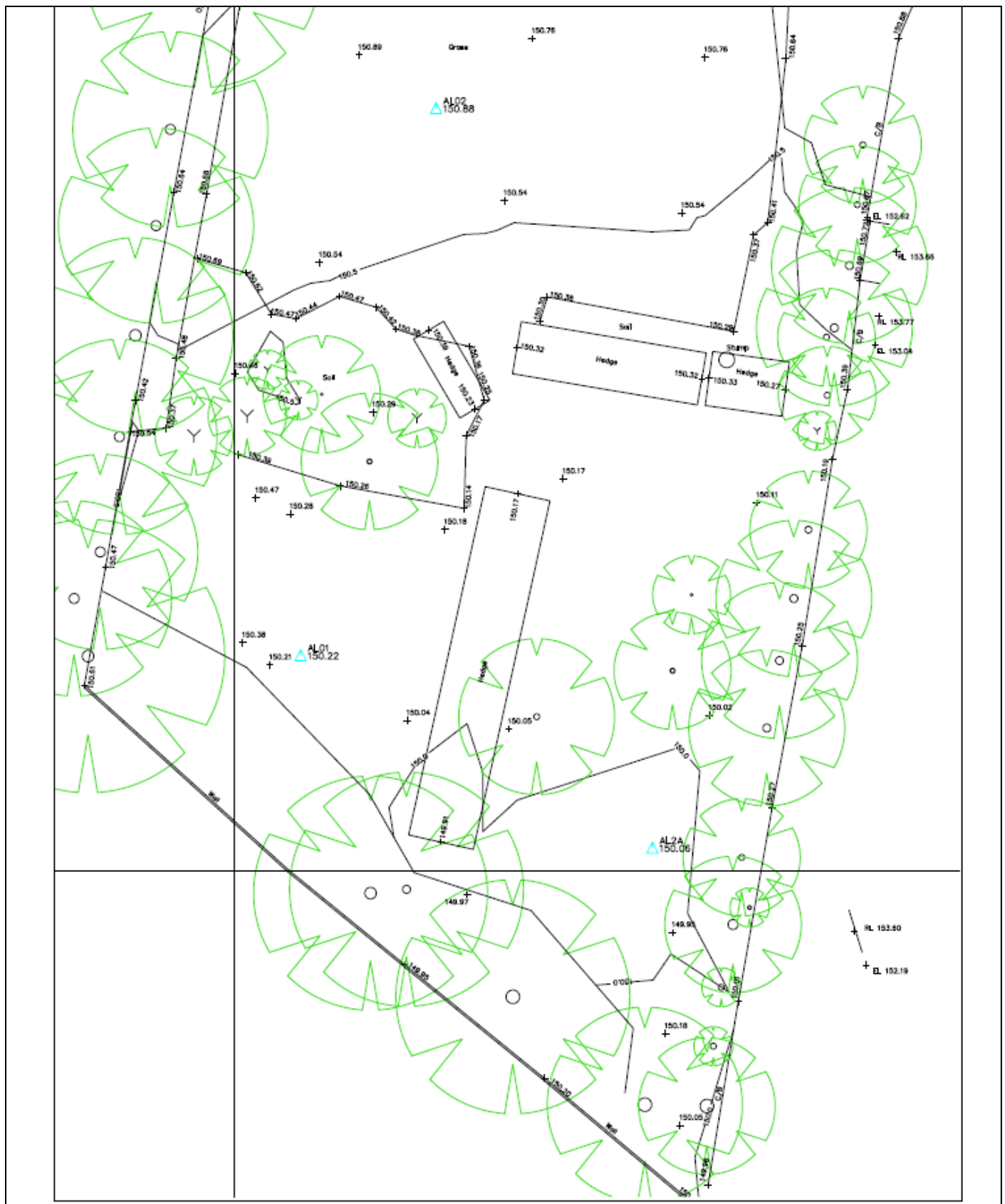
5. APPENDIX A: PHOTOS & FIGURES.

5.1. Location Plan.





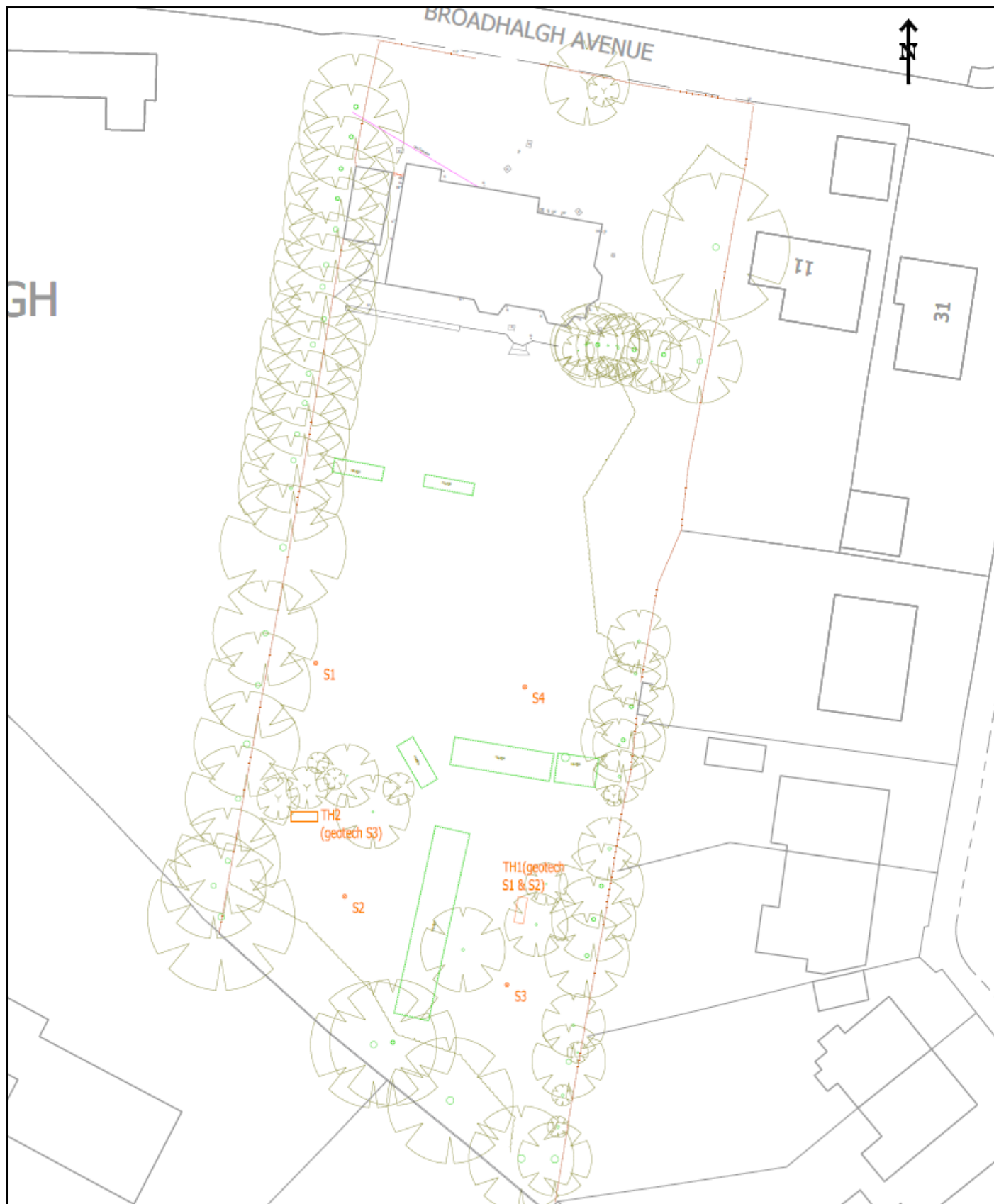
CONSULTING CIVIL & GEOTECHNICAL ENGINEERS



5.3. Proposed Development.



5.4. Site Investigation Plan.



5.5. Borehole Logs.

N/A – not used.

5.6. Trial Hole Logs.

N/A – in report.

5.7. Soil Sampling Analysis.

Client / Site		Doheny - Broadhalgh Av, Bamford.							
Sampling Date		13-Feb-19							
Comparison of Contamination Test Results with Thresholds (mg/kg)									
Contaminant		No	Max	Mean	t 95	RESIDENTIAL			
						(with or without plant uptake)		Comment	
						Pass/Fail			
METALS	Arsenic as As, dry weight	4	25	22	24.7	37	PASS	S3 elevated, S1,2,4 ok. Site ave ok	
	Boron as B, hot water sol dw	4	1	1	1	290	PASS		
	Cadmium as Cd, dry weight	4	1	1	1	22	PASS		
	chromium as Cr(III) dry weight	4	26.00	21.75	25.55	910	PASS		
	Chromium as Cr(VI), dry weight	4	1	1	1	21	PASS		
	Copper, as Dry Weight	4	110	64	101.9	2400	PASS		
	Lead, as Dry Weight	4	350	180	320	200	FAIL		
	Mercury as Hg, dry weight	4	1	1	1	1.2	PASS		
	Nickel as Ni, dry weight	4	29	20.25	27.5	130	PASS		
	Selenium as Se, dry weight	4	3	3	3	250	PASS		
	Zinc as Zn, dry weight	4	380	155	336.4	3700	PASS		
INORGANIC	Cyanide (Total)	4	1	1	1	2.5	PASS		
	Sulphate (Total) as SO4	4	0.11	0.08	0.104	0.24	PASS		
	Sulphide	4	10	10	10	250	PASS		
	pH	4	6.5	5.45	6.335	6 to 8	ACIDIC		
	Sulphur (Elemental)	4	500	500	500	100	comment		
	Asbestos Identification	4	0	0	0	0	PASS		
ORGANIC	SOM	4	6	6	6				
	PAH acenaphthene	4	0.42	0.215	0.402	1100	PASS		
	PAH acenaphthylene	4	0.04	0.02	0.037	920	PASS		
	PAH anthracene	4	0.51	0.27	0.491	11000	PASS		
	PAH benz[a]anthracene	4	1.5	0.818	1.44	13	PASS		
	PAH benzo[a]pyrene	4	1.2	0.718	1.167	5	PASS		
	PAH benzo[b]flouranthene	4	1.2	0.695	1.151	3.7	PASS		
	PAH benzo[g,h,i]perylene	4	0.6	0.385	0.587	350	PASS		
	PAH benzo[k]flouranthene	4	0.89	0.558	0.875	100	PASS		
	PAH chrysene	4	1.6	0.865	1.525	27	PASS		
	PAH dibenz[ah]anthracene	4	0.26	0.143	0.245	0.3	PASS		
	PAH flouranthene	4	2.8	1.52	2.68	890	PASS		
	PAH flourene	4	0.3	0.158	0.288	860	PASS		
	PAH indeno[123-cd]pyrene	4	0.53	0.34	0.52	41	PASS		
	PAH naphthalene	4	0.33	0.185	0.309	13	PASS		
	PAH phenanthrene	4	2.2	1.215	2.125	440	PASS		
	PAH pyrene	4	2.5	1.335	2.38	2000	PASS		
	PAH PAH (Total - SUM EPA16)	4	17	9.6	16.4	1	comment		
	SVOC phenol	4	1	1	1	380	PASS		

5.8. CLS – Soil Testing Certificates.

 CONCEPT LIFE SCIENCES DELIVERING SCIENCE Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)	Concept Life Sciences Certificate of Analysis	Hadfield House Hadfield Street Combrook Manchester M16 9FE Tel : 0161 874 2400 Fax : 0161 874 2468
Report Number: 802820-1 Date of Report: 26-Feb-2019 Customer: T J Booth Associates 20A Eastgate Rochdale OL16 1DH Customer Contact: Mr Daniel Slattery Customer Job Reference: Customer Purchase Order: doheny-13 broadhalgh ave-CLS-130219 Customer Site Reference: doheny - 13 broadhalgh ave, rochdale Date Job Received at Concept: 14-Feb-2019 Date Analysis Started: 15-Feb-2019 Date Analysis Completed: 26-Feb-2019		
The results reported relate to samples received in the laboratory and may not be representative of a whole batch. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation This report should not be reproduced except in full without the written approval of the laboratory Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual		
 1549	Report checked and authorised by : Toni Morris Customer Service Advisor	Issued by : Toni Morris Customer Service Advisor 
Page 1 of 4		

Concept Reference: 802820

Project Site: doheny - 13 broadhalgh ave, rochdale

Customer Reference:

Soil Analysed as Soil

ICRCL (Maxi)

Concept Reference					802820 001	802820 002	802820 003	802820 004
Customer Sample Reference					S1	S2	S3	S4
Date Sampled					13-FEB-2019	13-FEB-2019	13-FEB-2019	13-FEB-2019
Determinand	Method	Test Sample	LOD	Units				
Chromium VI	T6	A40	1	mg/kg	<1	<1	<1	<1
Arsenic	T6	A40	1	mg/kg	19	25	23	21
Boron (water-soluble)	T6	A40	1	mg/kg	<1	<1	<1	<1
Cadmium	T6	A40	1	mg/kg	<1	<1	1	<1
Chromium	T6	A40	1	mg/kg	18	23	26	20
Copper	T6	A40	1	mg/kg	46	56	110	44
Cyanide(Total)	T4	AR	1	mg/kg	<1	<1	<1	<1
Cyanide(free)	T4	AR	1	mg/kg	<1	<1	<1	<1
Lead	T6	A40	1	mg/kg	110	150	350	110
Mercury	T6	A40	1	mg/kg	<1	<1	<1	1
Nickel	T6	A40	1	mg/kg	16	19	29	17
pH	T7	A40			5.2	4.7	6.5	5.4
Phenols(Mono)	T4	AR	1	mg/kg	<1	<1	<1	<1
Selenium	T6	A40	3	mg/kg	<3	<3	<3	<3
SO4(Total)	T6	A40	0.01	%	0.07	0.11	0.07	0.07
Sulphide	T4	A40	10	mg/kg	<10	<10	<10	<10
Sulphur(Free)	T2	AR	500	mg/kg	<500	<500	<500	<500
Thiocyanate	T4	A40	10	mg/kg	<10	<10	<10	<10
Zinc	T6	A40	1	mg/kg	88	63	380	89

Concept Reference: 802820

Project Site: doheny - 13 broadhalgh ave, rochdale

Customer Reference:

Soil Analysed as Soil

Total and Speciated USEPA16 PAH

Concept Reference					802820 001	802820 002	802820 003	802820 004
Customer Sample Reference					S1	S2	S3	S4
Date Sampled					13-FEB-2019	13-FEB-2019	13-FEB-2019	13-FEB-2019
Determinand	Method	Test Sample	LOD	Units				
Naphthalene	T149	AR	0.01	mg/kg	0.33	0.06	0.16	0.19
Acenaphthylene	T149	AR	0.01	mg/kg	0.04	0.01	0.01	0.02
Acenaphthene	T149	AR	0.01	mg/kg	0.30	0.09	0.05	0.42
Fluorene	T149	AR	0.01	mg/kg	0.22	0.06	0.05	0.30
Phenanthrene	T149	AR	0.01	mg/kg	1.7	0.56	0.40	2.2
Anthracene	T149	AR	0.01	mg/kg	0.38	0.11	0.08	0.51
Fluoranthene	T149	AR	0.01	mg/kg	2.0	0.74	0.54	2.8
Pyrene	T149	AR	0.01	mg/kg	1.7	0.67	0.47	2.5
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	1.1	0.37	0.30	1.5
Chrysene	T149	AR	0.01	mg/kg	1.1	0.43	0.33	1.6
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	1.7	0.65	0.62	2.1
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	0.98	0.35	0.34	1.2
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	0.46	0.18	0.19	0.53
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	0.16	0.07	0.08	0.26
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	0.51	0.20	0.23	0.60
PAH(total)	T149	AR	0.01	mg/kg	13	4.6	3.8	17

Concept Reference: 802820								
Project Site: doheny - 13 broadhalgh ave, rochdale								
Customer Reference:								
Soil			Analysed as Soil					
Miscellaneous								
Concept Reference				802820 001	802820 002	802820 003	802820 004	
Customer Sample Reference				S1	S2	S3	S4	
Date Sampled				13-FEB-2019	13-FEB-2019	13-FEB-2019	13-FEB-2019	
Determinand	Method	Test Sample	LOD	Units				
Asbestos ID	T27	A40			N.D.	N.D.	N.D.	N.D.
Soil Organic Matter	T287	A40	0.1	%	8.2	9.3	13	6.8
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	0.87	0.37	0.34	1.2
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	0.79	0.28	0.27	0.89

Index to symbols used in 802820-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
N.D.	Not Detected
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos testing was subcontracted.

Method Index

Value	Description
T2	Grav
T27	PLM
T7	Probe
T4	Colorimetry
T6	ICP/OES
T287	Calc TOC/0.58
T149	GC/MS (SIR)

Accreditation Summary

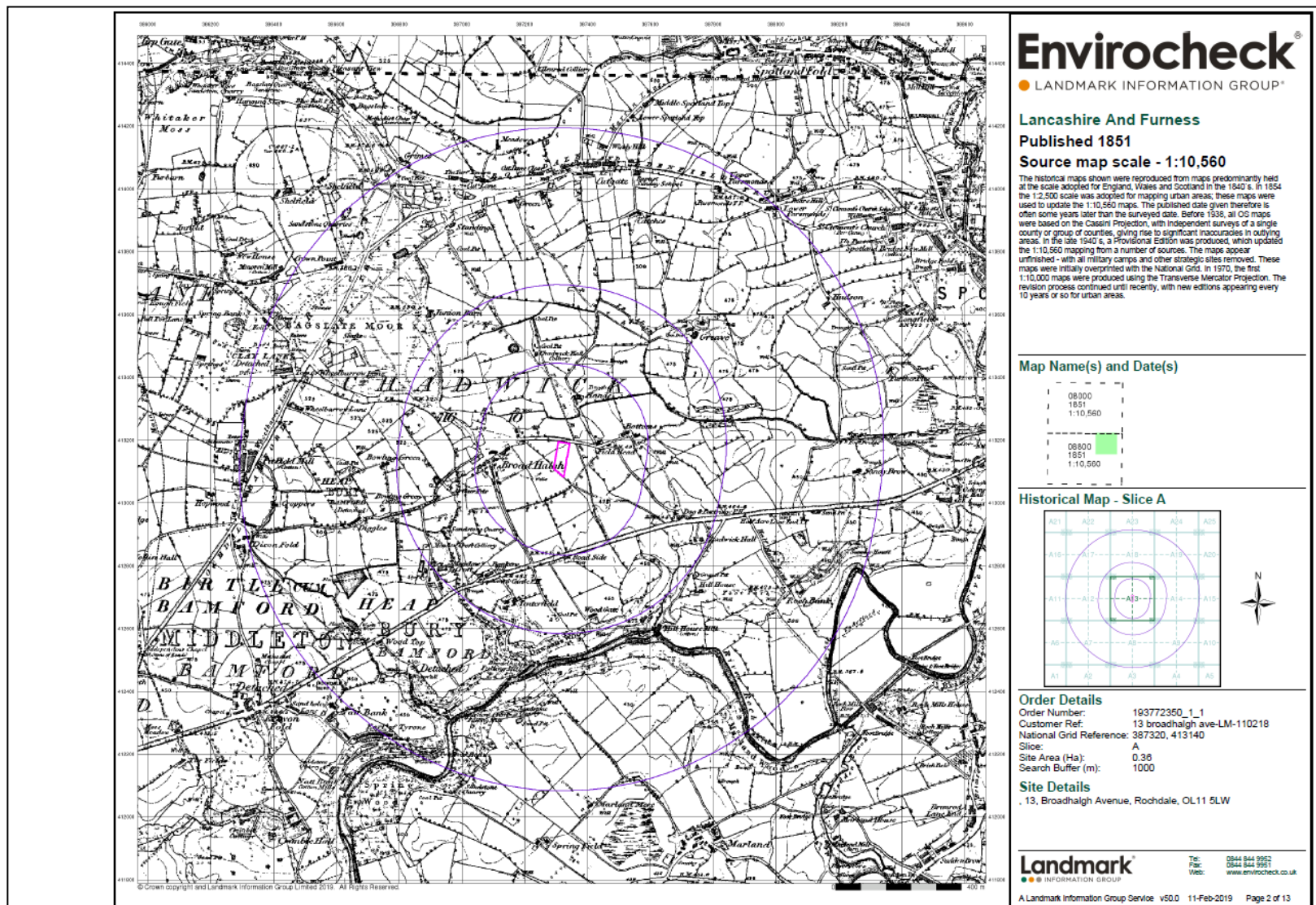
Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Chromium VI	T6	A40	1	mg/kg	N	001-004
Arsenic	T6	A40	1	mg/kg	U	001-004
Boron (water-soluble)	T6	A40	1	mg/kg	N	001-004
Cadmium	T6	A40	1	mg/kg	U	001-004
Chromium	T6	A40	1	mg/kg	U	001-004
Copper	T6	A40	1	mg/kg	U	001-004
Cyanide(Total)	T4	AR	1	mg/kg	U	001-004
Cyanide(free)	T4	AR	1	mg/kg	U	001-004
Lead	T6	A40	1	mg/kg	U	001-004
Mercury	T6	A40	1	mg/kg	U	001-004
Nickel	T6	A40	1	mg/kg	U	001-004
pH	T7	A40			U	001-004
Phenols(Mono)	T4	AR	1	mg/kg	U	001-004
Selenium	T6	A40	3	mg/kg	U	001-004
SO4(Total)	T6	A40	0.01	%	N	001-004
Sulphide	T4	A40	10	mg/kg	N	001-004
Sulphur(Free)	T2	AR	500	mg/kg	N	001-004
Thiocyanate	T4	A40	10	mg/kg	N	001-004
Zinc	T6	A40	1	mg/kg	U	001-004
Naphthalene	T149	AR	0.01	mg/kg	U	001-004
Acenaphthylene	T149	AR	0.01	mg/kg	U	001-004
Acenaphthene	T149	AR	0.01	mg/kg	U	001-004

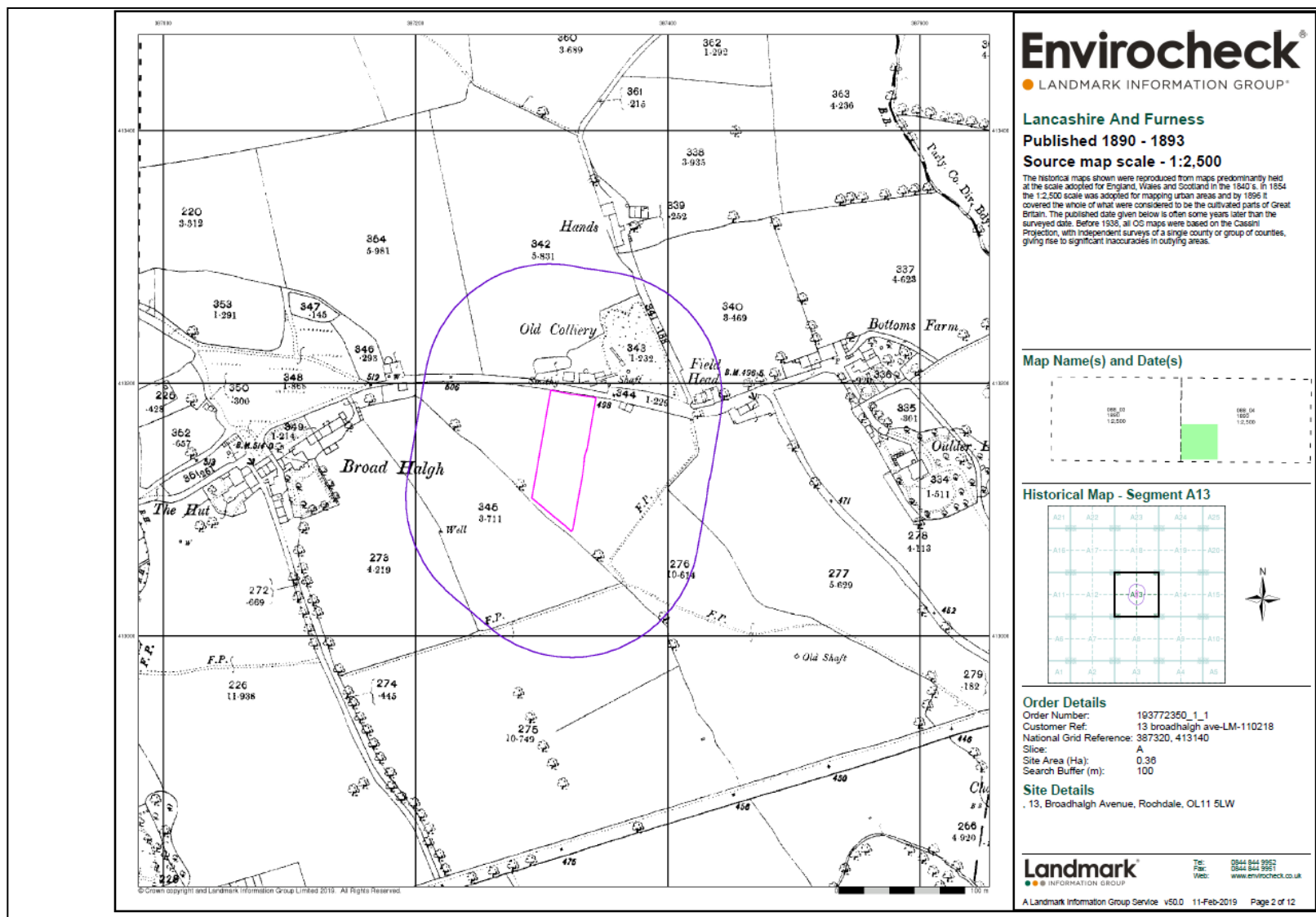


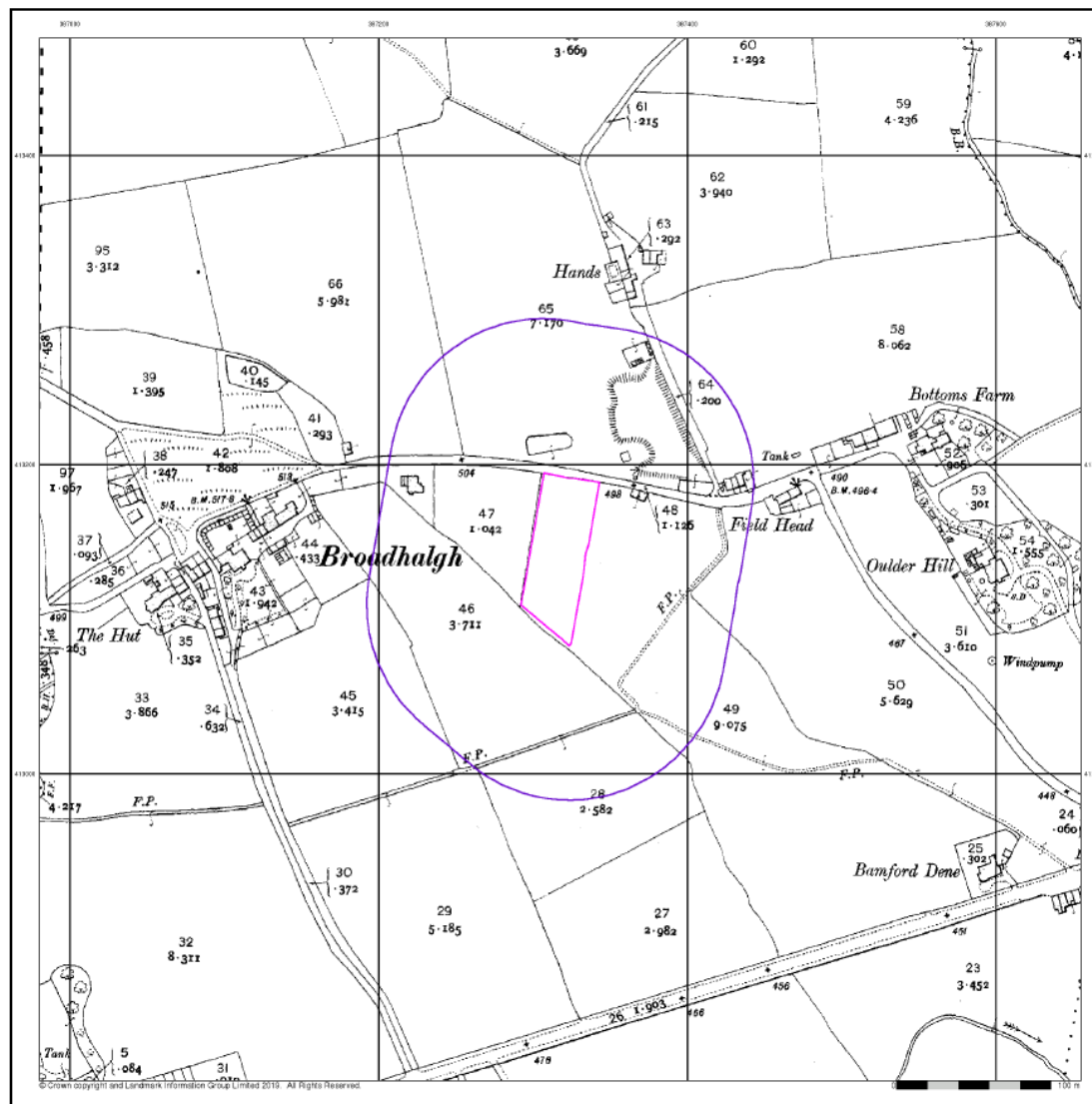
Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Fluorene	T149	AR	0.01	mg/kg	U	001-004
Phenanthrene	T149	AR	0.01	mg/kg	U	001-004
Anthracene	T149	AR	0.01	mg/kg	U	001-004
Fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Pyrene	T149	AR	0.01	mg/kg	U	001-004
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	U	001-004
Chrysene	T149	AR	0.01	mg/kg	U	001-004
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	U	001-004
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	U	001-004
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	U	001-004
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	U	001-004
PAH(total)	T149	AR	0.01	mg/kg	U	001-004
Asbestos ID	T27	A40			SU	001-004
Soil Organic Matter	T287	A40	0.1	%	N	001-004
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	U	001-004



6. APPENDIX B: ENVIROCHECK & AGENCY MAPS.







Envirocheck

LANDMARK INFORMATION GROUP

Lancashire And Furness

Published 1910

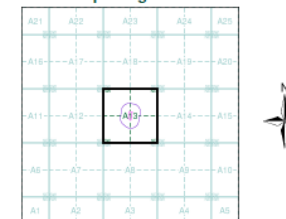
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1935, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 193772350_1_1
 Customer Ref: 13 broadhalgh ave-LM-110218
 National Grid Reference: 387320, 413140
 Slice: A
 Site Area (Ha): 0.36
 Search Buffer (m): 100

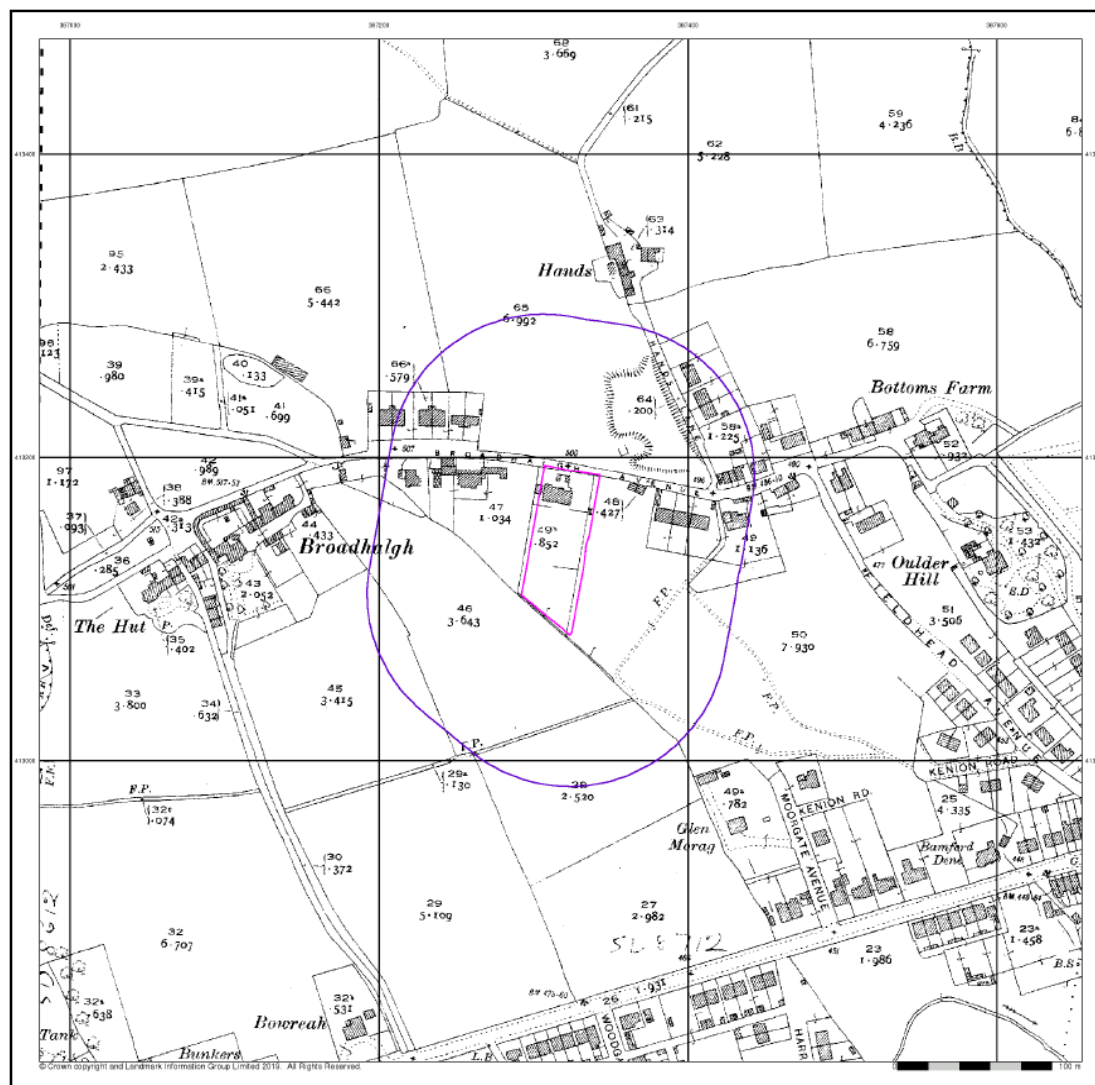
Site Details

13, Broadhalgh Avenue, Rochdale, OL11 5LW

Landmark

Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

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Envirocheck

LANDMARK INFORMATION GROUP

Lancashire And Furness

Published 1930

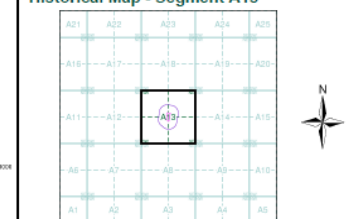
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1940's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1936, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 193772360_1_1
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National Grid Reference: 387320, 413140
Sheet: A
Site Area (Ha): 0.36
Search Buffer (m): 100

Site Details

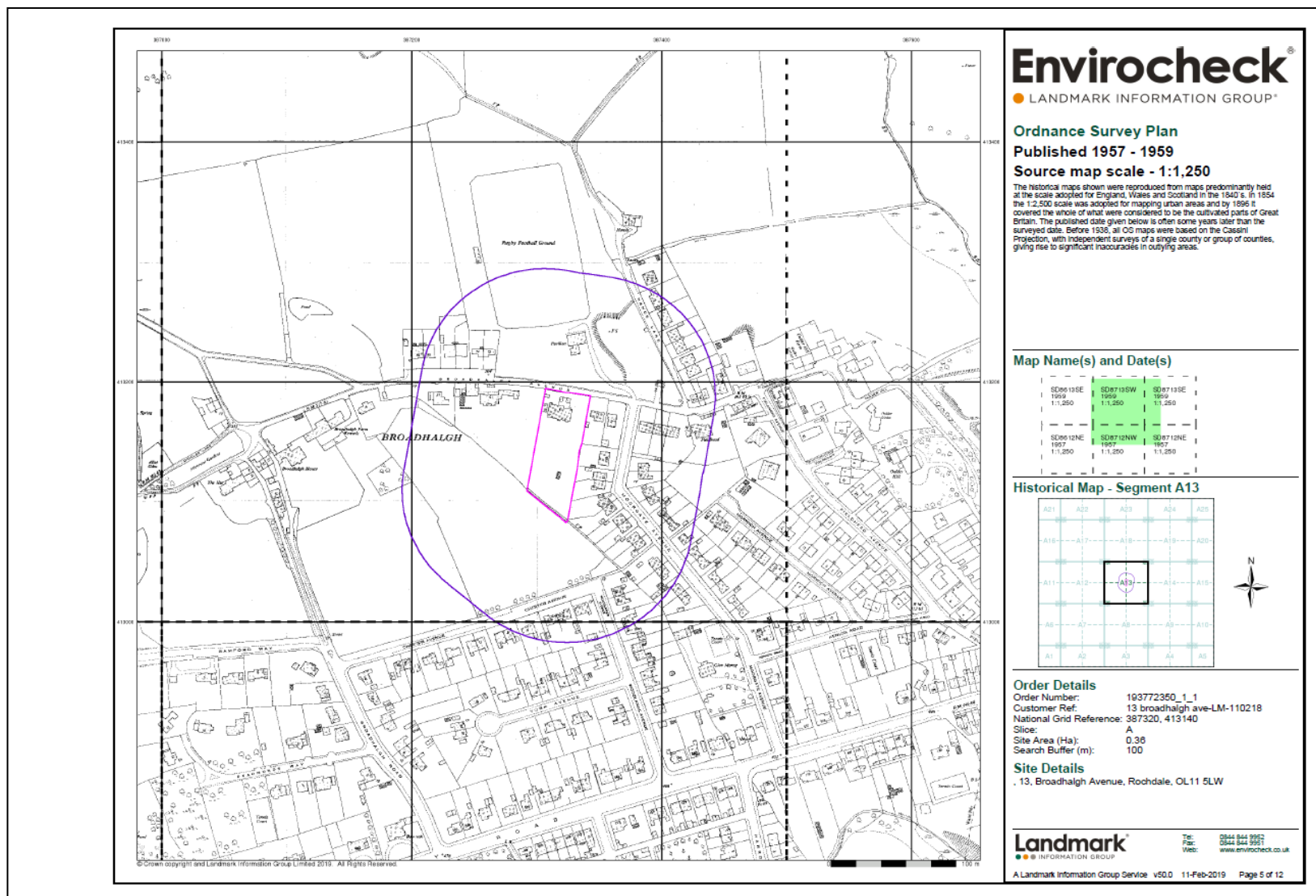
, 13, Broadhalgh Avenue, Rochdale, OL11 5LW

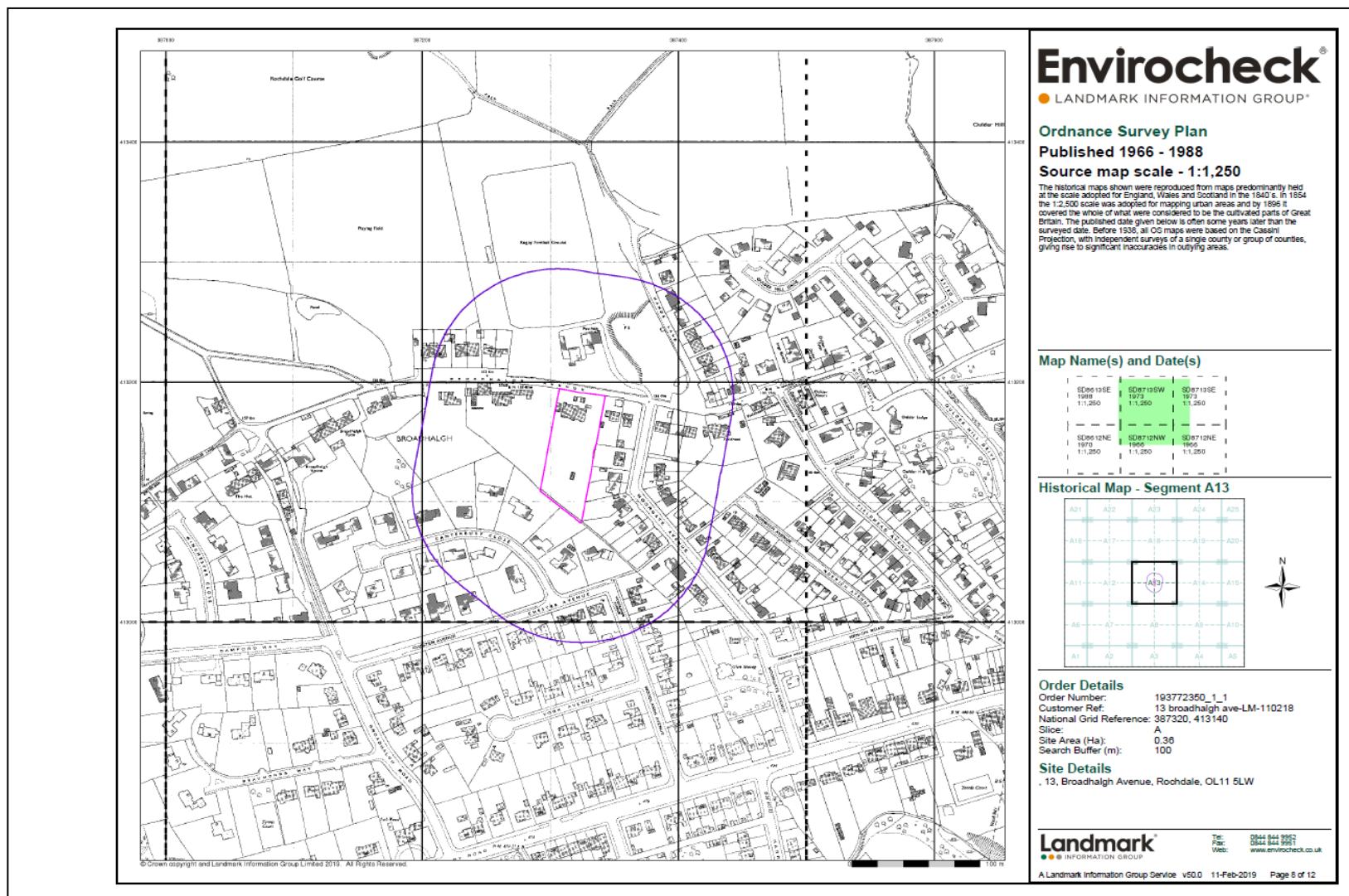
Landmark

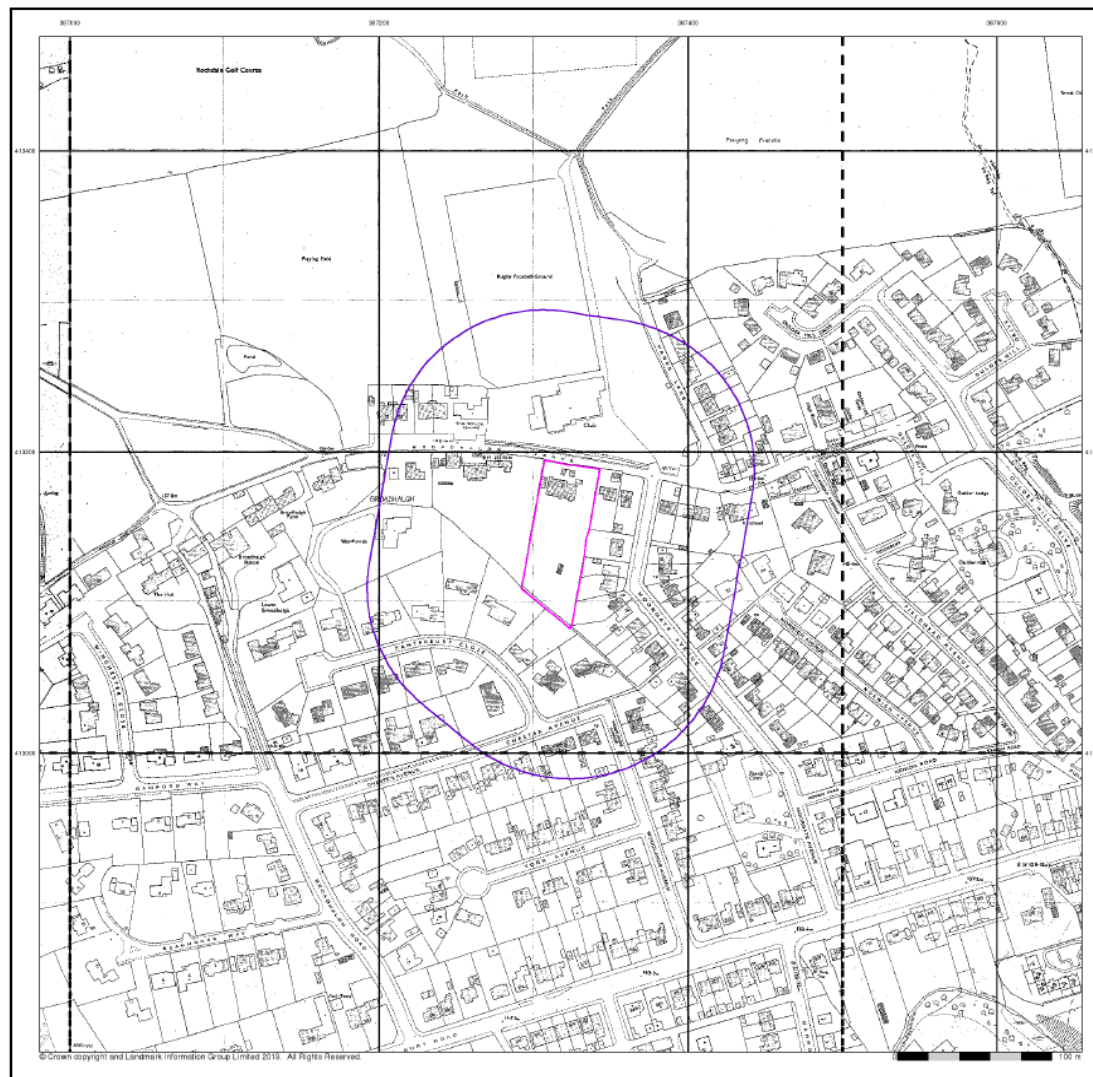
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Additional SIMs

Published 1977 - 1990

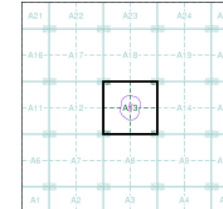
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SD8613SE	SD8713SW	SD8713SE
1979	1990	1995
1:1,250	1:1,250	1:1,250
SD8613NE	SD8713NW	SD8713NE
1977	1990	1995
1:1,250	1:1,250	1:1,250

Historical Map - Segment A13



Order Details

Order Number: 193772350_1_1
 Customer Ref: 13 broadhagh ave-LM-110218
 National Grid Reference: 387320, 413140
 Slice: A
 Site Area (Ha): 0.36
 Search Buffer (m): 100

Site Details

13, Broadhagh Avenue, Rochdale, OL11 5LW

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