

PHASE 1 & 2 ENVIRONMENTAL AUDIT

Proposed Residential Development

Hallmark Developments

Honresfeld

Halifax Road

Littleborough

OL15 0JG

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Client: Hallmark Developments Ltd.
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Revision	Date	Reason
0	Dec 2021	Original to address planning conditions.

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1. INTRODUCTION

T. J. Booth Associates have been appointed by Hallmark Developments Ltd to undertake a Phase 1 & 2 Environmental Audit to the above Development Site, to address planning conditions on a Town & Country planning application for development.

The Site is located off Halifax Road, Site centre co-ordinates E: 394741, N: 416850. It was formerly used as the Leonard Cheshire Nursing Home comprising the historic Honresfeld House, and more recent outbuildings, bungalows, and garages/sheds etc.

Currently the Site is subject to a planning application, ref No: 19/01091/FUL, for the "Change of use from care home to single detached dwelling with associated building and demolition works, demolition of existing bungalow and construction of six new detached dwellings with associated servicing and external works". At the time of writing the decision notice had not been issued, but it is expected that the usual environmental condition would be attached to any permission should the development be approved.

A previous similar outline planning permission c2016, ref No: 16/01457/HYBR, contained the following environmental condition:

- 28 No development shall take place until an investigation and risk assessment, in addition to any assessment provided with the planning application, to assess the nature and extent of any contamination on the site, whether or not it originates on the site has been submitted to and approved in writing by the local planning authority. The investigation and risk assessment must be undertaken by competent persons and the report of the findings must 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 archeological sites and ancient monuments;
 - iii) where unacceptable risks are identified, an appraisal of remedial options and proposal of the preferred option(s)

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 building(s) hereby approved are first occupied.

This report provides a desk based environmental study local to the Site on the potential for contamination via the source-pathway-receptor methodology using current environmental databases, in addition to a site walkover in line with current guidance. Recommendations in line with current best practice shall be put forward at the end of the report.

2. PROPOSED DEVELOPMENT

The proposal is for the redevelopment of the Site into a residential usage.

The existing historic Honresfeld House central to the Site shall be renovated for use as a dwelling. There will also be 6No. executive detached residential dwellings constructed around the existing dwelling.

The current existing access road will be retained as well as an additional access driveway to the S side adjacent to the new dwellings.

The extensive soft landscaped grounds on Site will be retained and incorporated into individual dwelling boundaries.

3. HISTORIC MAPS

DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
c1850	Site is in agricultural fields adjacent to Blackstone Edge Road.	Gatehouse Colliery 130m S, other coal pits in the wider area. Spring/pond approx. 200m SE. Some farmhouses within 250m of the Site but not many other features.
c1890	Honresfeld House now shown to the centre of the Site with crescent access road to entrances/exists as in the present day. Embankment to the garden area also noted to	Shafts to the S now noted as old. No overall change in the wider area.

	the NW side of the house as in the present day. There is a lawn area or similar to the SE corner and associated greenhouse. The Site perimeter is enclosed with trees.	
c1910	No change noted on OS maps. Other historic mapping c1910 indicates there are water pipes running through the Site which feed from the spring/pond 200m SE, there is also a well noted 100m SE. The pipes run through the Honresfeld Site trending SE-NW, adjacent the NE boundary and feed cottages/farmhouses to the NW.	Some local development with dwellings noted to the SE.
c1930	No change.	Some further development within 250m of the Site but no new contaminative industry or other commercial uses noted. Tank (agricultural) noted in fields to the SE approx 100m distant adjacent to springs.
c1965	Site noted as part of the Leonard Cheshire Homes. Much of the Site by now heavily vegetated.	Only residential uses within 250m of the Site boundaries.
c1985	No change.	Sub-station noted 100m S.
c1990	Site remains as Leonard Cheshire Nursing Home. There are multiple extensions to the NE side of the Honresfeld house. There are 2No. new buildings erected to the S & E of the main house with a garage noted to the NE close to the NE entrance.	Site to the W now noted as Breeze Hill Nursing Home. No overall change in the wider area.

4. PRESENT DAY MAPS

Site Boundaries, Outlines of Structures and Buildings:	The Site is noted to be heavily vegetated with juvenile & mature trees around the perimeter. The historic building is nominally located centrally with extensions noted to the SW & NE sides, and the garden/soft landscaping yard and lawns to the NW side. The Site access is formed by a crescent road from the W corner, around the S side of the house and exiting/entering to the N corner. There is a large detached building noted to the centre SE side of the Site, built into the existing natural bank/slope in this area. There is also a detached bungalow to E Site corner. There are two garages noted on Site 1 close to each entrance/exit. The majority of the Site is made up by soft landscaping.
Ground Contours, Natural Drainage Features:	The overall natural fall is to the W corner. The SE boundary is approx 190.5-191m aOD. The N entrance is approx 180m aOD. The NW entrance is 176m aOD. Existing hardstandings are drainage via a piped drainage/sewerage system. Multiple MHs/ICs have been noted on the topographical survey.
Water Courses:	In the wider area, overall land elevation falls to the NW to the Rochdale Canal 250m NW and the River Roch 450m NW.
Below Ground Obstructions:	None noted on current plans.

5. GEOLOGY

Bedrock Geology:	Maps indicate solid geology to comprise Trough Edge Sandstone of the Westphalian Lower Coal Measures.
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Superficial Geology:	The Site is underlain by glacial till the boundary of which terminates at the SE Site perimeter with no cover beyond (to the S).
Coal Seams/Faults.	A number of seams underlie the Site, the highest of which is the Upper Mountain Mine coal seam.

6. BOREHOLES RECORDS

No boreholes noted within close proximity to the Site.

7. LANDMARK ENVIROCHECK

7.1. AGENCY & HYDROLOGICAL

Contaminated land register entries & notices:	No records within a 250m radius.
Pollutant incidents to controlled waters:	There was 1 record within 219m southwest.
Bedrock aquifer:	Secondary A.
Superficial aquifer:	Secondary undifferentiated.
Source protection zone:	Not within an SPZ.

7.2. WASTE

BGS recorded landfill sites:	No waste or landfill sites were recorded within a 250m.
Historical landfill sites:	No waste or landfill sites were recorded within a 250m.
Registered landfill sites:	No waste or landfill sites were recorded within a 250m.

7.3. HAZARDOUS SUBSTANCES

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

7.4. GEOLOGICAL

Mining Instability:	No records.
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:	Low to very low risk.
Potential for Running Sand Ground Stability Hazards:	Very low risk to no hazard.
Potential for Shrinking or Swelling Clay Ground Stability Hazards:	Very low risk to no hazard.
Radon Potential - Radon Affected Areas:	Within and area where less than 1% of homes at or above the action level.
Radon Potential - Radon Protection Measures:	None required.

8. COAL AUTHORITY

Entries, Adits, Shafts.	No shafts within 20m of site boundaries, nor within close proximity to the site. Closest was 190m S.
Past Recorded Underground Mining.	No recoded workings of coal beneath the Site..
Shallow Unrecorded Mining.	None noted beneath the Site.
Shallow Recorded Mining.	None noted beneath the Site.
Development High Risk Area.	Not within a Development High Risk Area.

9. LOCAL KNOWLEDGE & PLANNING SEARCH

N/A.

10. INDUSTRY PROFILES

N/A.

11. SITE RECONNAISSANCE

Site reconnaissance was undertaken on 24th April 2019.

Details of Existing Structures:	The Site was accessed via the W corner entrance, and overall was described much as in Sect 4 – Present Day Mapping with regards to layout. Honresfeld House and associated extensions to the centre remained in temporary use, as did the bungalow to the E corner. However, the building to the centre SE side had been gutted with roofing slates removed allowing ingress of rainwater damaging the structure. Much of the ceiling had been removed and it was noted that insulation in particular was fibreglass. There was a dilapidated timber garage nominally to the centre SW boundary. Building rubble (predominantly blockwork) was noted on the ground surface beside it, however – no visual or olfactory contamination was noted. There were also a former garage to the centre NE boundary, with concrete floor slabs and macadam access. There was some asbestos sheet material around the slabs that had been broken on prior removal, but was localised. A minor outbuilding was also noted to the far east Site corner which was in a dilapidated state.
Adjacent Properties:	Site is within surrounded by agricultural land/open moor to the northeast & southeast, Blackstone Edge Road to the northwest, and residential development to the southwest.
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,	None noted.

Polluted Water, Vegetation, and Significant Odours:	
Relevant Ground Levels, Ground Water Levels, Positions of Wells and Springs:	Fall in elevation from the southeast boundary at 191.00m aOD to the lowest point of the Site at the west corner nominally 175.50m aOD.

12. IDENTIFICATION OF SOURCE-PATHWAY-RECEPTOR.

12.1. Potential Contaminants.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED SOURCE	CONTAMINANT/S
Some minor made ground horizons around the Site close to existing buildings.	Aerial contamination from past industry (mills, foundries, engineering factories, other works with chimneys); which settles in surrounding soil prior to the Site being hard surfaced. Minor ash noted on occasion close to building footprints but not representative of the Site in general.	Metals/PAH.
	Asbestos sheet roofing & cladding was noted across the Site and was in poor condition in some places.	Asbestos.
Natural upper Site soil.	Aerial contamination from past industry (mills, foundries, engineering factories, other works with chimneys); which settles in surrounding soil prior to the Site being hard surfaced.	Metals/PAH.

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

12.3. Potential Receptors.

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

13. PRELIMINARY CONCEPTUAL MODEL.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED USAGE	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK
Virgin Soil.	Various – see potential contaminants section.	Chemical contamination.	Direct ingestion, dermal contact, drinking water. Contact with potential hazards.	Site construction operatives & future occupants. Site buildings.	PRESENT – Virgin soil and existing landscaped area are considered low risk. However, sampling shall be undertaken to prove cleanliness of soil for reuse.	Medium.	Unlikely.	Low risk.
Made ground horizons.	Various – see potential contaminants section.	Chemical contamination.	Direct ingestion, dermal contact, drinking water. Contact with potential hazards.	Site construction operatives & future occupants. Site buildings.	PRESENT – Rare horizons of made ground on Site could potentially contain contaminative material above threshold limits for residential use and therefore requires testing prior to use.	Medium.	Likely.	Moderate risk.
Geological ground gas.	Coal seams noted but no radon or peat sources.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	NOT PRESENT – No worked coal seams noted at shallow depth beneath the Site, and no shafts or adits giving rise to preferential pathways.	Medium.	N/A.	No risk.
Anthropogenic ground gas.	Decomposing organic material in the ground although sources all over 250m distant.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	NOT PRESENT – No sources within 250m, pathways to tortuous. Included for clarity.	Medium.	N/A.	No risk.
Contaminated ground /surface water. Controlled Waters.	Made ground.	Chemical contamination.	Permeation through soil into ground water, local watercourses or aquatic habitats.	Watercourses, canal, aquatic habitats & associated wildlife.	NOT PRESENT – No evidence of major made ground with contaminants of the type to cause issues to either surface or ground water. No watercourses in close proximity, no source protection zone nearby.	Minor.	N/A.	No risk.
Aerial contaminants.	Historic local industrial activity.	Chemical contamination.	Dermal contact & aerial inhalation.	All site users / occupants.	PRESENT – Historic contamination is now be classified as shallow ground pollution in pollutant linkage 1. There are no known present emitters of aerial contamination locally.	Minor.	Unlikely.	Very low risk.

14. SITE INVESTIGATIONS.

14.1. Summary.

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.

The C4SL data relates to updated DEFRA Statutory Guidance under Part 2A of the Environmental Protection Act 1990 (Part 2A). The guidance introduces a 4 category system in which Category 4 is of the least concern and levels falling within this risk category are considered as 'acceptably low'.

As the S4ULs are considered more conservative than C4SLs, any contaminant levels exceeding a S4UL although not considered 'low risk' can still be considered 'acceptably low' for use within the planning regime as long as it is still within the C4SL risk category. Thus, soil sampling results are firstly held to C4SLs where available and then to S4ULs thereafter to define suitability with respect to specified proposed end uses within the planning regime.

14.2. Site Investigation (Soil Sampling) 15.03.2018.

A trial hole investigation was undertaken in March 2018 to try and find a historic local water pipe that was reported to have passed through the Site. The aim of the investigation was to see if the supply pipe remained on Site, to aid in purchasing.

A prior reconnaissance of the Site and surrounding area was undertaken by T J Booth Associates on the 03.03.2018. The historic bunds to the reservoir were still evident 180m SE, although the reservoir had long since been infilled. There was a feeding trough and cistern within the agricultural field to the S, nominally in the position of the historic well. It is not known if this is part of the historic system however the cistern ball cock was not in working order when tested.

Further to the site reconnaissance a trial hole investigation was undertaken by T J Booth Associates on the 15th March 2018. A trial hole trench (THT1) nominally 18m long was excavated close to the SE boundary of the site where the water supply pipe was shown to be located. The trial hole excavation was situated between the existing bungalow and ancillary building, refer to SI Plan Excerpt in appendix.

The trial hole was excavated to nominally 1m depth, and comprised the following:

THT1	GL 190.00m aOD
0-350	Dark brown silty TOPSOIL.
350-700	Brown slightly gravelly SILT.
700-1000	Light brown gravelly CLAY.

There was no evidence of a water supply pipe noted in the excavation. Ground encountered was virgin and no evidence of historic excavation and backfill was noted.

14.3. Site Investigation (Trial Holes) 29.11.2021.

A trial hole investigation was undertaken on the 29.05.2021 to assess the ground for geotechnical purposes/foundations & ground contamination.

The investigation comprised 7No. trial holes (THs1-7) undertaken with a back acting excavator. Soil samples were taken both for contamination testing (samples S1-7), and for plasticity analysis (samples S9-11).

The investigations recorded virgin upper soils across the Site, apart from in the developed areas which some minor made ground such as MOT, concrete and minor ash were noted. However, the majority of the upper Site soil appeared to comprise virgin TOPSOIL.

Below topsoil was generally a thin, nominally 300mm layer of firm orange SILT, sometimes absent, above firm to stiff gravelly CLAYS. Below the clay was generally WEATHERED BEDROCK (fractured shales) over mudstone BEDROCK.

Clay was notably absent around the newer nursing home building to the centre southeast part of the Site, which appears to have been historically cut into the slope at the rear of the Site.

For full trial hole logs & SI Plan excerpt, refer to Appendix.

Soil samples for contamination were sealed in 1kg white plastic snap top containers, amber jars & vials where appropriate and sent to Eurofins Chemtest Ltd to be tested for a range of common contaminants. The samples were tested for metals, specified

PAH, inorganics & sulphates, SOM, and asbestos screening analysis.

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).

RESULTS

The laboratory soil testing results revealed no contaminants of concern recorded at or above threshold levels when compared against residential end use guideline values.

15. ENVIRONMENTAL SITE RISK SUMMARY.

15.1. Summary.

The Site is on the urban fringe with open moorland beyond, and historic maps have identified that Site has only been developed with the former historic Honresfeld House, and later additions of the hospital wing and bungalow.

The risk assessment noted no major sources of contaminative risks to the Site, although there was the potential for made ground associated with construction and hardstandings.

Most of the hardstandings and historic house are to be retained in the proposed design, and new dwellings constructed in place of the former hospital wing/bungalow and surrounding area.

Site investigations have revealed that much of the Site comprises virgin subsoil & topsoil. There are some minor made ground horizons, not representative of the general ground on Site, but associated with areas that have seen past construction & hardstanding. Much of this this comprises MOT & sand blinding/finishes; with some minor areas around old paths being underlain with ash.

Samples across the Site have indicated levels below threshold values for a residential end use, however, minor made ground pockets such as ash should be removed from Site.

16. FINAL CONCEPTUAL MODEL.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED USAGE	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK
Virgin Soil.	Various – see potential contaminants section.	Chemical contamination.	Direct ingestion, aerial contact, dermal contact, drinking water. Contact with potential hazards.	Site construction operatives & future occupants. Site buildings.	NOT PRESENT – Virgin soil and existing landscaped area are considered low risk, generally with contaminant values below LODs.	Minor.	Unlikely.	Very low risk.
Made ground horizons.	Various – see potential contaminants section.	Chemical contamination.	Direct ingestion, aerial contact, dermal contact, drinking water. Contact with potential hazards.	Site construction operatives & future occupants. Site buildings.	PRESENT – Rare horizons of made ground on Site have been noted, and some minor contaminants have been recorded although these are generally below threshold levels for a residential end use.	Minor.	Low likelihood.	Low risk.

17. REMEDIATION STRATEGY.

17.1. Contamination Risk:

The majority of the Site comprises virgin soil which is suitable for the proposed end use, and some minor/rare pockets of made ground.

Virgin soil should be scraped and stockpiles for later reuse in garden areas.

Rare made ground horizons such as ash should be removed from Site.

Due to the newly developed parts of the Site comprising a larger footprint than the existing landscaped/wooded areas; there is likely to be a surplus of topsoil on Site and thus no imports will be required.

No further assessment is required regarding site soil unless unforeseen contamination is noted. If so, the area in question should be isolated and advice sought from a contaminated land professional.

17.2. Gas Risk:

No pollutant linkages concerned with gas risk noted to the Site and therefore no precautions or further assessment required in this regard.

17.3. Additional Notes:

This report should be issued to the RMBC Contaminated Land Officer, for approval and discharge of the geo-environmental planning condition.

We trust the above is clear but should any further clarification be required please do not hesitate to contact T J Booth Associates.

Signed.....

D.S.Slattery BSc (Hons).

T J Booth Associates.

Authorised.....

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

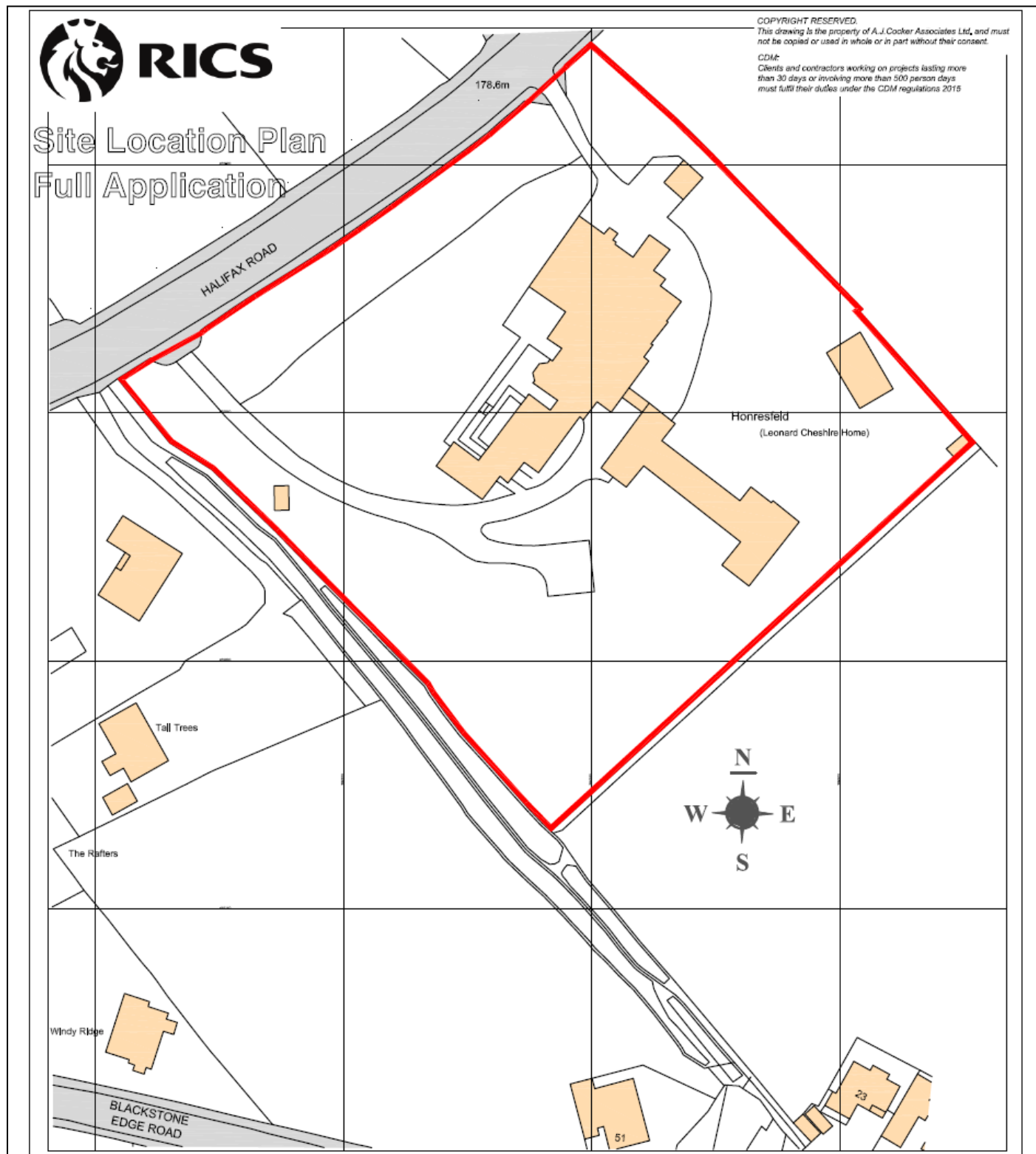
T J Booth Associates.

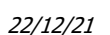
18. REFERENCES

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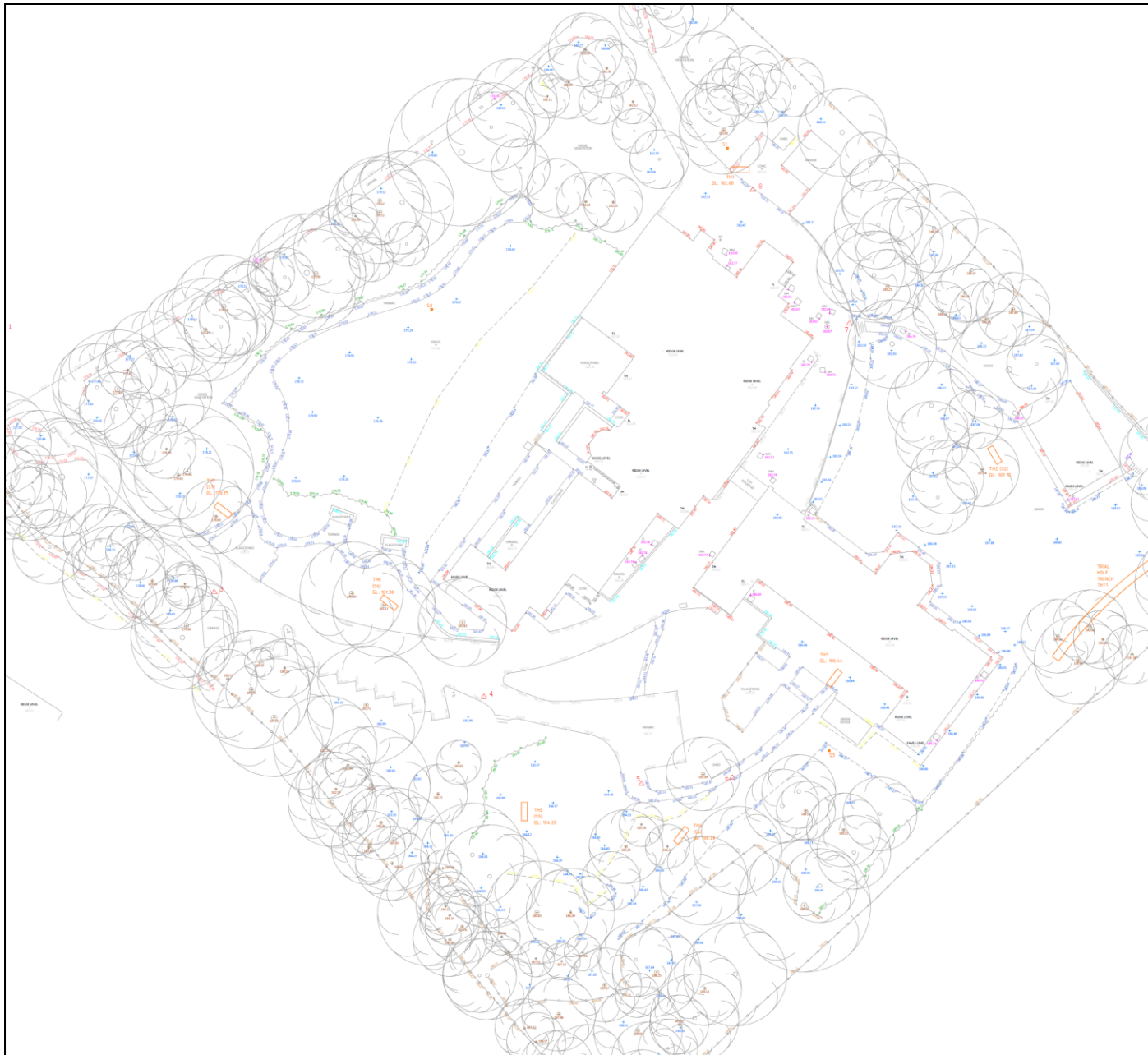
19. APPENDIX A: FIGURES

19.1. Location Plan





19.3. Site Investigation Plan



19.4. Site Investigation Trial Hole Logs

Trial pit reference TRENCH THT1;				Sheet 1 of 1;
Water;	Reduced Level (m);	Legend;	Depth (m);	Description;
	190.00;			
	189.65;	X x X x x X x X	(0.35); 0.35;	Dark brown silty TOPSOIL;
	189.30;	x o x o o x o x	(0.35); 0.70;	Brown slightly gravelly SILT;
	189.00;	- o - o - o - o -	(0.30); 1.00;	Light brown gravelly CLAY;
				Trial pit ends;
Not shown to scale;				
Additional notes: ;				

Trial pit reference TH1;				Sheet 1 of 1;
Water;	Reduced Level (m);	Legend;	Depth (m);	Description;
	182.00;			
	181.50;	X X X X X X	(0.50); 0.50;	Conc slab, mot, and brick fill MADE GROUND;
	180.20;	X o X o o X o X X o X o o X o X X o X o o X o X X o X o	(1.30); 1.80;	Light brown-grey mottled slightly gravelly MADE GROUND (becoming ; chocolate brown towards bottom). Perched water to top.;
				Trial pit ends;
Not shown to scale;				
Additional notes: ;				

Trial pit reference TH2;				Sheet 1 of 1;
Water;	Reduced Level (m);	Legend;	Depth (m);	Description;
	187.75;			
		X X	X (0.70);	Dark brown TOPSOIL , very rooty, rare gravel sized brick fragments. ; (S2);
	187.05;	X X	X 0.70;	
		- - -	(0.60);	Stiff orange-brown slightly gravelly, sandy CLAY (clay sample S9);
	186.45;	- - -	1.30;	
		X X	(0.40);	Orange-brown WEATHERED BEDROCK;
	186.05;	X X	1.70;	
	185.95;	X X	1.80;	BEDROCK;
				Trial pit ends;
Not shown to scale;				
Additional notes: ;				

Trial pit reference TH3;				Sheet 1 of 1;
Water;	Reduced Level (m);	Legend;	Depth (m);	Description;
	186.44;			
		X X	X (0.45);	PCC pavements, sand blind/MOT MADE GROUND;
	185.99;	X X	X 0.45;	
		X X	X (0.95);	Light brown fractured shale WEATHERED BEDROCK;
	185.04;	X X	X 1.40;	
		X X	(0.70);	BEDROCK;
	184.34;	X X	2.10;	
				Trial pit ends;
Not shown to scale;				
Additional notes: ;				

Trial pit reference TH4;				Sheet 1 of 1;
Water; (m);	Reduced Level (m);	Legend;	Depth (m);	Description;
	186.20;			
	185.70;	X X X X X X	(0.50); 0.50;	Dark brown silty, slightly gravelly TOPSOIL . (S4);
	185.40;	x x x x x	(0.30); 0.80;	Firm orange/brown SILT;
	183.60;	- o - o - o - o - - o - o - o - o - - o - o - o - o - - o - o - o - o - - o - o -	(1.80); 2.60;	Stiff to very stiff (becoming hard & friable) grey-brown very ; gravelly CLAY;
	183.10;	X X X X X X	(0.50); 3.10;	WEATHERD BEDROCK;
				Trial pit ends;
Not shown to scale;				
Additional notes: ;				

Trial pit reference TH5;				Sheet 1 of 1;
Water; (m);	Reduced Level (m);	Legend;	Depth (m);	Description;
	184.20;			
	183.90;	X x X x x X x X	(0.30); 0.30;	Dark brown silty TOPSOIL (S5). Pocket of minor made ground inc ; ash/conc to NE side of TH.;
	182.25;	- o - o - o - o - - o - o - o - o - - o - o - o - o - - o - o - o - o - - o - o -	(1.65); 1.95;	Stiff orange-brown very gravelly CLAY;
	181.90;	X X X X	(0.35); 2.30;	WEATHERED BEDROCK;
				Trial pit ends;
Not shown to scale;				
Additional notes: ;				

Trial pit reference TH6;				Sheet 1 of 1;
Water; (m);	Reduced Level (m);	Legend;	Depth (m);	Description;
	181.30;			
	180.20;	X x X x x X x X X x X x x X x X X x X x x X x X	(1.10); 1.10;	Brown silty TOPSOIL (S6);
	179.90;	x x x x x	(0.30); 1.40;	Firm orange/brown SILT;
	178.40;	- - - - - - - - - - - - - - - - - -	(1.50); 2.90;	Firm to stiff orange-brown/grey mottled slightly silty, slightly ; gravelly CLAY (clay sample S10). Becoming dark brown towards bottom.;
				Trial pit ends;
Not shown to scale;				
Additional notes: ;				

Trial pit reference TH7;				Sheet 1 of 1;
Water; (m);	Reduced Level (m);	Legend;	Depth (m);	Description;
	178.75;			
	178.15;	X x X x x X x X X x X x	(0.60); 0.60;	Dark brown silty TOPSOIL (S7);
	177.45;	- - - - - - - - -	(0.70); 1.30;	Firm orange/brown CLAY . Perched water to top.;
	176.95;	- o - o - o - o - - o - o -	(0.50); 1.80;	Firm light brown-grey mottled gravelly CLAY;
	175.55;	- - - - - - - - - - - -	(1.40); 3.20;	Firm chocolate brown CLAY (clay sample S11);
				Trial pit ends;
Not shown to scale;				
Additional notes: ;				

19.5. TJBA Soil Analysis

Client:		Hallmark Developments Ltd					
Site:		Honresfeld, Littleborough					
Sampling Date:		29.11.2021					
Comparison of Contamination Test Results with Thresholds (mg/kg)							
Contaminant		No	Max	Mean	t 95	RESIDENTIAL (with or without plant uptake)	
						Pass/Fail	Comment
METALS	Arsenic as As, dry weight	8	21	11.45	19.25	37	PASS
	Boron as B, hot water sol dw	8	1.7	0.5638	1.249	290	PASS
	Cadmium as Cd, dry weight	8	0.55	0.2513	0.498	22	PASS
	chromium as Cr(III) dry weight	8	96	28.38	70.10	910	PASS
	Chromium as Cr(VI), dry weight	8	0.5	0.5	0.5	21	PASS
	Copper, as Dry Weight	8	220	62.5	164	2400	PASS
	Lead, as Dry Weight	8	110	69.875	110	200	PASS
	Mercury as Hg, dry weight	8	0.2	0.1288	0.186	1.2	PASS
	Nickel as Ni, dry weight	8	25	12.2	21.15	130	PASS
	Selenium as Se, dry weight	8	0.72	0.5925	0.699	250	PASS
	Zinc as Zn, dry weight	8	130	54.375	108.3	3700	PASS
INORGANIC	Cyanide (Total)	8	0.5	0.5	0.5	2.5	PASS
	Sulphate (Total) as SO4	8	0.12	0.0613	0.101	0.24	PASS
	Sulphide	8	3.8	2.3438	3.555	250	PASS
	pH	8	7.5	7.1125	7.43	6 to 8	NORMAL
	Sulphur (Elemental)	8	7.4	3.6	6.84	100	PASS
	Asbestos Identification	8	0	0	0	0	PASS
ORGANIC	SOM	8	6	5.125	6		
	PAH acenaphthene	8	0.1	0.1	0.1	1100	PASS
	PAH acenaphthylene	8	0.1	0.1	0.1	920	PASS
	PAH anthracene	8	0.64	0.1825	0.486	11000	PASS
	PAH benzo[a]anthracene	8	1.4	0.4263	1.232	13	PASS
	PAH benzo[a]pyrene	8	1.6	0.2875	1.075	5	PASS
	PAH benzo[b]fluoranthene	8	2.2	0.3625	1.465	3.7	PASS
	PAH benzo[g,h,i]perylene	8	0.1	0.1	0.1	350	PASS
	PAH benzo[k]fluoranthene	8	1.1	0.225	0.75	100	PASS
	PAH chrysene	8	2.8	0.8513	2.31	27	PASS
	PAH dibenz[ah]anthracene	8	0.1	0.1	0.1	0.3	PASS
	PAH fluoranthene	8	2.9	0.7913	2.305	890	PASS
	PAH fluorene	8	0.1	0.1	0.1	860	PASS
	PAH indeno[123-cd]pyrene	8	0.1	0.1	0.1	41	PASS
	PAH napthalene	8	0.1	0.1	0.1	13	PASS
	PAH phenanthrene	8	1.8	0.3925	1.377	440	PASS
	PAH pyrene	8	3.3	0.9775	2.67	2000	PASS
	PAH PAH (Total - SUM EPA16)	8	18	4.55	13.73	1	comment
	SVOC	phenol	8	0.1	0.1	0.1	380

19.6. Chemtest Ltd Soil Chemical Results & Certification



Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-43172-1		
Initial Date of Issue:	20-Dec-2021		
Client	TJ Booth Associates		
Client Address:	20a Eastgate Street Rochdale Lancs OL16 1DH		
Contact(s):	Daniel Slattery		
Project	Hallmark - Honresfeld		
Quotation No.:	Q19-18321	Date Received:	07-Dec-2021
Order No.:		Date Instructed:	07-Dec-2021
No. of Samples:	11	Results Due:	15-Dec-2021
Turnaround (Wkdays):	7	Subcon Results Due:	30-Dec-2021
Date Approved:	20-Dec-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Soil

Project Hallmark - Honresfeld									
Client: TJ Booth Associates		Chemtest Job No.:		21-43172		21-43172		21-43172	
Quotation No.: 019-18321		Chemtest Sample ID.:		1335102		1335103		1335104	
		Client Sample ID.:		S1		S2		S3	
		Sample Location:		S1		TH2		S3	
		Sample Type		SOIL		SOIL		SOIL	
		Top Depth (m):							
		Bottom Depth (m):		0.5		0.7		0.5	
		Date Sampled:		29-Nov-2021		29-Nov-2021		29-Nov-2021	
		Asbestos Lab:		COVENTRY		COVENTRY		COVENTRY	
		LOD		N/A		N/A		N/A	
Determination		Accred.	SOP	Units					
ACM Type		U	2192						
Asbestos Identification		U	2192						
Moisture		N	2030	%	0.020				
Plasticity Index (Subsoil)		S							
pH		U	2010						
Boron (Hot Water Soluble)		U	2120	mg/kg	0.40				
Sulphur (Elemental)		U	2180	mg/kg	1.0				
Cyanide (Total)		U	2300	mg/kg	0.50				
Thiocyanate		U	2300	mg/kg	5.0				
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50				
Sulphate (Total)		U	2430	mg/kg	100				
Arsenic		U	2450	mg/kg	1.0				
Cadmium		U	2450	mg/kg	0.10				
Chromium		U	2450	mg/kg	1.0				
Copper		U	2450	mg/kg	0.50				
Mercury		U	2450	mg/kg	0.10				
Nickel		U	2450	mg/kg	0.50				
Lead		U	2450	mg/kg	0.50				
Selenium		U	2450	mg/kg	0.20				
Zinc		U	2450	mg/kg	0.50				
Chromium (Hexavalent)		N	2480	mg/kg	0.50				
Organic Matter		U	2625	%	0.40				
Naphthalene		U	2700	mg/kg	0.10				
Acenaphthylene		U	2700	mg/kg	0.10				
Acenaphthene		U	2700	mg/kg	0.10				
Fluorene		U	2700	mg/kg	0.10				
Phenanthrene		U	2700	mg/kg	0.10				
Anthracene		U	2700	mg/kg	0.10				
Fluoranthene		U	2700	mg/kg	0.10				
Pyrene		U	2700	mg/kg	0.10				
Benzofluoranthene		U	2700	mg/kg	0.10				
Chrysene		U	2700	mg/kg	0.10				
Benzofluoranthene		U	2700	mg/kg	0.10				
Benzofluoranthene		U	2700	mg/kg	0.10				
Benzofluoranthene		U	2700	mg/kg	0.10				
Indeno(1,2,3-c,d)Pyrene		U	2700	mg/kg	0.10				

Results - Soil

Project: Hallmark - Honresfeld		Client: TJ Booth Associates		Chemtest Job No.:		21-43172	21-43172	21-43172	21-43172	21-43172	21-43172	21-43172	21-43172	21-43172	21-43172	21-43172
Quotation No.: Q19-18321		Chemtest Sample ID.:		1335103	1335102	1335103	1335104	1335105	1335106	1335107	1335108	1335109	1335110	1335111	1335112	1335113
		Client Sample ID.:		S2	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
		Sample Location:		TH2	S1	TH2	S3	TH4	TH5	TH6	TH7	TH8	TH9	TH10	TH11	TH12
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):														
		Bottom Depth (m):		0.5	0.5	0.7	0.5	0.5	0.3	1.1	0.6	0.4	0.9	0.9	0.9	0.9
		Date Sampled:		29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021	29-Nov-2021
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
		Accred.		U	U	U	U	U	U	U	U	U	U	U	U	U
		SOP		2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
		Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		LOD		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Determinand		Accred.		U	U	U	U	U	U	U	U	U	U	U	U	U
Dibenz(a,h)Anthracene		U		2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
Benzofl(a,h)pyrene		U		2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
Total Of 16 PAH's		U		2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
Total Phenols		U		2920	2920	2920	2920	2920	2920	2920	2920	2920	2920	2920	2920	2920

Results - Soil

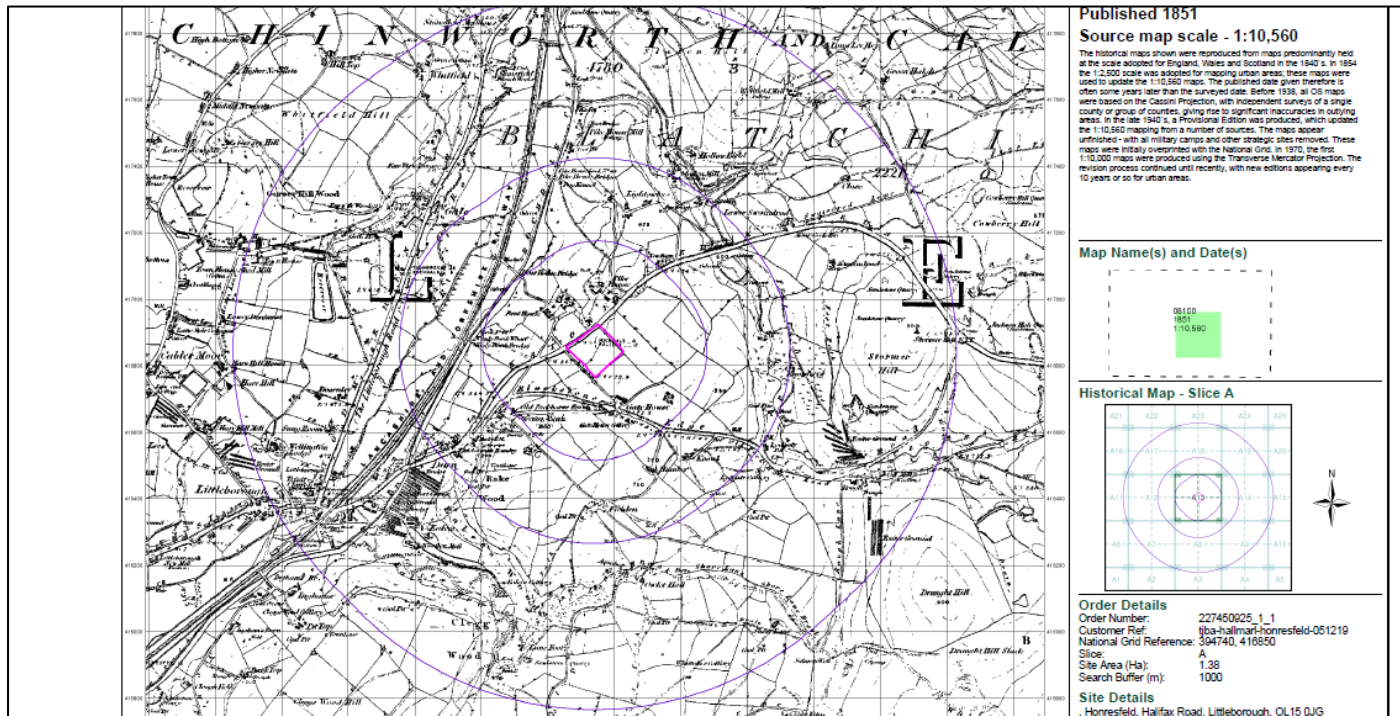
Project: Hallmark - Honresfeld		Client: TJ Booth Associates	Chemtest Job No.: 21-43172
Quotation No.: Q19-18321	Chemtest Sample ID.: 1335111	Client Sample ID.: 1335111	21-43172
	Client Sample Location: TH8	Client Sample Location: TH8	SOIL
	Sample Type: SOIL	Sample Type: SOIL	SOIL
	Top Depth (m): 1.4	Top Depth (m): 1.4	1.8
	Bottom Depth (m):	Bottom Depth (m):	
	Date Sampled: 29-Nov-2021	Date Sampled: 29-Nov-2021	29-Nov-2021
	Asbestos Lab:	Asbestos Lab:	
Determinand	Accred.	SOP	LOD
ACM Type	U	2192	N/A
Asbestos Identification	U	2192	N/A
Moisture	N	2030	%
Plasticity Index (Subsoil)	U	2010	4.0
pH	U	2010	4.0
Boron (Hot Water Soluble)	U	2120	mg/kg
Sulphur (Elemental)	U	2180	mg/kg
Cyanide (Total)	U	2300	mg/kg
Thiocyanate	U	2300	mg/kg
Sulphide (Easily Liberatable)	N	2325	mg/kg
Sulphate (Total)	U	2430	mg/kg
Arsenic	U	2450	mg/kg
Cadmium	U	2450	mg/kg
Chromium	U	2450	mg/kg
Copper	U	2450	mg/kg
Mercury	U	2450	mg/kg
Nickel	U	2450	mg/kg
Lead	U	2450	mg/kg
Selenium	U	2450	mg/kg
Zinc	U	2450	mg/kg
Chromium (Hexavalent)	N	2480	mg/kg
Organic Matter	U	2625	%
Naphthalene	U	2700	mg/kg
Acenaphthylene	U	2700	mg/kg
Acenaphthene	U	2700	mg/kg
Fluorene	U	2700	mg/kg
Phenanthrene	U	2700	mg/kg
Anthracene	U	2700	mg/kg
Fluoranthene	U	2700	mg/kg
Pyrene	U	2700	mg/kg
Benzo[a]anthracene	U	2700	mg/kg
Chrysene	U	2700	mg/kg
Benzo[b]fluoranthene	U	2700	mg/kg
Benzo[k]fluoranthene	U	2700	mg/kg
Benzo[a]pyrene	U	2700	mg/kg
Indeno[1,2,3-c,d]Pyrene	U	2700	mg/kg

Results - Soil

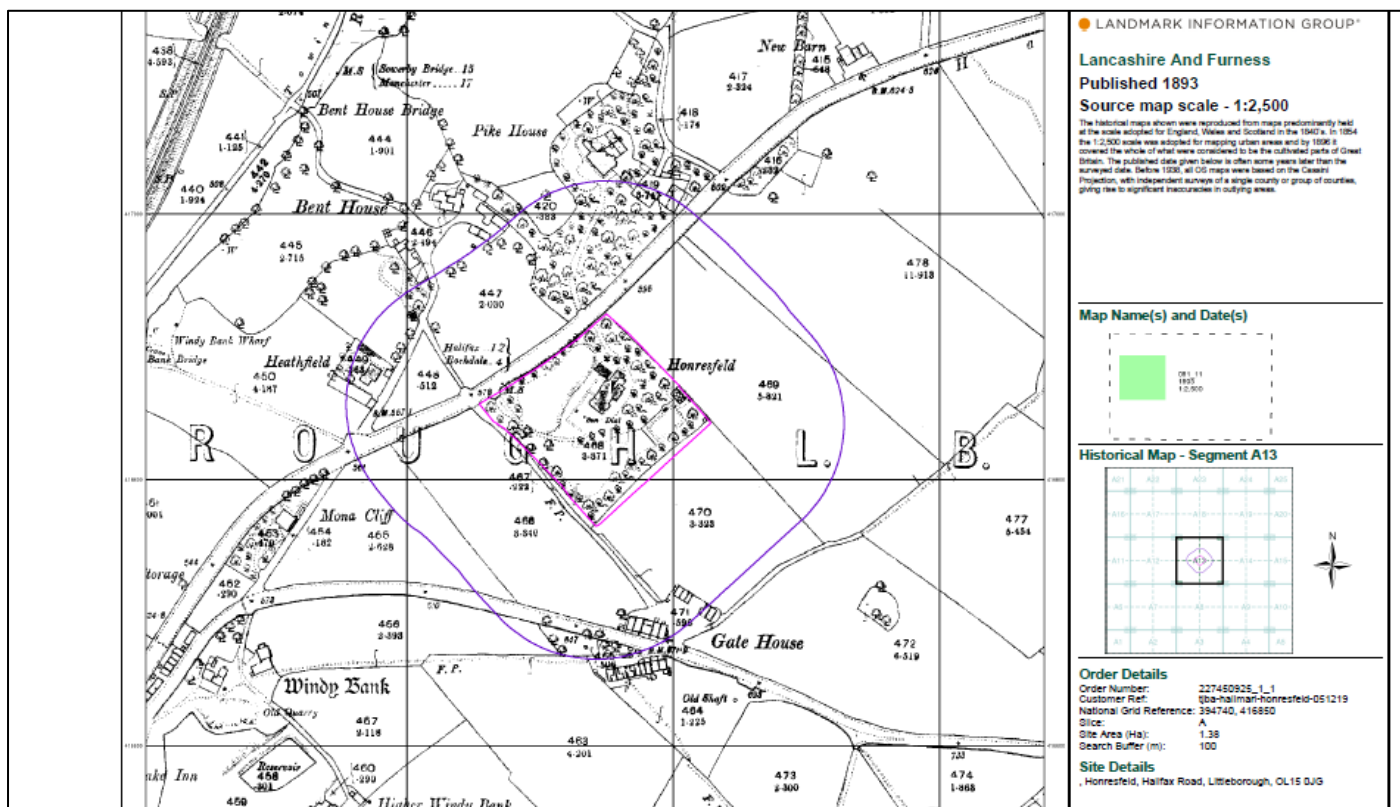
Project: Hallmark - Honresfeld									
Client: TJ Booth Associates									
Quotation No.: Q19-18321									
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		Chemtest Sample ID.:		1335111			1335111		1335112
		Client Sample ID.:		S10			S10		S11
		Sample Location:		TH8			TH8		TH7
		Sample Type:		SOIL			SOIL		SOIL
		Top Depth (m):		1.4			1.4		1.8
		Bottom Depth (m):							
		Date Sampled:		29-Nov-2021			29-Nov-2021		29-Nov-2021
		Asbestos Lab:							
		Accred.	SOP	Units	LOD				
Determinand									
Dibenz(a,h)Anthracene		U	2700	mg/kg	0.10				
Benzofl(a,h)pyrene		U	2700	mg/kg	0.10				
Total Of 16 PAH's		U	2700	mg/kg	2.0				
Total Phenols		U	2920	mg/kg	0.10				

20. APPENDIX B: MAPS

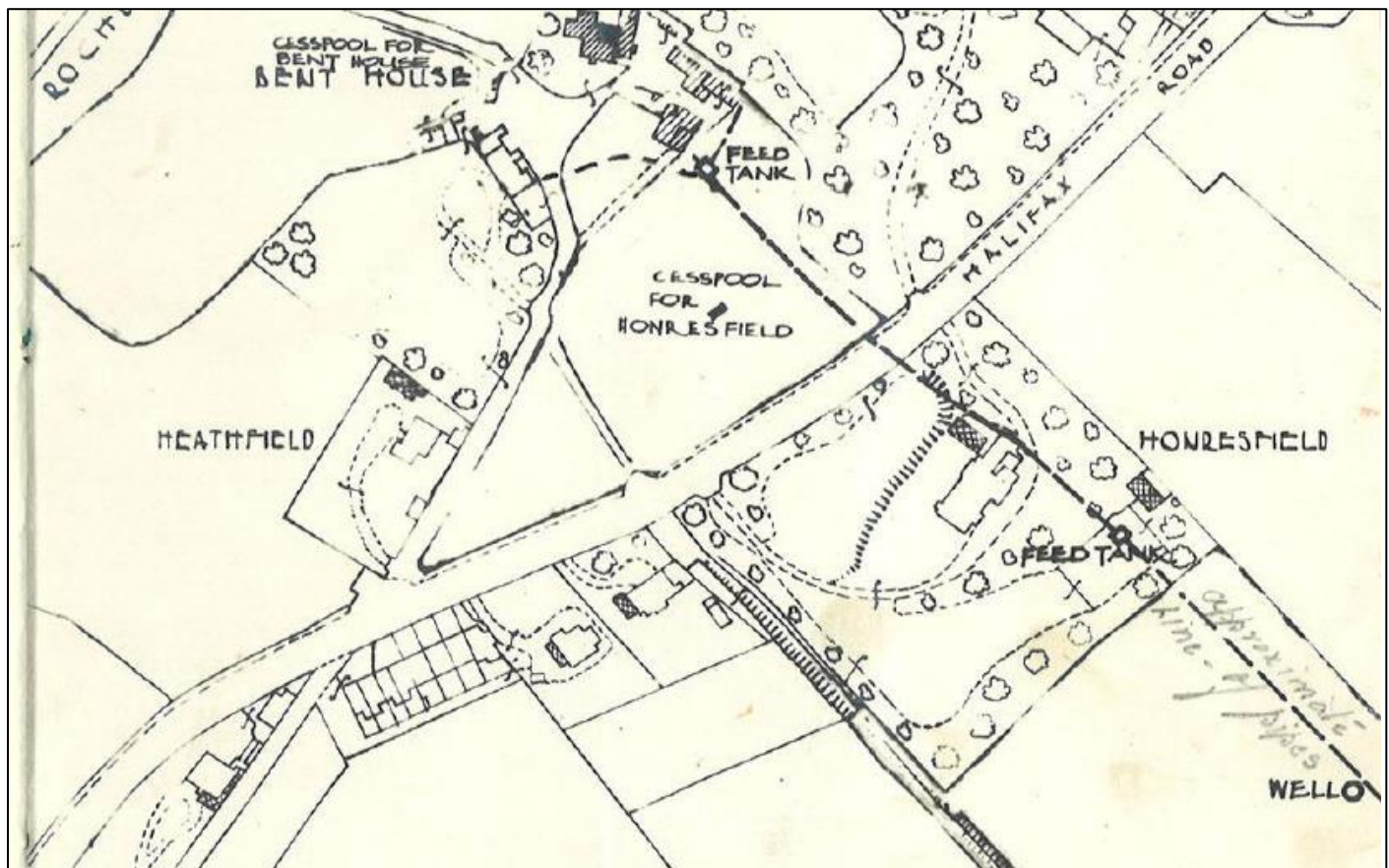
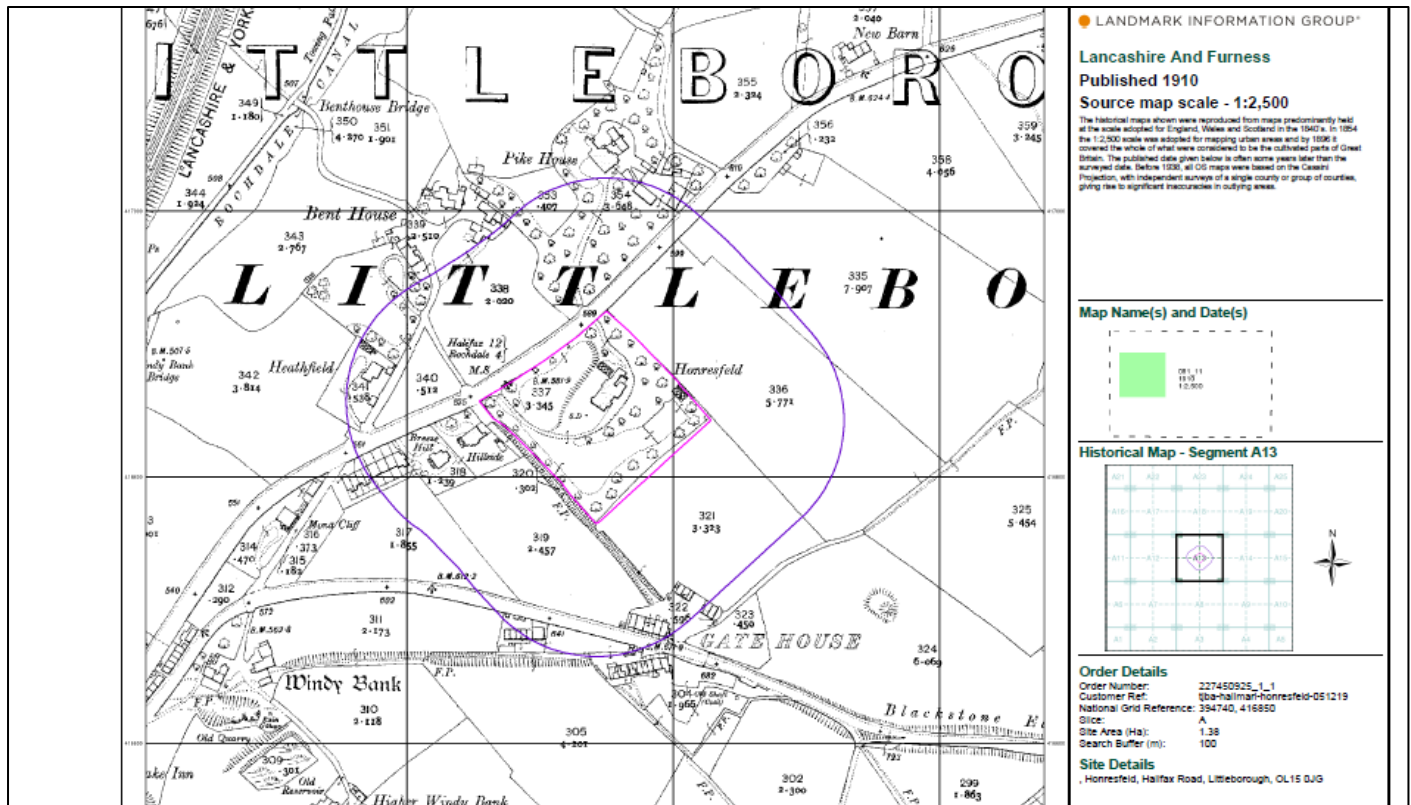
20.1. Ordnance Survey c1850

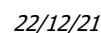


20.2. Ordnance Survey c1890

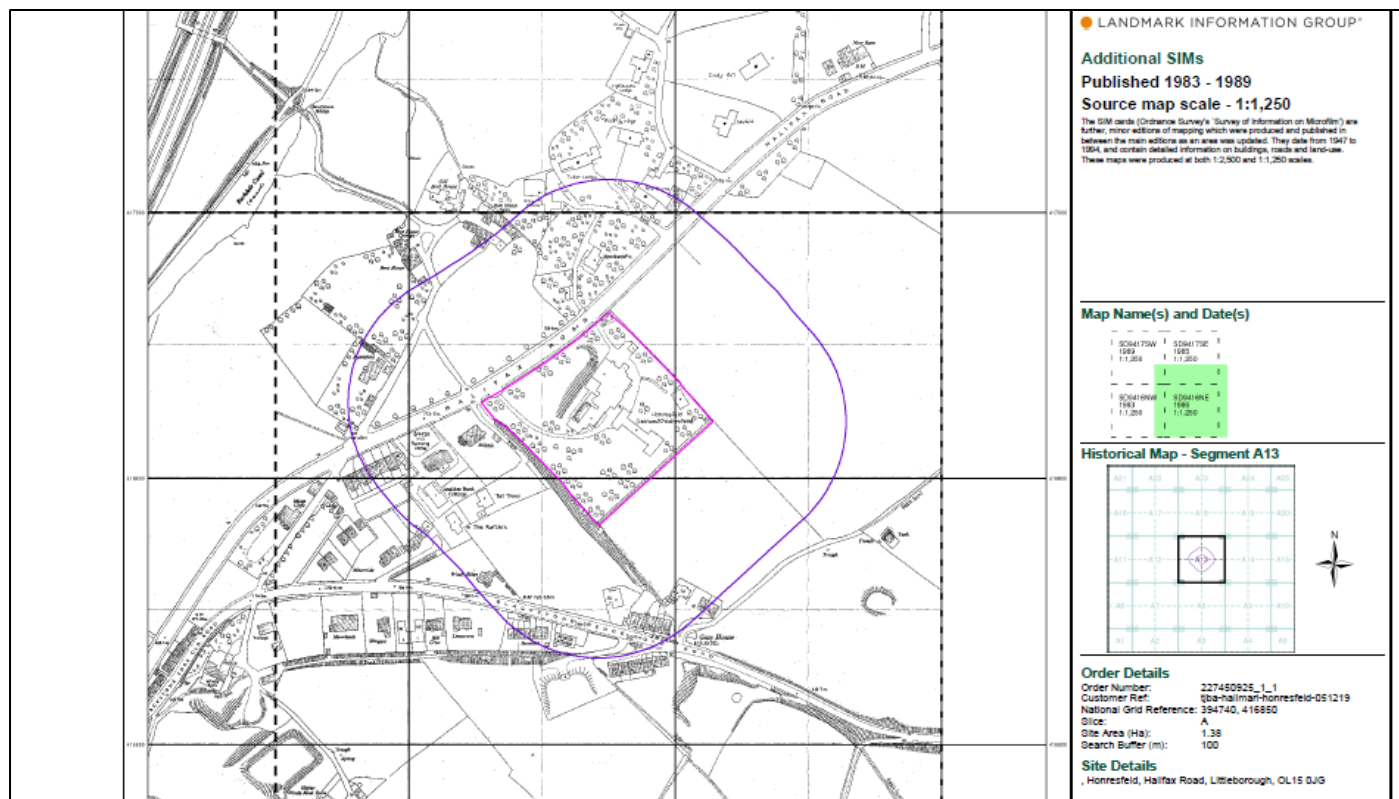


20.3. Ordnance Survey c1910

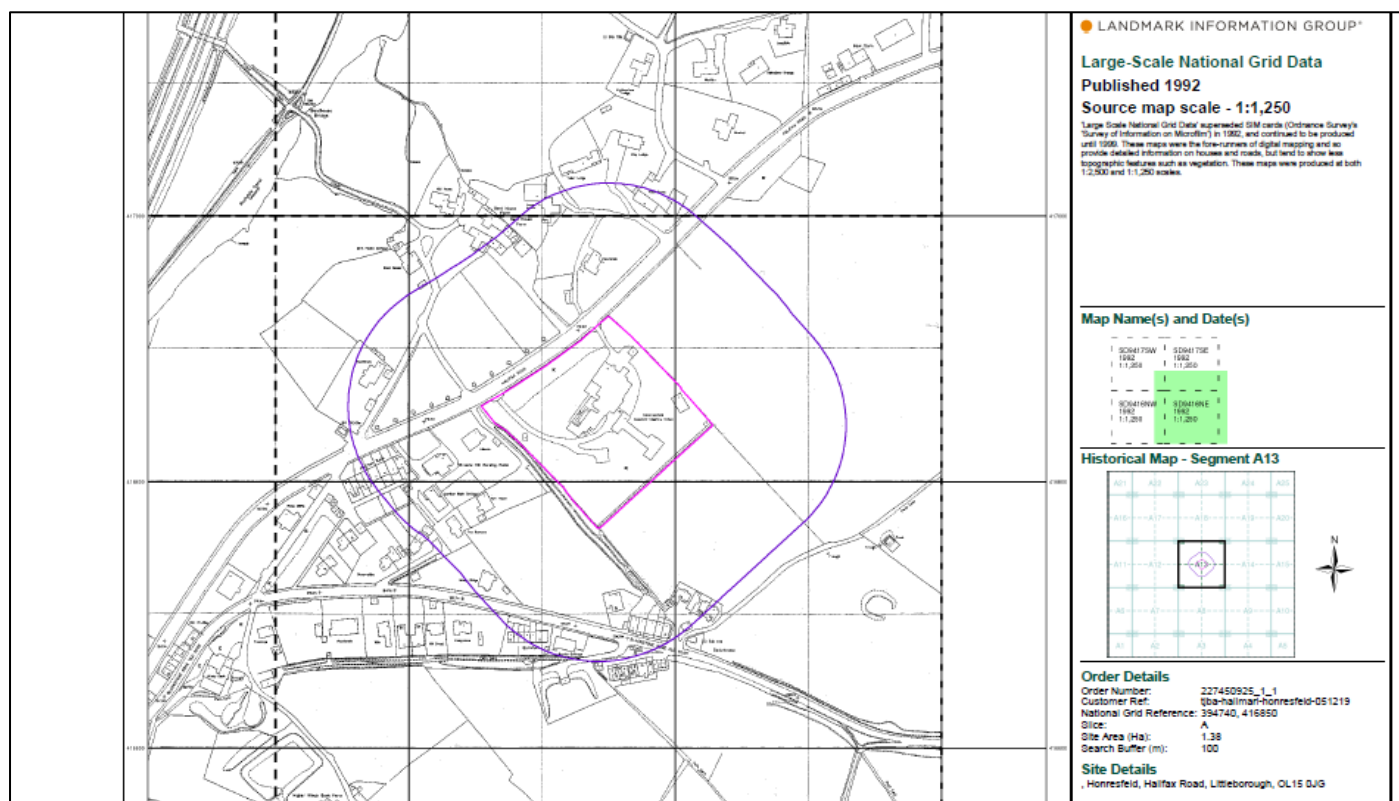




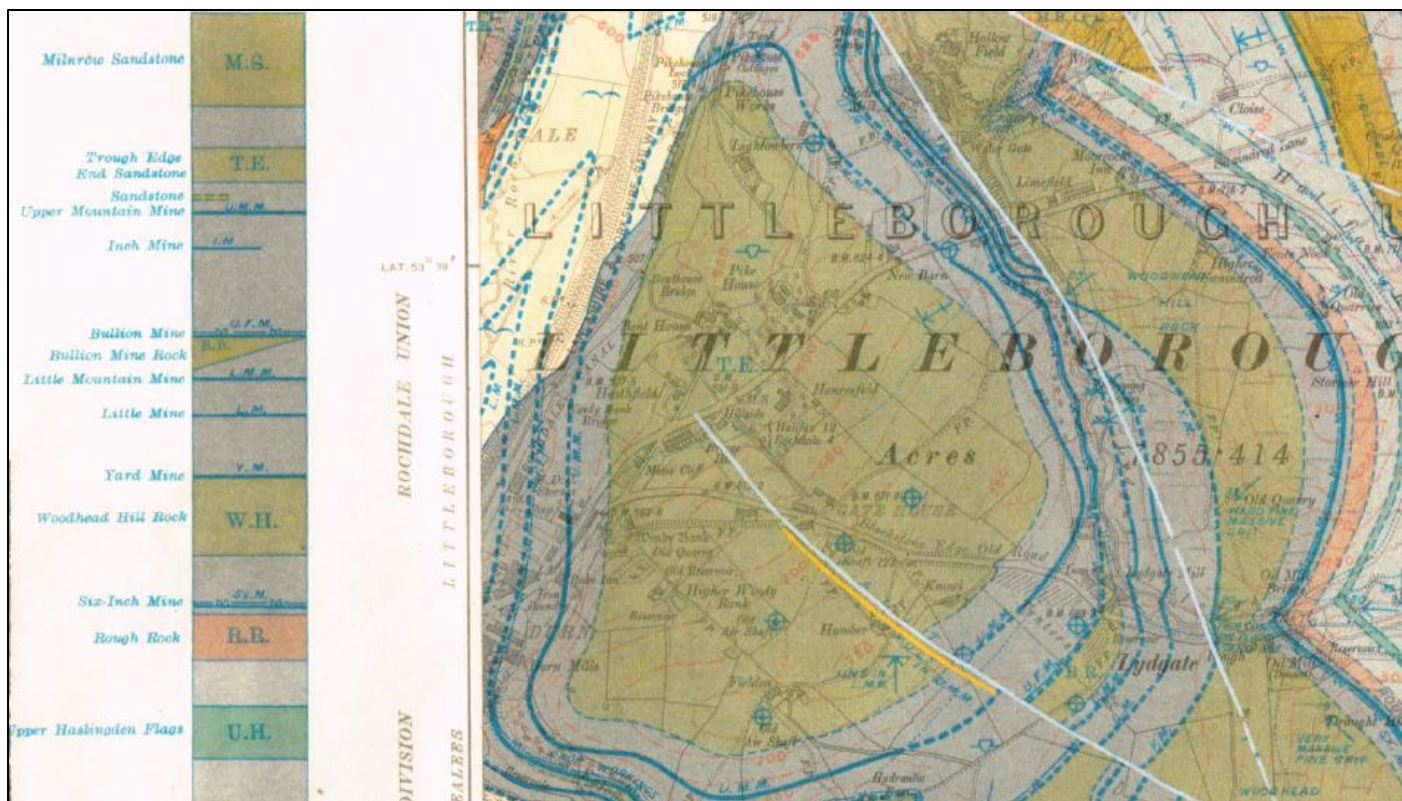
20.6. Ordnance Survey c1985



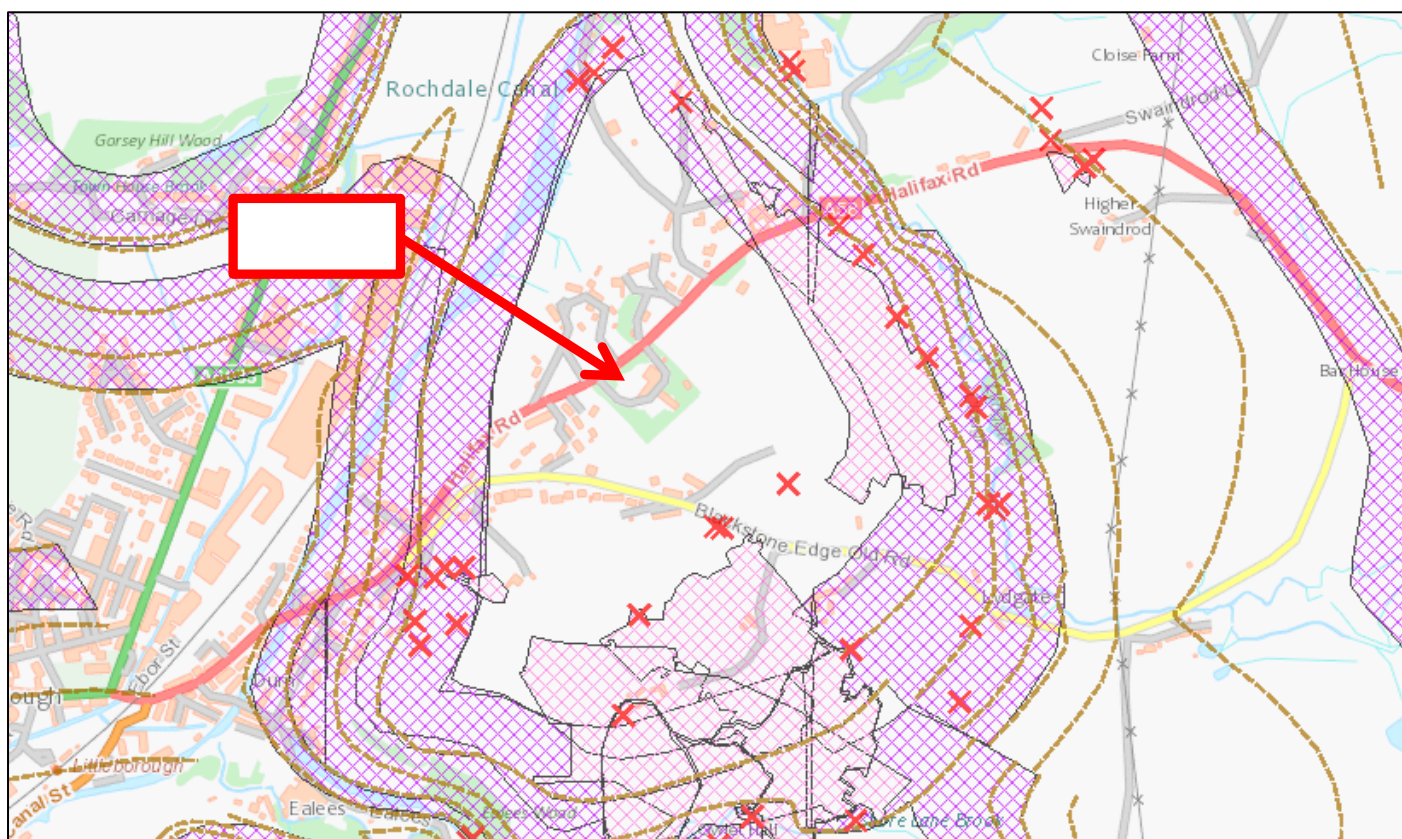
20.7. Ordnance Survey c1990



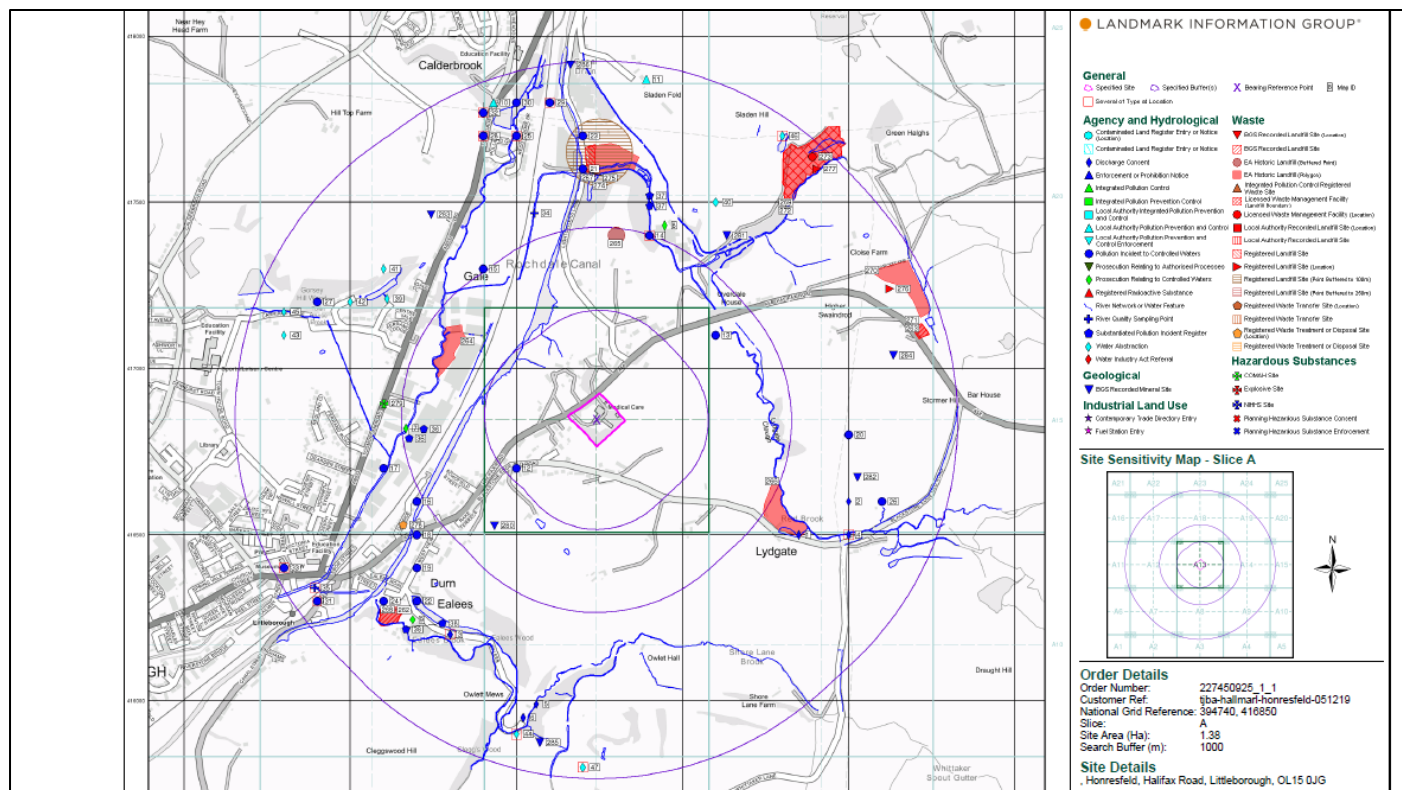
20.8. BGS Geological Map (Solid & Superficial)



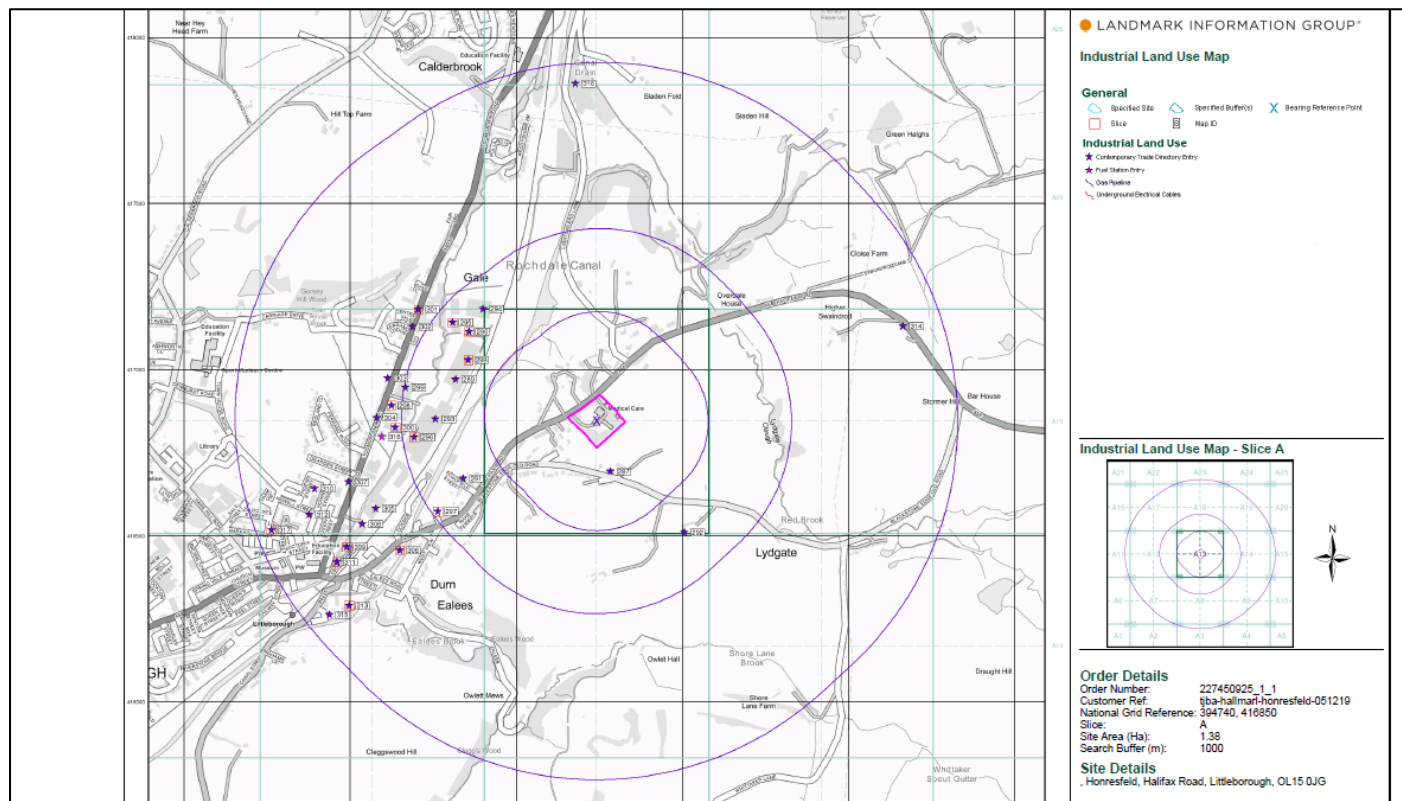
20.9. Coal Authority Map



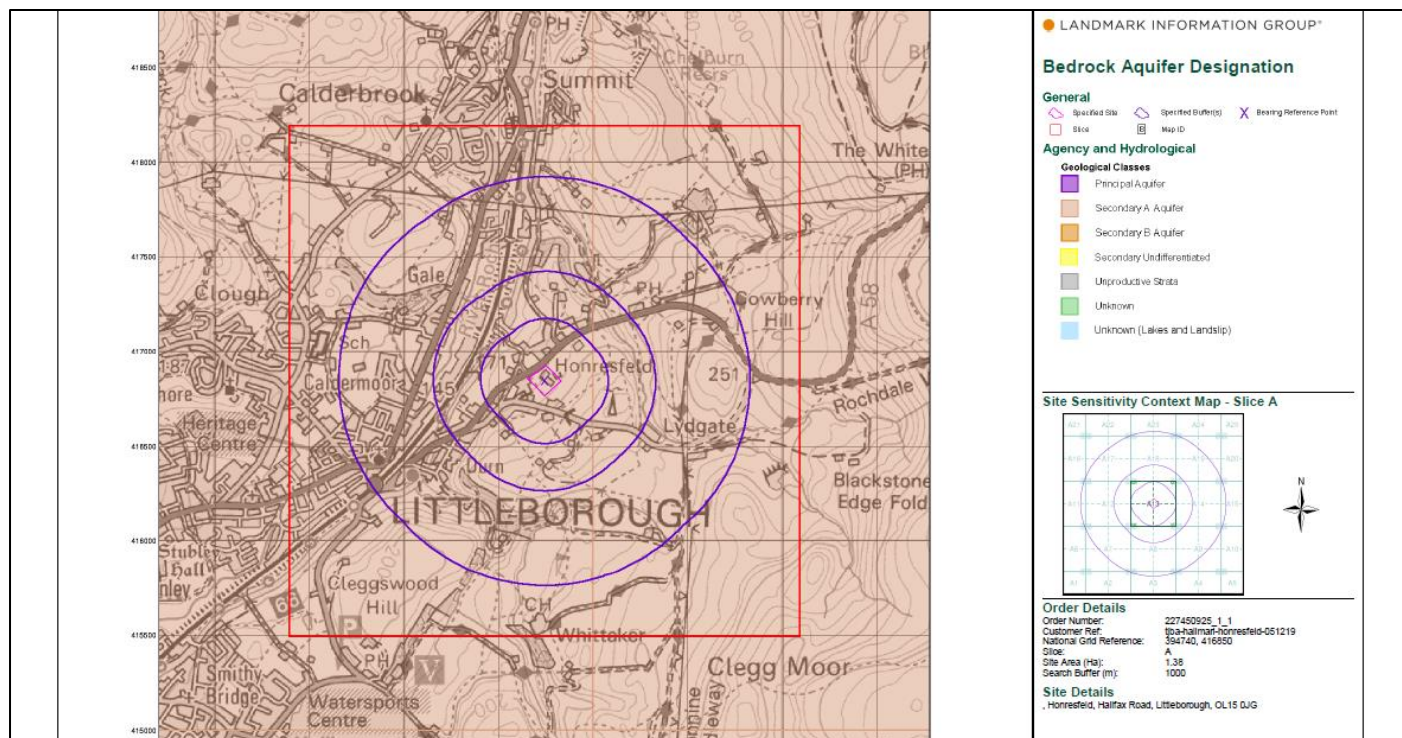
20.10. Landmark Landfill Contaminants Map



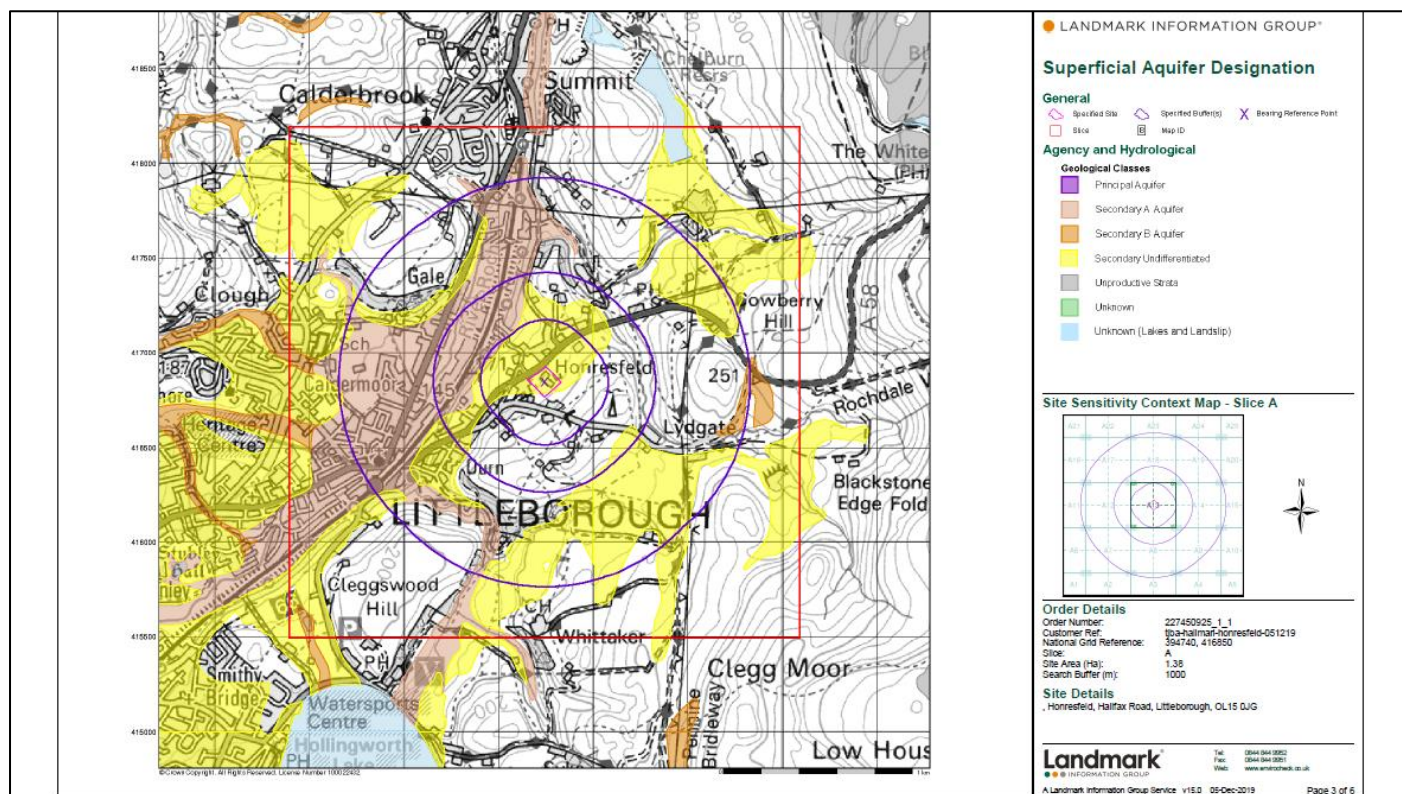
20.11. Landmark Landfill Industrial Land Use Map



20.12. Landmark Landfill Bedrock Aquifer Map



20.13. Landmark Landfill Superficial Aquifer Map



21. APPENDIX C: PUBLICATIONS

21.1. CIRIA SP 78, TABLE 15, Contaminant Hazards Related to End Use

	Targets and associated hazards ¹						
	1	2	3	4	5	6	7
	Site works	Water resources	Buildings and services	Buildings and services	Garden amenities	Allotments, agriculture	Plant growing
Critical Contamination ²	Harm to workers ³	Leachate pollution ⁴	Fire and explosion	Corrosion or expansion damage ⁴	Harm to children ⁵	Crop uptake of contaminant ⁴	Phyto-toxicity ⁴
Arsenic	○	○			●	○	
Cadmium		○			●	● ¹⁵	
Lead		○		○ ¹¹	●	● ¹⁵	
Cyanide	○	●			● ¹⁴		
PAH ⁶	●		○		●		○
Phenols	●	●		●	●		○
Copper		○		○ ¹¹	○		● ¹⁶
Nickel		○		○ ¹¹			● ¹⁶
Zinc		○		○ ¹¹			● ¹⁶
Sulphate		●		● ¹²	●		○
Sulphide		○		●			
Chloride		○		●			○
Mineral oils	● ⁸	○	○	●	○		
Ammonium ion				●			
Methane	○ ⁹		● ⁹				○
Sulphur			●	○ ¹³			
Combustibles	○		● ⁷				
Oily, tarry substances	●	○	○	●			○
Asbestos	●	○ ¹⁰					
Radioactive materials	●	○			○	○	
Soluble metals		●		○	○		
pH	○	●		●		●	●
Solvents and organics	○	○	○				
Boron		○					○
Expansives				○ ¹⁷			

● Listed contamination hazards (from BS, DD 175 1988, and ICRL Note 59/83 2nd edition 1987).
 ○ Non-listed contamination hazards.

Notes.

1. Combinations of hazards may need investigation.
2. Local factors may involve other contaminants.
3. Workers at risk from contact, inhalation, explosion, fire and ground pH.
4. Soil pH affects incidence of these hazards.
5. Children at risk from inhalation, ingestion and contact.
6. PAH polynuclear aromatic hydrocarbons.
7. Combustibles include coal, oils, tars, refuse, rubber, etc Determine calorific value, loss on ignition, ash and volatile contents, total organic carbon.
8. Mineral oils are industrial hygiene problem, with or without PCB contamination.
9. Continuous on-site monitoring.
10. Hazard if run-off carries friable asbestos into streams.
11. Electrolytic action if free metal present.
12. Total and soluble sulphate (See also Section 1 1.4.4).
13. Corrosion induced by sulphur consuming bacteria.
14. Free cyanide.
15. Total and 'plant-available' metals.
16. Total, 'plant-available' and 'zinc equivalent' values.
17. Expansives include: blast-furnace and steel slags, mining spoils and pyritic materials. Determine: total sulphur and acid soluble sulphate, calcite, and calcium as CaO.

21.2. CIRIA (Report c665) Wilson and Card Classification

Modified Wilson and Card classification

	Characteristic situation (CIRIA R149)	Comparable classification in DETR et al (1999)	Risk classification	Gas screening value (GSV) (CH ₄ or CO ₂) (l/hr) ¹ Threshold	Additional factors	Typical source of generation
	1	A	Very low risk	<0.07	Typically methane <1 % and/or carbon dioxide <5 %. Otherwise consider increase to Situation 2	Natural soils with low organic content "Typical" made ground
	2	B	Low risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to characteristic Situation 3	Natural soil, high peat/organic content. "Typical" made ground
	3	C	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
	4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures.	Mineworking – susceptible to flooding, completed landfill (WMP 26B criteria)
	5	E	High risk	<70		Mineworking unflooded inactive with shallow workings near surface
	6	F	Very high risk	>70		Recent landfill site

Notes on the use of Table 8.5

- 1 Gas screening value: (Litres of gas/hour) is calculated by multiplying the maximum gas concentration (%) by the maximum measured borehole flow rate (l/hr) – see Glossary.
- 2 Site characterisation should be based on gas monitoring of concentrations and borehole flow rates for the minimum periods defined in Table 5.5.
- 3 Source of gas and generation potential/performance should be identified.
- 4 Soil gas investigation should be in accordance with guidance provided in Chapters 4 to 6.
- 5 If there is no detectable flow, use the limit of detection of the instrument.
- 6 The boundaries between the Partners in Technology classifications do not fit exactly with the boundaries for the CIRIA classification.

21.3. CIRIA (Report c665) Wilson and Card Protective Measures

Typical scope of gas protective measures

Characteristic situation	Residential building (not those which belong to Situation B) ¹		Office/commercial/industrial development	
(From Table 8.5)	Number of levels of protection	Typical scope of protective measures	Number of levels of protection	Typical scope of protective measures
1	None	No special precautions	None	No special precautions
2	2	a. Reinforced concrete cast <i>in situ</i> floor slab (suspended, non-suspended or raft) with at least 1200 g DPM and underfloor venting. b. Beam and block or pre-cast concrete and 2000 g DPM/reinforced gas membrane and underfloor venting. All joints and penetrations sealed.	1 to 2	a) Reinforced concrete cast <i>in situ</i> floor slab (suspended, non-suspended or raft) with at least 1200 g DPM. b) Beam and block or pre cast concrete slab and minimum 2000 g DPM/reinforced gas membrane. c) Possibly underfloor venting or pressurisation in combination with a) and b) depending on use. All joints and penetrations sealed.
3	2	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space.	1 to 2	All types of floor slab as above. All joints and penetrations sealed. Minimum 2000 g/reinforced gas proof membrane and passively ventilated underfloor sub-space or positively pressurised underfloor sub-space
	3	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated underfloor sub-space or positively pressurised underfloor sub-space, oversite capping or blinding and in-ground venting layer.	2 to 3	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility.
	4	Reinforced concrete cast <i>in situ</i> floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and ventilated or positively pressurised underfloor sub-space, oversite capping and in-ground venting layer and in-ground venting wells or barriers.	3 to 4	Reinforced concrete cast <i>in situ</i> floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility. In ground venting wells or barriers.
	5	Not suitable unless gas regime is reduced first and quantitative risk assessment carried out to assess design of protection measures in conjunction with foundation design.	4 to 5	Reinforced concrete cast <i>in situ</i> floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and actively ventilated or positively pressurised underfloor sub-space with monitoring facility, with monitoring. In ground venting wells and reduction of gas regime.

Note:

- 1 For low rise traditional housing with ventilated clear underfloor void (ie Situation B. See Table 8.7, Box 8.4 and Section 8.3.2).

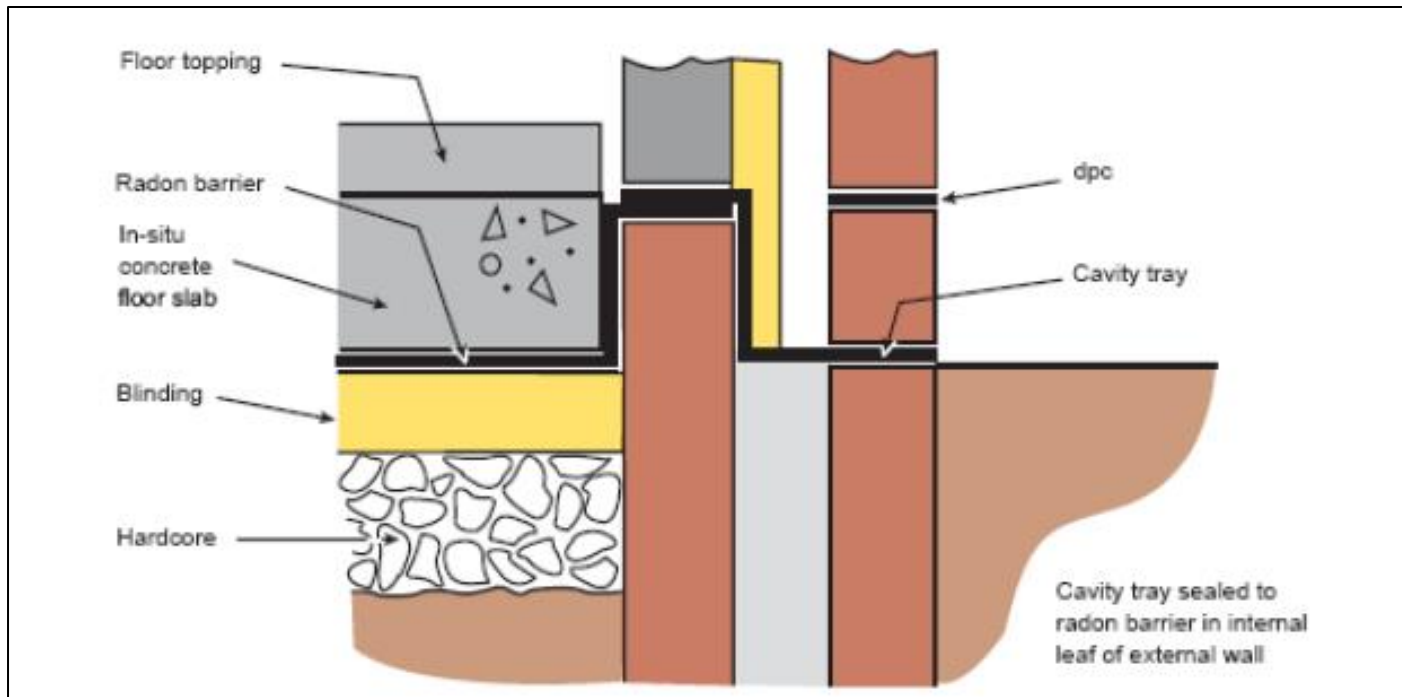
21.4. BGS/HPA report IR/11/044 – Radon Potential Class

Radon Potential Class*	Is the property in a Radon Affected Area?	Additional information
1	No	The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). The property is not in a radon affected area.
2	Yes	The property is in an Intermediate probability radon area (1 to 3% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.
3	Yes	The property is an Intermediate probability radon area (3 to 5% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.
4	Yes	The property is in an Intermediate probability radon area (5 to 10% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.
5	Yes	The property is in a Higher probability radon area (10 to 30% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.
6	Yes	The property is in a Higher probability radon area (more than 30% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.

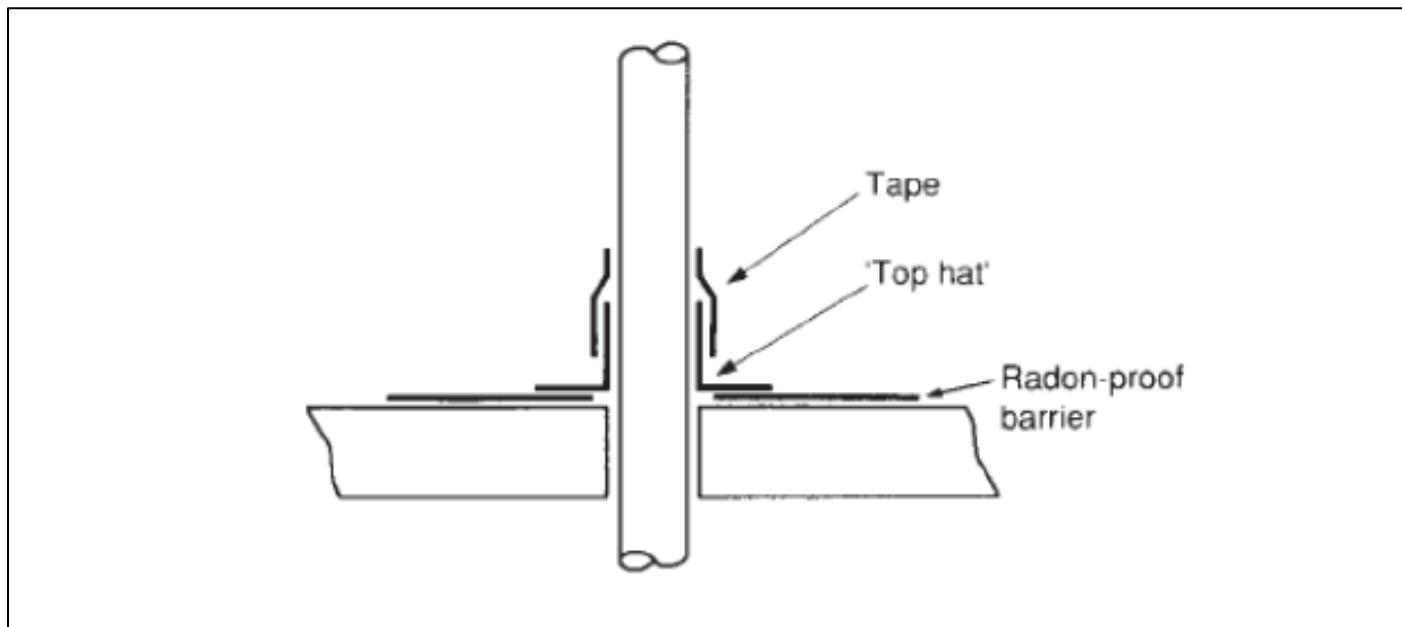
21.5. BGS/HPA report IR/11/044 – Radon Potential Class/Protection Measures

Radon Potential Class*	What level of radon protective measures are required for new buildings in England and Wales?	What level of radon protective measures are required for new dwellings in Scotland?
1	None**	None**
2	None	Stage 1
3	Basic	Stage 1
4	Basic	Stage 1
5	Full	Stage 2
6	Full	Stage 2

21.6. BRE 211 – Typical Ground Bearing Slab, Membrane/Cavity Tray Detail



21.7. BRE 211 – Typical Service Penetration Detail



21.8. CIRIA C552, 2001 – Tables 6.3-6.6, Risk Matrices

Table 6.3 *Classification of consequence*

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health ("significant harm" as defined in DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000).	Concentrations of a contaminant from site exceed the generic, or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the <i>Draft Circular on Contaminated Land</i> , DETR, 2000). Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (eg foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

Table 6.4 *Classification of probability*

Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term

Table 6.5 *Comparison of consequence against probability*

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Table 6.6 *Description of the classified risks and likely action required*

Very high risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term
Moderate risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, if is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term
Low risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.