

GEO-ENVIRONMENTAL AUDIT

PHASE 1 Preliminary Risk Assessment

PHASE 3 Remediation Statement

Proposed Commercial Development

Walpole Street

Rochdale

OL16 2AS

Author:

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Client:

Hallmark Developments Ltd

Reference:

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Revision	Date	Reason
0	March 2023	Original to support planning application.

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1. PHASE 1 – PRELIMINARY RISK ASSESSMENT

1.1. Introduction.

T. J. Booth Associates have been appointed by Hallmark Developments Ltd to undertake an Environmental Audit to support a Town & Country Planning application for a commercial development.

The Application Site is located in a commercial area of Rochdale. Its previous use was as a mobile caravan Site used by the travelling community.

A planning application is to be submitted for the erection of 1No. commercial unit to tie in with the adjacent Heritage Business Park.

T J Booth Associates have since been employed to undertake an environmental assessment of the Site including the Phase 1 desk study, and Phase 2 Site investigations/associated Phase 3 remediation statement if required, in accordance current UK guidance for environmental assessment 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 1No. steel frame warehouse complete with plastisol steel cladding sheet and dado walls.

The ownership is the same as the current Heritage Business Park, and will be joined into that Site forming one development with the same access.

The building footprint will take up the majority of the Site, leaving some of the perimeter for parking and some minor landscaping.

1.3. Historic Maps

DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
c1851	The Site once comprised virgin agricultural or open fields on the south banks of the River Roch.	The River Roch is shown nominally 50m north of the Site boundary. There are sand pits in the south bank of the Roch within 50m of the Site boundary. There is a tributary of the Roch 50m east named Moss Brook. The Lancashire-Yorkshire Railway is noted 150m southeast. There are some industrial works approximately 200m from the Site, namely goods sheds, rope walks, brick fields etc.
c1890	Site is now show as an access ramp built upon made ground. The access ramp heads to the north across the River Roch and to the former Corporation Sanitary Depot.	Much of the area to the northeast remains as allotment land. The area to the south is dominated by the Lancashire & Yorkshire Railway which by now has moved within 50m of the Site boundary due to excessive sidings in the local area. The land to the west of the Site is dominated by minor commercial premises intermixed with terraced housing.
c1910	South part of the Site comprises a sawmill, and the north is covered with residential terraced dwellings, with Pringle Street passing through the east boundary.	The area of fill to the north has been levelled and now appears to be used as allotment land or similar. The former access ramp to the Corporation Sanitary Works is no longer shown across the River Roch, suggesting that the infilling around the north of Pringle Street is much as in the present day.

		The Sanitary Depot itself across the Roch is also shown to have been filled.
c1930	No change.	No change.
c1937	No change.	No overall change.
c1956-61	No change.	Much of the area to the northeast of the area (present day tip & north side of Chichester Street) is now shown to have been mass filled.
c1967-68	No change.	No change. Moss Brook to the 50m to the east of the Site remains un-culverted.
c1977-79	No change.	Almost all of the area to the east side of Pringle Street is now shown as having been mass infilled. Railway siding reduced and Whitworth Branch line removed.
c1982-86	Terraced dwellings remain to the north part of the Site. The sawmill to the south and the remainder of the land now occupied by Heritage Business Park is shown as vacant.	Many of the former terraces have been demolished, as well as much of the local commercial development. There are two scrap yards to the northeast of the Site.
c1983-1989	No change.	Heritage Business Park buildings are now as in the present day.
c1992	Terraced dwellings are now demolished, and the Site is vacant apart from a 'back-alley' running centrally east to west, and part of the former Pringle Street remaining to the east boundary.	Caravan Site noted to the north. Commercial development noted in the local area.

1.4. Present Day Paper & Electronic Maps/Topographic Surveys

Site Boundaries, Outlines of Structures and Buildings:	The Application Site is enclosed within its own curtilage and masonry walls. It is surrounded by the commercial development of Heritage Business Park to the east & south, other commercial premises to the west, and a traveller community caravan park to the north.
Ground Contours, Natural Drainage Features:	Ground levels fall gently over the Site and local area towards the north.
Water Courses:	The River Roch is nominally 75m to the north, and is the only watercourse shown on current mapping data.
Below Ground Obstructions:	None noted.

1.5. Geology

Bedrock Geology:	Old Lawrence Rock of the Carboniferous Westphalian Coal Measures. The local stratigraphic dip is approx 0-5 degrees south.
Superficial Geology:	Superficial geology comprises glaciofluvial sand & gravels.
Coal Seams.	No coal seams in the local area.

1.6. Boreholes Records

There are no borehole records within close or relevant proximity to the Site.

1.7. Planning/Other Data.

N/A.

1.8. Landmark Environmental Data

1.8.1. AGENCY & HYDROLOGICAL

BGS groundwater flooding susceptibility:	On-site.
Contaminated land register entries and notices:	No records within 250m.
Discharge consents:	10 records within 250m all relating to storm tank/combined sewerage overflows on the UU network.
Local Authority pollution prevention and controls:	5 records within 250m.
Pollution incidents to controlled waters:	6 records with 250m – miscellaneous but all over 158m from the Application Site.
Water abstractions:	3 records within 250m – closest is 123m north for cooling.
Groundwater vulnerability:	High.
Bedrock aquifer:	Secondary A Aquifer.
Superficial aquifer:	Secondary A Aquifer.
Source protection zone:	Not within a Source Protection Zone.

1.8.2. WASTE

BGS recorded landfill sites:	1 records within 250m. Waithlands Tip, 45m east – no other data supplied.
Historic landfill sites:	1 records within 250m. Waithlands Tip, 28m east – waste deposited between 1922 & 1985, with deposited wastes identified as inert, industrial, commercial and household waste, and liquid sludge.
License waste management facilities:	4 records within 250m.

1.8.3. HAZARDOUS SUBSTANCES

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

1.8.4. GEOLOGICAL

Mining Instability:	In an area that may be affected by coal mining.
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Potential for Collapsible Ground Stability Hazards:	Very low.
Potential for Compressible Ground Stability Hazards:	No hazard.
Potential for Ground Dissolution Stability Hazards:	No hazard.
Potential for Landslide Ground Stability Hazards:	Very low.
Potential for Running Sand Ground Stability Hazards:	Very low.
Potential for Shrinking or Swelling Clay Ground Stability Hazards:	No hazard.
Radon Potential - Radon Affected Areas:	The property is in an intermediate probability radon area where 1-3% of homes are estimated to be at or above the action level.
Radon Potential - Radon Protection Measures:	No radon protection measures are necessary in the construction of new dwellings or extensions.

1.9. Coal Authority

Entries, Adits, Shafts.	No mine entries close to the Site.
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.	The Site is not within a Development High Risk Area.

1.10. Industry Profiles

N/A.

1.11. TJBA Site Reconnaissance – March 2023

Details of Existing Structures & Features:	The Site was inspected in March 2023. The Site was enclosed within masonry boundary walls. The entire Site was covered with a macadam finish apart from the northeast side/corner which was finished in block paving. There only permanent structures on-site were a toilet/shower block to the centre north boundary, and an electrical cabinet adjacent the Site access. Site features including manholes, electric points for caravans, and lighting & camera poles were noted around the Site. Entrance gates were noted on the west boundary to Walpole Street.
Adjacent Properties:	Site is surrounded by a residential caravan park to the north and commercial development on all other sides.
Water Levels, Directions of Flow and Rates in Rivers:	None noted on recce.

Old Mine or Quarry Workings:	No evidence noted.
Areas of Discoloured Soil, Polluted Water, Vegetation, and Significant Odours:	None noted – Site was covered in permanent hardstandings.

1.12. Identification of Source-Pathway-Receptor.

1.12.1. Potential Contaminants.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED SOURCE	CONTAMINANT/S
Made ground.	Past landfill operations and subsequent historic development.	Metals, PAH, inorganics, asbestos.
Made ground.	Past landfill operations.	CH ₄ , CO ₂ , trace gasses such as H ₂ S.

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. Environmental Site Risk Summary/Conclusions

The local area has been subject to historical infilling up to approximately 16m depth. The Landmark historic environmental database suggests that the former Waithlands Tip to the east/northeast is the primary risk, comprising infill between 1922 & 1985. However, historic mapping suggests earlier infilling occurred beneath the Application Site and to the north of the area prior to this and before c1890.

The Site was also developed subsequently to this which could have introduced further contaminants on to the Site.

Coal mining is not a risk locally, and radon protection measures are not required.

1.14. Preliminary Conceptual Model.

CURRENT SOURCE/S		ORIGINAL ASSOCIATED USAGE / LOCATION	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK
CHEMICAL (SOLID)	Existing made ground/infilled ground – ex surface/sub-soil.	Landfill.	Metals, PAHs, sulphates, asbestos.	Direct ingestion, aerial ingestion, dermal contact, drinking water.	Site construction operatives & future occupants. Site buildings.	Made ground is highly likely to exist below the Site, and may well contain contaminants of concern. Any contamination may or may not be above thresholds for commercial development. Considering the proposed building is to encompass almost the entire footprint of the Site, and much of the remaining area is to be hardstanding apart from a small area of soft landscaping; the pathways to any Site receptor are highly unlikely.	Severe.	Unlikely.	Moderate to low risk.
	Anthropogenic ground gas sources/existing made ground/infilled ground - surface/sub-soil.	Landfill.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	Credible risk to the Site from migrating ground gas, in particular CH ₄ & CO ₂ . There may be some other trace gasses such as H ₂ S, but VOCs are not considered a risk due to the age of the fill.	Severe.	High likelihood.	Very high risk.
GROUND GAS RISK (VAPOURS)	Geological ground gas sources.	Coal mining/seams.				No coal mining in the local area.	Medium.	Unlikely.	Low risk.
		Radon bearing rocks.	Rn			The Site is within an intermediate radon area. No protective measures are required.	Medium.	Unlikely.	Low risk.
CHEMICAL (LIQUID)	Existing made ground/infilled ground - surface/sub-soil.	Landfill.	Metals, PAHs, sulphates.	Permeation through soil.	Contaminated ground / surface water. Controlled Waters such as watercourses, canal, aquatic habitats & associated wildlife.	There is a risk to groundwater from past landfill operations in the area, but this risk is beyond remediation on a local scale. The proposed development is of low risk, and will not likely contribute additional contamination to the ground.	Mild.	Unlikely.	Very low risk.

1.15. Site Investigation Strategy

1.15.1. Ground/Soil Contamination Risk

Considering the proposed building will encompass almost the entire Site footprint, soil sampling investigations will not be a suitable solution or strategy for managing environmental risk.

1.15.2. Ground Gas Risk

Ground gas risk to the Site will need to be addressed but protection can be incorporated into the foundations/slabs to mitigate the risk without the need for gas monitoring.

2. PHASE 2 - SITE INVESTIGATION & RISK ASSESSMENT

2.1. Site Investigations

2.1.1. Summary

N/A – not undertaken.

2.1.2. Trial Holes

N/A – not undertaken.

2.1.3. Soil Sampling (contamination)

N/A – not undertaken.

2.1.4. Soil Sampling (Geotechnical)

N/A – not undertaken.

2.1.5. Gas Monitoring

N/A – not undertaken.

2.2. Final Conceptual Model.

CURRENT SOURCE/S		ORIGINAL ASSOCIATED USAGE / LOCATION	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	RISK (FROM PRA)	MITIGATION
CHEMICAL (SOLID)	Existing made ground/infilled ground – ex surface/sub-soil.	Landfill.	Metals, PAHs, sulphates, asbestos.	Direct ingestion, aerial ingestion, dermal contact, drinking water.	Site construction operatives & future occupants. Site buildings.	Made ground is highly likely to exist below the Site, and may well contain contaminants of concern. Any contamination may or may not be above thresholds for commercial development. Considering the proposed building is to encompass almost the entire footprint of the Site, and much of the remaining area is to be hardstanding apart from a small area of soft landscaping; the pathways to any Site receptor are highly unlikely.	Moderate to low risk.	REMOVE EXISTING SOIL IN SOFT LANDSCAPING AREAS ONLY AND REPLACE WITH A CLEAN MATERIAL.
	Anthropogenic ground gas sources/existing made ground/infilled ground - surface/sub-soil.	Landfill.	CH ₄ , CO ₂ , other trace gases.	Diffusion through soil, substructures, aerial inhalation.	Future occupants. Explosion, suffocation.	Credible risk to the Site from migrating ground gas, in particular CH ₄ & CO ₂ . There may be some other trace gasses such as H ₂ S, but VOCs are not considered a risk due to the age of the fill.	Very high risk.	PROVIDE GAS PROTECTION MEASURES IN ACCORDANCE WITH BS 8485.

3. PHASE 3 - REMEDIATION STATEMENT

3.1. Basic Site Details

Full details included in the Phase 1 & 2 Site Investigation Introduction & subsequent sections.

3.2. Site & Remedial Objectives

Two pollutant linkages were identified that require mitigation/remediation:

1. Ensure soft landscaping is free from contamination.
2. Ensure the proposed building is protected from potential ground gas migration.

The primary environmental objectives are to break the pollution linkages by either the source being removed, or pathways mitigated.

The receptors considered in the assessment are predominantly the end user. Site construction operatives can mitigate risk by adopting PPE, and risk cannot be reduced further due to construction workers being a necessary part of the construction process.

3.3. Conceptual Model (Final) & Relevant Pollution Linkages

Ground Contamination.

The conceptual model has found a moderate to low risk of chemical contamination of made ground beneath the Site. The risk comes from the severity of the source rather than the likelihood of occurrence.

There is a limited amount of external floor space owing to the size of the building footprint, which is why the likelihood of occurrence is low.

It will be a more cost effective solution to remove and replace existing soil rather than to categorise the risk any further if soft landscaping is incorporated into the development.

Ground Gas Risk.

There is a ground gas risk in the local area from the historic Waithlands Tip and the made ground beneath the Site and local area. The risk will have to be mitigated by remedial measures included in the foundations & floor slab in lieu of gas monitoring.

3.4. Recommended Remediation.

Ground Contamination.

While made ground may remain on site beneath permanent hardstandings such as the proposed building footprint, access and pavings etc; to mitigate the risk to receptors, it is advised that a cover layer of clean inert soil is imported for soft landscaping areas ONLY.

Existing made ground within proposed soft landscaping areas, should be excavated to 600mm from finish levels (or to clean virgin material if shallower than this) and replaced with a clean/inert imported soil to suit finishes. 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.

The cover level can be further reduced to 450mm in common or public open space areas.

Imported soil should be free from contamination and deleterious materials, and should be suitable for use in a commercial end use setting.

It should be able to pass contaminant 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 commercial end use setting.

Ground Gas Risk.

The proposed building is Type D low risk industrial according to BS8485, and would require a minimum gas protection score of 2.5 which would include protection up to CS3.

CS2 GAS PROTECTIVE MEASURES		BS8485:2019 score required: 2.5
FOUNDATION TYPE: TBC		
SLAB	Cast in situ ground-bearing floor slab (with only nominal mesh reinforcement) – as a minimum.	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/VENTILLATION	Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building).	0.5

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

Should any suspected potential contamination be noted within the groundworks or construction phases of development, the associated areas should be isolated and professional environmental advice sought from a suitably qualified environmental consultant.

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.

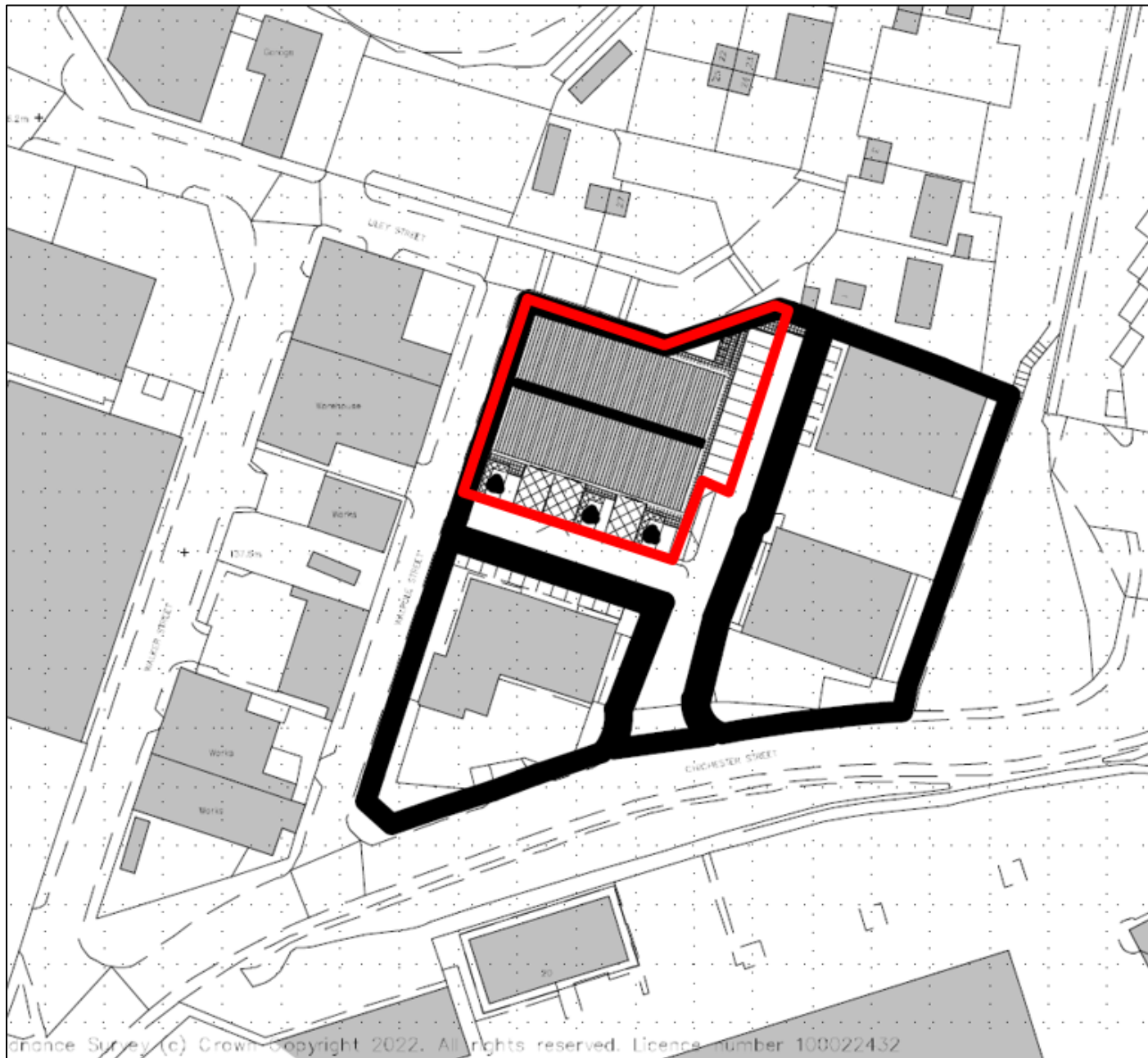
Environment Agency. 2005. Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination. R&D Technical Report P5-066/TR.

ICE Manual of Geotechnical Engineering Volume I. 2012.

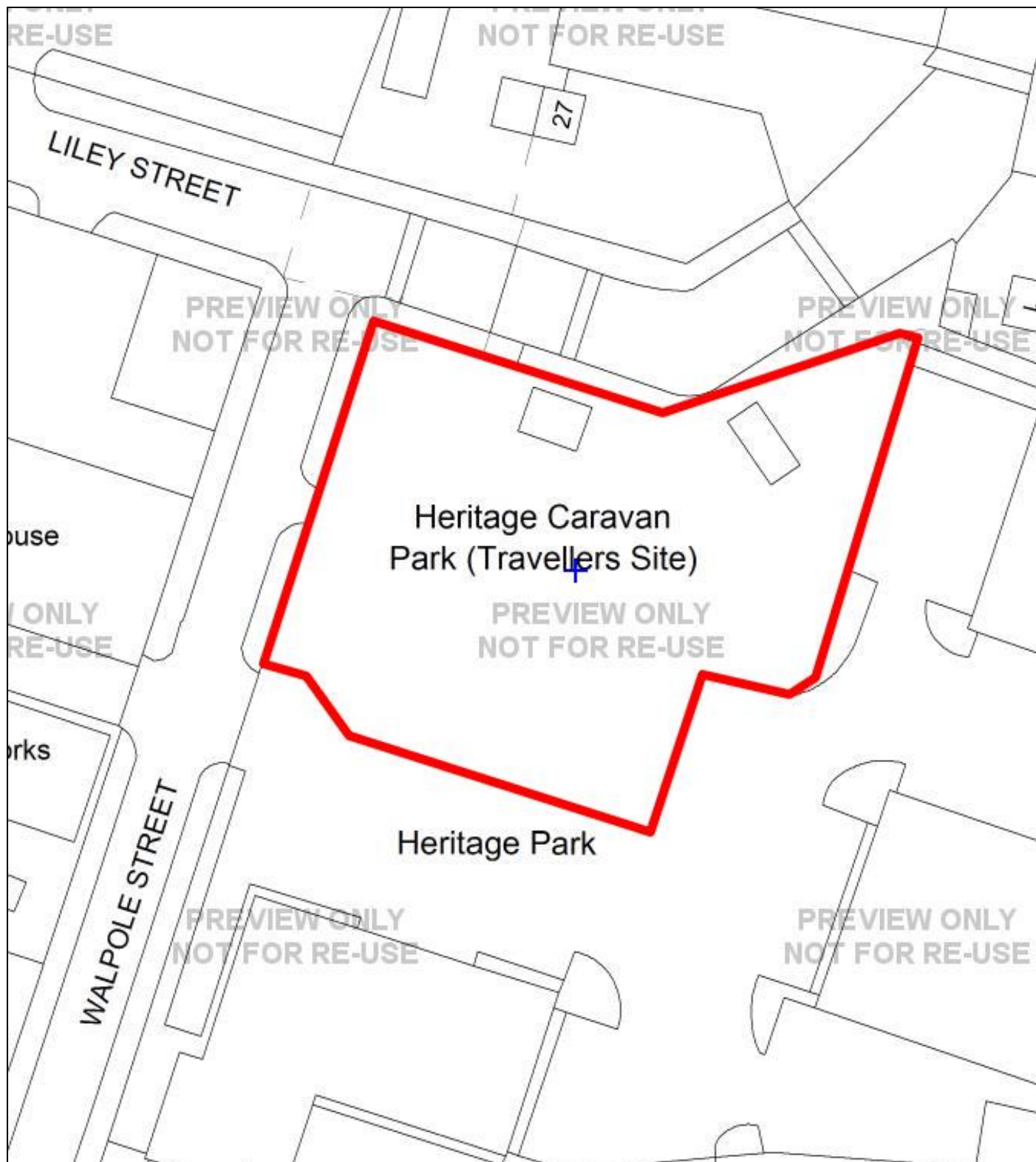
CIRIA. Report SP32.

5. APPENDIX A: PHOTOS & FIGURES.

5.1. Location Plan.



5.2. Existing Site Plan.



5.6. Trial pit and borehole logging (BS5930)

N/A – Phase 1 only.

5.7. Soil Sampling Analysis.

N/A – Phase 1 only.

5.8. Soil Testing Certificates.

N/A – Phase 1 only.

6. APPENDIX B: PHOTOS.



Figure 1 – View to south boundary.



Figure 2 – View to east boundary.



Figure 3 – View to northeast corner.

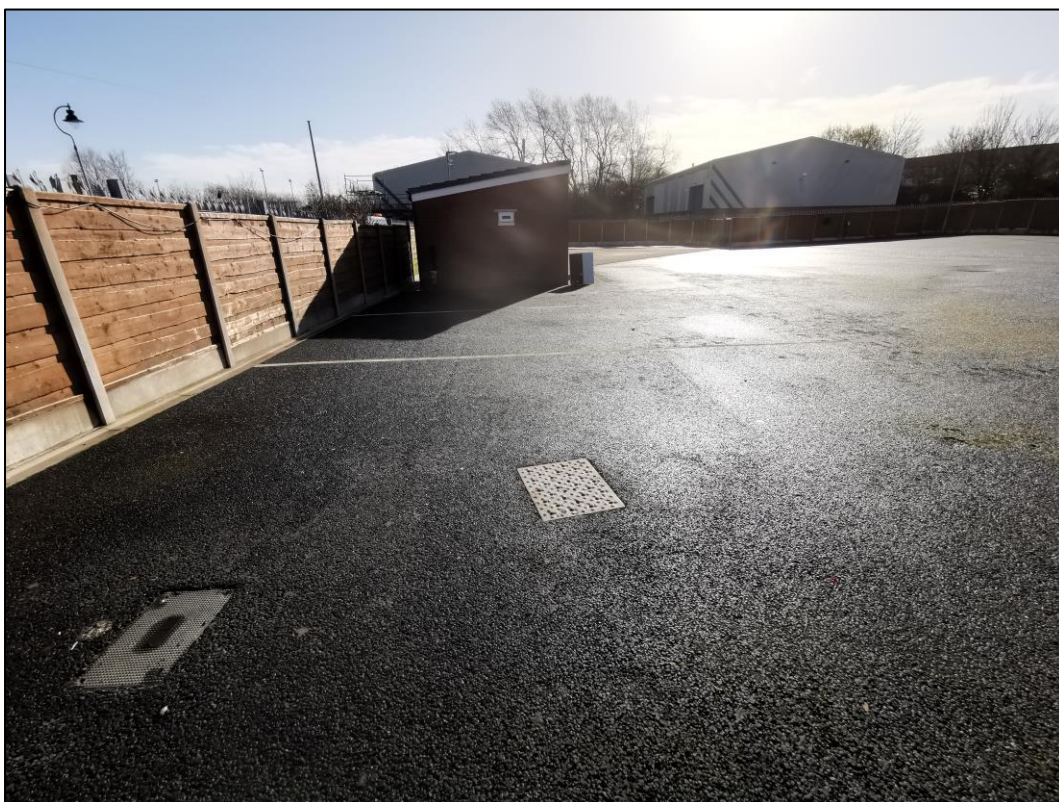
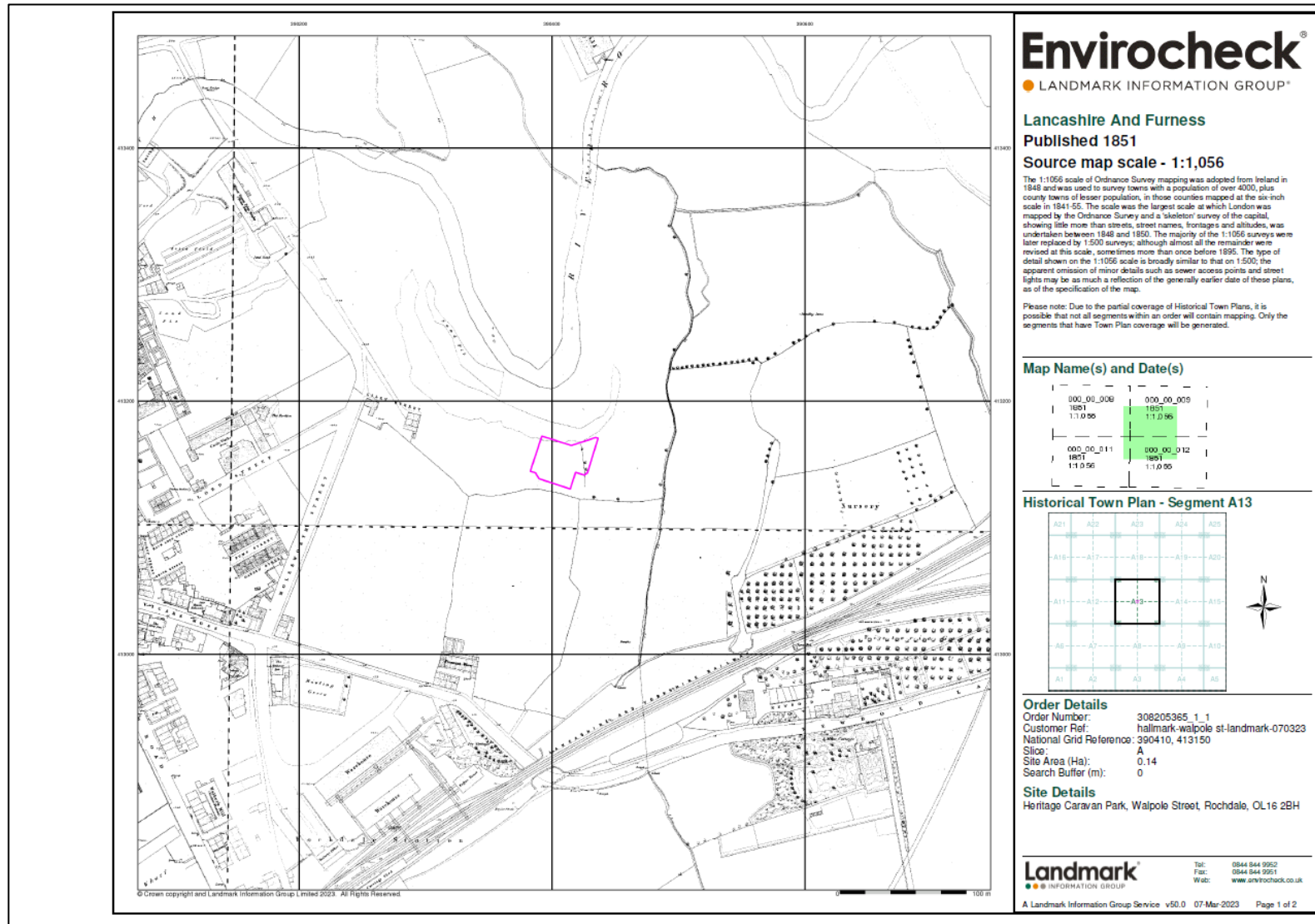
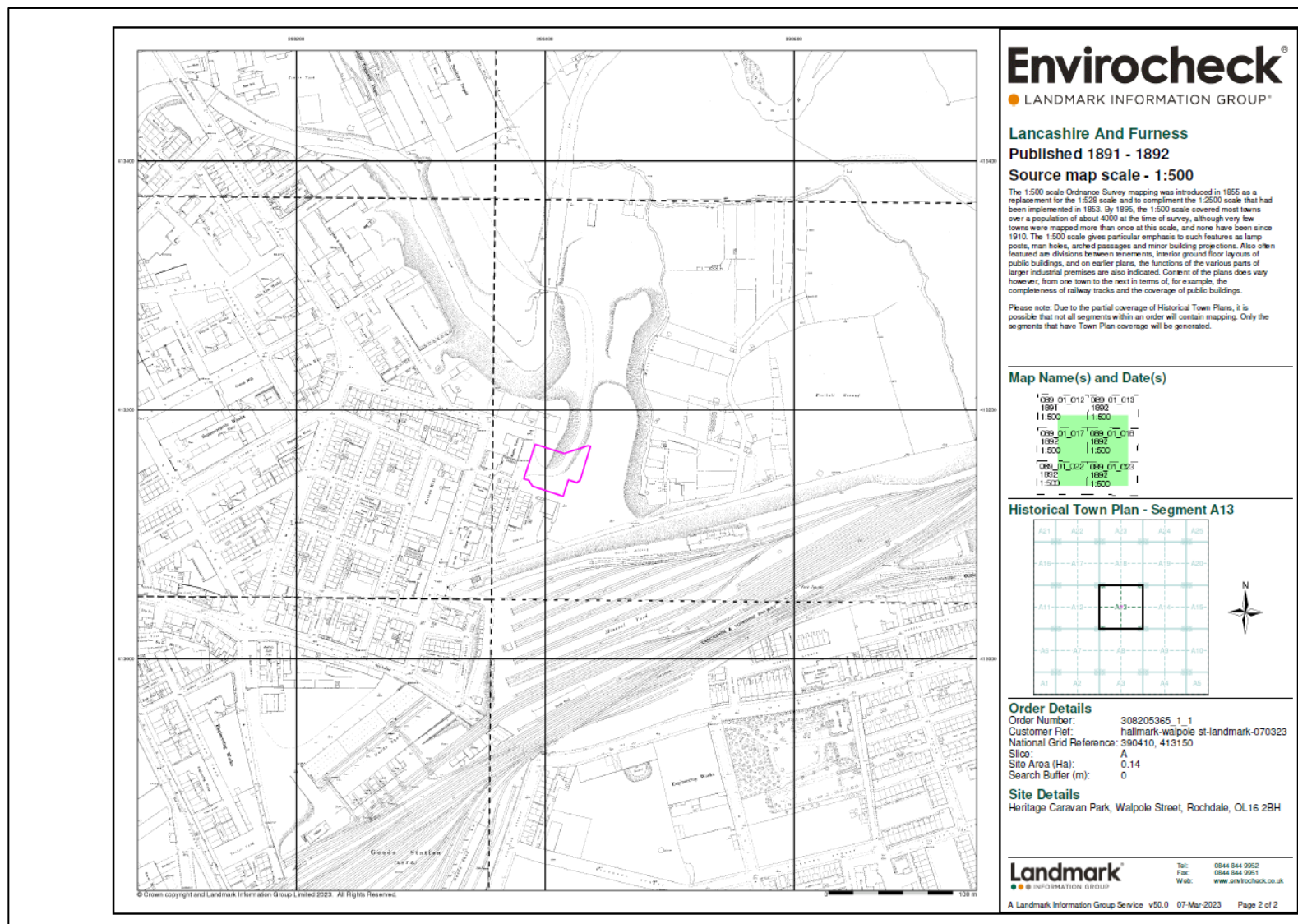
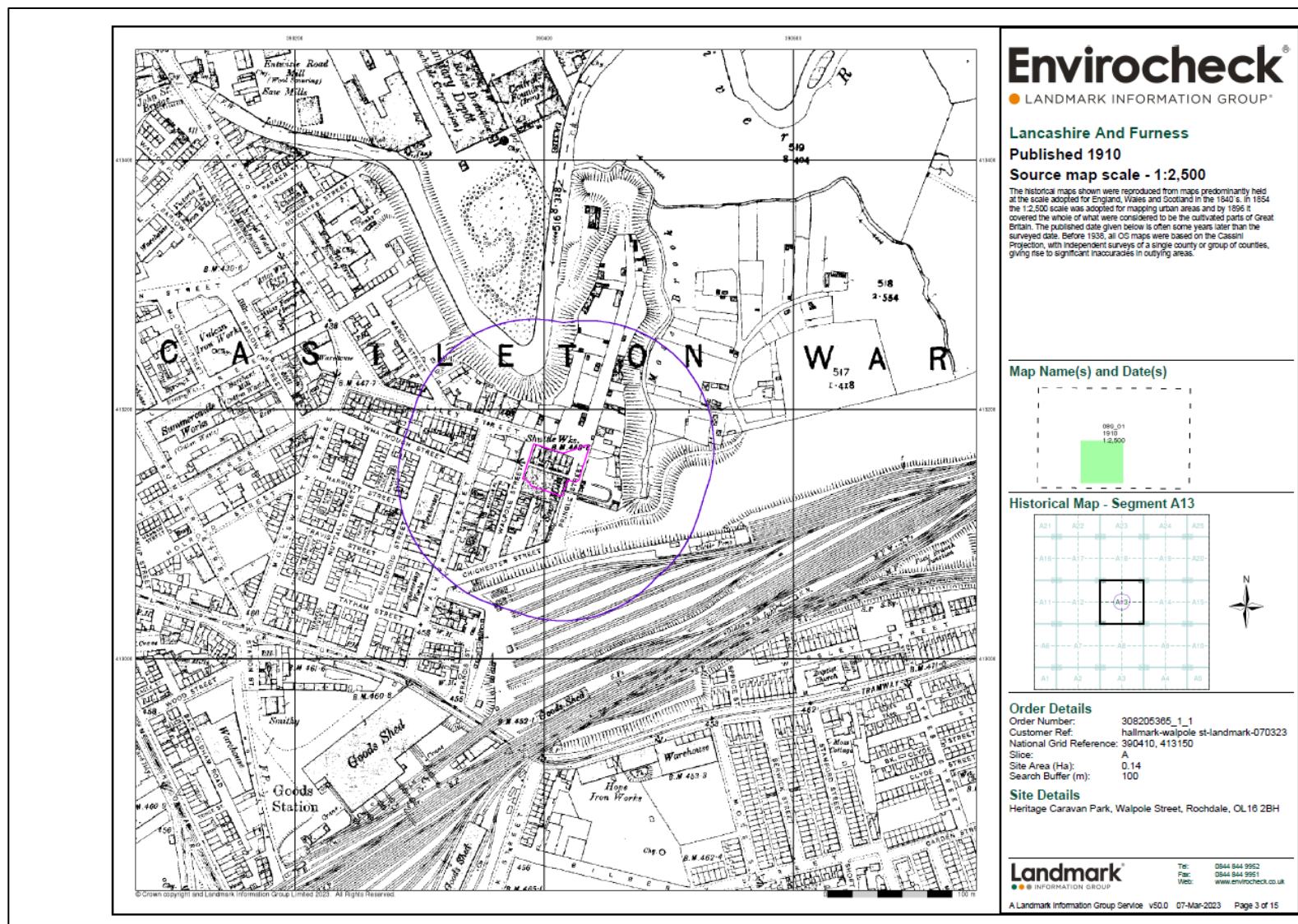


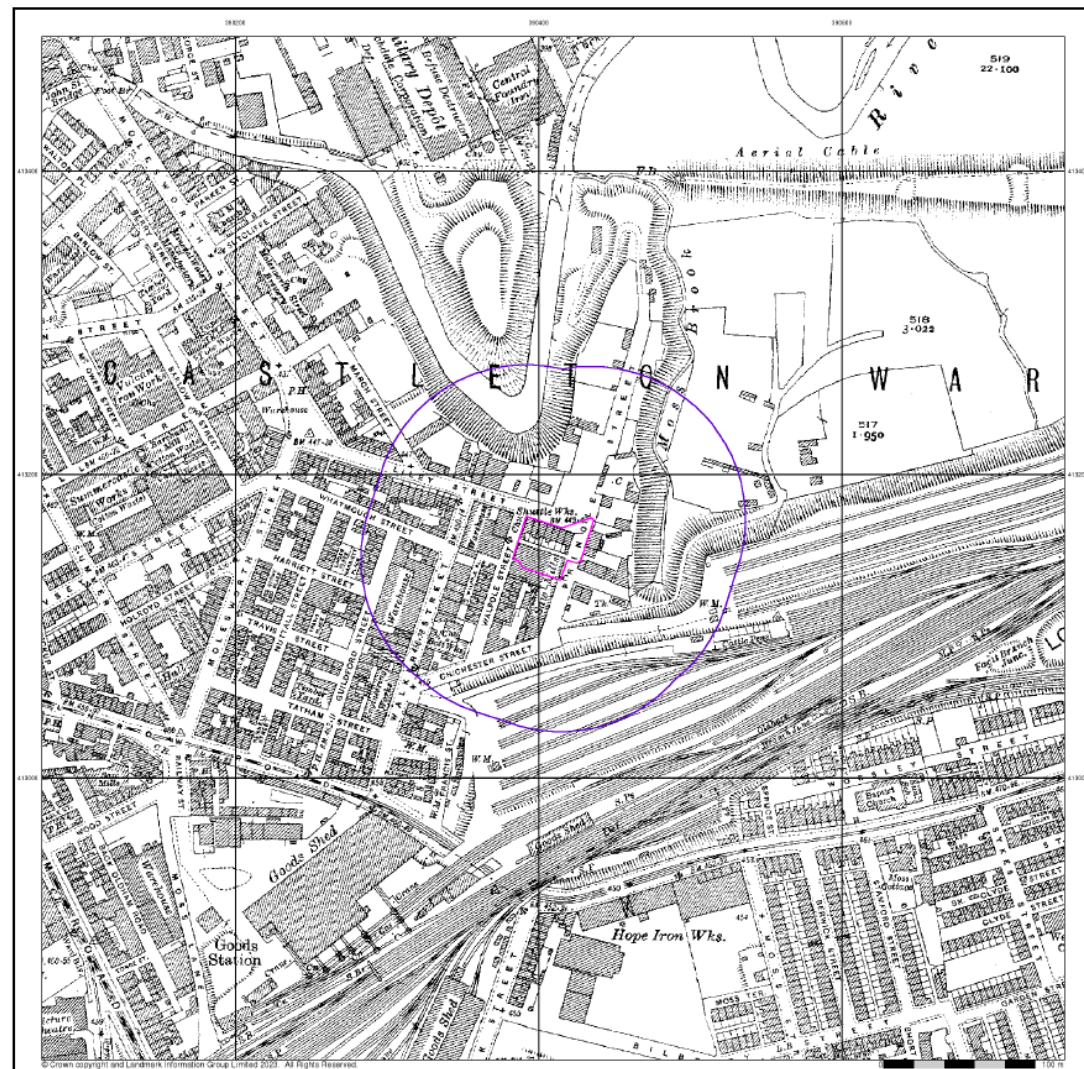
Figure 4 – View to east boundary.

7. APPENDIX C: LANDMARK ENVIROCHECK.









Envirocheck
 LANDMARK INFORMATION GROUP[®]

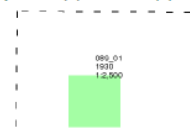
Lancashire And Furness

Published 1930

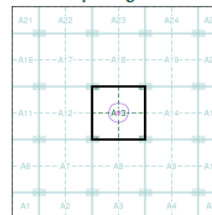
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1940's. In 1954 the 1:2,500 scale was adopted for mapping urban areas and by 1956 it covered the whole of what were considered to be the outvulved 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: 308205385_1_1
 Customer Ref: hallmark-walpole-st-landmark-070323
 National Grid Reference: 300410, 413150
 Slice: A
 Site Area (Ha): 0.14
 Search Buffer (m): 100

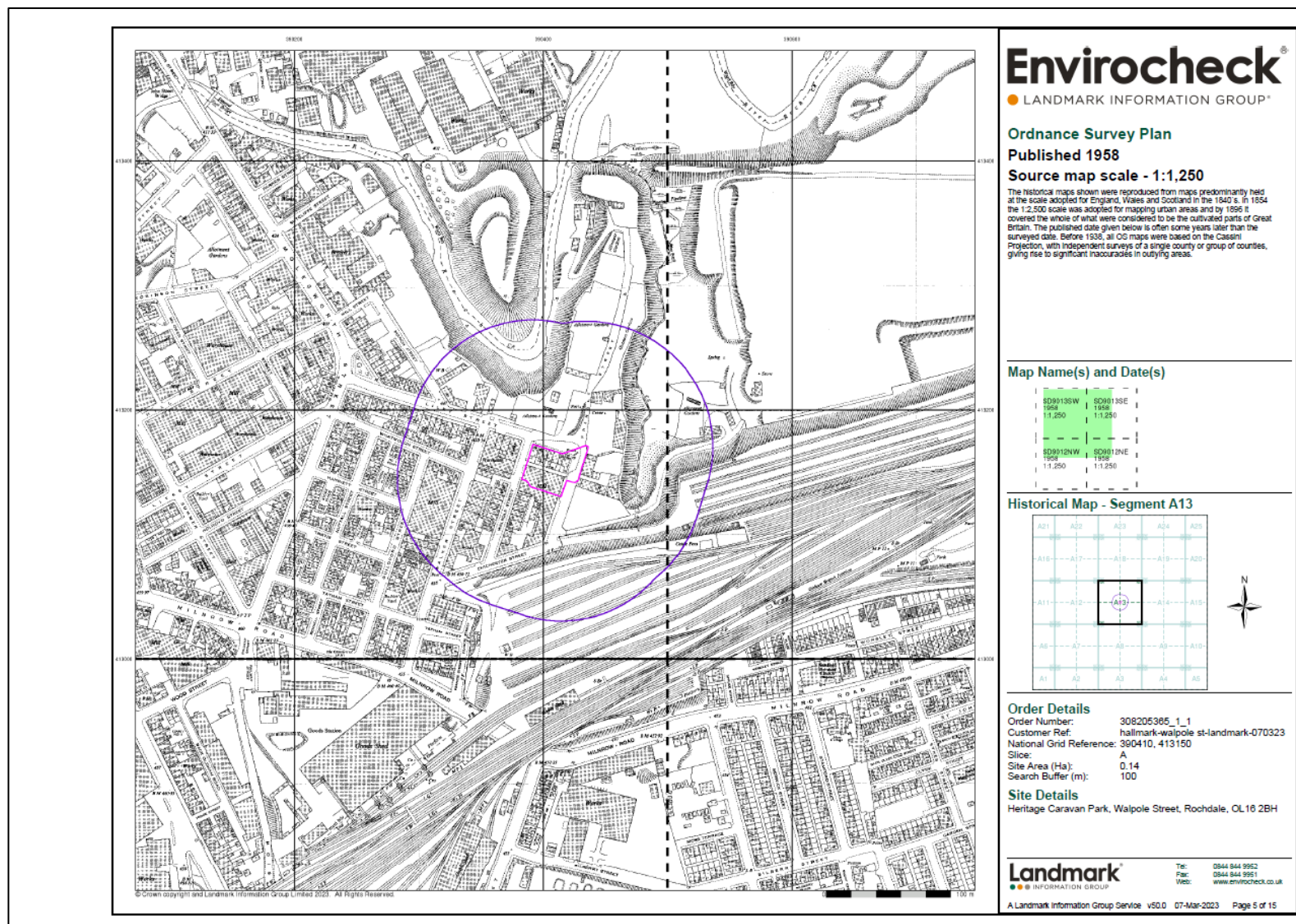
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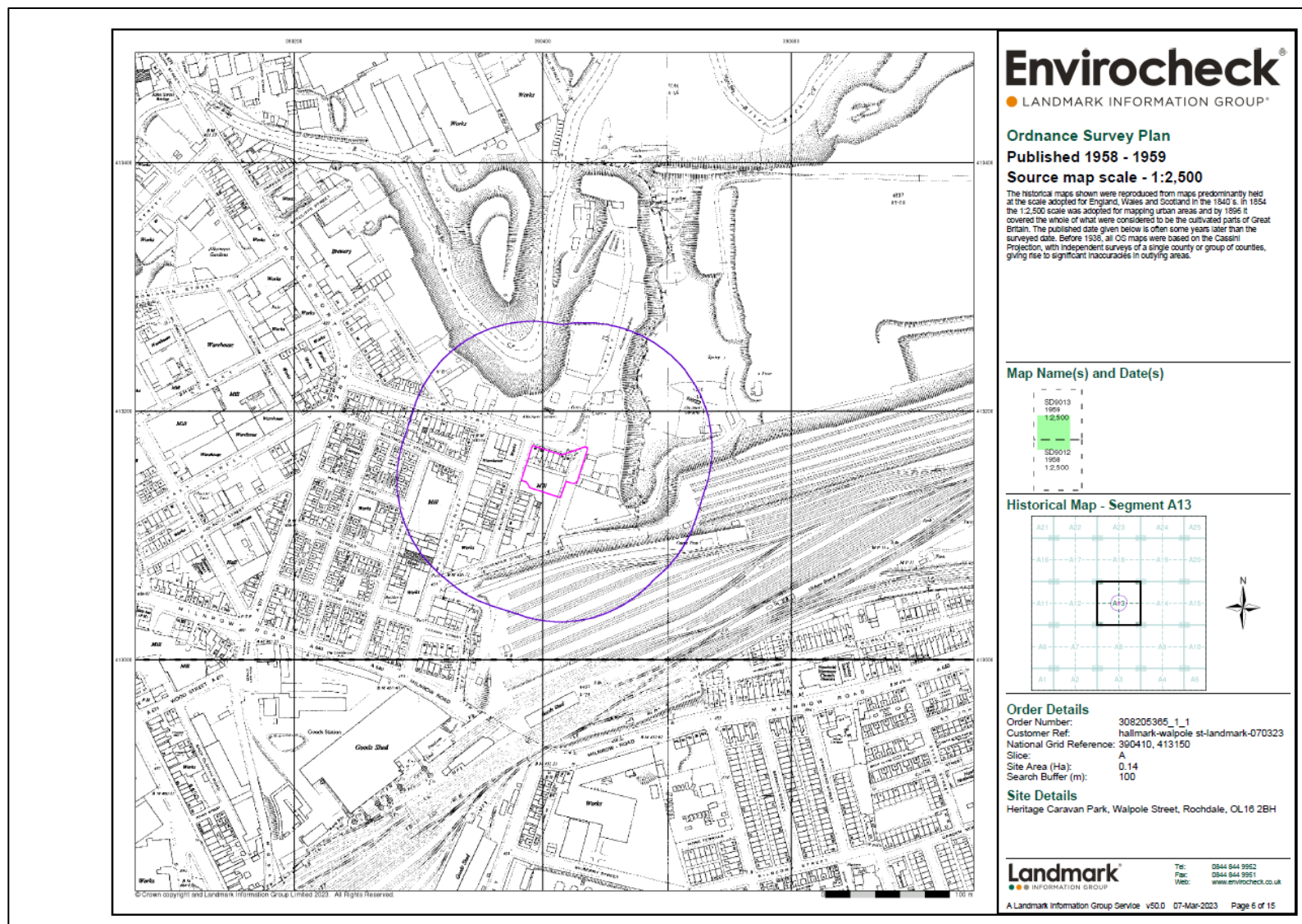
Heritage Caravan Park, Walpole Street, Rochdale, OL16 2BH

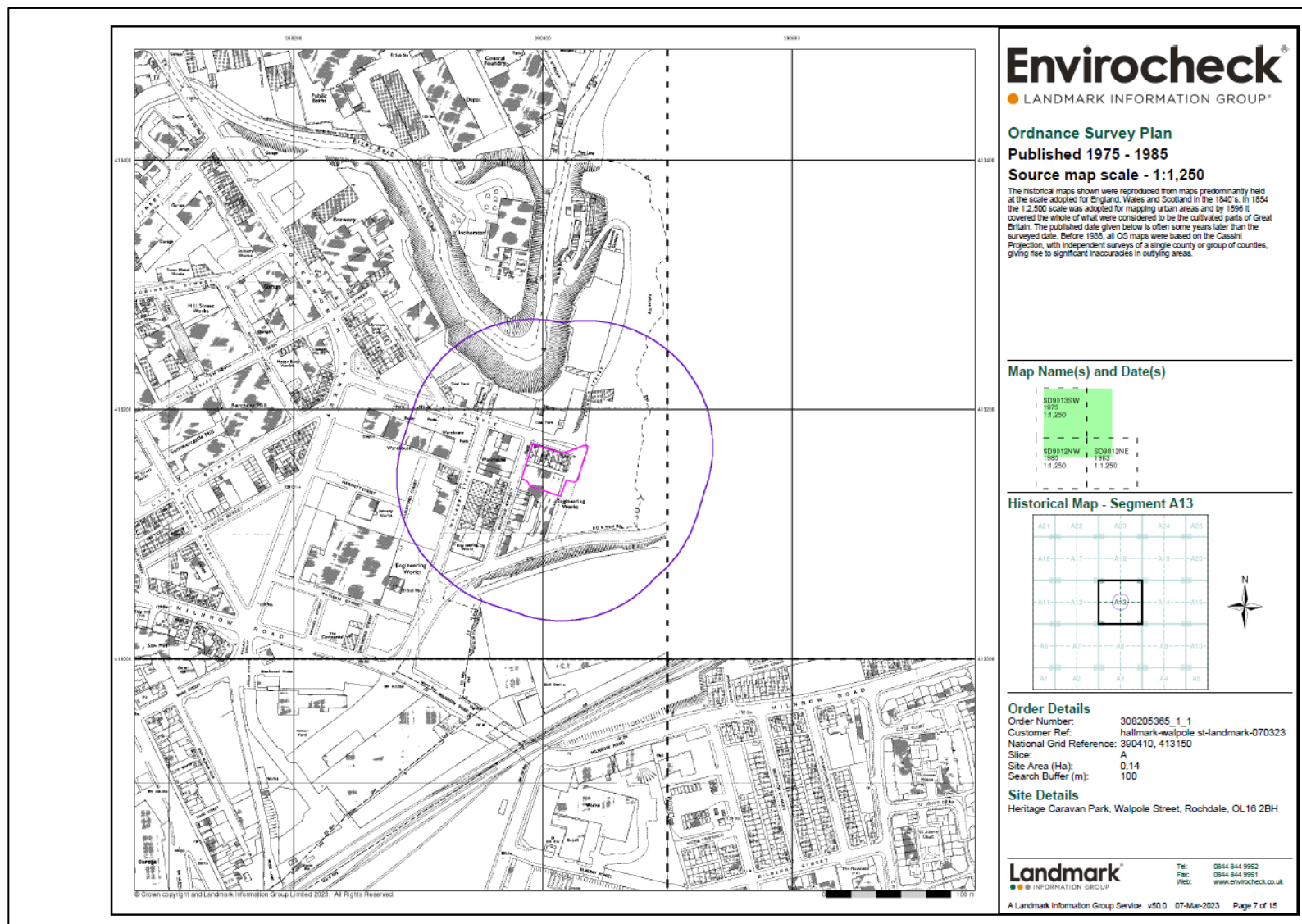
Landmark
 LANDMARK INFORMATION GROUP

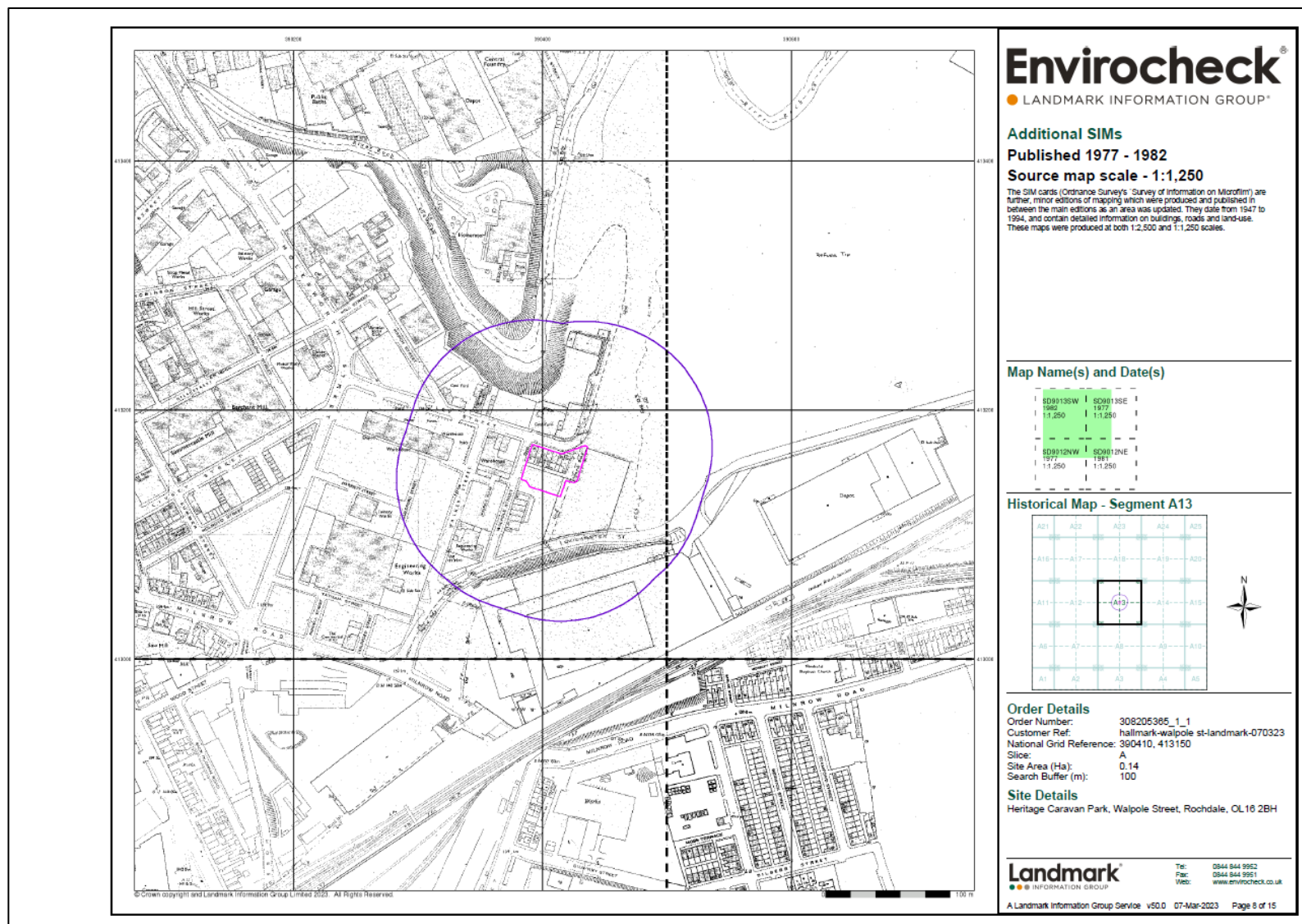
Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

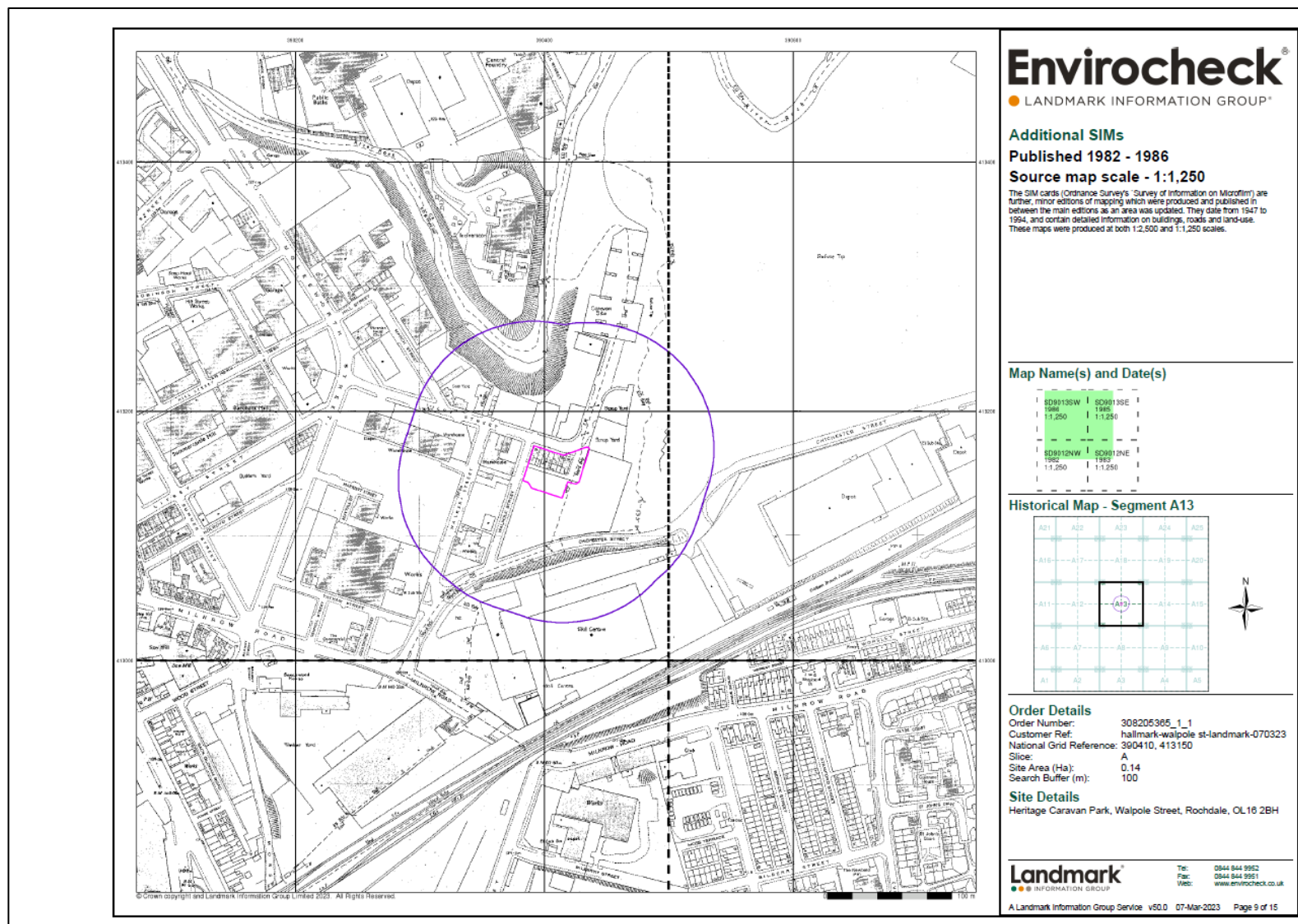
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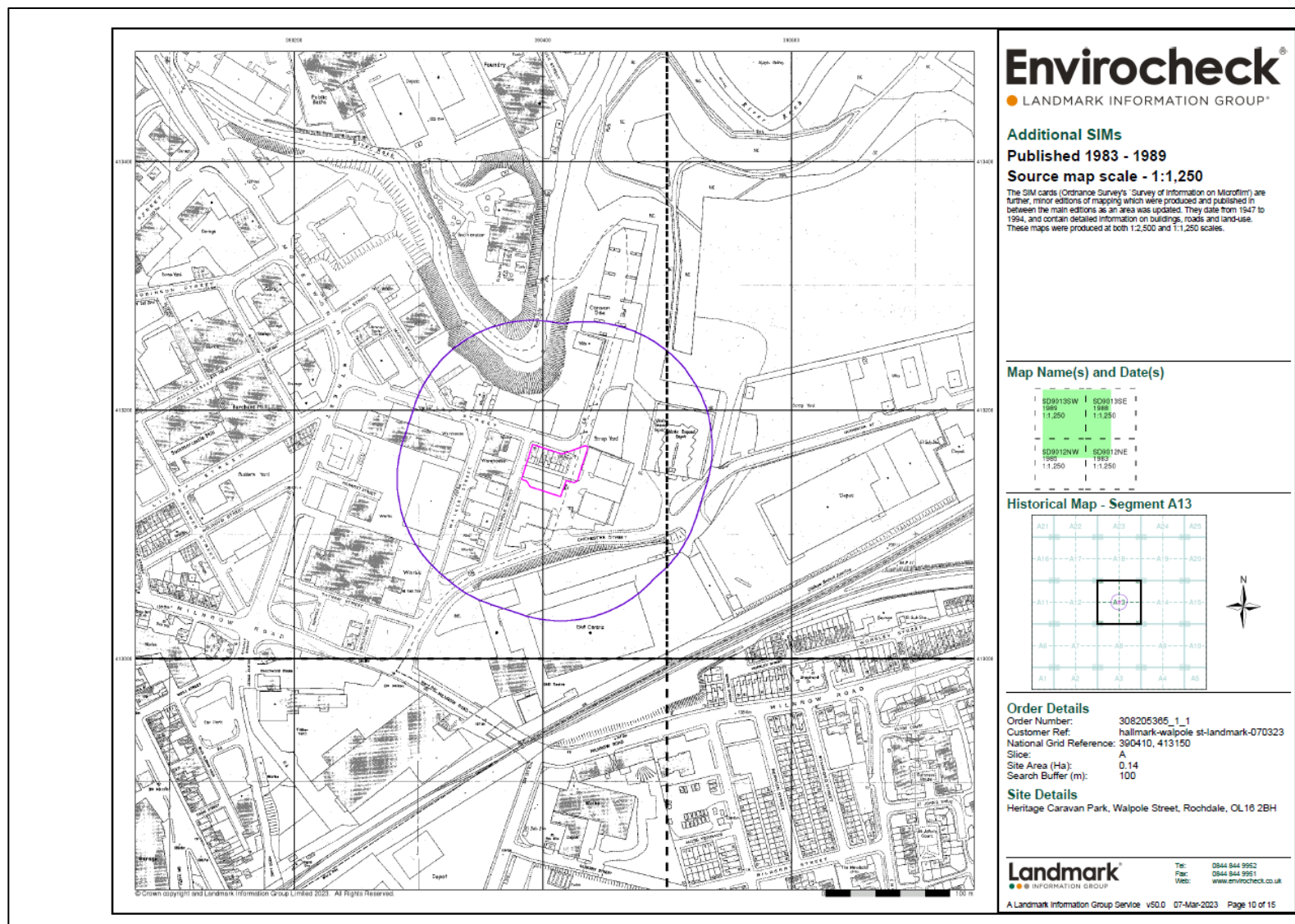


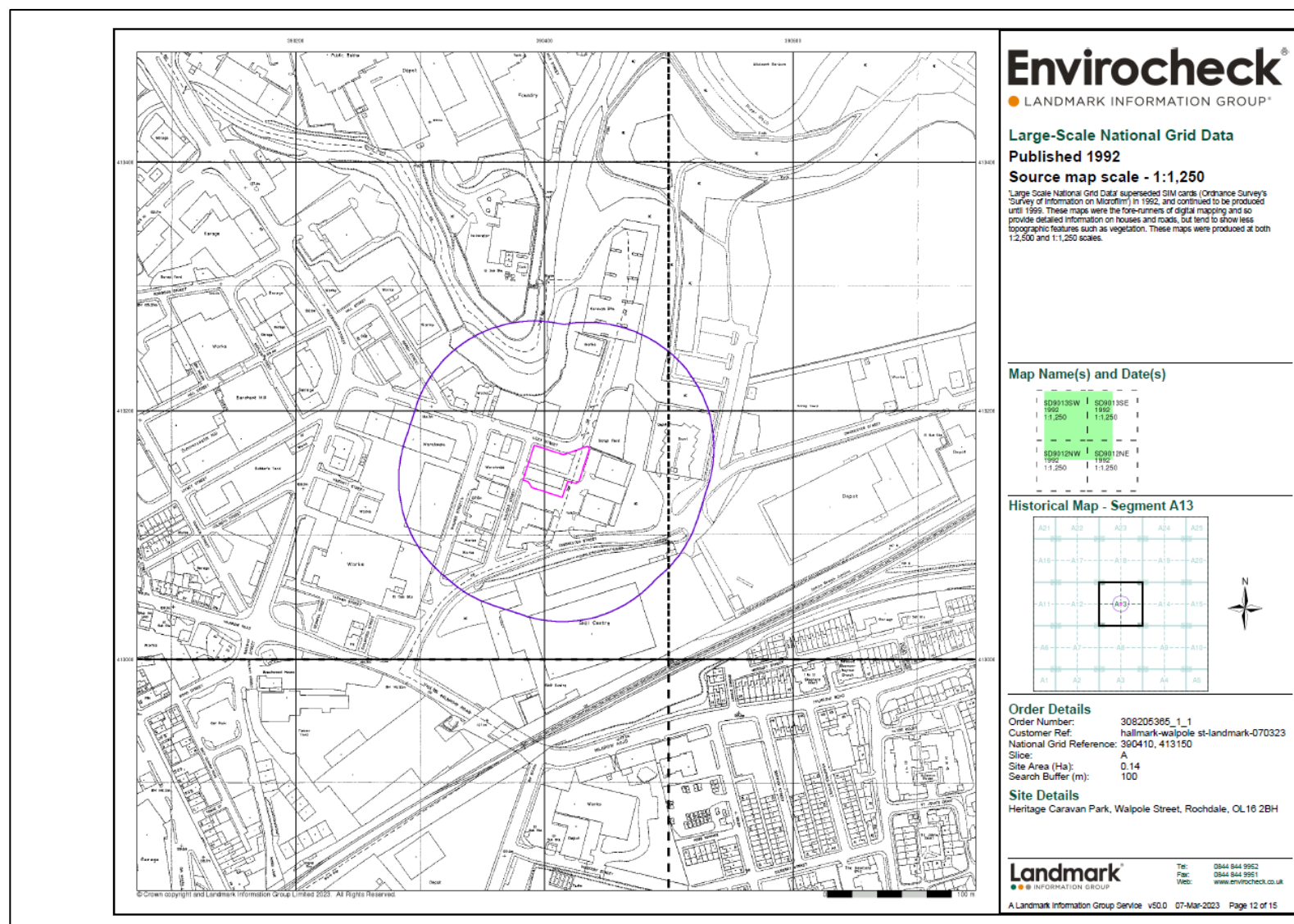


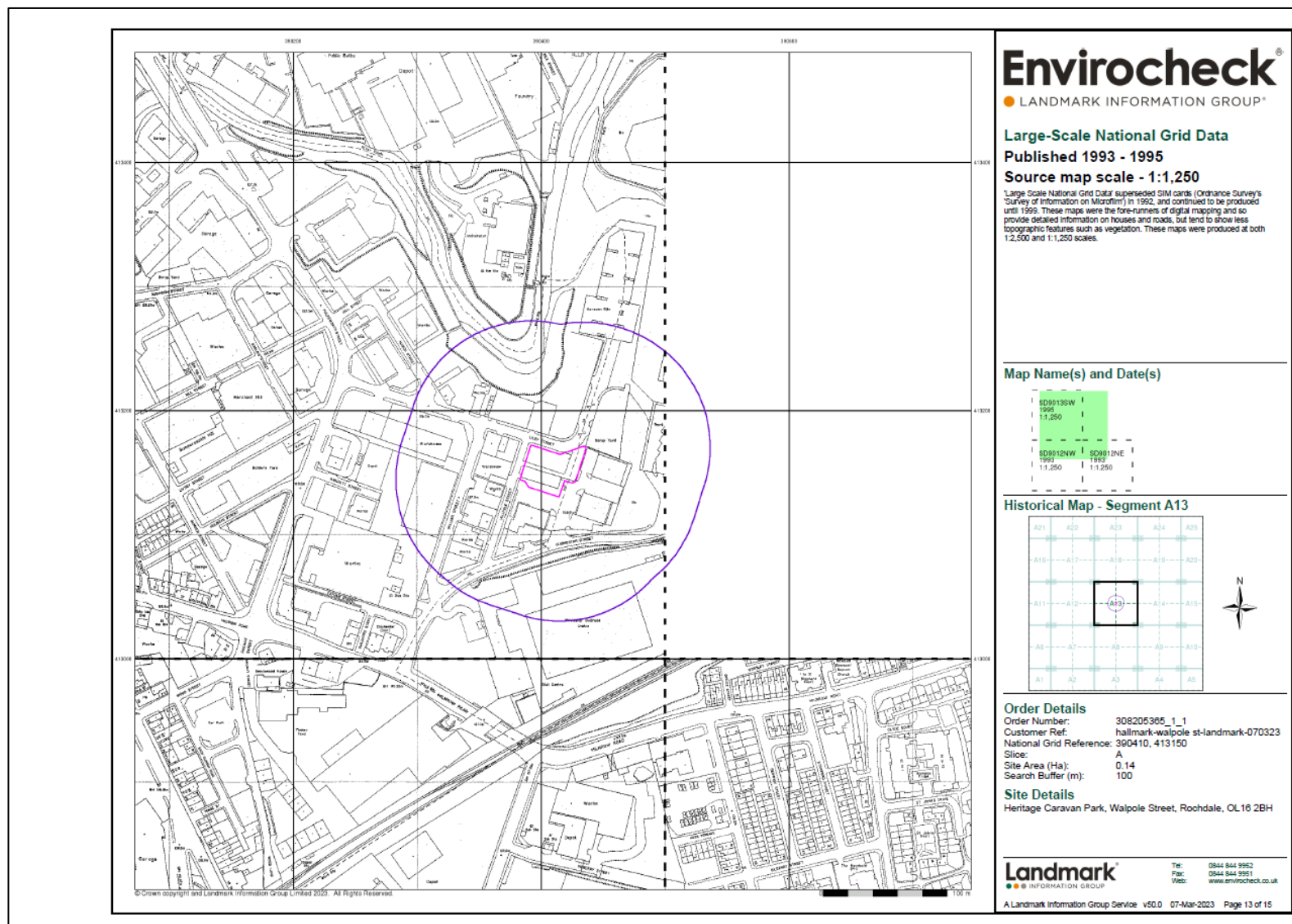




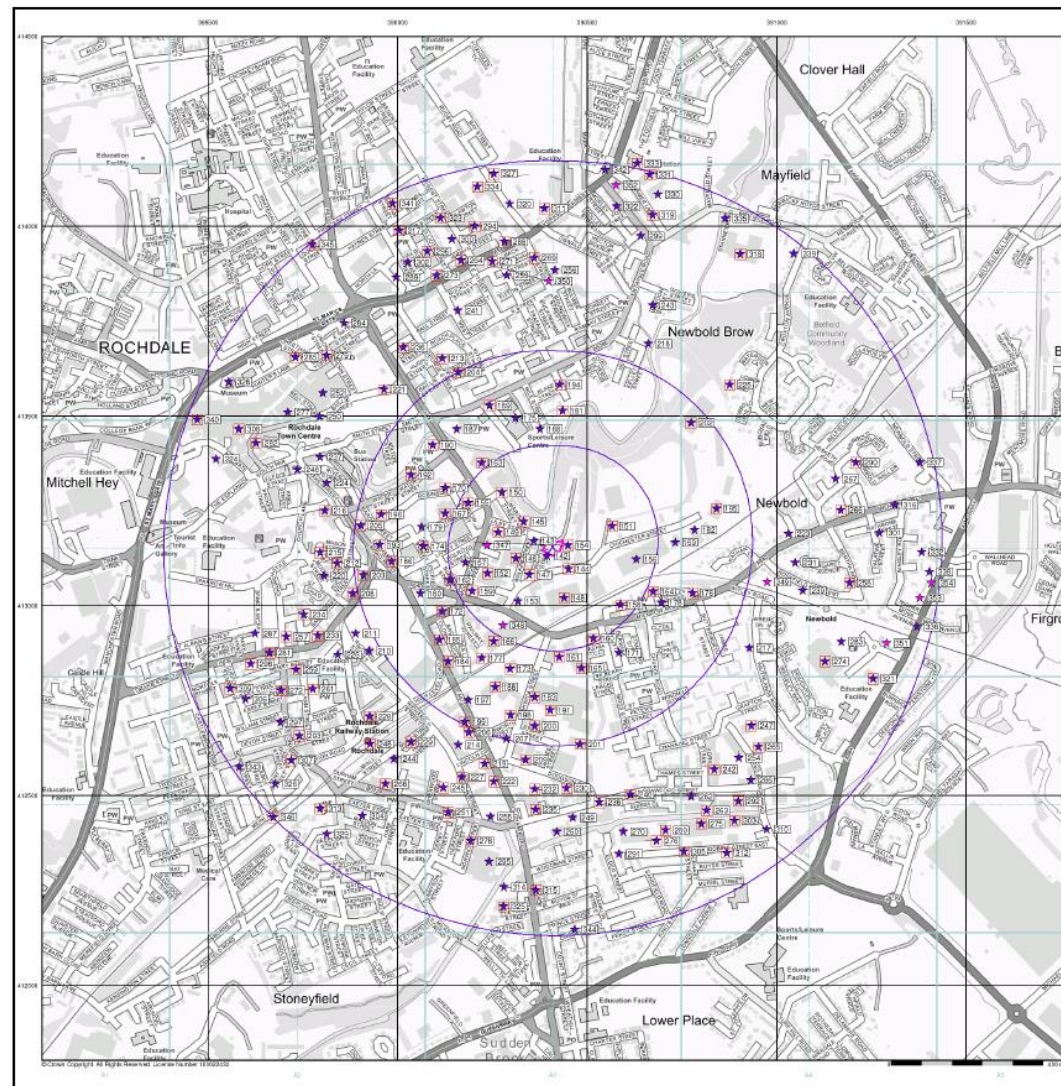










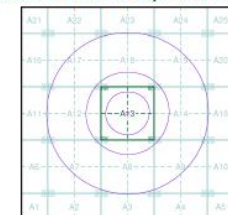


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Industrial Land Use Map

- General**
- Specified Site
 - Specified Buffer(s)
 - Site
 - Map ID
 - Bearing Reference Point
- Industrial Land Use**
- Contemporary Trade Directory Entry
 - Real Estate Entry
 - Gas Pipeline
 - Underground Electrical Cables

Industrial Land Use Map - Slice A



Order Details

Order Number: 308205305_1_1
Customer Ref: hallmark-walpole st-landmark-070323
National Grid Reference: 390410, 413150
Slice: A
Site Area (Ha): 0.14
Search Buffer (m): 1000

Site Details

Heritage Caravan Park, Walpole Street, Rochdale, OL16 2BH

Landmark
LANDMARK INFORMATION GROUP

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