

**Phase I Contaminated Land Assessment
Site 369 – Roull Road Gasworks**

City of Edinburgh Council

December 2009

QM

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Site Executive Summary

Site Ref	369	Priority Category
Site Name, Address and Telephone	98 and 100 Saughton Road North, Edinburgh, EH12 7JN	2
Site Owner	Unknown	Risk Assessment
Leaseholder	N/A	Medium/High
Grid Reference	320090, 672210	
Area (Ha)	Approximately 0.21	

Environmental Risk Assessment Summary

There is a risk of residual on-site contamination associated with a historical gas works on site. Site preparation/remediation works may have been undertaken prior to the development of the current properties, however no documentary evidence has been made available. The property on the north of the site has a private garden, representing a potential risk of direct contact, inhalation or ingestion of any localised contaminants by residents. There is also a potential risk of contaminants leaching into the local groundwater, given the permeable deposits underlying the southern area of the site.

Status Under Part IIA, the Environmental Protection Act 1990

Potentially Contaminated

Current Land Use

Residential properties and retail premises.

Proposed Land Use

As current. No known change of use proposed.

Remediation Status

Not Known

Land Use

Site History	The site was utilised as a gasworks from pre 1896 until pre 1907, after which it was marked as disused. A property in the north (possibly originally the gasworks cottage) has remained on site to the present and is a residential property with a private garden. The current retail/residential properties in the east were constructed pre 1947.
Surrounds	Potentially contaminative historical land uses in the close vicinity include a laundry 20m west and an electricity sub-station 25m southeast.
Landfill	There are no known operational landfills at or adjacent to the site.

UST	Information from CEC's Petroleum Officer (PO) does not indicate any current or historical petrol USTs at the site, however the PO does not hold records of USTs for other fuel types.
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Site Sensitivity

Groundwater	Moderate vulnerability. Moderately permeable drift over moderately permeable bedrock.
Surface Water	Low. No surface water features have been identified within 250m of the subject site.
Other	There are no designated ecological sites within 500m of the subject site. There are no Scheduled Ancient Monuments on or adjacent to the site. There are residential properties adjacent to the site and a recreation ground is 30m southeast.

Additional Information

Records held by the Royal Commission for Ancient and Historical Monuments Scotland have been searched but no plans or other records relating to this gasworks site were identified. Additionally, National Grid has been contacted for any available information on the operation, closure and subsequent remediation of the former gasworks site. No information was available.
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1 Land Use

1.1 CURRENT LAND USE

1.1.1 Site Details

Site Reference and Name	369 Roull Road Gasworks
Site Address	98 and 100 Saughton Road North, Edinburgh, EH12 7JN
Grid Reference	320090, 672210
Site Area (Ha)	0.21
Details of Current Site Owner / Leaseholder	Unknown
Current Site Use	Residential properties and retail premises.
Proposed Use	As current. No known change of use proposed.

1.1.2 Site Inspection

A site visit was undertaken on 1st November 2007.

The site is currently in residential and retail use comprising a house with private garden, flats with shared gardens to the rear above retail properties, with car parking to the front. The retail properties on site are occupied by J Wood Builders (builders and joiners), Natural Therapies (acupuncture clinic), Harry Simpson (butchers), Donachie Bakers, Evening News (newsagents), Ferry Good Food (bakers) and Abercorn TV Ltd. (TV repairs and retail).

A single storey property is present on the northeast corner of the site, this property is connected to the other retail properties, however appears to have been constructed at a later date. This property is occupied by J Wood Builders. On the east of the site there are several car parking spaces with a long three-storey building adjacent. This building houses the remainder of the retail properties on the ground floor and residential flats are present on the upper floors. Communal yards and gardens are present to the west of this property. The north of the site is occupied by a residential property with private garden, the garden was observed to be mainly lawn with some flower beds.

The site is approximately square in shape and slopes gently up from south to north. The site boundary is formed by roads to the east and north. Residential properties with private gardens are present to the north and west of the site.

Ground cover comprises hardstanding car parking and areas of private and shared gardens.

No evidence of invasive species was observed.

No obvious vegetative stress was observed during the site visit.

No obvious visual evidence of subsidence was observed.

No fuels, chemicals or other hazardous materials were observed on site and given the small scale retail and residential use of the site no storage of such materials is anticipated.

There are no watercourses on site. Grate drains were observed on the hardstanding areas.

No evidence of atmospheric emissions was observed and none are anticipated.

Surrounding land uses include residential properties to the north, south and west. A recreation ground is located approximately 30m to the southeast of the site.

A site plan is provided in Appendix A. Site photographs are provided in Appendix B.

1.2 HISTORICAL LAND USE

The following summary of historical site development is based upon information obtained from available historical maps and air photographs provided in digital format by the City of Edinburgh Council. Copies of selected historical map and air photograph extracts are contained in Appendix C.

<i>Land Use On Site</i>	<i>Dates</i>
The site is undeveloped, however a road bisects the site in a north/south direction.	Pre 1856 to Pre 1898
A gasworks has been constructed on-site, comprising one long building on the southwest of the site. Two tanks or small gasholders are present in the west and a smaller building is present in the north-central site area.	Pre 1898 to Pre 1907
As above, however the gasworks is recorded as disused and an additional small structure is present in the centre of the site.	Pre 1907 to Pre 1914
The tanks/gasholders and the larger building in the south have been removed but the two smaller buildings in the central and north-central areas remain.	Pre 1914 to Pre 1932
As above, however an additional unlabelled structure has been developed in the east of the site.	Pre 1932 to Pre 1947
The small, north-central building remains. The remainder of the site has been redeveloped, the small structures in the central and eastern areas have been cleared and a long residential building has been constructed on the east of the site, with possible gardens or yards to the west.	Pre 1947 to Pre 1973
As above, however the north-central building (identified on-site as a detached residential house) has been extended towards the north.	Pre 1973 to Present

<i>Surrounding Land Use</i>	<i>Dates</i>	<i>Distance</i>	<i>Orientation</i>
Laundry	Pre 1914 – Pre 1944	20m	West
<i>Then</i> residential properties	Pre 1944 - Present		
Electricity Sub-Station	Pre 1947 - Present	25m	Southeast

1.2.1 Other Information

<i>Landfill Sites in the Vicinity</i>	There are no known operational landfills at or adjacent to the site.
<i>Underground Storage Tanks (USTs) on Site</i>	Information from CEC's Petroleum Officer (PO) does not indicate any current or historical petrol USTs at the site (see Section 1.4).

1.3 CONTAMINATION

1.3.1 Known Contaminants

None.

1.3.2 Potential Contaminants

Source	Potential Associated Contaminants
Gasworks	Toxic Metals/Semi-metals. Phytotoxic Metals/Semi-metals. Cyanides. Sulphate. Sulphide. Asbestos. Acids/Alkalis. Phenols/Chlorophenols. Oil/Fuel Hydrocarbons. Aromatic Hydrocarbons. Polyaromatic Hydrocarbons (PAHs).
Potential for Elevated Ground Gas	There is potential for localised carbon dioxide and methane generation in made ground which may be present, particularly if former gasholders have been infilled.
Potential for Volatile Organic Compound (VOC) Vapours	Given the historical land use on site, there is considered to be potential for generation of volatile vapours.
Remediation Status	Not Known

1.4 CONSULTATIONS AND OTHER INFORMATION

Mining Information:	Information supplied by the Coal Authority indicates that underground or opencast coal mining activity may have taken place within the vicinity of the site. Historical maps do not show any mining activity at or in the immediate vicinity of the site.
Planning / Building Control Information	Information from the on-line Planning and Building Control Portal indicates that various small alterations and changes of use have been undertaken to the properties on site. No information was available regarding the original development of the current properties.
SEPA Information	The GIS based data provided by CEC includes SEPA data. This dataset shows no features on or in the close vicinity of the site, which are recorded as being regulated by SEPA. No industrial installations have been noted in the close vicinity of the site, therefore no further consultation with SEPA has been carried out.
Petroleum Officer Information	Information from CEC's Petroleum Officer (PO) does not indicate any current or historical petrol USTs at the site, however the PO does not hold records of USTs for other fuel types.
Information from Other Consultees	No further information has been made available.
Existing Reports	No existing reports have been identified.



Other

Records held by the Royal Commission for Ancient and Historical Monuments Scotland have been searched but no plans or other records relating to this gasworks site were identified.

Additionally, National Grid has been contacted for any available information on the operation, closure and subsequent remediation of the former gasworks site. No information was available.

2 Environmental Setting

2.1 GEOLOGY

Geological Maps Consulted	Digital Geological Map Sheet no.32E, Edinburgh, 1:50,000, Solid and Drift (2001)
Geological Setting	Published geological maps indicate that the site is underlain by Lacustrine Deposits (undifferentiated) comprising clay, silt and sand. The north of the site is underlain by Glacial Till. Bedrock comprises the Gullane Formation.
Hydrogeology Summary	The BGS 1:625,000 scale Groundwater Vulnerability Map of Scotland (2001) indicates that the strata beneath the site are classified moderately permeable. The BGS 1:625,000 Hydrogeological Map of Scotland (1988) indicates that the site is underlain by Carboniferous (Dinantian and Namurian) bedrock forming highly productive but not extensive aquifers in which flow is dominantly in fissures and other discontinuities.
Groundwater Vulnerability	The overall groundwater vulnerability is assessed as moderate .

2.2 SURFACE WATER

No surface water features have been identified within 250m of the subject site.

Surface Water Vulnerability	Surface water vulnerability is assessed as low .
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SEPA's Indicative River and Coastal Flood Map (Scotland) shows the site is within an area where there is not an estimated flood risk of 0.5% (1:200) or greater in any given year.

2.3 FURTHER INFORMATION

Ecological Receptors	There are no designated ecological sites within 500m of the subject site.
Archaeological Sites	There are no Scheduled Ancient Monuments on or adjacent to the site.
Surrounding Land Use	There are residential properties adjacent to the site and a recreation ground 30m southeast.

3 Environmental Risk Ranking Model

Source Pathway Receptor Analysis

Land Use Source 1 Gas works				
Source	Pathway	Receptor	Risk	Comment
Contaminated Soils - Inorganics	Direct contact/inhalation or ingestion	Site residents	Medium-High	Potential for localised contamination, private garden provides a pathway for dermal contact.
		Construction/maintenance workers	Low-Medium	Landscaping workers may come into contact with localised contamination; however this can be mitigated by use of appropriate PPE.
	Leaching into local groundwater	Local groundwater	Medium	Potential for leaching of localised residual contaminants.
	Leaching into local groundwater, direct contact or ingestion of groundwater	Site residents	Medium-High	Potential for localised contamination, private garden provides a pathway for dermal contact.
		Construction/maintenance workers	Low-Medium	Workers may come into contact with localised contamination, however this can be mitigated by use of appropriate PPE.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology and services, direct contact or ingestion of groundwater	Neighbouring residents	Medium	Potential for migration of localised residual contaminants off site. Private gardens at adjacent properties.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology, services	Regional groundwater	Medium	Potential for migration of contamination within shallow deposits and downward to the bedrock aquifer.
		Surface water	Low	No surface water bodies have been identified within 250m of the site.
Contaminated Soils - Organics	Direct contact/inhalation or ingestion	Site residents	Medium-High	Potential for localised contamination, private garden provides a pathway for dermal contact.
		Construction/maintenance workers	Low-Medium	Landscaping workers may come into contact with localised contamination, however this can be mitigated by use of appropriate PPE.

Land Use Source 1 Gas works				
Source	Pathway	Receptor	Risk	Comment
	Leaching into local groundwater	Local groundwater	Medium	Potential for leaching of localised residual contaminants.
	Direct contact (with services/structures)	Site structures/services	Low-Medium	Potential for any residual contamination to impact site structures and services.
	Leaching into local groundwater, direct contact or ingestion of groundwater	Site residents	Medium-High	Potential for localised contamination, private garden provides a pathway for dermal contact.
		Construction/maintenance workers	Low-Medium	Landscaping workers may come into contact with localised contamination, however this can be mitigated by use of appropriate PPE.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology and services, direct contact or ingestion of groundwater	Neighbouring residents	Medium	Potential for migration of localised residual contaminants off site.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology, services	Surface water	Low	No surface water features have been identified within 250m of the subject site.
		Regional groundwater	Medium	Potential for migration of contamination within shallow deposits and downward to the bedrock aquifer.
	Leaching into local groundwater, direct contact (with services/structures)	Site structures/services	Low-Medium	Potential for any residual contamination to impact site structures and services.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology, services	Neighbouring structures/services	Low-Medium	Potential for migration of residual contamination to impact on neighbouring structures/services.
Contaminated Soils - Sulphates/acids	Leaching into local groundwater	Local groundwater	Medium	Potential for leaching of localised residual contaminants.
	Direct contact (with services/structures)	Site structures/services	Low-Medium	Potential for any residual contamination to impact site structures and services.
	Leaching into local groundwater, direct contact (with services/structures))	Site structures/services	Low-Medium	Potential for leaching of residual contamination to impact on structures/services.

Land Use Source 1 Gas works				
Source	Pathway	Receptor	Risk	Comment
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology, services	Neighbouring structures/services	Low-Medium	Potential for leaching of residual contamination to impact on neighbouring structures/services.
Ground gas – Methane and carbon dioxide	Direct ingress/pooling	Site residents	Low-Medium	There is potential for localised ground gas generation in made ground, particularly if former gasholders have been infilled. However, these are remote from current structures, reducing the potential risk.
		Site services/structures	Low-Medium	Limited potential for methane generation in the immediate vicinity of current structures.
		Construction/maintenance workers	Low-Medium	Potential risk for any workers entering confined spaces, e.g. drainage pipes/ chambers.
	Gaseous migration via drift geology, bedrock geology, services	Neighbouring residents	Low-Medium	Potential for migration of ground gas to adjacent properties, however may be limited by low permeability Till in the northern site area.
Volatile Organic Compounds	Indoor inhalation	Site residents	Low-Medium	Potential for volatiles associated with historical land uses to migrate into site properties, however given the length of time since the gasworks was removed from site the potential may be limited.
		Construction/maintenance workers	Low-Medium	Potential risk for any workers entering confined spaces, e.g. drainage pipes/ chambers, however given the length of time since the gasworks was removed from site the potential may be limited.

Appendix D provides a graphical representation of the Source-Pathway-Receptor model.



4 Conclusions and Recommendations

4.1 CONCLUSIONS

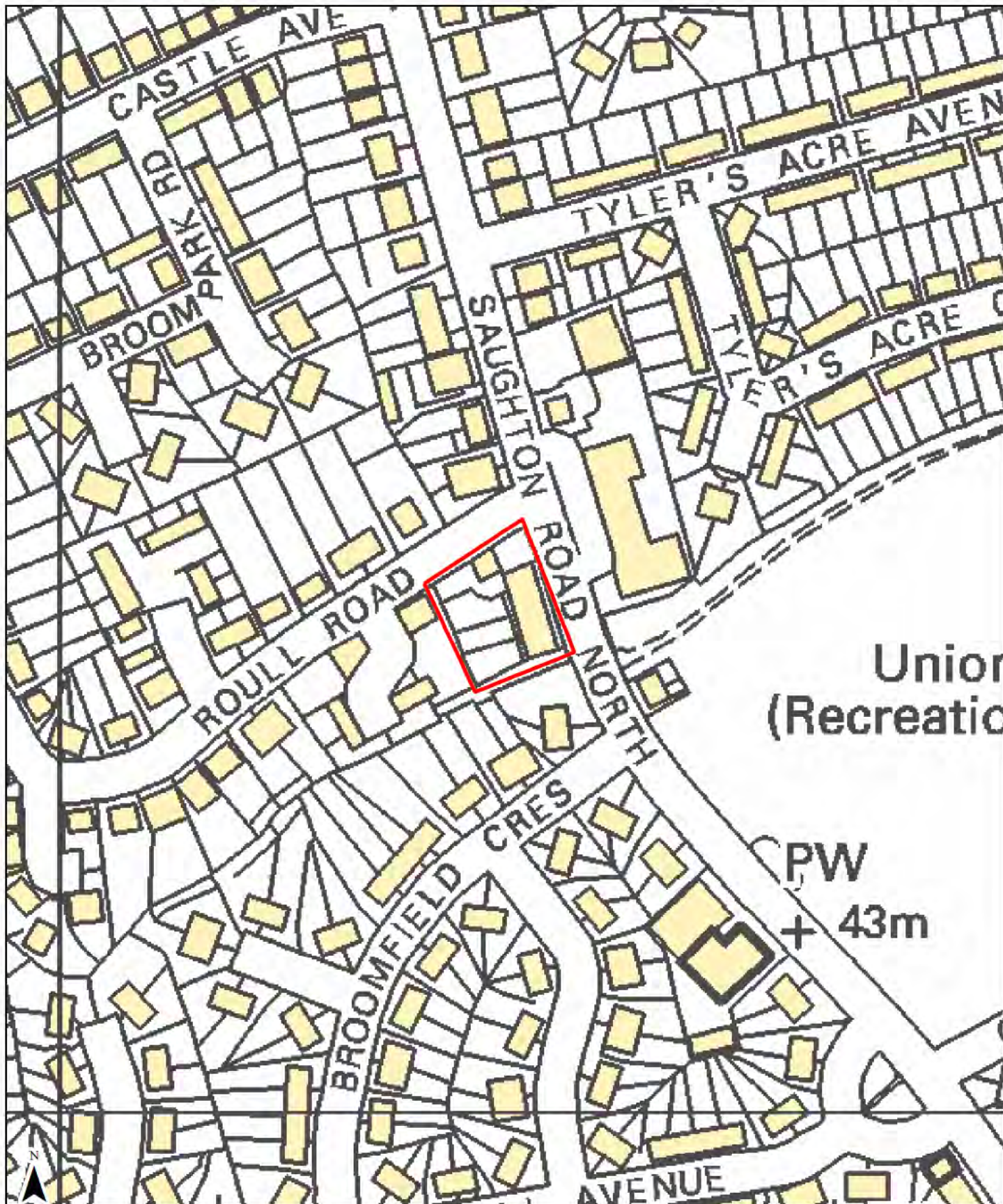
Environmental Risk Assessment Summary	The following summarises the potential environmental risks identified, to each receptor: Human Health –Medium/High Property (Crops, plants, domestic pets) – Low Property (Buildings) – Low/Medium Groundwater – Medium Surface Water – Low Ecology – Low Other – Low
Status Under Part IIA, the Environmental Protection Act 1990	Potentially Contaminated
Overall Environmental Risk Assessment	Medium-High
Overall Priority Category	2

4.2 RECOMMENDATIONS

Recommendation	Indicative Cost (£)	Timescale
<i>Further Investigations</i>		
It is recommended that a targeted site investigation be undertaken that would include: ■ Near surface soil samples in the private garden area to assess potential for direct contact/ inhalation/ ingestion of contaminated materials by site residents (highest priority), ■ Borehole drilling in common areas to provide installations for groundwater monitoring and an assessment of the potential for off-site migration of contaminants, where present. This should include targeting of the former gasholders to identify fill materials and potential for significant ground gas generation as well as groundwater impact.	12,000 to 18,000	8 to 12 weeks
<i>Remediation</i>		
The requirement for remedial works would depend on the findings of any site investigation works undertaken.	N/A	N/A
<i>Monitoring</i>		
The requirement for any ongoing monitoring would depend on the findings of any site investigation works undertaken.	N/A	N/A



Appendix A Site Location Plan and Source Location Plan



Legend



Site Boundary



Adjacent Sites

Notes

Appendix A

Site Location Plan

369 Roull Road Gasworks

Size: A4

Scale: 1:2,000

Project: 12151185 - Edinburgh Con Land

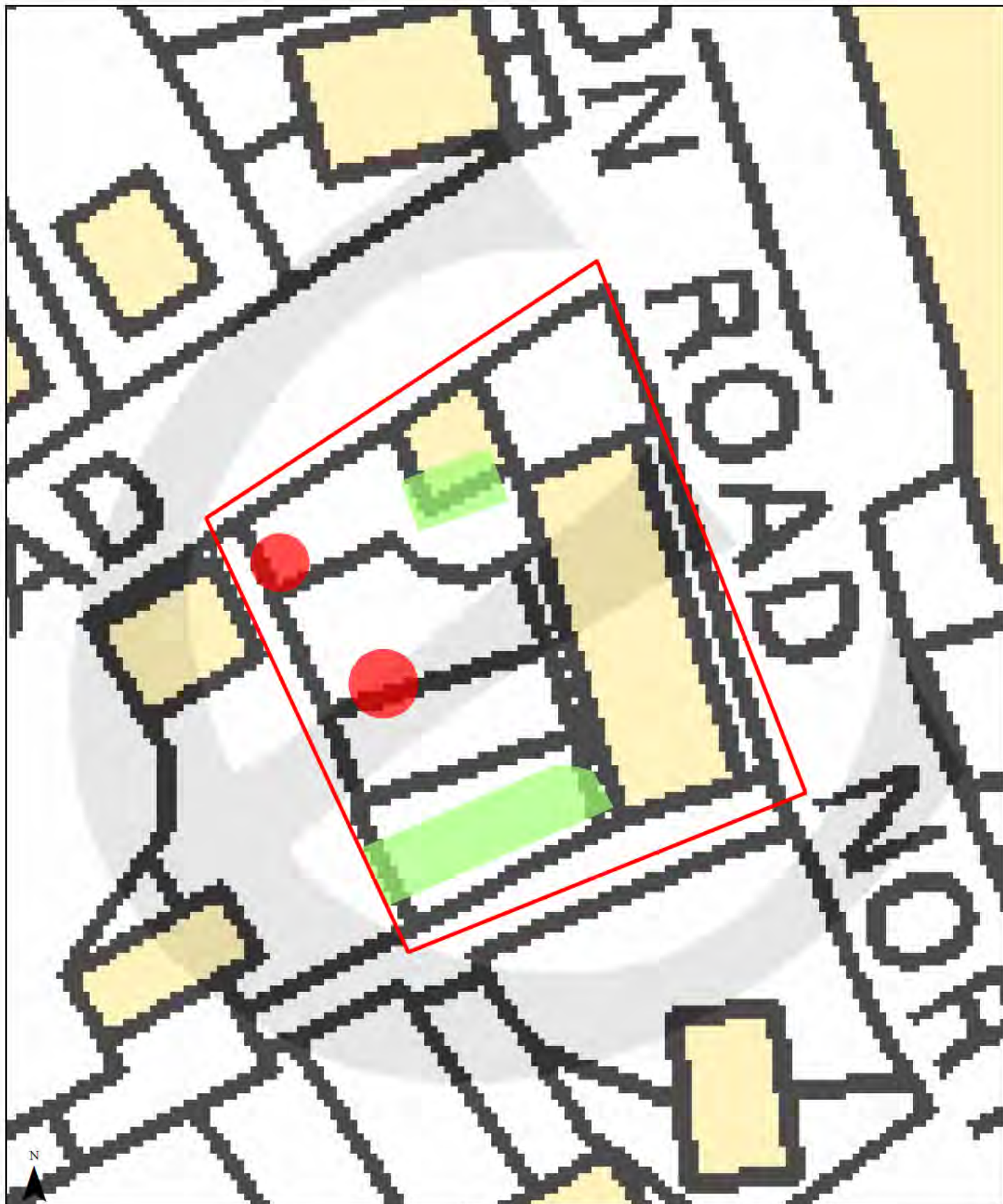


Date: 07.12.09

Revision: -

Drawn by: JH

Checked by: -



Legend

Site Boundary

Adjacent Sites

Potential Sources of Contamination

Gas Holder

Gas Works Building

Notes

The locations of potential sources of contamination have been digitised from OS historical mapping.

Appendix A

Site Location Plan & Sources 369 Roull Road Gas Works

Size: A4

Scale: 1:500

Project: 12151185 - Edinburgh Con Land



Date: 29.11.07
Revision: -
Drawn by: SB
Checked by: -



Appendix B Site Photographs

PLATE 1: East of the site comprising flats and retail properties

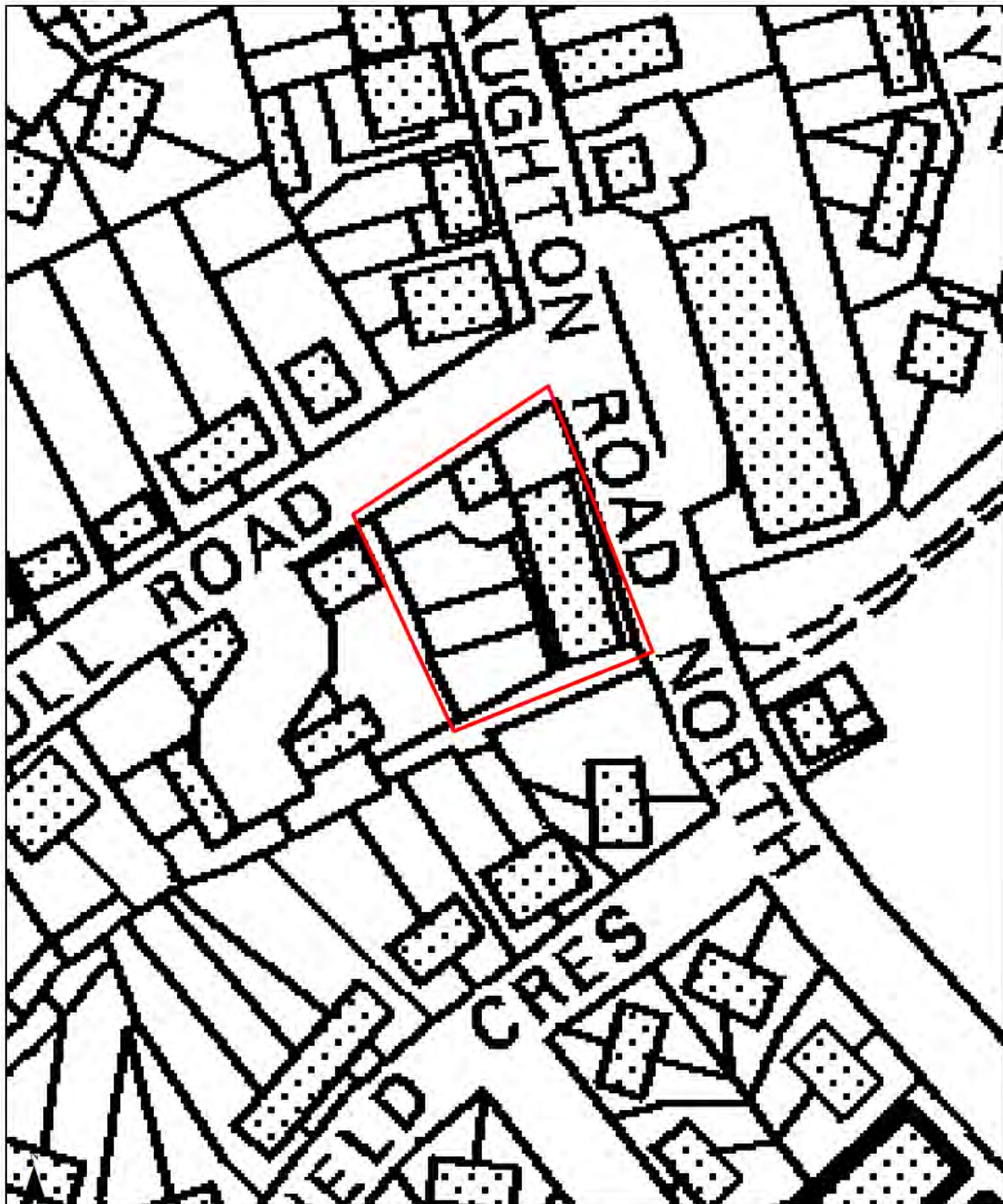


PLATE 2: West of the site





Appendix C Historical Map and Air Photograph Extracts



Legend

 Site Boundary

Notes

Site 369
Roull Road Gas Works

Historical Mapping from
Ordnance Survey
National Grid 1,10,000
1997

Appendix C

Historical Map and Air Photograph
Extracts

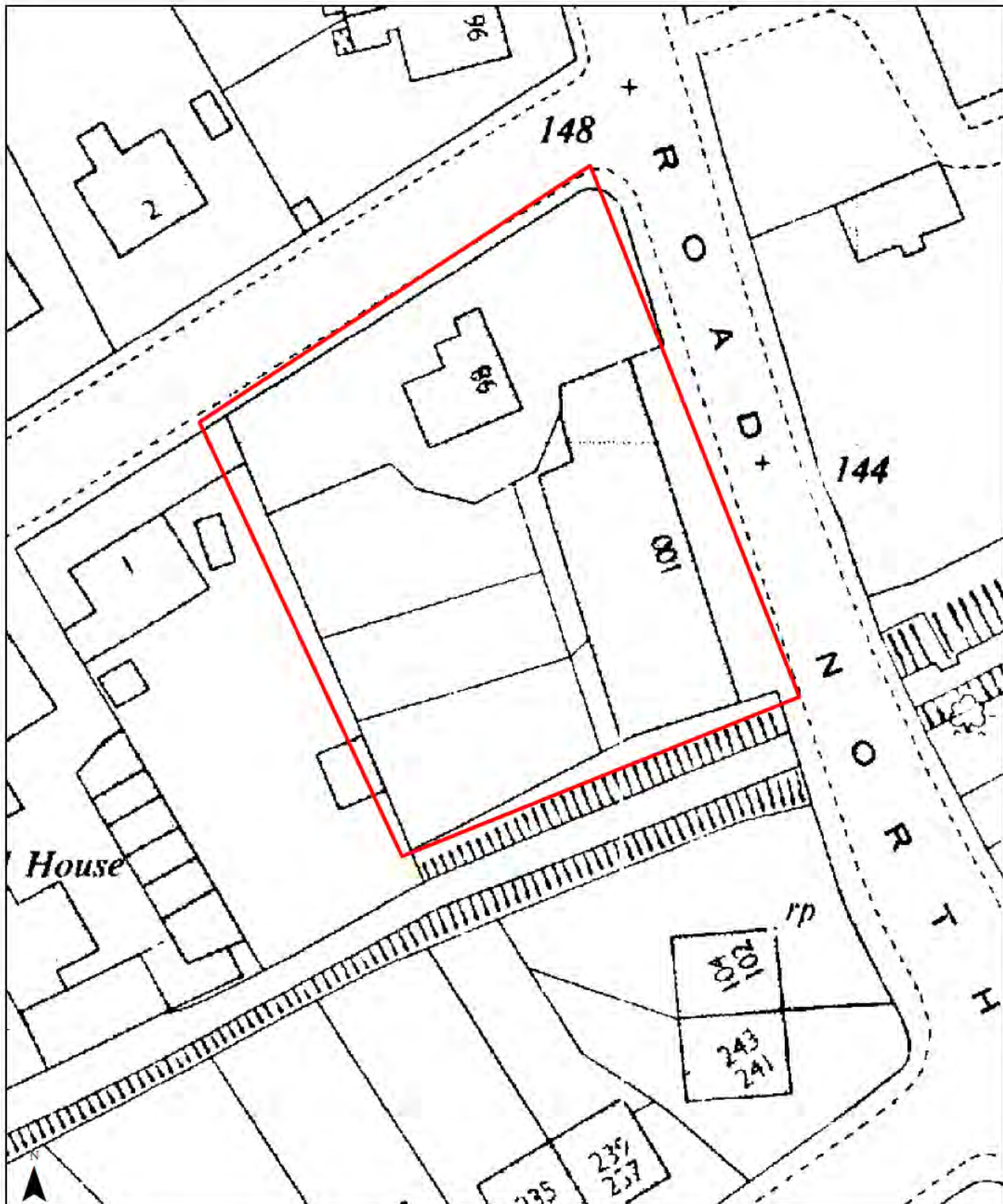
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Scale: 1:1,000

Project: 12151185 - Edinburgh Con Land



Date: 09.11.07
Revision: -
Drawn by: CB
Checked by: -



Legend

 Site Boundary

Notes

Site 369
Roull Road Gas Works

Historical Mapping from
Ordnance Survey
National Grid 1,10,000
1946 - 1991

Appendix C

Historical Map and Air Photograph
Extracts

Size: A4

Scale: 1:500

Project: 12151185 - Edinburgh Con Land

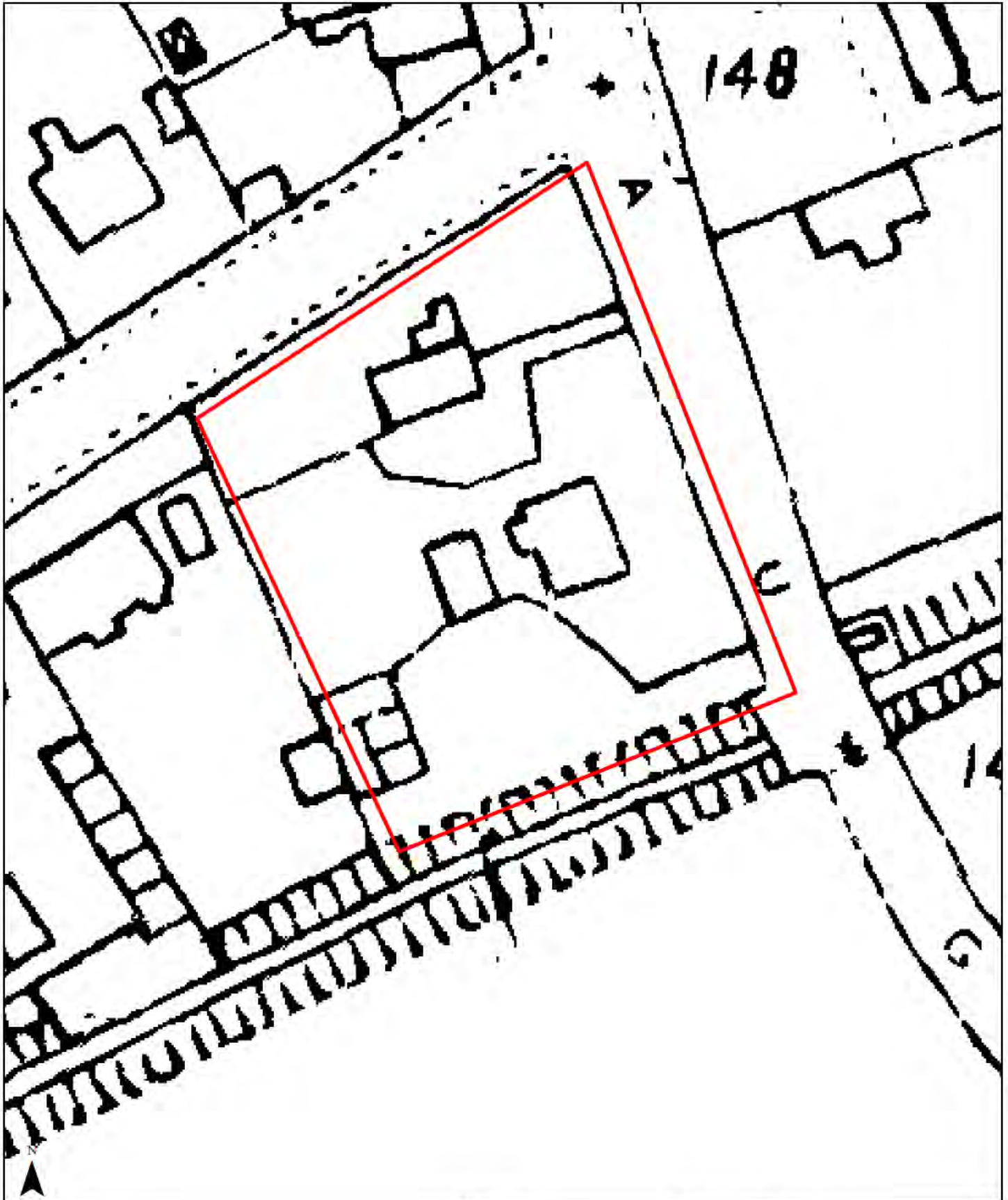


Date: 09.11.07

Revision: -

Drawn by: CB

Checked by: -



Legend

 Site Boundary

Notes

Site 369
Roull Road Gas Works

Historical Mapping from
Ordnance Survey
County Series 1,2,500
1931 - 1942

Appendix C

Historical Map and Air Photograph
Extracts

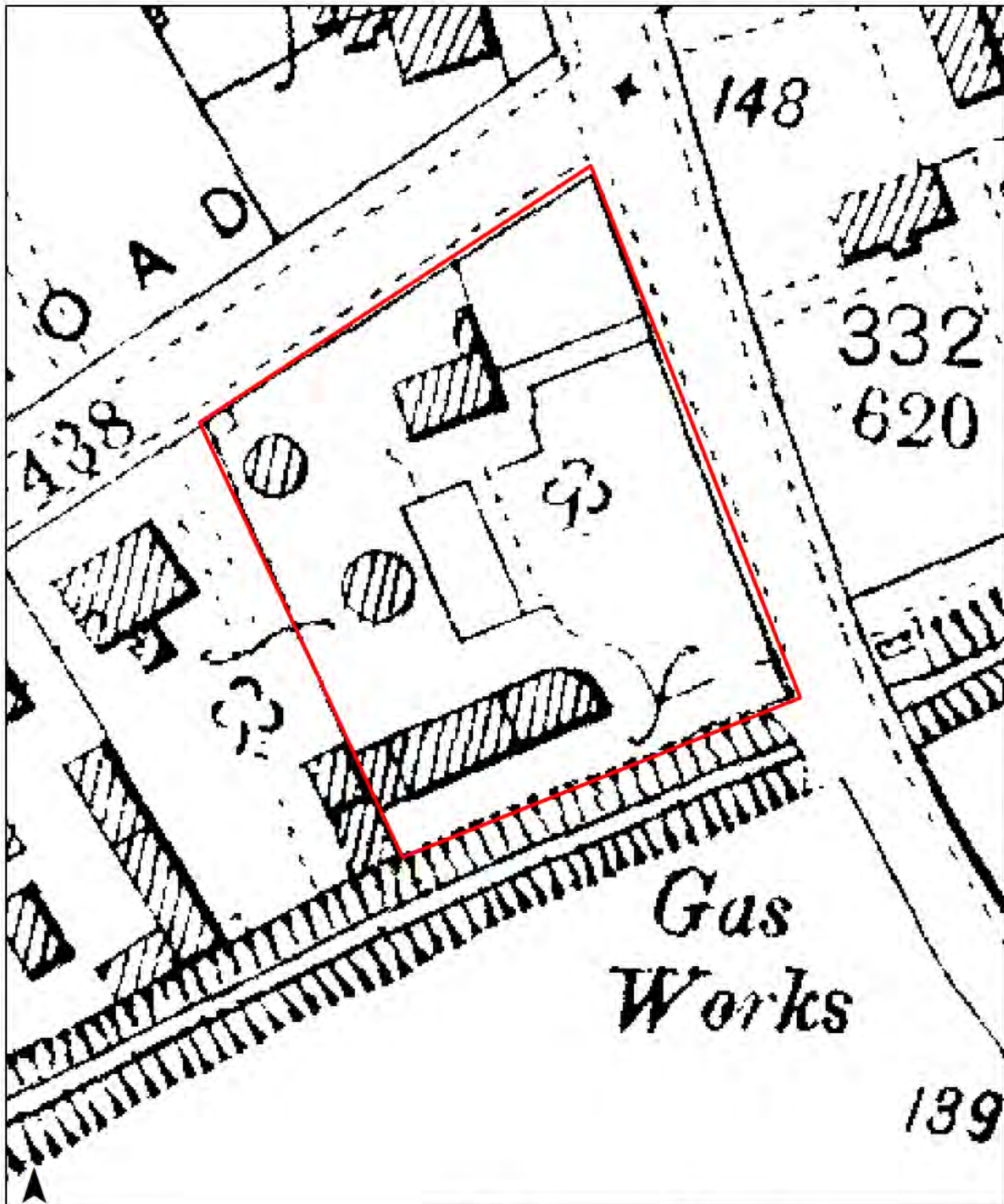
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Scale: 1:500

Project: 12151185 - Edinburgh Con Land



Date: 09.11.07
Revision: -
Drawn by: CB
Checked by: -



Legend

 Site Boundary

Notes

Site 369
Roull Road Gas Works

Historical Mapping from
Ordnance Survey
County Series 1,2,500
1894 - 1896

Appendix C

Historical Map and Air Photograph
Extracts

Size: A4

Scale: 1:500

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Date: 09.11.07

Revision: -

Drawn by: CB

Checked by: -



Legend

 Site Boundary

Notes

Site 369

Roull Road Gas Works

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Appendix C

Historical Map and Air Photograph Extracts

Size: A4

Scale: 1:500

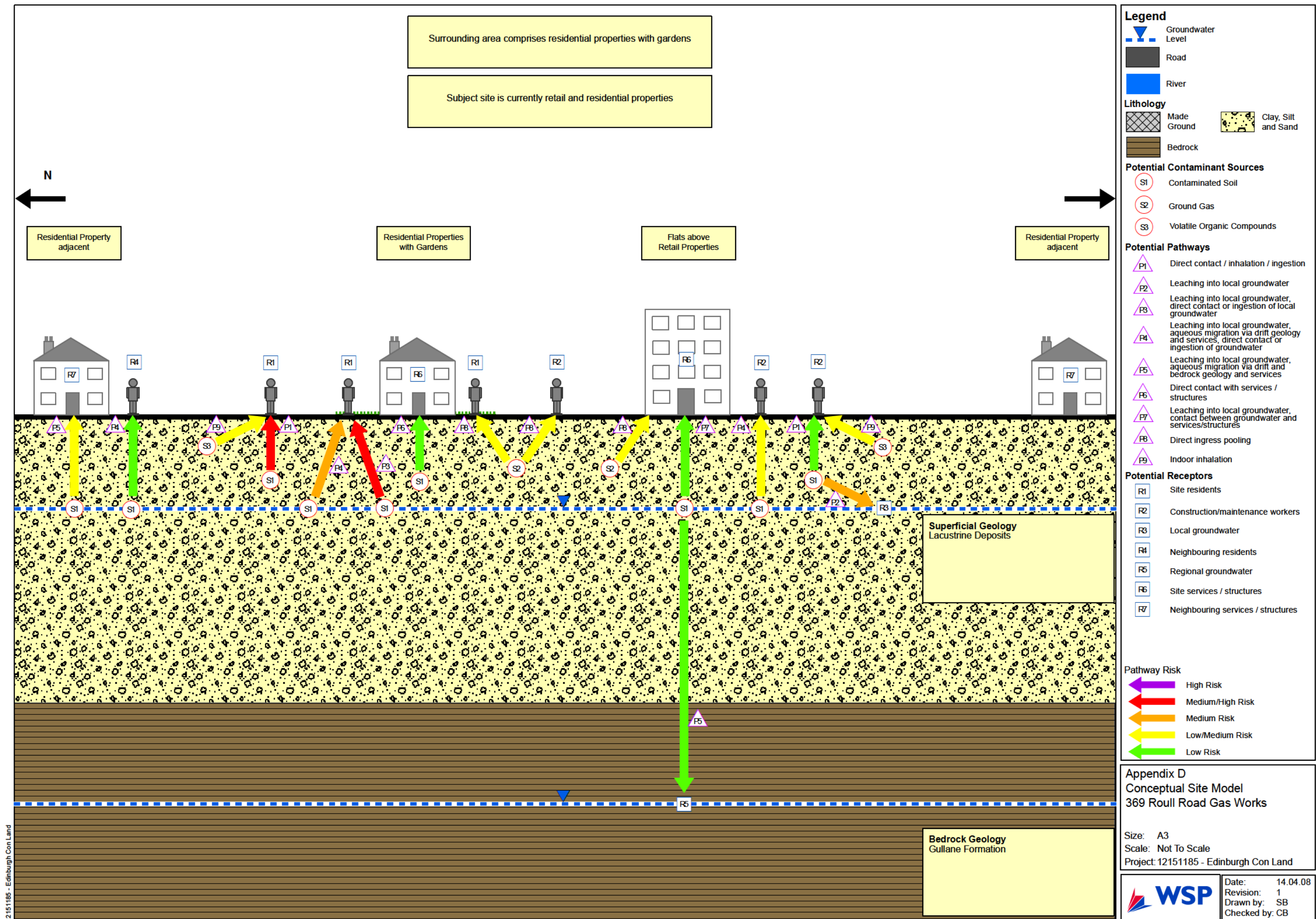
Project: 12151185 - Edinburgh Con Land



Date: 09.11.07
Revision: -
Drawn by: CB
Checked by: -



Appendix D Source-Pathway-Receptor Model



Appendix E Notes on Limitations

General

WSP Environmental Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from WSP Environmental Limited; a charge may be levied against such approval.

WSP Environmental Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) this document to any third party with whom an agreement has not been executed.

Phase I Environmental Audits

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP Environmental Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and groundwater.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

The risk assessment and opinions provided, inter alia, take in to consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

Geo-environmental Investigations

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions to provide a reasonable assessment of the environmental risks together with engineering and development implications.

If costs have been included in relation to site remediation these must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects.

The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.

The risk assessment and opinions provided, inter alia, take in to consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.