



# QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Draft	Final		
Date	April 2009	May 2010		
Prepared by				
Signature				
Checked by				
Signature				1
Authorised by		0	1	
Signature				
Project number	12151185	12151185		
File reference	12151185/594	12151185/594/ FINAL		

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# Site Executive Summary

Site Ref	594	
Site Name, Address and Telephone	Princes Street Station and Goods Yard Caledonian Hotel; Standard Life House; 1 Rutland Court; Conference Square; Clydesdale Bank Plaza; Sheraton Hotel and Capital House at Festival Square; Edinburgh International Conference Centre at The Exchange; north end of Edinburgh One at 60 Morrison Street.	
Site Owner	Various private owners	
Leaseholder	Various leaseholders	
Grid Reference	324652, 673345	
Area (Ha)	Approximately 6.3	

Priority Category	
3	

Risk Assessment

Low/Medium

Environmental Risk Assessment Summary There is a risk of residual on-site contamination associated with the historical railway land across the site. Site preparation/ remediation works are likely to have been undertaken prior to the development of the current structures, however no documentary evidence has been made available to confirm this. The site is almost entirely covered by building footprints and hardstanding, limiting human health risks from direct contact/ inhalation/ ingestion of contaminants. Furthermore, groundwater is unlikely to represent a sensitive receptor given that the area is underlain by low permeability till.

Status Under Part IIA, the Environmental Protection Act 1990 Unlikely to be designated as Contaminated Land under Part IIA of EPA 1990, based on information available.

Proposed Land Use Remediation Status

**Current Land Use** 

Hotels, offices, conference centre, car parking and associated infrastructure.

As current. No known change of use proposed.

Not known.

# Land Use

Site History	Pre 1896 the site comprised station buildings and rail siding with the gardens of residential properties present in the northwest. The site underwent minor changes up until pre 194 at which point motor engineering works were established with the southeast of the site and the goods station was renamed at the Lothian Road Goods Station. Tunnels also cross the centrof the site. The goods station was disused by pre 1973, with some track and building clearance. The site was then cleared (except for a hotel) by 1988 and redeveloped into commercial office space and car parks over the next decade.	
Surrounds	Potentially contaminative historical land uses in the close vicinity include: a tramway, a garage and electric light works (adjacent); a dairy (65m); warehouses (80m); and a garage (100m).	
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.	

# Site Sensitivity

Groundwater	Low/moderate vulnerability. Weakly permeable drift over moderately permeable bedrock.
Surface Water	<b>Low</b> vulnerability. No surface watercourses within 250m of the site boundary.
Other	Arthur's Seat Volcano (Site of Special Scientific Interest) is located 210m to the east of the site. This area is also designated as a Scheduled Ancient Monument (Edinburgh Castle).
	There are residential properties with gardens adjacent to the site and a hospital is located 70m to the east.

# Additional Information

Planning consent has been granted for an extension to the spa at the Caledonian Hotel and construction of a new building in the southwest (mostly off-site, to the east of the conference centre building). Both consents include conditions requiring ground investigation and where required, remediation of contamination and ground gas risks.

No information is available regarding Planning Consents issued for the original development of any of the buildings on-site and no previous reports have been identified.

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# 1 Land Use

# 1.1 CURRENT LAND USE

## 1.1.1 Site Details

Site Reference and Name 594

Princes Street Station and Goods Yard

Site Address 

Caledonian Hotel at Princes Street/ Lothian Road, EH1 2AB

Standard Life House at 30 Lothian Road, EH1 2DH

Clydesdale Bank Plaza at 50 Lothian Road

1 Rutland Court, EH3 8EY

1, 3 and 5 to 8 Conference Square, EH3 8AN/ EH3 8RB

Sheraton Hotel at 1 Festival Square, EH3 9SR

Capital House at 2 Festival Square, EH3 9SU

■ Edinburgh International Conference Centre at 150 The Exchange,

Morrison Street, EH3 8EE

North end of Edinburgh One at 60 Morrison Street, EH3 8BE

**Grid Reference** 324652, 673345

Site Area (Ha) Approximately 6.3

Details of Current Site Owner /

Leaseholder

Various private owners and leaseholders

Current Site Use Hotels, offices, conference centre, car parking and associated infrastructure.

**Proposed Use** As current. No known change of use proposed.

## 1.1.2 Site Inspection

A site visit was undertaken on 23<sup>rd</sup> January 2009.

The site is occupied by hotels, office buildings and a conference centre, with associated car parking, access and infrastructure.

The north end of the site is occupied by the Caledonian Hotel, a traditional sandstone building comprising six storeys. The central section of the building, to the south of the northern façade, is newer and of brick construction. South of this is a tarmac-surfaced car park serving the hotel, accessed through an archway. The southeast part of the hotel building is a spa. A public house, Henry J Bean's, is attached to the southwest of the main hotel.

The north-central site area is occupied by a large office building, No. 30 Lothian Road, used by Standard Life bank. The building is modern with a stone façade. Parking is provided partially underground (at ground level on the west side, due to sloping topography).

A glass-fronted office building occupied by Anderson Strathearn is located to the southwest of Standard Life, on the western site boundary.

To the south of Standard Life is West Approach Road. Historical railway tunnels are reported to be located beneath. South of this is Clydesdale Bank Plaza at No. 50 Lothian Road. This is a large office building with stone and glass façade. It curves around to the west/ southwest and is partly used for car parking.

In the central part of the southern site area is a complex occupied by a Sheraton hotel and associated spa, fitness centre and indoor car parking.

Edinburgh International Conference Centre is located in the southwest corner of the site. To the west of this, across the West Approach Road, is an active construction site which is partly on the subject site.

In the southeast corner of the site is the northern end of Capital House, another office building.

Almost the entire site area is occupied by building footprints or hardstanding cover (tarmac or decorative stone). Occasional shrubs are located within the hardstanding areas.

No obvious evidence of invasive species or vegetative stress was observed.

No obvious visual evidence of subsidence was observed.

No storage of fuels/ chemicals or other hazardous materials was observed. No significant storage of such materials would be expected, although there is a potential for the small-scale storage of diesel, associated with any back-up generators which may be present. It is not expected that any of the on-site buildings would be heated by heating oil.

No substations or transformers were identified on-site, however it is considered likely that there are substations within some or all buildings, possibly within basement areas or similar.

There are no surface watercourses on or adjacent to the site. It is considered likely that surface water run-off drains to the public surface water drainage system.

No significant atmospheric emissions were observed.

Surrounding land uses comprise: Rutland Street/ Princes Street junction to the north; a church beyond Lothian Road to the northeast; offices and commercial/ retail properties beyond Lothian Road to the east; offices and a cinema to the south; and offices, a large electricity substation complex and a terrace of residential properties with gardens to the west.

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 aerial photography provided in digital format by the City of Edinburgh Council. Copies of selected historical map and aerial photography extracts are contained in Appendix C.

Land Use On Site Dates

Site comprises two large station buildings to the north and east of the site. A series of rail-tracks/ sidings enter the site from the south and terminate in the north and northeast. Small buildings are located in the southwest, southeast, east and northeast of the site. In addition, St Cuthbert's Lane with residential gardens is present on the northwest boundary of the site (NB: These properties remain on site to present and are not considered further in the risk assessment, given that they are not part of the former railway land).

The northern building is named as 'Princess Street Station (Terminus)' and the eastern building as 'Goods Station'. Two cranes are present in the east. Additional rail-tracks are evident running parallel to existing tracks. A hotel is shown in the north/northeast site area, extending along the west side of Lothian Road.

Pre 1896 – Pre 1908

Pre 1908 - Pre 1914

Land Use On Site	Dates
As previous – additional rail-tracks also shown.	Pre 1914 – Pre 1931
As previous with the hotel in the northeast named as the 'Caledonian Hotel'. Unnamed industrial buildings are now present in the southeast of the site.	Pre 1931 – Pre 1948
Goods Station renamed as 'Lothian Road Goods Station'. Tunnels cross the centre of the site from west to east. Industrial buildings to the southeast are now named as 'Motor Engineering Works'. Extension to small building adjacent to crane in the east of the site.	Pre 1948 – Pre 1956
As previous – no major site changes. Industrial building to southeast is no longer named.	Pre 1956 – Pre 1973
Goods Station noted as disused and building reduced in size. Some rail-tracks/ small buildings appear cleared (map clarity poor).	Pre 1973 – Pre 1988
Site mainly cleared/ redeveloped except for hotel in the north. Princess Street Terminal building and rail-tracks cleared and replaced with two car parks in the north. A road network enters the site from the west. The industrial building in the south is now cleared and new office/ commercial buildings are located in the southeast.	Pre 1988 – Pre 1997
Hotel in the north extended and additional buildings constructed in the southwest corner of the site.	Pre 1997 – Pre 2005
Building in southwest named as Conference Centre with adjacent car park. New hotel (Sheraton) is located in the south with small tank to the east. Further large scale office/commercial buildings surround the hotel to the north and west. An additional office building is also located in the north.	Pre 2005 – Present

Surrounding Land Use	Dates	Distance	Orientation
Tramway	Pre 1908 – Pre 1951	Adjacent	East
Then cleared - roadway	Pre 1951 – Present		
Electric Light Works	Pre 1908 – Pre 1931	Adjacent	Southwest
Then unnamed industrial/ commercial unit	Pre 1931 – Present		
Garage	Pre 1959 – Pre 1968	Adjacent	West
Then unnamed industrial/ commercial building	Pre 1968 – Present		
Dairy	Pre 1931 – Pre 1950	65m	South
Then additional tank	Pre 1950 – Pre 1973		
Then unnamed industrial/commercial units	Pre 1973 – Pre 1997		
Then cleared	Pre 1997 – Pre 2005		
Then residential and office units	Pre 2005 – Present		

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Surrounding Land Use	Dates	Distance	Orientation
Unnamed industrial units	Pre 1896 – Pre 1950	80m	West
Then warehouse with unnamed buildings	Pre 1950 - Pre 1987		
Then unnamed industrial/commercial unit	Pre 1987 – Present		
Garage	Pre 1914 – Pre 1931	100m	Southeast
Then unnamed industrial/commercial unit	Pre 1931 – Pre 1987		
Then training centre	Pre 1987 – Present		
Motor Engineering Works	Pre 1950 – Pre 1968	140m	Southeast
Then additional unnamed industrial	Pre 1968 – Pre 1988		
building	Pre 1988 – Pre 1997		
Then northern building now car park, southern building unnamed	Pre 1997 – Present		
Then cleared			
Coal Yard	Pre 1896 – Pre 1931	150m	South
Then bakery	Pre 1931 – Pre 1950		
Then additional tanks	Pre 1950 – Pre 1973		
Then unnamed units	Pre 1973 – Pre 1997		
Then cleared	Pre 1997 – Pre 2005		
Then residential and office space	Pre 2005 – Present		
Morrison Street Mineral Depot (inc. rail-tracks)	Pre 1896 – Pre 1973	180m	Southwest
Then cleared	Pre 1973 – Pre 1988		
Then car park	Pre 1988 – Pre 1997		
Then residential	Pre 1997 – Present		
Rosemount Engineering Works	Pre 1896 – Pre 1987	190m	Southwest
Then garage	Pre 1987 – Pre 1997		
Then unnamed industrial/ commercial unit	Pre 1997 – Present		
Works	Pre 1950 – Pre 1973	220m	Southeast
Then unnamed industrial/ commercial unit	Pre 1973 – Pre 1997		
Then cleared – grassland	Pre 1997 – Present		

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Surrounding Land Use	Dates	Distance	Orientation
Meat Market	Pre 1914 – Pre 1956	230m	Southeast
Then cleared with new industrial/commercial unit	Pre 1956 – Pre 1997		
Then reduced in size to small commercial/industrial unit	Pre 1997 – Present		
Warehouse	Pre 1950 – Pre 1963	230m	South
Then unnamed industrial/ commercial unit	Pre 1963 – Present		

## 1.2.1 Other Information

Landfill Sites in the Vicinity

There are no known operational landfills at or adjacent to the site.

Underground Storage Tanks (USTs) on Site

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

Railway land Toxic Metals/Semi-metals. Phytotoxic Metals/Semi-metals. Sulphate. Asbestos. Acids/Alkalis. Phenols/Chlorophenols. Oil/Fuel Hydrocarbons. Polyaromatic

Hydrocarbons (PAHs). Chlorinated Aliphatic Hydrocarbons. Polychlorinated Biphenyls

(PCBs.) Ground Gas, e.g. CH<sub>4</sub> and CO<sub>2</sub>.

Potential for Elevated Ground Gas

Given the former use of the site as railway land, there is considered to be a potential for ground gas generation, largely CO<sub>2</sub>. However, given the large-scale development on-site including basement car park areas and relatively high buildings (likely requiring deep foundations), much of the residual made ground from the former railway land may have been removed.

Potential for Volatile Organic Compound (VOC) Vapours

Given the former use of the site as railway land, there is considered to be a potential for the generation of volatile vapours, although as noted above, much of the residual made ground may have been removed.

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 *has not* taken place within the vicinity of the site.

Planning / Building Control Information

Information from the on-line Planning and Building Control Portal and a review of relevant Planning files in CEC's offices provides the following information relating to the subject site and immediate surrounding area:

- Planning Consent ref. 05/04241/FUL was granted in 2005 for the construction of a new building to the east of the Edinburgh International Conference Centre building (current car park area), to provide additional function space. A condition attached to the consent required investigation and where required, remediation of contamination and ground gas risks. The consent does not appear to have been taken up to date and no further information relating to site investigation work is available. It is therefore assumed that no such works have yet been carried out. The location of the proposed building is mostly off the subject site, to the south.
- Planning Consent ref. 07/02421/FUL was granted in 2007 for the demolition of the Scottish Power sub station building on the west side of West Approach Road (site partly within the southwest area of the subject site) and construction of a new sub station facility behind the retained traditional façade. No conditions relating to land contamination were attached to the consent. It is considered likely that the construction works observed to be ongoing at the far southwest edge of the site relate to this consent.
- Planning Consent ref. 07/05182/FUL was granted in March 2008 for an extension to the Caledonian Hotel, involving infilling of the internal courtyard. No conditions relating to land contamination were attached to this consent. There is no evidence to suggest that this consent has been taken up to date.
- Planning Consent ref. 08/00260/FUL was granted in December 2008 for an extension to and alteration of the spa at the Caledonian Hotel. A condition attached to the consent required investigation and where required, remediation of contamination and ground gas risks.

No information is available relating to the original development of any of the buildings on-site, although the file for the latter of the above consents refers to the restoration of the Caledonian Hotel in 1998.

SEPA Information

The SEPA dataset held by CEC indicates that there are no recorded authorised processes within the subject site or within 250m of the site boundary.

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 any records of USTs for other fuel types.

Information from Other Consultees

No further information available.

**Existing Reports** 

No previous reports have been identified.

Other

No further relevant information has been made available.

## 2 **Environmental Setting**

#### 2.1 **GEOLOGY**

Geological Maps

Consulted

Geological Map Sheet no. 32E, Edinburgh, 1:50,000, Solid (2006) and Drift (Date)

**Geological Setting** 

Published geological maps indicate that the site is underlain by Glacial Till with Made Ground covering the southwest and central areas of the site. Bedrock comprises Gullane Formation rocks of the Lower Oil-Shale Group, with a

sandstone band across the central, southern and eastern parts of the site.

Hydrogeology Summary

The BGS 1:625,000 scale Groundwater Vulnerability Map of Scotland (2001) indicates that the strata beneath the site are classified as moderately permeable.

The BGS 1:625,000 Hydrogeological Map of Scotland (1988) indicates that the site is underlain by highly productive but not extensive aquifers in which flow is

dominately in fissures and other discontinuities.

**Groundwater Vulnerability** 

The overall groundwater vulnerability is assessed as low/moderate.

#### 2.2 **SURFACE WATER**

There are no surface watercourses within 250m of the site boundary.

Surface Water Vulnerability

Surface water vulnerability is assessed as low.

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** Arthur's Seat Volcano (Site of Special Scientific Interest) is located 210m to the

east of the site.

Archaeological Sites Edinburgh Castle (Scheduled Ancient Monument) is located 200m east of the site.

Surrounding Land Use There are residential properties with gardens adjacent to the site and a hospital is

located 70m to the east.

# 3 Environmental Risk Ranking Model

# Source Pathway Receptor Analysis

Land Use Source 1: Railway land across entire site				
Source	Pathway	Receptor	Risk	Comment
Contaminated soils - inorganics	- Direct contact/ inhalation/ ingestion	Site workers/users	Low	Low potential for frequent/ prolonged contact of soils by site workers/ users, given hardstanding cover and building footprints across essentially the entire site.
		Construction/ maintenance workers	Low	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	Low-Medium	Potential for leaching of contaminants, where present, into perched groundwater in made ground.
	Leaching into local groundwater, direct contact or ingestion of groundwater	Site workers/ users	Low	Low potential for frequent/ prolonged contact of groundwter by site workers/ users, given hardstanding cover and building footprints across essentially the entire site.
		Construction/ maintenance workers	Low	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, services, direct contact or ingestion of groundwater	Neighbouring residents/ workers	Low-Medium	Neighbouring properties mainly comprise commercial properties and hardstanding. A terrace of residential properties, with gardens, is located to the northwest of the site. There is potential for residual contamination onsite to migrate to these gardens, although groundwater migration is likely to be limited.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology, services	Regional groundwater	Low-Medium	The bedrock aquifer is protected by low-permeability till, however foundations may be piled, representing a migration pathway for near-surface contamination, if present.

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Source	Pathway	Receptor	Risk	Comment
Contaminated Soils - Organics	·	Site workers/ users	Low	Low potential for frequent/ prolonged contact of soils by site workers/ users, given hardstanding cover and building footprints across essentially the entire site.
		Construction/ maintenance workers	Low	Landscaping workers ma come into contact wit localised contamination however this can be mitigated by use cappropriate PPE.
	Leaching into local groundwater	Local groundwater	Low-Medium	Potential for leaching of contaminants, wher present, into perche groundwater in mad ground.
	Direct contact (with services/structures)	Site structures/ services	Low-Medium	There is potential for residual contamination where present, to impact water supply pipes.
	Leaching into local groundwater, direct contact or ingestion of groundwater	Site workers/ users	Low	Low potential for frequen prolonged contact of groundwater by sit workers/ users, give hardstanding cover an building footprints across essentially the entire site.
		Construction/ maintenance workers	Low	Workers may come int contact with localise contamination, howeve this can be mitigated buse of appropriate PPE.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology, services, direct contact or ingestion of groundwater	Neighbouring residents/ workers	Low-Medium	Neighbouring properties mainly comprise commercial properties and hardstanding. A terrace of residential properties, with gardens, is located to the northwest of the site. There is potential for residual contamination on site to migrate to the gardens, although groundwater migration likely to be limited.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology, services	Regional groundwater	Low-Medium	The bedrock aquifer protected by low permeability till, however foundations may be piled representing a migration pathway for near-surfaction contamination, if present.
	Leaching into local groundwater; direct contact by structures/ services with groundwater	Site structures/ services	Low-Medium	There is potential for residual contamination where present, to impair water supply pipes.

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Source	Pathway	Receptor	Risk	Comment
	Leaching into local groundwater; aqueous migration via drift geology, bedrock geology, services	Neighbouring structures/ services	Low	Limited potential for groundwater migration, given the till underlying the site (perched water in made ground unlikely to be significantly mobile).
Contaminated Soils - Sulphates/acids	Leaching into local groundwater	Local groundwater	Low-Medium	Potential for leaching of contaminants, where present, into perched groundwater in made ground.
	Direct contact (with services/structures)	Site structures/ services	Low	There is potential for elevated sulphate concentrations and high pH in made ground on-site, however given the relatively recent site redevelopments, it is likely that the specification of the foundation concrete would have taken such considerations into account.
	Leaching into local groundwater, aqueous migration via drift geology, bedrock geology, services	Regional groundwater	Low-Medium	The bedrock aquifer is protected by low-permeability till, however foundations may be piled, representing a migration pathway for near-surface contamination, if present.
	Leaching into local groundwater; direct contact by structures/ services with groundwater	Site structures/ services	Low	There is potential for elevated sulphate concentrations and high pH in made ground on-site, however given the relatively recent site redevelopments, it is likely that the specification of the foundation concrete would have taken such considerations into account.
	Leaching into local groundwater; aqueous migration via drift geology, bedrock geology, services	Neighbouring structures/ services	Low	Limited potential for groundwater migration, given the till underlying the site (perched water in made ground unlikely to be significantly mobile).
Ground gas – Methane and carbon dioxide	Direct ingress/ pooling	Site workers/ users	Low-Medium	Limited potential for significant methane generation based on historical land uses, however there is some potential for elevated carbon dioxide, which could ingress into site properties, particularly given the presence of basement areas.

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Source	Pathway	Receptor	Risk	Comment
		Site services/ structures	Low	Limited potential for significant methane generation based on historical land uses.
		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/ workers/ site users	Low	Limited potential for significant flow rates based on potential gas source (made ground), therefore off-site migration potential is considered low.
Volatile Organic Compounds	Indoor inhalation	Site workers/users	Low-Medium	Potential for volatiles associated with historical land uses to migrate into site structures.
		Construction/ maintenance workers	Low-Medium	Potential risk for any workers entering confined spaces, e.g. drainage pipes/ chambers.

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

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# 4 Conclusions and Recommendations

# 4.1 CONCLUSIONS

**Environmental Risk Assessment Summary** 

The following summarises the potential environmental risks identified, to each receptor:

Human Health - Low/Medium

Property (Crops, plants, domestic pets) – Low

Property (Buildings) - Low/Medium

Groundwater - Low/Medium

Surface Water - Low

Ecology - Low

Other - Low

Status Under Part IIA, the Environmental Protection Act 1990

Unlikely to be designated as Contaminated Land under Part IIA of EPA 1990, based on information available.

Overall Environmental Risk Assessment

**Overall Priority Category** 

3

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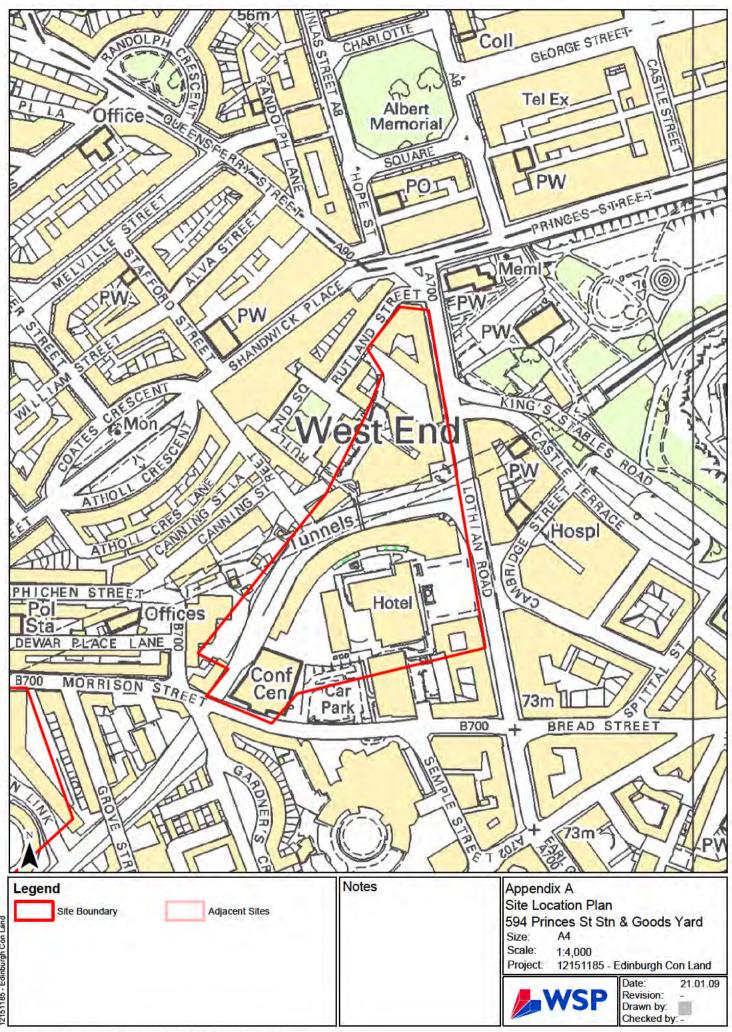
Low-Medium

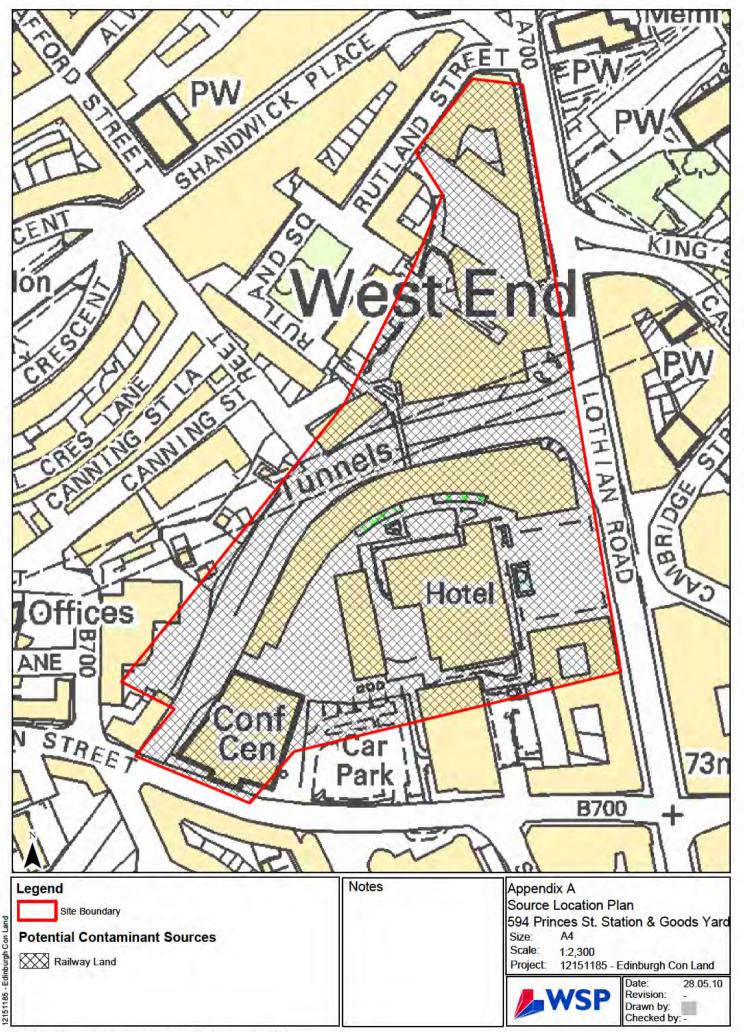
# 4.2 RECOMMENDATIONS

Recommendation	Indicative Cost (£)	Timescale			
Further Investigations					
No further investigations are recommended for the continued use of the site.	N/A	N/A			
For the proposed extensions which have been granted Planning Consent, conditions require investigation/ remediation of contamination which is the responsibility of the developer.					
Remediation					
No remedial works currently recommended for the continued use of the site.	N/A	N/A			
For the proposed extensions which have been granted Planning Consent, conditions require investigation/ remediation of contamination which is the responsibility of the developer.					
Monitoring	ı	1			
No monitoring currently recommended.	N/A	N/A			

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# Appendix A Site Location Plan and Source Location Plan



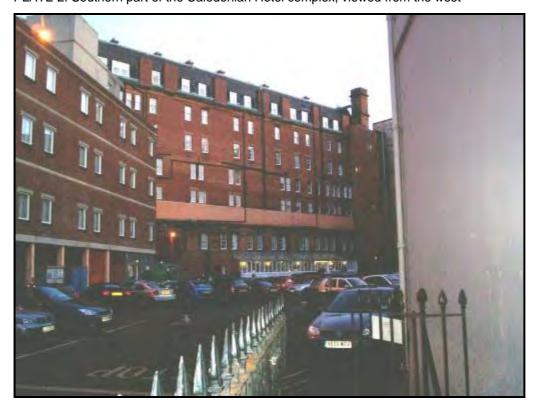


# Appendix B Site Photographs



PLATE 1: Caledonian Hotel at the north end of the site, viewed from the north

PLATE 2: Southern part of the Caledonian Hotel complex, viewed from the west



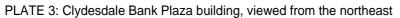
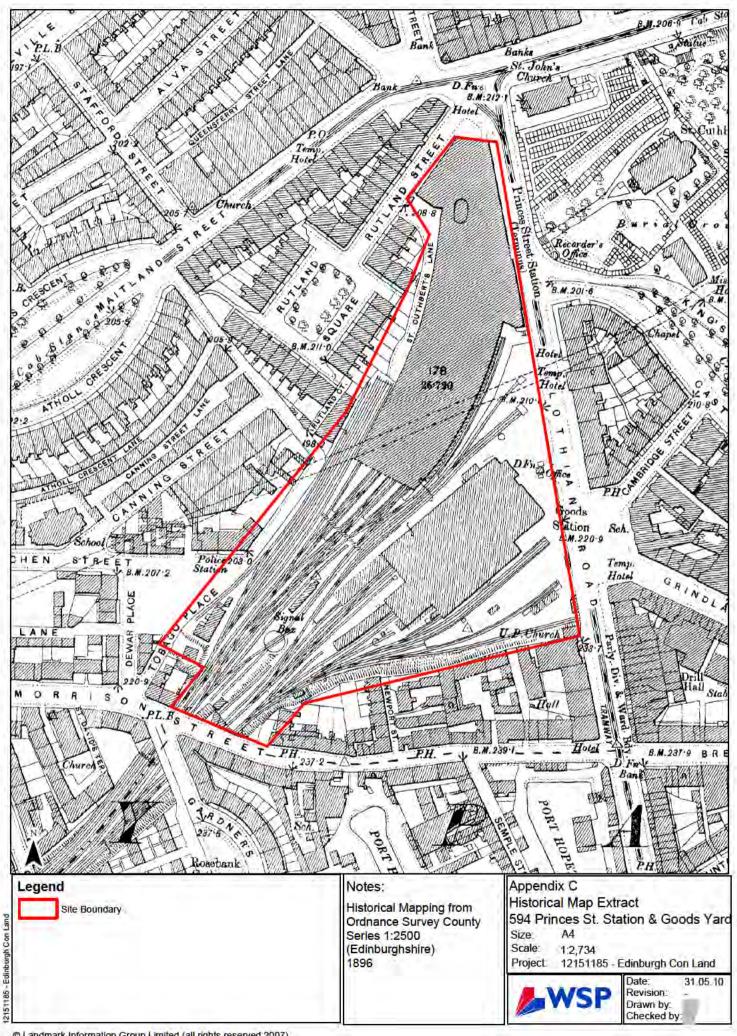


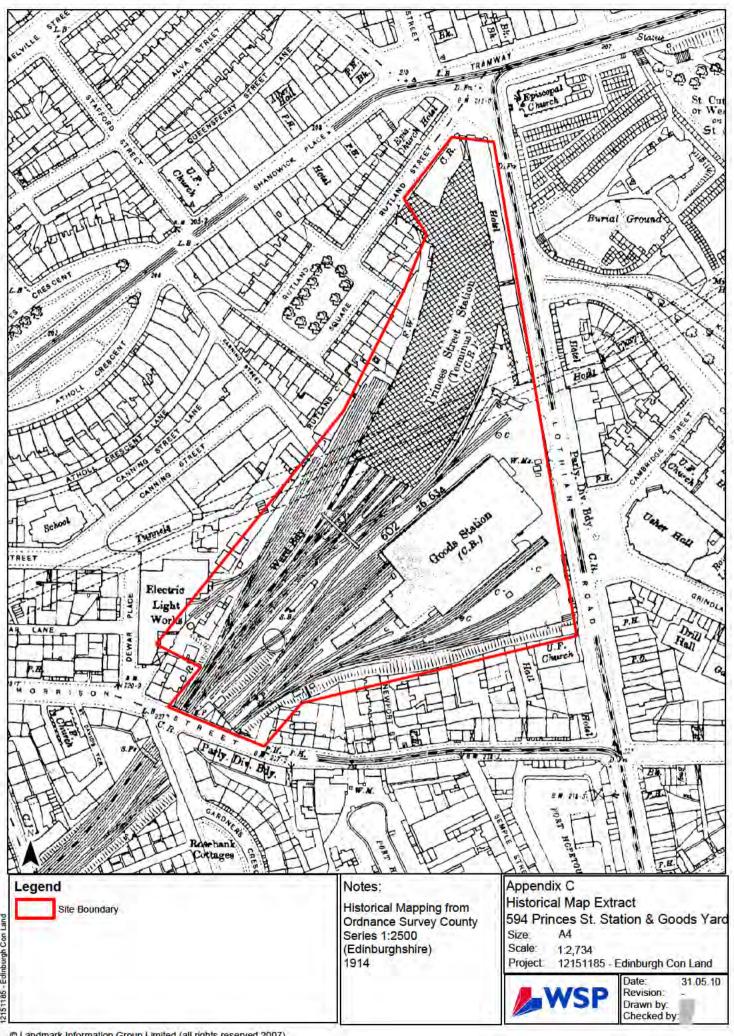


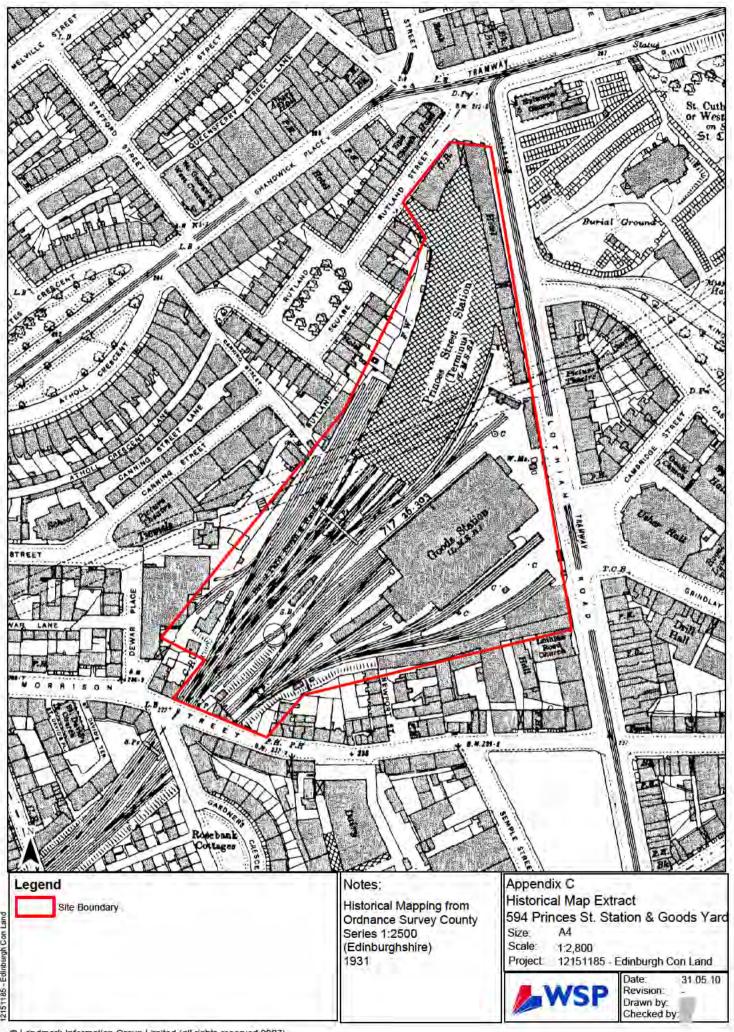
PLATE 4: Standard Life building viewed from the southeast

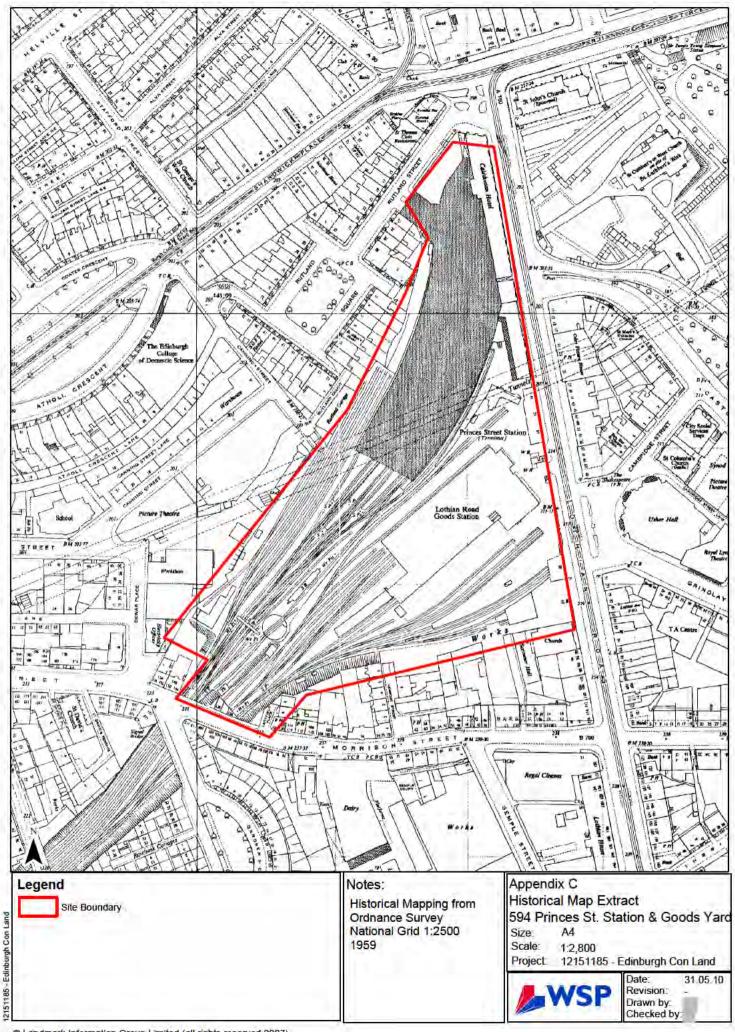


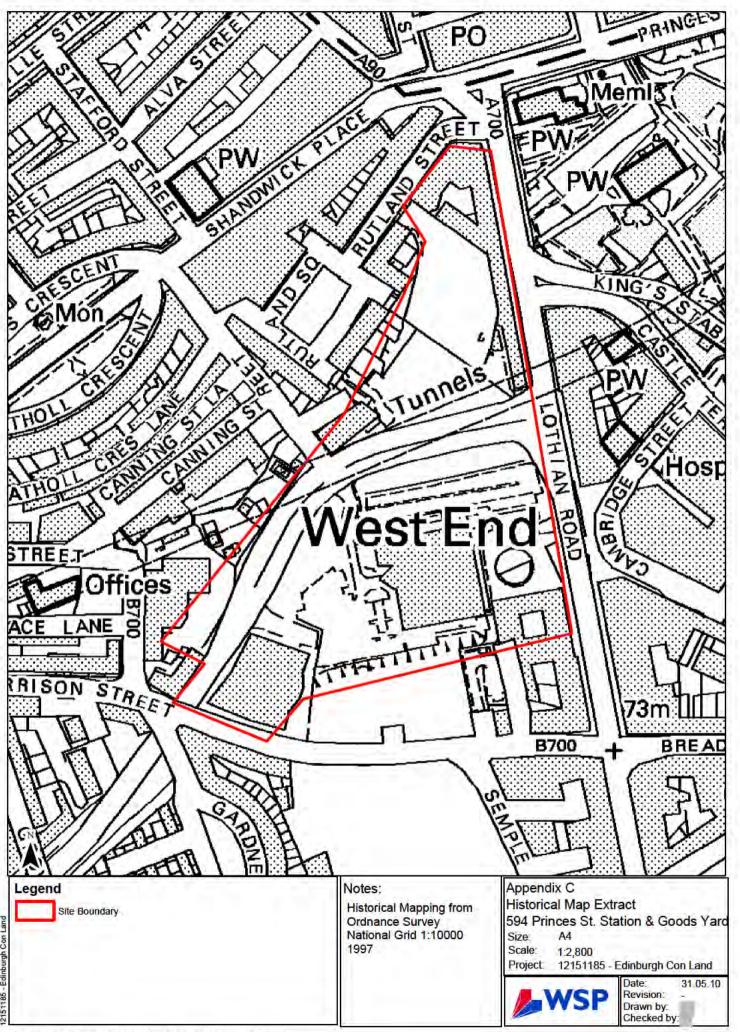
# Appendix C Historical Map and Air Photograph Extracts



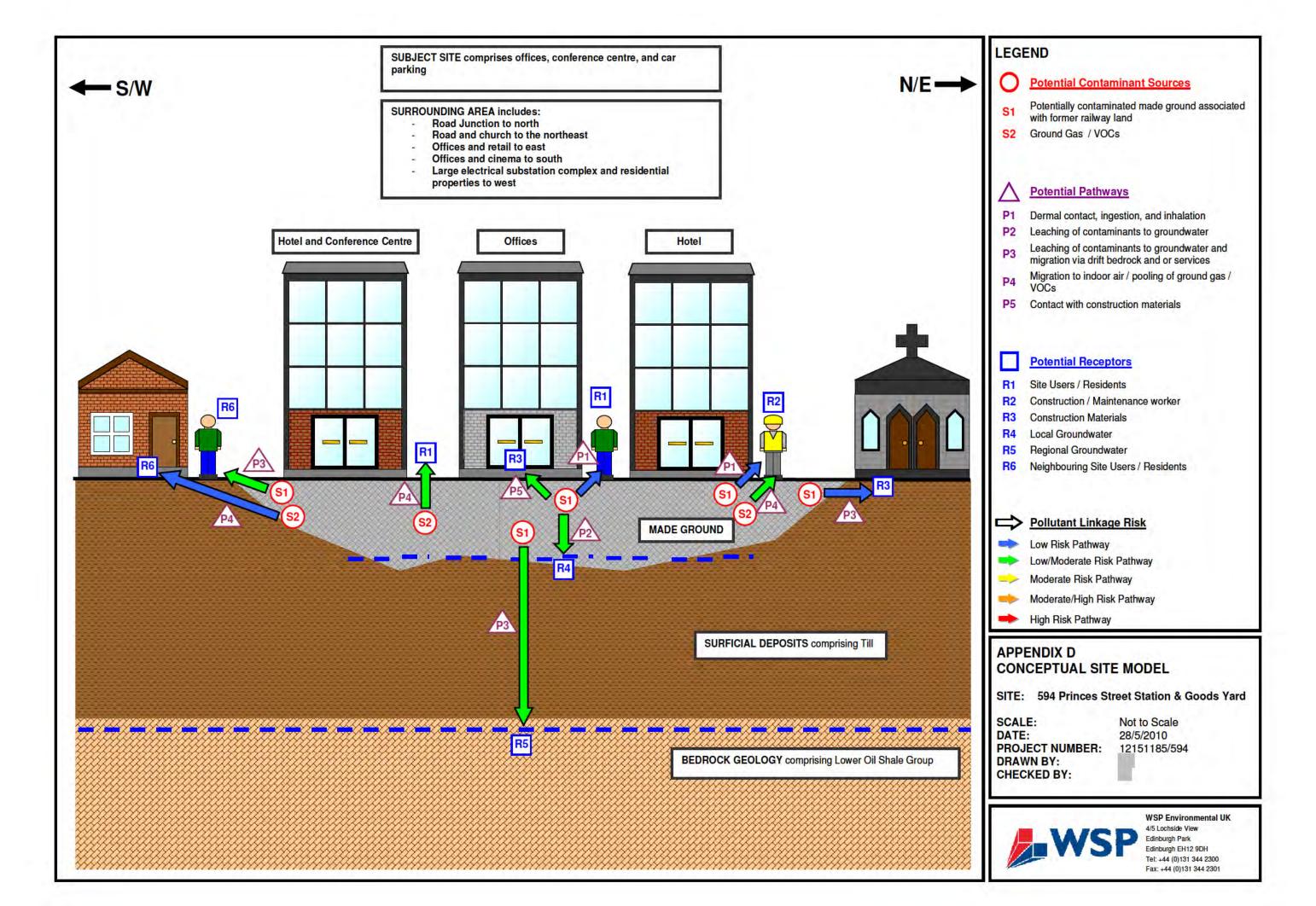








# Appendix D Source-Pathway-Receptor Model



# 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.