



**3 VIVEASH CLOSE
HAYES, MIDDLESEX UB3 4RY**

**PHASE 1 PRELIMINARY RISK ASSESSMENT
FOR
*GENERAL FOOD TRADING CO LTD***



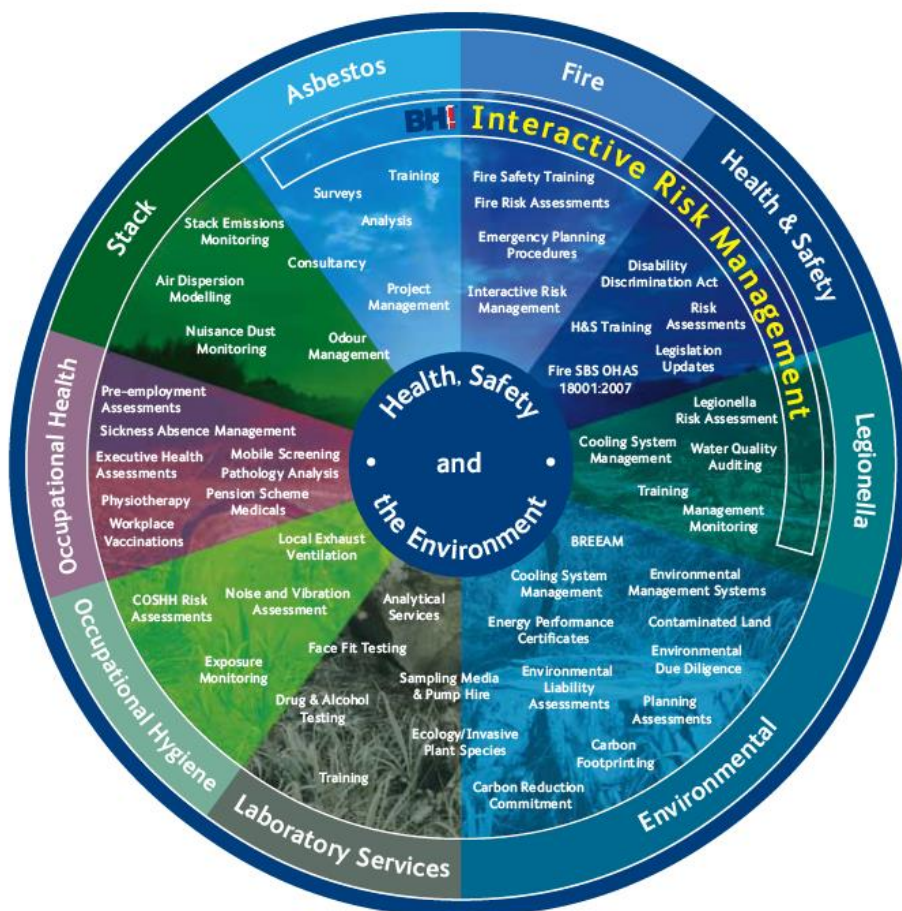
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EXECUTIVE SUMMARY

RPS Health, Safety & Environment (RPS) was commissioned by General Food Trading Co Ltd to undertake a Phase 1 Preliminary Risk Assessment for 3 Viveash Close, Hayes, Middlesex UB3 4RY. The report has been commissioned prior to the proposed redevelopment of the site to comprise a mixed use, residential led scheme.

Site History

Former potentially contaminative land uses identified at the site include both small and large commercial/industrial type buildings present on site from c.1932. Two smaller buildings were present in the north of the site. One was indicated to be present from c.1946 and the other from c.1973. Given that the northern area of the site was heavily overgrown at the time of the site walkover, it is not known if these two buildings are still present on the site.

Former potentially contaminative land uses identified in the surrounding area include a former Nestlé factory (previously labelled as a confectionery works (from 1972 to c.1974); including tanks, located adjacent to the north of the site. Current mapping indicates that these tanks are still present on the site.

Other formerly potentially contaminative land uses include railway lines, located 5m to 10m to the north of the site from 1864 to c.1972; with an associated carriage shed (located approximately 65m to the north of the site from 1895 to c.1932), a goods shed (located approximately 75m to the northwest of the site from 1914 to c.1999) and railway sidings (located approximately 75m to the northeast of the site from 1895 to c.1999).

On Site and Surrounding Land Use

At the time of the walkover the site was occupied by a food and drinks storage and distribution warehouse. No significant potential sources of contamination were observed on site during the walkover.

There is the potential for Made Ground to be present beneath the site as a result of past construction and demolition activities.

Current potentially contaminative land uses in the surrounding area comprise a powder coating warehouse, an electricity sub-station, railway lines and Squirrels Trading Estate

Environmental Setting

The site is located within a light industrial/commercial area.

The site is indicated to be underlain by a Principal Aquifer relating to the Lynch Hill Gravel Member. This is indicated to be underlain by the London Clay Formation (an Unproductive Stratum). Made Ground is considered likely to be present beneath the site as a result of past construction and demolition activities.

The site is not located in a groundwater Source Protection Zone (SPZ). The nearest likely active groundwater abstraction is located approximately 575m to the west of the site. The nearest surface water is the Grand Union Canal, located approximately 125m to the north of the site.

Outline Conceptual Site Model

An outline conceptual site model (CSM) has been derived on the basis of the desktop study and site reconnaissance. Current and historical potentially contaminative land uses have been identified both on site and in the surrounding area. Based on current redevelopment plans, the proposed surface cover at the site will comprise building cover, hardstanding and soft landscaping areas. In areas of the site covered by buildings or hardstanding the risks to future on site human health receptors via the pathways of dermal contact and ingestion will be mitigated. However, in areas of soft landscaping pathways of dermal contact and ingestion could still be active. Furthermore, there would be the potential for the airborne off-site migration of soil/dust from these areas.

There is the potential for ground gas and volatile contaminants of concern in soil and/or groundwater (if present) beneath the site to impact future site users via the inhalation pathway in indoor areas.

There is the potential for any groundwater within any Made Ground or the Lynch Hill Gravel Member to migrate vertically or laterally beneath the site, which may constitute a potential pathway for the on or off-site lateral migration (via groundwater) of any contaminants of concern (where present).

Recommendations

The outline CSM produced upon completion of the desk study assessment has identified a number of potential pollutant linkages that may become active upon the redevelopment of the site. It is therefore recommended that the potential for these linkages to be active is assessed through a Phase 2 Environmental Site Investigation of the site.

RPS considers that this is likely to be required under condition of planning for the proposed redevelopment of the site. It would be prudent to combine any site investigation undertaken for environmental purposes with geotechnical testing, in order to facilitate preliminary foundation and pavement design.

Other Issues

Given the likely age of the buildings on site, there is potential for asbestos containing materials (ACMs) to be present within the building fabric. Given the proposed redevelopment of the site, a formal Demolition / Refurbishment Asbestos Survey should also be conducted prior to any demolition work commencing.

1 INTRODUCTION

1.1 Preamble

RPS Health, Safety & Environment (RPS) was commissioned by *General Food Trading Co Ltd* to undertake a Phase 1 Preliminary Risk Assessment for 3 Viveash Close, Hayes, Middlesex UB3 4RY. A site location plan is provided as Figure 1. The report has been commissioned in relation to the proposed redevelopment of the site with a mixed use, residential led scheme.

1.2 Scope of Work

The scope of works for this assessment was as follows:

- To undertake a site inspection;
- To review the historical land uses to assess the potential for ground contamination;
- To review the environmental setting to assess the sensitivity of the surrounding area to contamination/pollution;
- To undertake a qualitative environmental risk assessment of the site's current and proposed use; and
- Produce an outline Conceptual Site Model (CSM) detailing potential pollutant linkages associated with the redevelopment of the site.

1.3 Legislation and Guidance

This report has been produced in general accordance with:

- *Contaminated Land (England) Regulations 2006 (as amended)*;
- *DEFRA Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance (2012)*;
- Environment Agency (EA) Contaminated Land Report 11 (CLR 11): *Model Procedures for the Management of Land Contamination*;
- *National Planning Policy Framework (2012)*; and
- British Standard requirements for the '*Investigation of potentially contaminated sites - Code of practice*' (ref. BS10175:2011).

Where appropriate, consideration has also been given to the following:

- The potential for environmental liabilities to occur under other associated regimes, for example the *Water Resources Act (1991)* and the *Environmental Damage Regulations (2009)*; and
- Key constraints on site redevelopment.

Details of the limitations of this type of assessment are described in Appendix A.

2 SITE RECONNAISSANCE AND DESK STUDY

2.1 Site Reconnaissance

This section of the report is based upon observations made during a site visit carried out on 16th January 2017. A site boundary plan is shown as Figure 2. Selected photos are shown in Appendix B.



General view of the site. For further photos see Appendix B.

2.1.1 The Site

Table 1 – Summary of Site Reconnaissance

Section	Description
<i>Background:</i>	The site is located to the south of Hayes town centre and adjacent to Hayes & Harlington train station. The site lies at the north end of Viveash Close, at National Grid Coordinates 509890 179350. It is irregular in shape and occupies an area of approximately 0.25ha.
<i>Site Layout:</i>	At the time of the walkover the majority of the site was occupied by a warehouse building. Access to the main warehouse was via a roller shutter door in the west. A small area of car parking was present in the northwest of the site. Associated offices, kitchen and meeting rooms were located in the northwestern part of the building. A boiler room was located in the north of the building. The northern and eastern areas, around the perimeter of the site, were heavily overgrown at the time of the walkover and it was not possible to access these areas. Access to the eastern area was <i>via</i> an external storage/equipment yard associated with the adjacent property.

Section	Description
<i>Activity Operations:</i>	At the time of the visit the site was occupied by <i>General Food Trading Ltd</i>, a food and drinks storage and distribution company. Items were stored on pallets on rows of metal racking. Two refrigerated units were located in the west of the building (see Appendix B, Photo 1). Two forklifts were used to transport goods around the warehouse. These were battery powered, with the charging unit located in the west of the warehouse (see Appendix B, Photo 2).
<i>Building Structure(s):</i>	The warehouse building comprised a steel structure, clad with brick and metal sheeting. The roof consisted of metal sheeting with transparent roof panels. Two floors of office space were located in the northwestern part of the building.
<i>Topography and Surface Cover:</i>	The site was generally flat. The external areas were laid to concrete. As discussed above, the northern and eastern areas of the site were unsurfaced and heavily overgrown. Internally, the warehouse floor comprised concrete, coated with rubber in places.
<i>Surface Water Drainage:</i>	Several manhole covers were located in the car parking area. No oil/water interceptors or surface water drains were identified during the site walkover. No internal surface water drainage was observed within the warehouse building. No drainage plans for the site were made available for review by RPS.
<i>Bulk Storage / Tanks:</i>	The site representative advised that no above or below ground tanks were located on site. Bulk storage of potentially contaminative substances was not observed on site during the walkover.
<i>Waste:</i>	One wheeled bin (capacity approximately 1,000 litres) for the storage of general waste was located in the west of the building. Waste cardboard packaging was also stored in this area. A site representative advised that waste items were collected once a week.
<i>Electricity Sub-stations / Transformers:</i>	No electricity sub-stations/transformers were observed on site at the time of the walkover. One electricity sub-station was located approximately 5m to the west of the site. Signage indicated that this was owned and operated by <i>SSE Power Distribution</i> (see Appendix B, Photo 3).
<i>Visual Evidence of Contamination:</i>	No visual evidence of contamination was noted on the site during the walkover. A building, adjacent to the south of the site, was in use by <i>Paramount Powders</i> (a powder coatings manufacturer) at the time of the visit. A number of pieces of equipment were located externally (adjacent to the site). Gravel and ponded surface water in this area had been stained pink and off-white by spilt powder coating.
<i>Other Issues:</i>	No Japanese Knotweed or Giant Hogweed (invasive plant species) were readily identified on the site at the time of the survey. <i>(It should be noted that not all areas of the site were accessible at the time of this assessment (especially the northern and eastern parts of the site) and that the identification of such species can be limited by the seasons and in areas of dense vegetation growth).</i> The site representative was not aware of whether an asbestos management plan had been undertaken for the site. Given the likely age of the building, there is potential for asbestos containing materials (ACMs) to be present within the building fabric. RPS can provide further specialist advice on this issue upon request.

2.1.2 The Surrounding Area

The site is located in an area of light industrial/commercial units. At the time of the site inspection, neighbouring land consisted of the following:

Table 2 – Neighbouring Land Uses

Direction	Description
<i>North</i>	Pay and display car park and parts of the former Nestlé factory, with a railway line beyond.
<i>East</i>	Former Nestlé factory.
<i>South</i>	Industrial unit occupied by <i>Paramount Powders</i> .
<i>West</i>	Viveash Close then an electricity sub-station and a vacant warehouse building beyond.

2.2 Proposed Development

The proposed redevelopment masterplan indicates that the site will comprise two blocks (Blocks A and B). Block A will be 13 storeys in height and Block B will be eight storeys. A ground floor level will be present across an area between the two blocks. The ground floor (including a mezzanine level) will comprise commercial units, car and cycle parking, an energy centre, refuse storage areas, a water tank and a lobby for the residential units. In Block A, the first floor will comprise commercial units with the upper 11 floors comprising residential units. In Block B, the upper seven floors will comprise residential units.

Areas of soft landscaping will be present on the ground floor level, with terraces and play areas on the upper floors.

A proposed redevelopment plan is provided as Figure 3.

2.3 Site History

2.3.1 Historical Map Review

The following review is based on past editions of readily available Ordnance Survey (OS) maps. These include scales of 1:1,250, 1:2,500 and 1:10,000 dated 1864 to 2016. Extracts from selected and historical maps are given as Figures 4 to 8.

Table 3 – Historical Site Uses

On-site Land Use and Features	Dates
The site was indicated to comprise vacant land.	1864 to c.1914
The site was indicated to comprise part of an orchard.	1914 to c.1934
The south of the site was indicated to comprise part of a sports ground.	1932 to c.1938
A small building of unspecified use was shown in the east of the site.	1932 to c.1946
An area of woodland was depicted in the north of the site.	1932 to c.1946
A large building of unspecified use was present in the centre and west of the site.	1932 to c.1946

On-site Land Use and Features	Dates
A large building of unspecified use (likely commercial/industrial) was indicated to be present across the majority of the site. A small building associated with the large building was indicated to be present in the north of the site.*	1946 to Present
Another small building associated with the larger building of unspecified use was indicated to be present in the north of the site.* From 1999, the site was indicated to comprise part of a trading estate. From 1973, the site resembles its present day layout.	1973 to Present

* Due to the overgrown nature of the northern part of the site, it was not possible to confirm the presence of the two small buildings during the site walkover.

Table 4 – Historical Neighbouring Site Uses

Surrounding Land Uses (100m radius)	Orientation	Distance	Dates
Confectionery works <i>Then factory*</i>	East	100m	1972 to c.1974 1974 to Present
Above ground storage tanks (unspecified contents or capacity)*	North and East	Adjacent	1972 to Present
Railway lines	North	5m	1932 to c.1972
Railway line	North	10m	1864 to c.1895
Electricity sub-station	West	5m	Present
Railway lines	North	20m	1914 to Present
Squirrels Trading Estate	South	35m	1991 to Present
Government offices	South	35m	1965 to c.1972
Employment exchange	Southwest	45m	1965 to c.1992
Carriage shed	North	65m	1895 to c.1932
Railway sidings	Northeast	75m	1895 to c.1999
Goods shed	Northwest	75m	1914 to c.1999
Metal works <i>Then works</i>	North	80m	1972 to c.1991 1991 to c.2016
Electricity sub-station	East	85m	1993
Government offices	Southwest	90m	1972 to c.2016
Tank	East	95m	Present

* A planning record indicates that the factory and tanks were part of the former *Nestlé* factory.

2.3.2 Site Planning History

No relevant planning records relating to the site were provided on the London Borough of Hillingdon planning website.

The former *Nestlé* factory, located to the east of the site, is proposed to be redeveloped for mixed commercial and residential end use. A request for a screening opinion (ref: 1331/APP/2016/1155) was submitted to the London Borough of Hillingdon in March 2016. The scoping report was prepared by Barton Willmore in March 2016 and included a chapter on land contamination. As part of the chapter, reference was made to a programme of intrusive works having been carried out at the site. It was reported that the Lynch Hill Gravel Member was located in close proximity to the ground surface. Preliminary investigations identified that there may be an area of Made Ground and shallow subsoil that was contaminated and linked to an historical release of petroleum hydrocarbons in and around areas of old boiler plant and fuel tanks. Additional contaminants of concern detected in shallow soils included mercury, arsenic, hexavalent chromium and lead. From the information provided in the

scoping report, it is not known if the fuel tanks referred to, relate to the tanks which are located adjacent to the north of the site.

2.4 Environmental Setting

2.4.1 Geology

Based on British Geological Survey (BGS) mapping (1:50,000-scale) and the EA Groundwater Vulnerability mapping (1:100,000-scale), the stratigraphic sequence and aquifer classifications beneath the site are indicated to be as follows:

Table 5 – Descriptions of Geological Strata

Strata	Description & approximate thickness	Aquifer Classification
Lynch Hill Gravel Member	This stratum is indicated to comprise sand and gravel and is likely to be approximately 5m in thickness beneath the site.	Principal Aquifer
London Clay Formation	This stratum is indicated to comprise clay, silt and sand and is likely to be approximately 50m in thickness beneath the site.	Unproductive Stratum

In addition to the strata detailed above, Made Ground is likely to be present beneath the site as a result of previous construction and demolition activities.

Three records of boreholes (ref: TQ17NW112, TQ17NW113, TQ17NW114 and TQ17NW239) are indicated on the BGS website. These are located approximately 185m to 325m to the east of the site. The logs indicate the following sequence:

- Made Ground: Ranging in thickness from approximately 0.90m to 1.05m;
- Lynch Hill Gravel Member: Ranging in thickness from approximately 4.55m to 6.00m; and
- London Clay Formation: Ranging in thickness from approximately 51.00m to 56.70m.

Groundwater was indicated to have been encountered at approximately 2.14m below ground level (bgl) within the Lynch Hill Gravel Member in one of these boreholes.

2.4.2 Hydrogeology

The site is located above a Principal Aquifer relating to the Lynch Hill Gravel Member. These formations provide a high level of water storage and may support water supply and / or river base flow on a strategic scale. The London Clay Formation is classified as an Unproductive Stratum. These formations have a low permeability and have negligible significance for water supply or base flow.

According to EA data, the site is not located in a groundwater Source Protection Zone (SPZ).

Groundwater chemical quality beneath the site, within the Lynch Hill Gravel Member, has been classified as good, under the EA's local River Basin Management Plan.

Information provided by the EA indicates that there are records of three active licensed groundwater abstractions present within 1km of the site. These are detailed in the table below.

Table 6 – Licensed Groundwater Abstractions within 1km of the Site

Licence Holder	Use	Approx. Distance and Direction from Site
Nestlé UK Ltd*	Other industrial/commercial/public services: evaporative cooling	310m East
Nestlé UK Ltd*	Other industrial/commercial/public services: evaporative cooling and boiler feed	315m East
Thorn Emi Electronics Ltd	Manufacture (boiler)	575m West

* Given that the *Nestlé* site is not currently operational, it is considered likely that these abstraction licenses may have lapsed.

For the license held by Thorn Emi Electronics Ltd, groundwater is abstracted from the White Chalk Subgroup (present at depth beneath the London Clay Formation (and the Lambeth Group and the Thanet Formation)). Although this information is not known for the two licenses held by *Nestlé*, it is considered likely that groundwater would have also been abstracted from the White Chalk Subgroup.

2.4.3 Surface Water

Under the Water Framework Directive, the EA identifies three watercourses within 1km of the site which are classified within the local River Basin Management Plan. A list of all nearby watercourses and water bodies is as follows:

Table 7 – Nearby Surface Watercourses

Watercourse / body	Quality Classification	Approx. Distance and Direction from Site
Grand Union Canal	Chemical Quality: Good Ecological Quality: Moderate	125m North
River Crane	Chemical Quality: Good Ecological Quality: Poor	605m East
Yeading Brook	Chemical Quality: Good Ecological Quality: Moderate	770m Northeast

Information provided by the EA indicates that there is a record of one active licensed surface water abstraction present within 1km of the site. The operator is the Canal and River Trust and the abstraction is used for other industrial/commercial/public services: non-evaporative cooling. It is

located approximately 805m to the northwest of the site and is likely to be abstracted from the Grand Union Canal.

2.4.4 Fluvial / Tidal Flood Risk

According to the EA flood map, the site is located within Flood Zone 1, whereby there is less than a 0.1% (1 in 1000) chance of flooding from rivers or the sea occurring each year.

2.4.5 Ecologically Sensitive Sites

Natural England data indicates that there are no ecologically sensitive sites that constitute environmental receptors as defined within Table 1 of the DEFRA Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance (2012), located within a 1km radius of the site.

2.4.6 Radon

According to the Indicative Atlas of Radon in England and Wales published by the Health Protection Agency and the British Geological Survey, the site is located within a lower probability radon area (less than 1% of properties are estimated to be at or above the Action Level). No radon protective measures are necessary in the construction of new dwellings or extensions.

2.4.7 Coal Authority

According to Coal Authority data, the site is not located in an area potentially affected by coal mining activities.

2.4.8 Unexploded Ordnance

The Bomb Sight website indicates that a high explosive bomb was recorded close to Viveash Close during World War 2.

A desk study for potential UXO contamination has been undertaken by RPS. This is reported under separate cover (report ref: EES0733-R-01-00). It was concluded that there was a low risk from UXO at the site.

2.5 Authorised Processes and Pollution Incidents

2.5.1 Landfills and Waste Sites

Information provided by the EA, Local Authority and BGS show that there is one record of a historical landfill and one licensed waste management/transfer facility within 500m of the site. Available details on these are provided below:

Table 8 – Nearby Landfills and Waste Management Facilities

Operator Details	Waste Type and Details	Approx. Distance and Direction from Site
Landfill Site		
Location: Hays Town Operator: London Borough of Ealing	Deposited waste includes inert, commercial and household waste. Last input date was 31 st December 1936	210m East
Waste Management/Transfer Facility		
Location: Unit 1, Pump Lane, Hayes Operator: Personnel Hygiene Services Ltd	Clinical waste transfer station	450m Northeast

2.5.2 Environmental Permits

EA and Local Authority data indicates that there are five active processes regulated by an Environmental Permit (under the Environmental Permitting Regulations 2010) registered within 500m of the subject site. These are outlined in the table below:

Table 9 – Environmental Permits

Licence Holder	Permitted Activity	Approx. Distance and Direction from Site
Mays (Pressure Diecasting) Ltd	PG2/6 Aluminium and aluminium alloy processes	195m Northeast
Nestlé UK Ltd*	Combustion: Any fuel greater or equal to 50Mw	240m East
Tesco Express	PG1/14 Petrol filling station	280m Southwest
Dagenham Motors (Hayes) Ltd	PG1/1 Waste oil burners, less than 0.4MW net rated thermal input	450m Northwest
Bace (Bullsbridge)	PG6/45 Surface cleaning	495m East

* Given that the Nestlé site is not currently operational, it is considered likely that there are not any processes currently carried out under this permit.

2.5.3 COMAH Sites

There are no records of facilities being registered under the Control of Major Accident Hazards (COMAH) Regulations 1999 within 500m of the site.

2.5.4 Pollution Incidents

EA data indicates that there are records of two significant pollution incidents within 500m of the site. These are outlined in the following table:

Table 10 – Significant Pollution Incidents within 500m of the Site

Location/Address	Receiving Medium and Date	Severity of Incident and Type	Approx. Distance and Direction from Site
Silverdale Road, Hayes	Not provided	Significant - unknown chemicals	130m North
Argyle Warehouse	Not provided	Significant - unknown chemicals	230m Northeast

2.6 Regulatory Consultations

The Environmental Protection Unit at the London Borough of Hillingdon was contacted regarding any known contamination issues at the site. The Council advised that they are not aware of any site investigations having been carried out on the site. They were aware that a small investigation was carried out nearby on Viveash Close in the 1990s, but they do not hold a copy of the report.

They advised that the site is part of an industrial estate and the wider industrial estate was identified in the prioritisation list of site for inspection under their Contaminated Land Inspection Strategy.

3 OUTLINE CONCEPTUAL SITE MODEL

3.1 Background

An outline conceptual site model (CSM) consists of an appraisal of the *source-pathway-receptor* 'contaminant linkages' which is central to the approach used to determine the existence of 'contaminated land' according to the definition set out under Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential 'pollutant linkage'.

- **Source** referring to the source of contamination.
- **Pathway** for the contaminant to move/migrate to receptor(s).
- **Receptor** that could be affected by the contaminant(s).

Receptors include human beings, other living organisms, crops, controlled waters and buildings / structures. The National Planning Policy Framework, used to address contaminated land through the planning process, follows the same principles as those set out under Part 2A. Further details on the Part 2A regime are presented within Appendix C.

3.2 Potential Pollutant Linkages

Each stage of the potential pollutant linkages have been assessed individually on the basis of information obtained during the site reconnaissance and desk study exercise and is discussed in the following section.

3.2.1 Potential Contaminant Sources

On Site

Both small and large commercial/industrial type buildings have been present on site from c.1932. The current building on site is occupied by a food distribution factory. Two smaller buildings were present in the north of the site. One was indicated to be present from c.1946; and the other from c.1973. Given that the northern area of the site was heavily overgrown at the time of the site walkover, it is not known if these two buildings are still present on the site.

Made Ground may also be present beneath the site, resulting from previous construction and demolition activities, which may also represent a source of contaminants of concern, as well as ground gas.

Off-Site

Former potentially contaminative land uses in the vicinity of the site include a former *Nestlé* factory (previously labelled as a confectionery works (from 1972 to c.1974); including above ground storage tanks (unspecified use or capacity), located adjacent to the north of the site. Current OS mapping indicates that these tanks are still present on the site.

Other formerly potentially contaminative land uses include railway lines, located approximately 5m to 10m to the north of the site from 1864 to c.1972; with an associated carriage shed (located approximately 65m to the north of the site from 1895 to c.1932), a goods shed (located approximately 75m to the northwest of the site from 1914 to c.1999) and railway sidings (located approximately 75m to the northeast of the site from 1895 to c.1999). An historical landfill is indicated to be present approximately 210m to the east of the site, waste types included inert, commercial and household.

Current potentially contaminative land uses in the vicinity of the site include the powder coating warehouse located adjacent to the south of the site; an electricity sub-station (located approximately 5m to the west of the site); railway lines (located approximately 20m to the north of the site; and Squirrels Trading Estate (located approximately 35m to the south of the site).

3.2.2 Potential Pathways

Following redevelopment, the potential risks to future site users *via* the dermal contact and ingestion pathways in areas of the site comprising building cover and hardstanding will be mitigated. In areas of soft landscaping, the pathways of dermal contact and ingestion could still be active. Furthermore, there would be potential for the airborne off-site migration of soil/dust from these areas.

There is the potential for ground gas and volatile contaminants of concern in soil and/or groundwater (if present) beneath the site to impact future site users *via* the inhalation pathway in indoor areas.

Groundwater within granular horizons of the Made Ground and underlying Lynch Hill Gravel Member may constitute a potential pathway for the on or off-site migration of contaminants of concern.

The pathways of dermal contact, ingestion and vapour inhalation to neighbouring residential properties from potential contaminants of concern originating from the site may be active.

3.2.3 Potential Receptors

Potential human health receptors include future residential and commercial site users and neighbouring commercial properties.

Providing construction workers adopt appropriate levels of hygiene and personal protective equipment, they are not considered to be at significant risk from potential contaminants of concern and have not been considered further as part of this assessment.

The site is indicated to be directly underlain by a Principal Aquifer, relating to the Lynch Hill Gravel Member. The site is not located within a groundwater SPZ. The nearest groundwater abstraction is approximately 310m to the east of the site. The license for this abstraction is held by *Nestlé*; given that the site is not currently operational it is considered likely that the license may have lapsed. The nearest active groundwater abstraction is approximately 575m to the west of the subject site. Groundwater under this license is reported to be abstracted from the White Chalk Subgroup.

The Grand Union Canal is the nearest surface water feature to the site, located approximately 125m to the north of the site. It is considered that there is potential for this watercourse to be lined. In addition, given the distance to this feature, it is not considered to be a potential receptor to any potential contaminants of concern (if present) sourced from beneath the site.

3.3 Outline Conceptual Site Model

An outline CSM has been developed on the basis of the site reconnaissance and desk study. The CSM is used to identify potential sources, pathways and receptors (i.e. potential pollutant linkages) on site and is summarised in the table below:

Table 11 – Outline Conceptual Site Model

Potential Source	Contaminants of Concern	Via	Potential Pathways	Linkage Potentially Active?	Receptors
On site – historical: Buildings of unspecified use On site – current: Food distribution factory and Made Ground	Metals, hydrocarbons and asbestos	Soil	Direct contact/ingestion	✓	Future site users
			Inhalation of volatiles	✓	
			Airborne migration of soil or dust	✓	Off-site users
			Leaching of mobile contaminants	✓	Lynch Hill Gravel Member Principal Aquifer
		Groundwater	Direct contact/ingestion	✓ ✓	Future site users Off-site users
			Inhalation of volatiles	✓ ✓	Future site users Off-site users
			Vertical and lateral migration in permeable strata	✓	Lynch Hill Gravel Member Principal Aquifer

Off site – historical: Former Nestlé factory (including tanks), railway lines, carriage shed, goods shed, railway sidings and landfill Off-site – current: Powder coatings warehouse, electricity sub-station, railway lines and Squirrels Trading Estate	Metals, hydrocarbons , and polychlorinated biphenyls (PCBs)	Groundwater	Direct contact/ingestion	✓	Future site users
			Inhalation of volatiles	✓	Future site users
On and off-site: Historical landfill, Made Ground / natural strata or bio-degradation of contamination	Carbon dioxide and methane	Ground Gas	Inhalation of ground gas	✓ ✓	Future site users Off-site users
			Explosive risks	✓ ✓	Future site users Off-site users

4 CONCLUSIONS AND RECOMMENDATIONS

The outline CSM produced upon completion of the desk study assessment has identified a number of potential pollutant linkages that may be active upon the redevelopment of the site.

It is therefore recommended that the potential for these linkages to be active is assessed through a Phase 2 Environmental Site Investigation of the site. The scope of this investigation should include the following:

- Drilling of a number of boreholes across the site targeting identified potential sources and pollutant linkages;
- Installation of groundwater and gas monitoring wells in selected boreholes;
- Collection of soil and groundwater samples from beneath the site with chemical analysis of these samples for contaminants of concern;
- Ground gas monitoring from wells installed at the site;
- Assessment of ground conditions and generic quantitative risk assessment of soil and groundwater chemical analysis results to determine the potential for the identified potential pollutant linkages to remain active upon redevelopment of the site; and
- Provision of recommendations (where necessary) for remediation/mitigation measures to ensure that any identified potential pollutant linkages are not active upon redevelopment of the site.

It would be prudent to combine any site investigation undertaken for environmental purposes with geotechnical testing, in order to facilitate preliminary foundation and pavement design.

Given the likely age of the buildings on site, there is potential for asbestos containing materials (ACMs) to be present within the building fabric. Given the proposed redevelopment of the site, a formal Demolition / Refurbishment Asbestos Survey should also be conducted prior to any demolition work commencing. RPS can provide a fee proposal for the above item upon request.

FIGURES

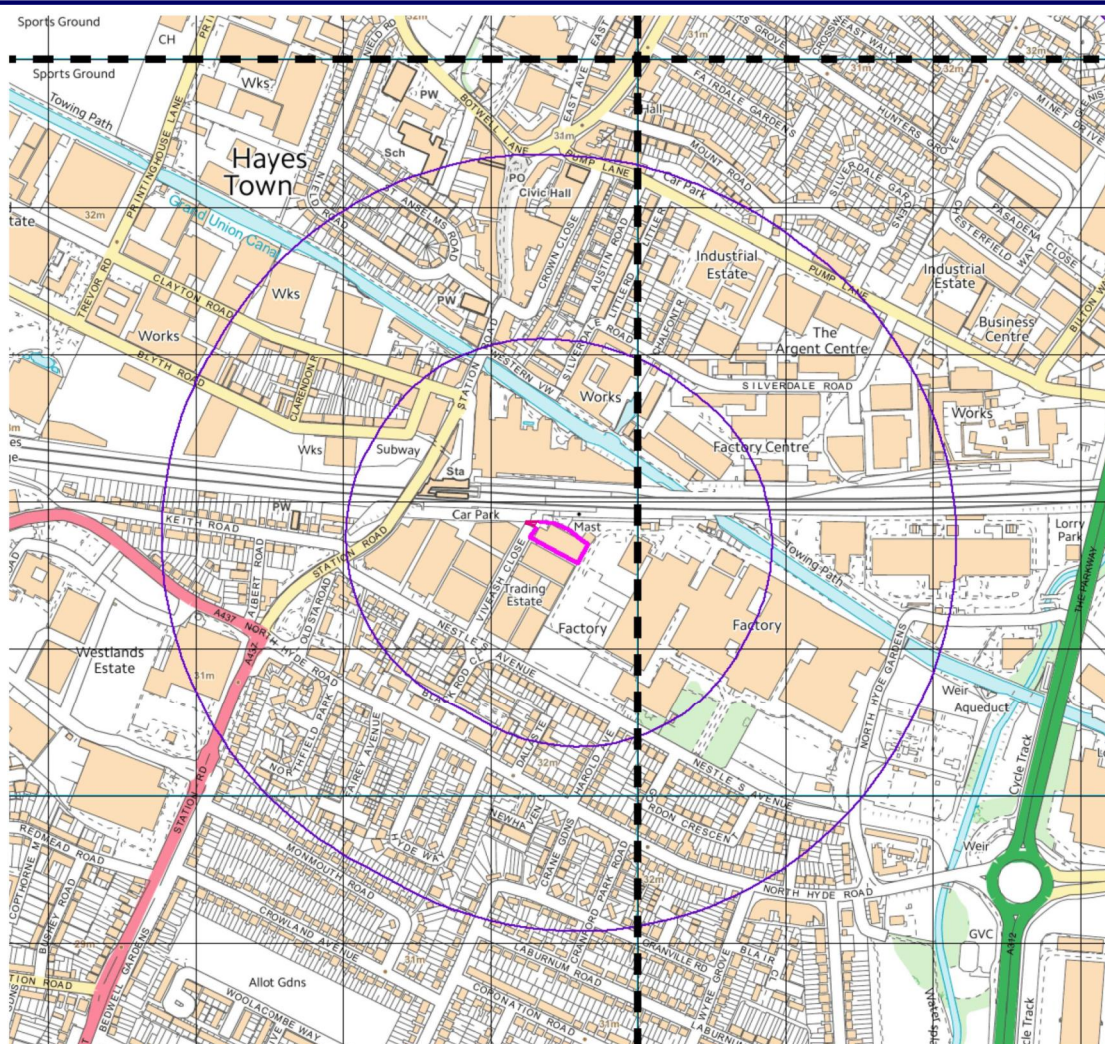


Figure 1: Site Location Plan

Map Date: Current

Scale: Not to scale

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35 New Bridge Street
London
EC4V 6BW

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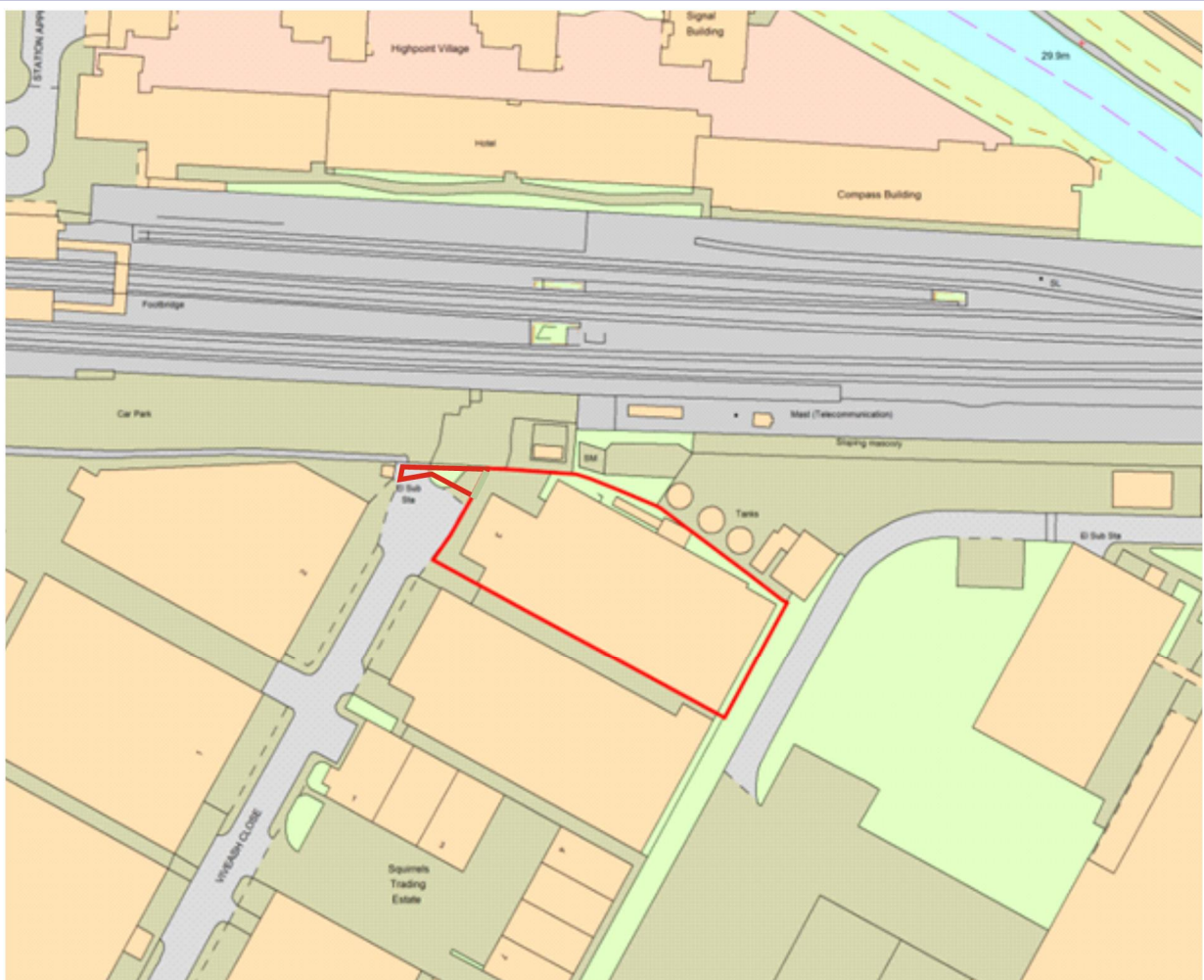


Figure 2: Site Boundary Plan

Map Date: Current

Scale: Not to scale

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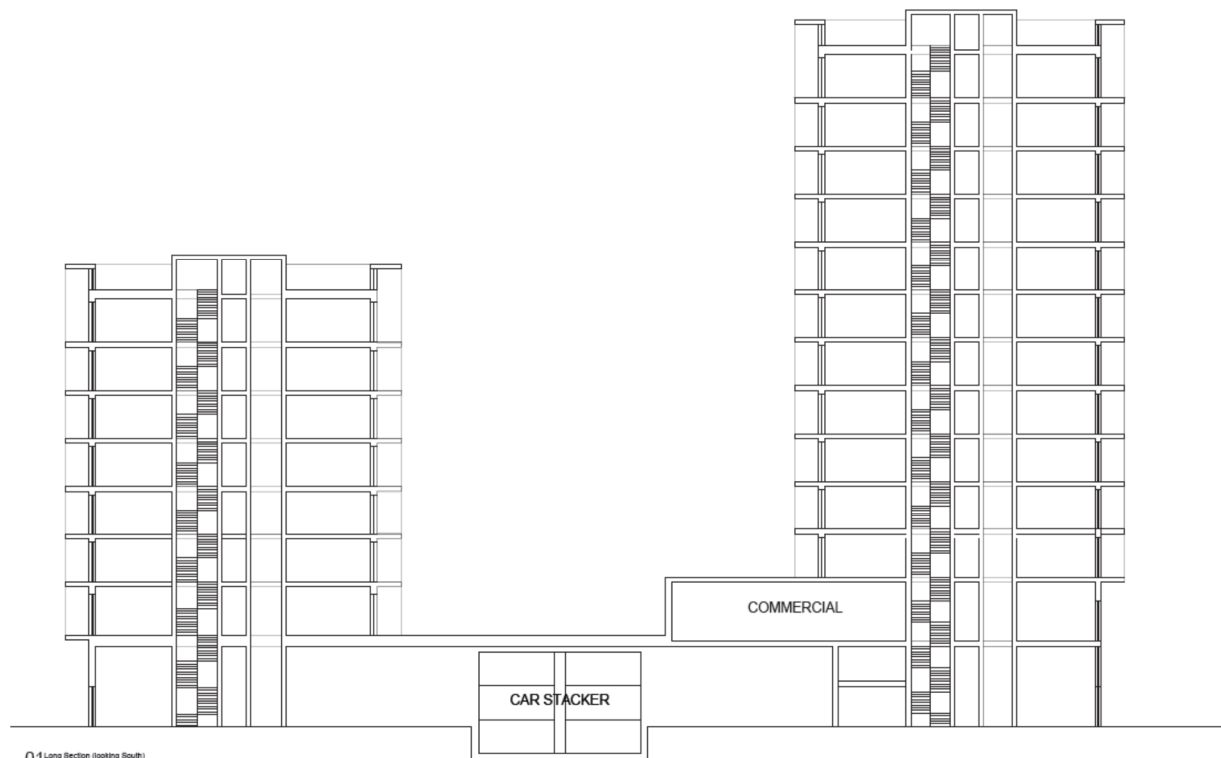
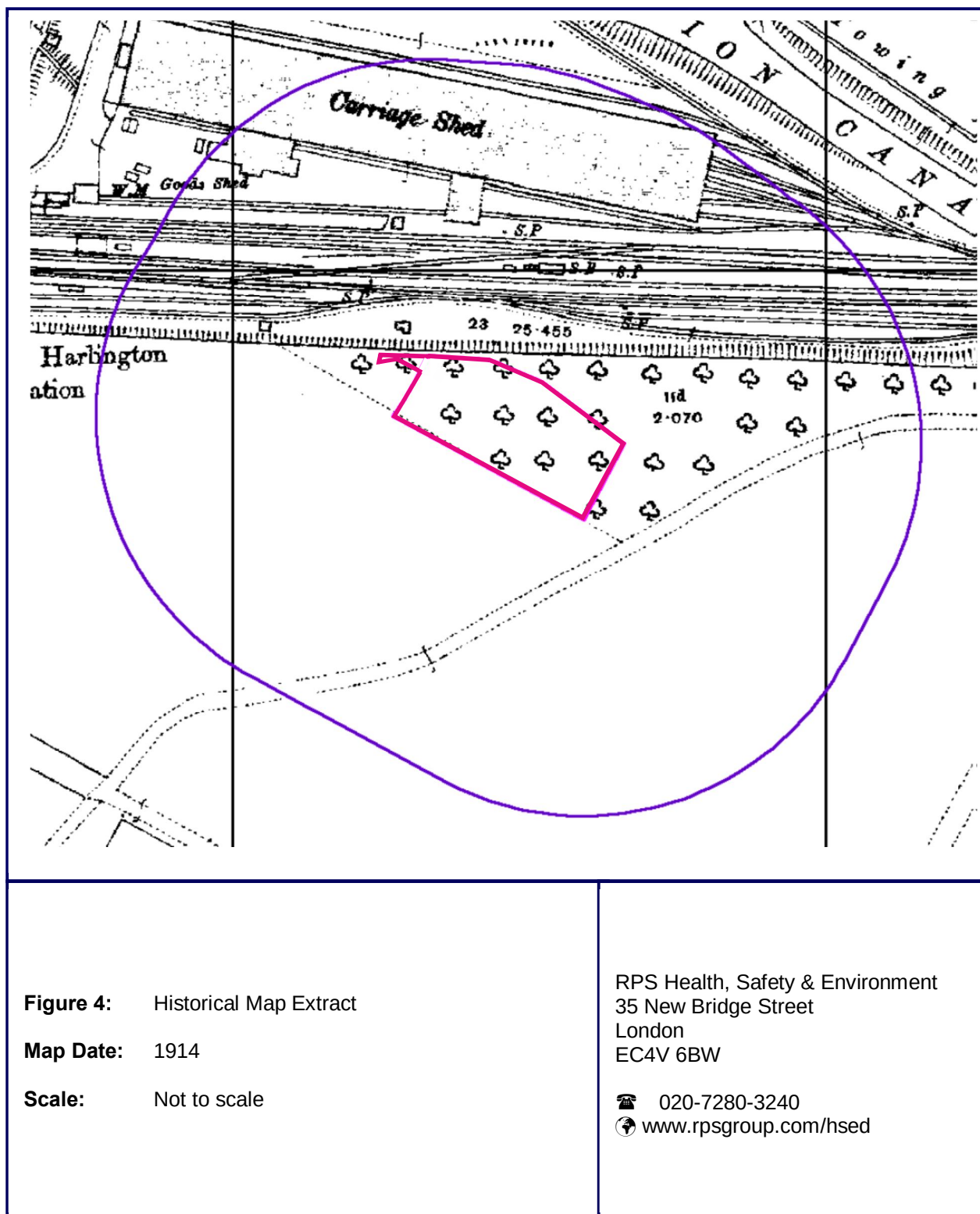


Figure 3: Proposed Development Plan

Scale: Not to scale

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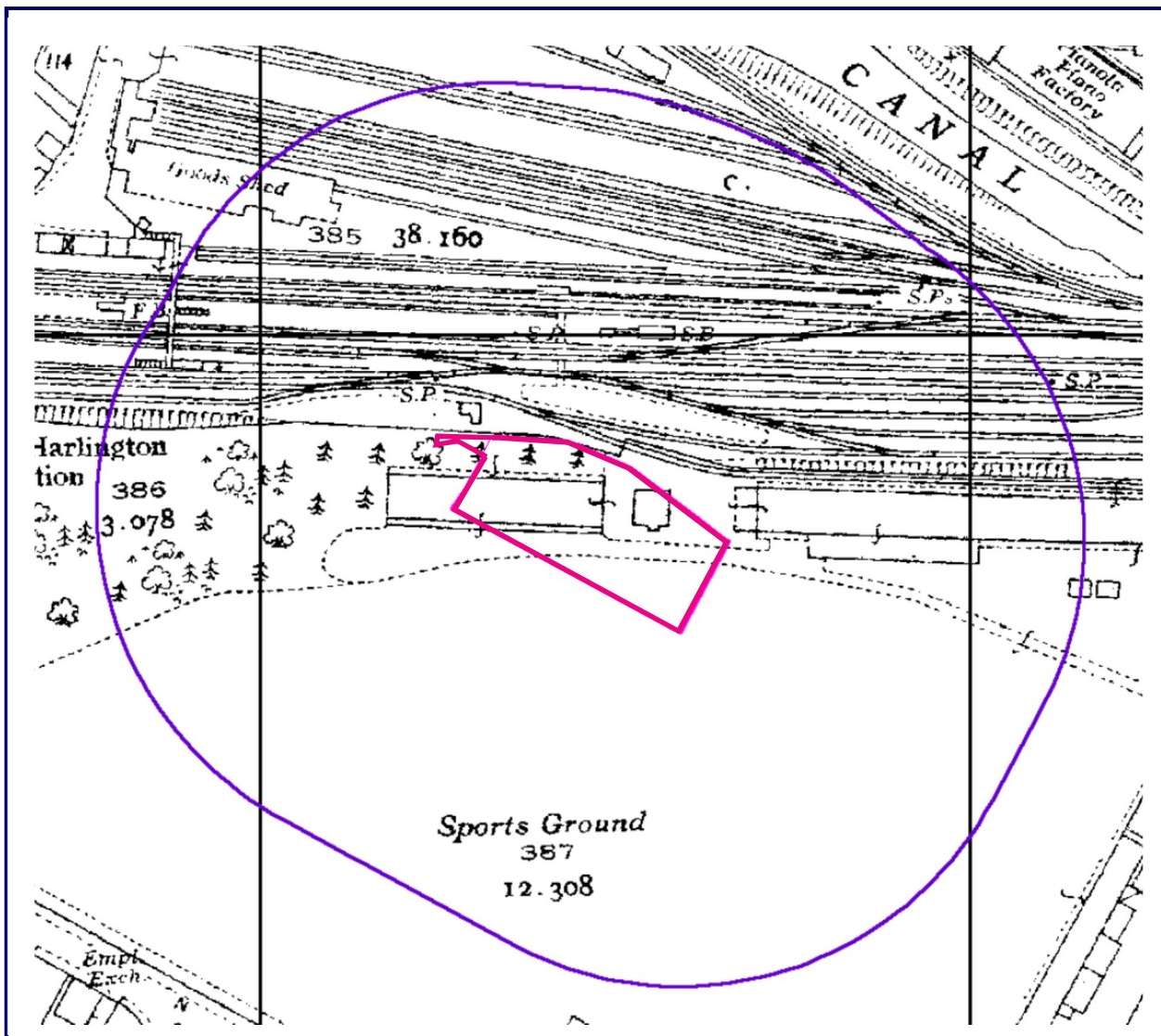


Figure 5: Historical Map Extract

Map Date: 1934

Scale: Not to scale

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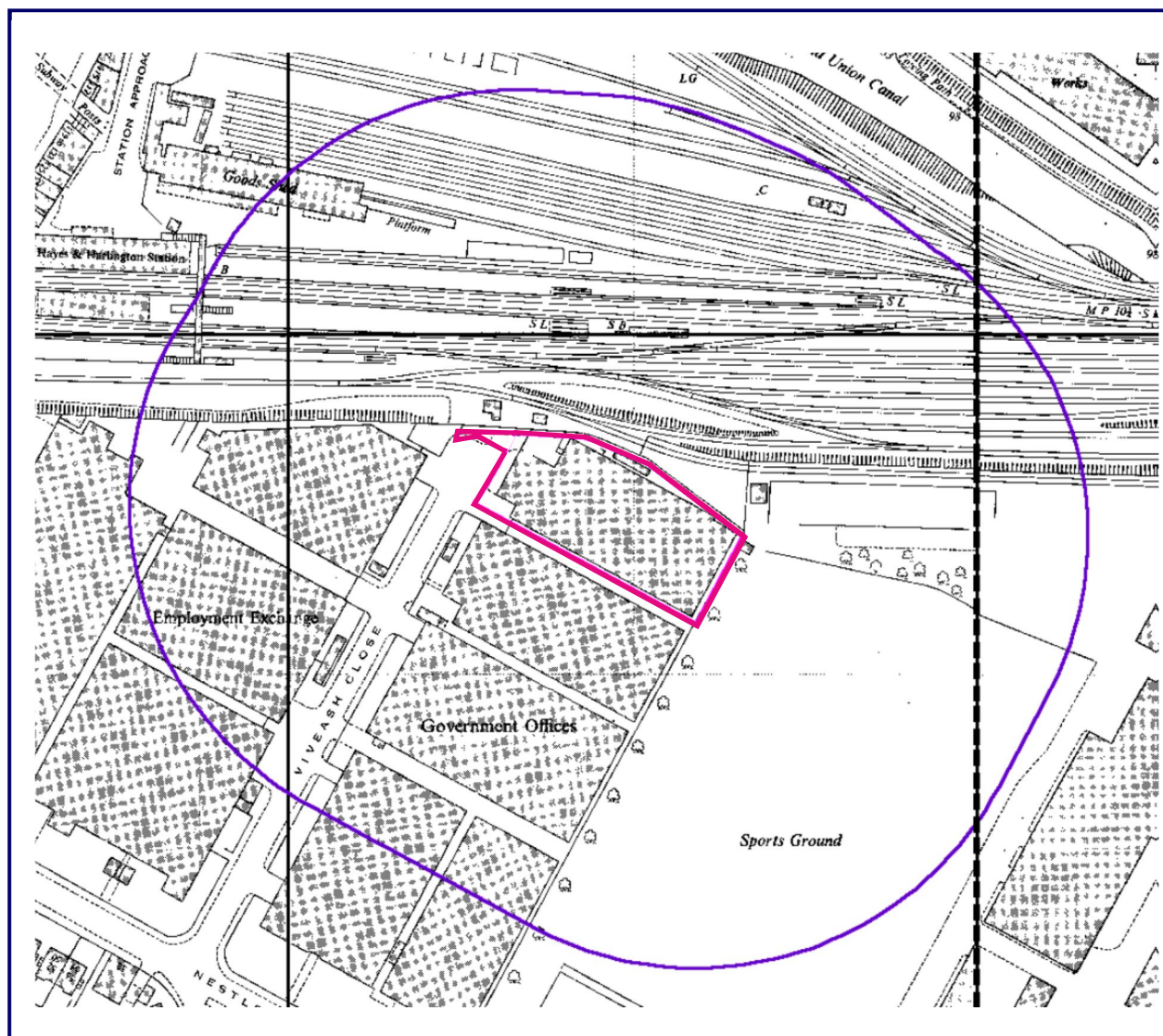


Figure 6: Historical Map Extract

Map Date: 1963

Scale: Not to scale

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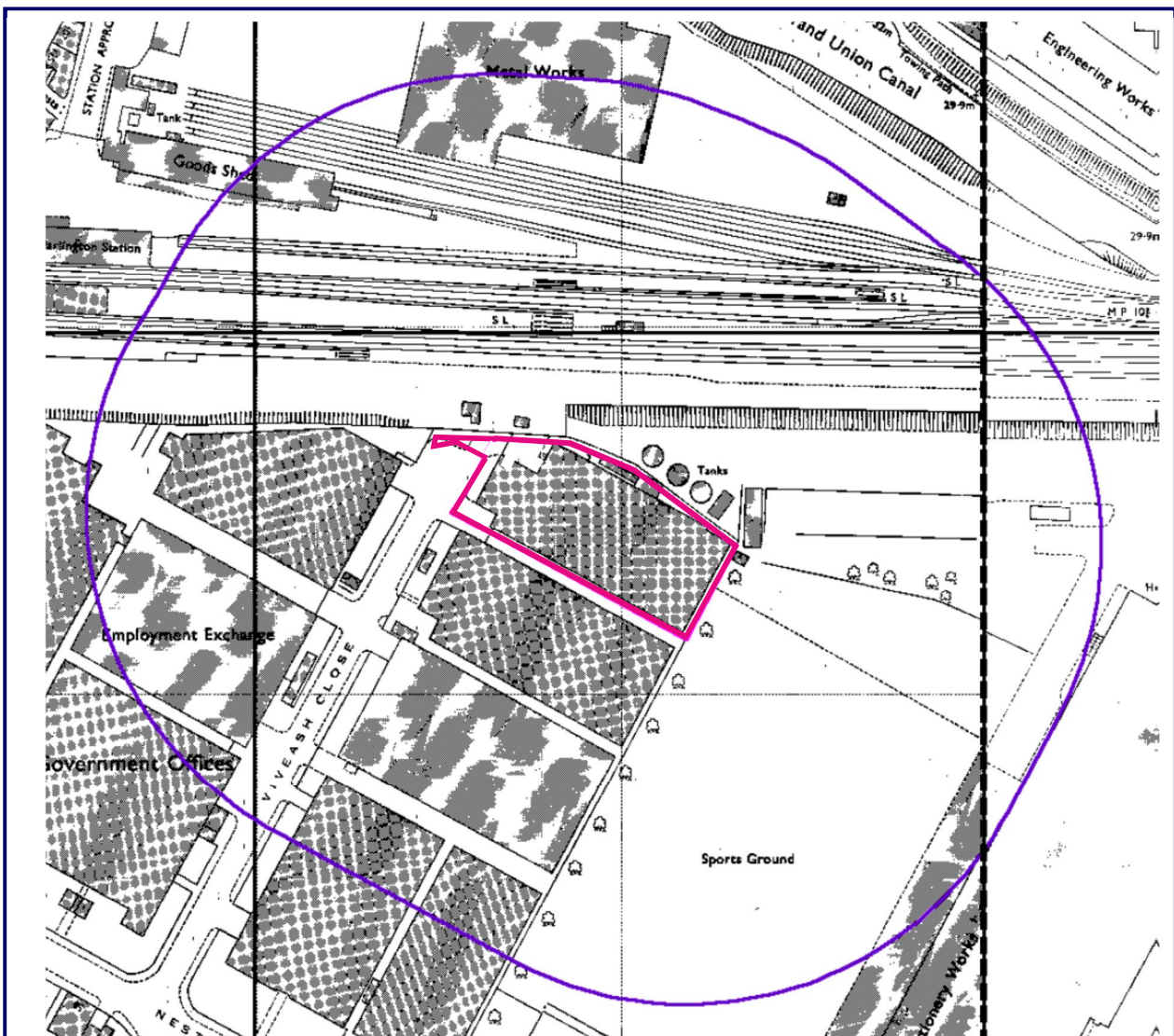


Figure 7: Historical Map Extract

Map Date: 1972

Scale: Not to scale

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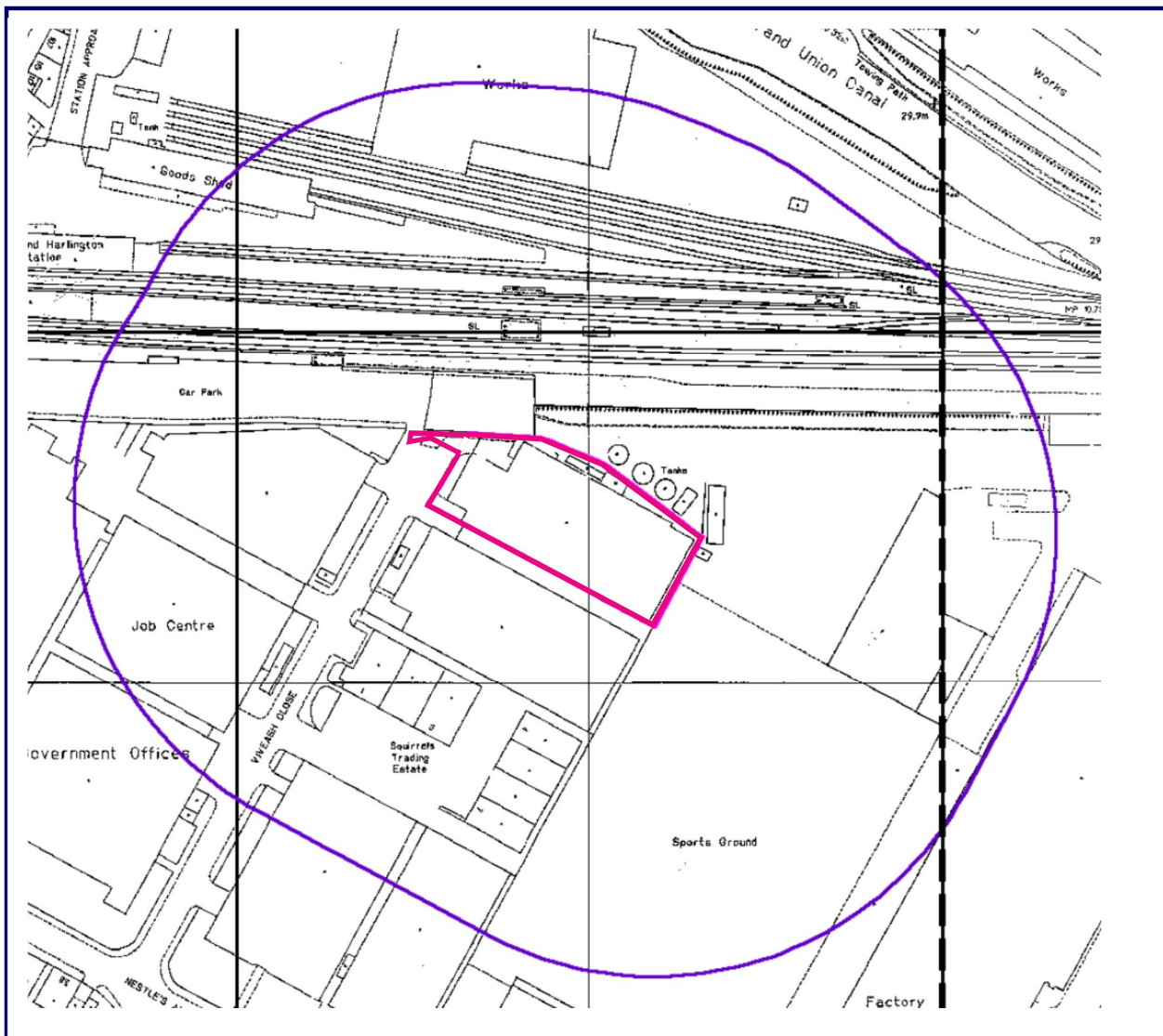


Figure 8: Historical Map Extract

Map Date: 1991

Scale: Not to scale

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APPENDIX A

General Notes

RPS HEALTH, SAFETY & ENVIRONMENT

Phase 1 - Environmental Risk Assessment / Desk Study Environmental Review

General Notes

1. A "desk study" means that no site visits have been carried out as any part thereof, unless otherwise specified.
2. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client.
3. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.
4. The accuracy of maps cannot be guaranteed and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
5. No sampling or analysis has been undertaken in relation to this desk study.
6. Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".
7. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.
8. This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.
9. The copyright in the written materials shall remain the property of the RPS Company but with a royalty-free perpetual licence to the Client deemed to be granted on payment in full to the RPS Company by the Client of the outstanding amounts.
10. The report is provided for sole use by the Client and is confidential to them, their professional advisors, no responsibility whatsoever for the contents of the report will be accepted to any person other than the Client. [Unless otherwise agreed]
11. These terms apply in addition to the RPS HSED "Standard Terms & Conditions" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms & Conditions the said Standard Terms & Conditions shall prevail.) In the absence of such a written contract the Standard Terms & Conditions will apply.

APPENDIX B

Photographs

Photo 1: Two refrigerated units located in the west of the building.



Photo 2: Forklift battery charging unit located in the west of the warehouse.

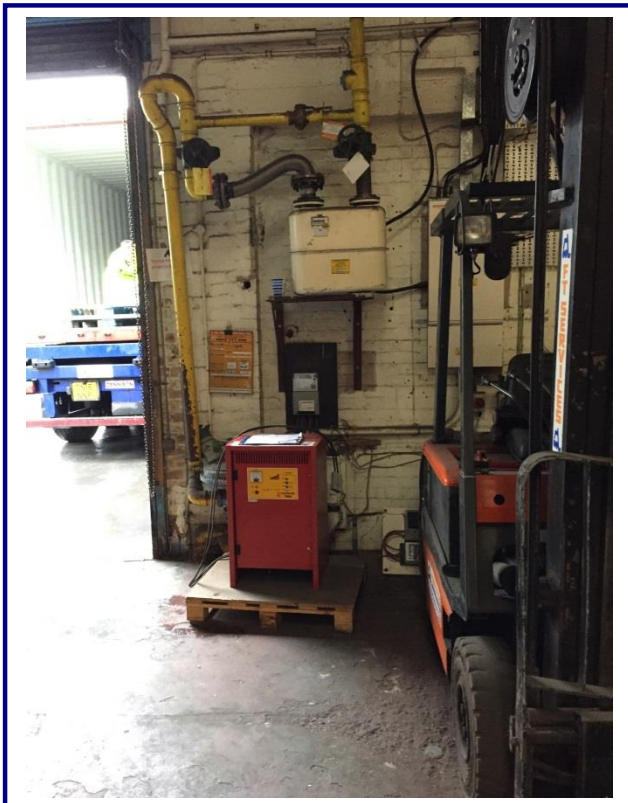


Photo 3: Electricity sub-station located to the west of the site.



APPENDIX C

Part 2A (The Contaminated Land Regime)

Contaminated Land Definition

Under Section 57 of the Environmental Act 1995, Part 2A was inserted into the Environmental Protection Act 1990 to include provisions for the management of contaminated land.

Subsequent regulations were first implemented in England in April 2000, Scotland in July 2000 and Wales in July 2001¹, providing a definition of ‘contaminated land’ and setting out the nature of liabilities that can be incurred by owners of contaminated land and groundwater.

According to the Act, contaminated land is defined as ‘any land which appears to the local authority in whose area the land is situated to be in such a condition, by reason of substances in, on or under the land that:

- a) *significant harm* is being caused or there is a *significant possibility* of such harm being caused; or
- b) *significant pollution* of controlled waters² is being caused or there is a significant possibility of such pollution being caused³

The guidance on determining whether a particular possibility is significant is based on the principles of risk assessment and in particular on considerations of the magnitude or consequences of the different types of significant harm caused. The term ‘possibility of significant harm being caused’ should be taken, as referring to a measure of the probability, or frequency, of the occurrence of circumstances that could lead to significant harm being caused.

The following situations are defined where harm is to be regarded as significant:

- i. Chronic or acute toxic effect, serious injury or death to humans
- ii. Irreversible or other adverse harm to the ecological system
- iii. Substantial damage to, or failure of, buildings
- iv. Disease, other physical damage or death of livestock or crops
- v. The pollution of controlled waters⁴.

¹ In England by The Contaminated Land (England) Regulations 2000, updated by The Contaminated Land (England) (Amendment) Regulations 2012; in Scotland by The Contaminated Land (Scotland) Regulations 2000, updated by the Contaminated Land (Scotland) Regulations 2005; and in Wales by The Contaminated Land (Wales) Regulations 2001, updated by the Contaminated Land (Wales) Regulations 2006.

² In Scotland the term ‘controlled water’ has been updated to ‘water environment’ under the Contaminated Land (Scotland) Regulations 2005 in line with the Water Environment and Water Services (Scotland) Act 2003.

³ The definition was amended in 2012 by implementation of the Water Act 2003.

⁴ Groundwater in this context does not include waters within underground strata but above the saturated zone.

With regard to radioactivity, contaminated land is defined as any land which appears to be in such a condition, by reason of substances in, on or under the land that harm is being caused, or there is a *significant possibility of such harm being caused*⁵

The Risk Assessment Methodology

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risks to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected with the hazard via one or several exposure pathways (e.g. the pathway of direct contact). Risks are generally managed by isolating or removing the hazard, isolating the receptor, or by intercepting the exposure pathway. Without the three essential components of a source (hazard), pathway and receptor, there can be no risk. Thus, the mere presence of a hazard at a site does not mean that there will necessarily be attendant risks.

The Risk Assessment

By considering where a viable pathway exists which connects a source with a receptor, this assessment will identify where pollutant linkages may exist. A pollutant linkage is the term used by the DEFRA in their standard procedure on risk assessment. If there is no pollutant linkage, then there is no risk. Therefore, only where a viable pollutant linkage is established does this assessment go on to consider the level of risk. Risk should be based on a consideration of both:

- The likelihood of an event (probability) - takes into account both the presence of the hazard and receptor and the integrity of the pathway.
- The severity of the potential consequence - takes into account both the potential severity of the hazard and the sensitivity of the receptor.

For further information please see the Contaminated Land section on the DEFRA website (www.defra.gov.uk)

⁵ The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 and Contaminated Land (Wales) Regulations 2006.