



Lancaster Avenue, Whitefield

**Phase 2 Geo-Environmental Investigation, Risk Assessment and
Remediation Strategy**

Job Number
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22nd October 2025

Client
Mr Paul Power



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Ground Investigation | Land Remediation | Project Management



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Report Title	Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy
Job Number	LKC251560
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EXECUTIVE SUMMARY

Site Details

Location	End of Lancaster Avenue, adjacent to 1 Lancaster Avenue, Whitefield, Manchester. National Grid Reference 381042E, 405338N.
Area	Approximately 100m ² .
Topography	102 metres above ordnance datum (AOD). Slight downward gradient to north-east.
Current Site Use	Vacant plot of land with no discernible features. Overgrown with vegetation.
Proposed Development	Erection of 1no. two storey dwelling with off street parking.

Site Setting

Main Historical Features	Onsite: Vacant land. Surrounding Area: Ponds, railway line, reservoir, tank, refuse tip.
Geology / Hydrogeology	Artificial: Made ground associated with the railway line to the west. Superficial: Glaciofluvial deposits (sand and gravel) likely underlain by Glacial Till (Diamicton). Secondary A Aquifer. Bedrock: Nob End Rock (sandstone). Secondary A Aquifer.
Landfills / Infilled Ground	Historic refuse tip (43m south-west, 1969). Potentially infilled ground identified.
Site Reconnaissance	The site occupies a rectangular shaped plot of vacant land. The site has no features. The exposed soil contains inclusions including gravels, cobbles of brick, concrete, metal and plastic. In the northern corner of the site there is a small stockpile of broken concrete fence panels, bricks, gravels, rubble and a plastic sheet. A small stockpile of bags of cement was located south of the centre along the eastern site boundary.
Recommendations	Site Investigation was recommended to further assess geo-environmental risk.

Ground Investigation Work Undertaken

Date of Investigation:	9 th October 2025.
Intrusive Investigation Work Undertaken:	5no. hand dug pits to 1.20mbgl.

Ground Conditions

Made Ground	Encountered within all exploratory holes from ground level to 1.00mbgl. Comprised sand or silt with ash, clinker, brick, concrete, glass, metal, plastic, ceramic and cloth.
Superficial	Encountered underlying the made ground to the base of the hand dug pits. Comprised sand and silt. A band of fibrous peat was encountered within HDP103 from 0.80-1.10mbgl.
Bedrock	Not encountered.
Groundwater	Not encountered.
Obstructions	None encountered.

Contamination Risk Assessment

PL	Contaminant	Risk	Recommendations
1	Metals, PAHs	Moderate	Remediation required.
	Petroleum hydrocarbons	Low	No remediation required.
2	Petroleum hydrocarbons	Low	No remediation required.
3	Carbon dioxide, Methane	Moderate / Low	No remediation required.
4	Groundwater (mobile contaminants)	Low	No remediation required.
5	Organic contaminants.	Low	Utility provider risk assessment to be completed. The site will likely require PE piping.

PL	Recommendation
1	Removal of made ground within garden areas by 600mm to accommodate a clean environmental cover system (600mm of clean soils over demarcation membrane).
2	No remediation required.
3	No remediation required.
4	No remediation required.
5	Potable water pipe assessment required.

Other Considerations
Unexpected Contamination
Re-use of Site Generated Material
Stockpile Management
Disposal
Control of Water
Health and Safety Considerations

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1. Introduction

1.1. Background

LK Consult Ltd (LKC) has been commissioned to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy for Lancaster Avenue, Whitefield. The investigation was undertaken in support of a planning application (67976) to develop the site for residential use.

The following work has previously been undertaken:

- Preliminary Risk Assessment (PRA) report, undertaken by bEk Enviro Ltd (Ref: BEK-23024-1, dated February 2023).

This investigation has been undertaken to confirm the ground conditions below the site and to allow a contamination assessment to be undertaken.

The investigation will aim to confirm the risks of the potential pollutant linkages identified in the PRA and recommend further assessment / remediation, as required.

The aims of this report are also to establish the feasibility of developing this site, to demonstrate to the Local Planning Authority that in accordance with the National Planning Policy Framework (NPPF)¹ the site may be developed for a residential end use and that appropriate site investigation and risk assessment works are in place to allow conditional approval of any future planning application.

A summary of the site details is presented in Table 1-1. Figure 1 indicates the site location and boundary plan. Figure 2 indicates the proposed development.

Location	End of Lancaster Avenue, adjacent to 1 Lancaster Avenue, Whitefield, Manchester. National Grid Reference 381042E, 405338N.
Area	Approximately 100m ² .
Topography	102 metres above ordnance datum (AOD). Slight downward gradient to north-east.
Current Site Use	Vacant plot of land with no discernible features. Overgrown with vegetation.
Proposed Development	Erection of 1no. two storey dwelling with off street parking.

Table 1-1: Summary of site details.

2. Summary of Preliminary Risk Assessment (PRA)

Pertinent information has been summarised from the PRA in Table 2-1.

Main Historical Features	Onsite: Vacant land. Surrounding Area: Ponds, railway line, reservoir, tank, refuse tip.
Geology / Hydrogeology	Artificial: Made ground associated with the railway line to the west. Superficial: Glaciofluvial deposits (sand and gravel) likely underlain by Glacial Till (Diamicton). Secondary A Aquifer. Bedrock: Nob End Rock (sandstone). Secondary A Aquifer.
Landfills / Infilled Ground	Historic refuse tip (43m south-west, 1969). Potentially infilled ground identified.
Site Reconnaissance	The site occupies a rectangular shaped plot of vacant land. The site has no features. The exposed soil contains inclusions including gravels, cobbles of brick, concrete, metal and plastic. In the northern corner of the site there is a small stockpile of broken concrete fence panels, bricks, gravels, rubble and a plastic sheet. A small stockpile of bags of cement was located south of the centre along the eastern site boundary.

Table 2-1: Summary of site details, historical review, environmental settings, and site reconnaissance.

2.1. Conceptual Model

The contamination conceptual model in the bEk Enviro report has been updated to be in line with LKC current risk assessment methodology (detailed below). The model is based on the contamination sources, pathways and receptors identified in the original report. LKC also consider the following should be considered:

- Potable water supply.

The conceptual model is based on the future use of the site (post development), in line with proposed development scheme.

Due to the minor consequence associated with the phytotoxic effect to flora (i.e., loss of plants in a landscaping scheme), the overall risk for most sites will be very low to low. Where soils contain significant concentrations of heavy metals, in general there will other pollutant linkages (i.e., the risk to human health) that will trigger the requirement for remediation (e.g., a clean environmental cover system). As such the risk to flora associated with phytotoxic contaminants will not be considered further.

The risk to buildings associated with elevated sulphate will be considered as part of the geotechnical assessment and will not be included in the contamination risk assessment.

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk
1	Metals, PAHs, petroleum hydrocarbons, asbestos (adjacent to railway land, made ground onsite, rubble onsite)	Dermal contact. Inhalation of soil, fibres, and dust. Ingestion of soils, dust, home-grown produce, soil attached to home-grown produce. Windblown dust.	Future site users. Offsite receptors.	Low Likelihood	Medium	Moderate / Low
2	Naphthalene, petroleum hydrocarbons (adjacent to railway land, made ground onsite, rubble onsite)	Inhalation of vapours. Migration via permeable strata and preferential pathways.	Future site users. Offsite receptors.	Unlikely	Medium	Low
3	Hazardous / ground gas: methane, carbon dioxide (historic refuse tip offsite (pond), made ground onsite)	Migration via permeable strata and preferential pathways. Inhalation of gas. Explosion in confined spaces.	Future site users. Buildings. Offsite receptors.	Low likelihood	Severe	Moderate
4	Metals, PAHs, petroleum hydrocarbons (adjacent to railway land, made ground onsite, rubble onsite)	Surface run-off. Migration via permeable strata and preferential pathways. Perched waters migration.	Groundwater Surface water	Unlikely	Medium	Low
5	PAHs, petroleum hydrocarbons (adjacent to railway land, made ground onsite, rubble onsite)	Ingestion of tainted water supply.	Future site users. Water pipes.	Low Likelihood	Medium	Moderate / Low

Table 2-2: Preliminary Contamination Conceptual Model.

3. Ground Investigation

3.1. Site Investigation Design and Methodology

The investigation was carried out on 9th October 2025 and comprised the following:

- 5no. hand pits (using hand auger / spade) excavated to 0.85-1.20mbgl (ref. HDP101 to HDP105).

All site investigation locations are shown in Figure 3.

The locations were chosen to allow adequate assessment of ground conditions across the site. Table 3-1 details the site investigation locations.

Site Investigation Locations	Rationale
HDP101, HDP102	Under proposed rear garden to assess contamination risk.
HDP103, HDP104	Under footprint of proposed property to assess contamination risk.
HDP105	Under proposed site entrance to assess risk to potable water.

Table 3-1: Summary of Sampling Locations.

The number of site investigation points corresponds to approximately one location per 5m square centres. This is considered to be a conservative sampling density and is in line with BS10175² for a 'detailed investigation'.

3.2. Sampling Protocol

3.2.1. Soil Sampling (Contamination)

Soil sampling was not carried out as part of this investigation.

Although moderate / low risk was identified in the preliminary contamination conceptual model for human health (Pollutant Linkage 1 & 2), LKC did not consider soil testing to be required due to the ground conditions encountered and the small scale of the proposed development. This is discussed further in Section 5.

3.2.2. Water Sampling

Groundwater sampling was not carried out as part of this investigation.

A low risk was identified in the preliminary contamination conceptual model for controlled waters (Pollutant Linkage 4) and further action was only recommended if visual evidence of potentially mobile contamination was identified on site. Based on the ground conditions encountered, LKC did not consider testing to be required. This is discussed further in Section 5.4.

3.3. Gas Monitoring

Gas monitoring was not carried out as part of this investigation.

A low / moderate risk was identified in the preliminary contamination conceptual model for gas (Pollutant Linkage 3) and further action was only recommended if significant organic / putrescible material was identified on site. Based on the ground conditions encountered, LKC did not consider gas monitoring to be required. This is discussed further in Section 5.3.

4. Ground Conditions

4.1. Geology

The ground conditions beneath the site are summarised below. Logs are provided in Appendix B.

4.1.1. Made Ground

Made ground was recorded in all hand dug pits to a maximum depth of 1.00mbgl. The made ground comprised:

- Dark brown gravelly sandy silt with brick fragments, rootlets, ash, clinker, plastic, ceramic, cloth, metal and breeze block. This was encountered within HDP102-HDP105 from ground level to 1.00mbgl.
- Dark brown very gravelly silty sand with ash, brick fragments, rootlets, bricks, ceramic, glass and metal was encountered within HDP101 from ground level to 0.70mbgl.

4.1.2. Natural Strata

Superficial strata was encountered from the base of the made ground to the extent of the hand dug pits and comprised:

- Soft consistency slightly gravelly sandy silt was encountered within HDP101, HDP103-HDP105 from 0.55m to 1.10mbgl to depths of >1.20mbgl.
- Slightly gravelly silty sand was encountered within HDP102 from 0.85mbgl to depths of >1.10mbgl.
- Fibrous slightly sandy silty peat was encountered from 0.80-1.10mbgl within HDP103.

Bedrock was not encountered during this investigation.

4.1.3. Contamination

There was no visual / olfactory evidence of fuel related hydrocarbons or volatile contaminants in any locations. The PID recorded a maximum of 0.1ppm TVOC in the samples. Anthropogenic material was identified in the soil.

4.1.4. Obstructions

No obstructions were identified within any investigation location.

4.2. Groundwater

4.2.1. Groundwater Levels

Groundwater strikes were recorded during the investigation in trial pits and boreholes. This data is provided in the profile logs (Appendix B). A groundwater strike was recorded at 1.20mbgl within HDP105. All other exploratory holes were dry.

4.2.2. Contamination

No evidence of contamination was identified in the groundwater during investigation work or monitoring. No free phase hydrocarbons were detected.

5. Generic Risk Assessment

5.1. Introduction

Current good practice requires that the findings from a site investigation should be evaluated on a site-specific basis, using a risk-based approach. Risk assessment involves identification and evaluation of the hazards followed by an evaluation of the risks which are associated with these hazards (LCRM³). Information gathered from the risk assessment has been collated in the revised contamination conceptual model in Section 5.6.

5.2. Soil Risk Assessment

5.2.1. Direct Contact Risk – Pollutant Linkage 1

Ash, clinker and ceramic have been noted in the made ground soils on site. These will likely be a source of heavy metals and PAHs within the made ground soils.

These contaminants are considered to pose a potential risk to future site users (residents) in the garden area, where made ground may be exposed / in contact with homegrown produce. The principal pathways are the ingestion pathways (soil, dust, and homegrown produce) and dermal contact.

LKC considers the probability of heavy metals and PAHs contamination affecting site users (via ingestion and dermal contact) as likely. Given a medium consequence a moderate risk is considered appropriate and remediation is recommended.

No visual or olfactory evidence of fuel related petroleum hydrocarbon contamination was noted during the site investigation. Therefore, the probability of these contaminants posing a risk to site users is considered unlikely. With a medium consequence, the risk is considered to be low and no remediation is recommended.

5.2.2. Risk from Inhalation of Vapours – Pollutant Linkage 2

No visual / olfactory evidence of volatile contaminants was identified during the investigation. The PID did not detect any significant TVOCs.

LKC therefore consider the probability of volatile contaminants affecting site users as unlikely. The consequence is expected to be medium, giving a low risk and no remediation is required.

5.3. Gas Risk Assessment

Gas monitoring was not carried out as part of this assessment. The PRA identified a moderate risk of hazardous or ground gas and recommended gas monitoring if a significant depth of organic / putrescible material was identified.

Made ground onsite was identified to a depth of 0.55-1.00mbgl and was encountered across the site.

In line with CL:AIRE Research Bulletin 17⁴ where made ground is 1m or less and no significant organic / putrescible material is present, the site can be classified as Characteristic Situation 1 and no gas protection measures are required.

One location had a thin layer of peat (0.8-1.1mbgl). As per guidelines in NHBC⁵ this material is unlikely to generate sufficient hazardous gas concentrations at significant rates to generate a risk to the future development.

The offsite 'historical tip' mentioned in the bEk report appears to be a small pond that has been developed and this feature along with historical reservoirs within 250m of the site should not be a risk to the future development, considering the age and likely enclosed nature of these potentially infilled features.

LKC therefore confirm the probability of gas affecting receptors is unlikely. With a severe consequence, the risk is moderate / low.

5.4. Controlled Water Assessment

The PRA identified a low risk with respect to controlled waters as no significant source of mobile contamination was anticipated. Furthermore, although a Principal Aquifer is present below the site, no abstractions have been identified within influencing distance and the site is not located in a Source Protection Zone. There are no surface water features within 250m of site.

No evidence of significant mobile contamination was identified on the site. Although metals and PAHs are likely to be present onsite within the made ground, the source is anticipated to be ash and clinker. Contamination associated with ash and clinker is not anticipated to be mobile due to the residual crystalline nature of the matrix.

The site investigation did not identify any significant sources of likely mobile contamination within the soils. This coupled with the low thickness of made ground would generate an unlikely probability of onsite contamination affecting controlled waters. With a medium consequence the risk is anticipated to be low, and no remediation is required.

5.5. Potable Water Supply (Pollutant Linkage 5)

In the area of site where potable water supply pipes are likely to be installed (HDP105) made ground was encountered to 0.55mbgl. Supply pipes are likely to be installed in natural strata between 0.75-1.35mbgl

The probability of organic contaminants affecting potable water pipes is unlikely. Given the consequence is considered to be medium, the risk (Pollutant Linkage 5) is anticipated to be low risk and no remediation is likely to be required.

Once details of the pipeline location and depths are known a UU Water Pipe Risk Assessment in line with the utility provider should be undertaken to confirm the most appropriate pipework for potable water.

5.6. Revised Contamination Conceptual Model

The preliminary contamination conceptual model (Table 2-3) has been revised following the risk assessments undertaken in Sections 5.1-5.4. The revised contamination conceptual model follows the same methodology and guidance used in the preliminary contamination conceptual model. The risk matrix is provided in Appendix A.

The revised contamination conceptual model is presented in Table 5-1.

Where a very low risk or low risk is identified no specific remediation is required.

Where there is a moderate / low risk is identified, some form of remediation may be required depending on the pollutant linkage, the type and concentration of contaminants present and the proposed development.

Where LKC identifies a moderate or higher risk, remediation or further investigation work is recommended.

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk	Justification and Recommendations
1	Metals, PAHs, (adjacent to railway land, made ground onsite, rubble onsite)	Dermal contact. Inhalation of soil, fibres, and dust. Ingestion of soils, dust, home-grown produce, soil attached to home-grown produce. Windblown dust.	Future site users. Offsite receptors.	Likely	Medium	Moderate	Anthropogenic material within made ground underneath proposed rear garden. Likely to be a source of contaminants. Recommendations: Removal of made ground required by 600mm to allow a clean environmental capping layer to be installed.
	Petroleum hydrocarbons (adjacent to railway land, made ground onsite, rubble onsite)			Unlikely	Medium	Low	No visual or olfactory evidence of hydrocarbon contamination noted during site investigation. Recommendations: No remediation required.
2	Naphthalene, petroleum hydrocarbons (adjacent to railway land, made ground onsite, rubble onsite)	Inhalation of vapours. Migration via permeable strata and preferential pathways.	Future site users. Offsite receptors.	Unlikely	Medium	Low	No evidence of volatile contamination encountered. Recommendation: No remediation required.
3	Hazardous / ground gas: methane, carbon dioxide (offsite historic refuse tip, made ground onsite)	Migration via permeable strata and preferential pathways. Inhalation of gas. Explosion in confined spaces.	Future site users. Buildings. Offsite receptors.	Unlikely	Severe	Moderate / Low	Shallow made ground (<1.00mbgl) encountered during site investigation. No significant source of ground gas encountered. Low risk from offsite sources migrating to the site. The peat encountered on site is not of significant thickness to generate a gas source or high flow rate. Recommendations: No remediation required.
4	Metals, PAHs, petroleum hydrocarbons (adjacent to railway land, made ground onsite, rubble onsite)	Surface run-off. Migration via permeable strata and preferential pathways. Perched waters migration.	Groundwater Surface water	Unlikely	Medium	Low	No significant source of likely mobile contamination encountered. Recommendations: No remediation required.
5	PAHs, petroleum hydrocarbons (adjacent to railway land, made ground onsite, rubble onsite)	Ingestion of tainted water supply.	Future site users. Water pipes.	Unlikely	Medium	Low	Made ground unlikely to be present at potable water supply installation depth. Recommendation: UU Risk Assessment to be undertaken once location of supply pipe known. Assumed PE pipe will be required.

Table 5-1: Revised Contamination Conceptual Model.

6. Conclusions

6.1. Ground Conditions

Ground conditions are summarised in Table 6-1 below.

Made Ground	Encountered within all exploratory holes from ground level to 1.00mbgl. Comprised sand or silt with ash, clinker, brick, concrete, glass, metal, plastic, ceramic and cloth.
Superficial	Encountered underlying the made ground to the base of the hand dug pits. Comprised sand and silt. A band of fibrous peat was encountered within HDP103 from 0.80-1.10mbgl.
Bedrock	Not encountered.
Groundwater	Not encountered.
Obstructions	None encountered.

Table 6-1: Summary of Ground Conditions.

6.2. Contamination Assessment

A revised contamination conceptual model has been produced by LKC which is summarised in Table 6-2 below (more detailed model provided in Section 5).

PL	Contaminant	Risk	Recommendations
1	Metals, PAHs	Moderate	Remediation required.
	Petroleum hydrocarbons	Low	No remediation required.
2	Petroleum hydrocarbons	Low	No remediation required.
3	Carbon dioxide, Methane	Moderate / Low	No remediation required.
4	Groundwater (mobile contaminants)	Low	No remediation required.
5	Organic contaminants.	Low	Utility provider risk assessment to be completed. The site will likely require PE piping.

Table 6-2: Summary Risk Table.

PL=Pollutant Linkage, see Table 5-1 for details.

7. Recommendations and Remediation Strategy

The recommendations/requirements provided below are considered appropriate for the site based on the site investigation work undertaken. LKC should stress that no remediation, enabling works or designing works should take place until Regulatory approval has been obtained.

The local authority may require a standalone Build-Phase Remediation Strategy and Verification Plan in accordance with LCRM Stage 3 remediation and verification⁶. This should be produced once details of design, contractors and installation are known.

A summary of remediation requirements is included in Table 7-1.

PL	Recommendation
1	Removal of made ground within garden areas by 600mm to accommodate a clean environmental cover system (600mm of clean soils over demarcation membrane).
2	No remediation required.
3	No remediation required.
4	No remediation required.
5	Potable water pipe assessment required.

Table 7-1: Remediation Summary.

7.1. Remediation and Validation Recommendations

7.1.1. Environmental Cover System (PL1)

As the made ground is relatively shallow across the site, it is recommended that levels are reduced and built up with suitable clean cover soils.

If the made ground remains in place in the garden area, an environmental cover system will be required. The environmental cover system should comprise 600mm depth in private gardens. The environmental cover system should be constructed as shown in Plate 7-1.

Either (physical break layer)			Or (geotextile membrane)		
600mm gardens. (minimum)	Chemically validated TOPSOIL ¹		600mm rear gardens. (minimum)	Chemically validated TOPSOIL ¹	
	Chemically validated SUBSOIL			Chemically validated SUBSOIL	
	100mm (minimum) PHYSICAL BREAK LAYER ²			GEOTEXTILE MEMBRANE (at base of subsoil)	
Existing MADE GROUND					

Plate 7-1: Typical Environmental Cover System Construction.

Notes:

Hardstood Areas – No Remediation Required.

¹NHBC recommend 100mm minimum topsoil depth.

²Gravel break layer, minimal fines.

Where there are TPO's in influencing distance of environmental cover systems it is likely the arboriculture officer may only allow a 100mm clean cover system over a geotextile membrane.

Validation of environmental cover soils will be required and should include measuring depth using a staff and providing photographic evidence. Photographic evidence of the granular physical break or geotextile layer should also be collected.

Chemical validation of imported soils is required, details are included in Section 7.3.

7.1.2. Potable Water Pipe Remediation (PL5)

It is recommended that a Water Pipeline Assessment⁷ is undertaken once the location and depth of potable water pipes are known. It is likely that PE pipe will be required.

Validation of pipeline installation should include delivery notes of pipe materials, photographs of installed pipe and confirmation of connections.

7.2. Other Considerations

7.2.1. Unexpected Contamination

The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required.

Impacted soils should be placed on an impermeable surface to await further assessment, treatment, or removal from site (this may be subject to chemical testing to confirm suitable waste facility). The work should be done under the supervision and instruction of an environmental consultant.

To determine that significantly impacted soils have been removed, verification samples will be collected from the base and sides of the excavation. If all impacted ground cannot be removed and contamination remains on the ground, further remediation may need to be considered.

Validation requirements should include a log of work undertaken, including photographs and details of any sampling undertaken and validation of any potential additional remedial work.

7.2.2. Re-use of Site Generated Material

To ensure material is compliant with appropriate waste regulations, any site won material re-used onsite should be in recourse to appropriate exemptions. A U1 and T5 exemption should be registered. This will allow the following to be used onsite or brought in for use onsite (refer to guidance for types of waste that can be used⁸):

- 5,000 tonnes (c. 2,500m³) treatment of crushed concrete / stone.
- 1,000 tonnes (c. 500m³) use of non-hazardous soil.
- 5,000 tonnes (c. 2,500m³) use of clays, sand, gravel, brick, concrete, stone etc.
- 50,000 tonnes (c. 25,000m³) use of bituminous material to be used in roadways.

A Materials Management Plan (MMP) with recourse to the CL:AIRE Code of Practice⁹ may be required if volumes exceed exemption limits. This must be registered before material movement starts onsite.

If an MMP is required, this needs to be registered by a Qualified Person (QP) and there must be 'certainty of use' for any material re-used onsite or exported to site to ensure there is no 'sham recovery'.

For all the above material will need to be tested at the rate and analytical suites presented in Table 7-2.

7.2.3. Stockpile Management

Stockpiled material should be suitably managed. Material should be segregated by type and source. For example, construction / demolition arisings, site won subsoil. Stockpiles may also require covering to minimise the generation of vapours, fibres, dust, and possible nuisance to adjacent receptors, and to prevent rainwater ingress. The source of each stockpile should be recorded and appropriate validation testing for re-use or potential offsite disposal should be undertaken as required.

7.2.4. Disposal

Material required to be removed from site should be undertaken under an appropriate duty of care and the results of chemical analysis should be provided to a licensed landfill for confirmation of waste classification.

Waste records such as disposal tickets and waste carrier licences should be provided in the Site Completion Report. Photographic evidence of removal and waste removal tickets should be retained and included in the validation report.

7.2.5. Control of Water

If significant organic contamination is present or to chase out deeper obstructions some localised excavation below the groundwater table may be required. Contingency arrangements to remove groundwater (including contaminated groundwater if encountered) from excavations/ relict structures should be allowed.

Small volumes of pumped fluids/ groundwater may be stored in appropriate, sealed tanks/containers and analysed for a range of determinants prior to disposal to suitable facility. Alternatively, a temporary discharge licence, including their requirements for treatment/ testing should be agreed with local utility providers (United Utilities) prior to start on site.

Where relict structures are found to retain fluid contaminants, they should be drained prior to removal.

7.2.6. Health and Safety Considerations

In working with, removing, or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance¹⁰) should be adopted by all workers involved with site enabling and construction works.

7.3. Validation of Imported / Site Won Soils

Chemical validation of all imported and site-won soils to be used on site in gardens should be undertaken. Imported soils should be accompanied by a certificate of analysis and source details.

A summary of the required imported material sampling requirements is presented in Table 7-2 and is based on the slightly modified YALPAG guidance (2021)¹¹ based on a general worst case scenario. Ideally, the material should be sampled at source to prevent double handling if soil fails, with confirmatory sampling undertaken on importation to site. Where this is not possible then material imported should be segregated based on source and soil type. Validation samples should be taken prior to placement in gardens to ensure suitability for use.

Material Type	Source	Suite of Analysis	Sampling Rate
Virgin Quarried Material	First generation quarried material (stone / subsoil)	Suite A	1 or 2 depending upon the type of stone / subsoil utilised to confirm the inert nature of the material.
Crushed Hardcore Stone and Brick (excluding asphalt)	Recycled (no volatile staining)	Suite A*	1 sample per 500m ³
General Fill	Imported fill – Greenfield / manufactured	Suite A*	1 sample per 500m ³
	Imported fill - Brownfield	Suite B*	
Topsoil / Subsoil	Greenfield / manufactured / natural site-won soil	Suite A*	^A 1 sample per 50m ³
	Brownfield / Screened Soils / site won made ground	Suite B**	^B 1 sample per 50m ³

Table 7-2: Sampling Requirements for Imported and Site Won Soils.

Notes:

Suite A - Heavy metals, pH, water soluble sulphate, speciated PAH, soil organic matter and asbestos screen.

Suite B - Heavy metals, pH, water soluble sulphate, speciated PAH, phenol, total and free cyanide, soil organic matter, asbestos screen, banded petroleum hydrocarbons (TPH CWG), BTEX, MTBE.

*Minimum sampling rate of 3 samples per source.

**Minimum sampling rate of 6 samples per source.

^A YAPALG states Between 1 sample per 50m³ and 1 sample per 250m³. Worst case assumed.

^B YAPALG states Between 1 sample per 50m³ and 1 sample per 100m³. Worst case assumed.

Any soil with visual or olfactory evidence of hydrocarbons should be rejected.

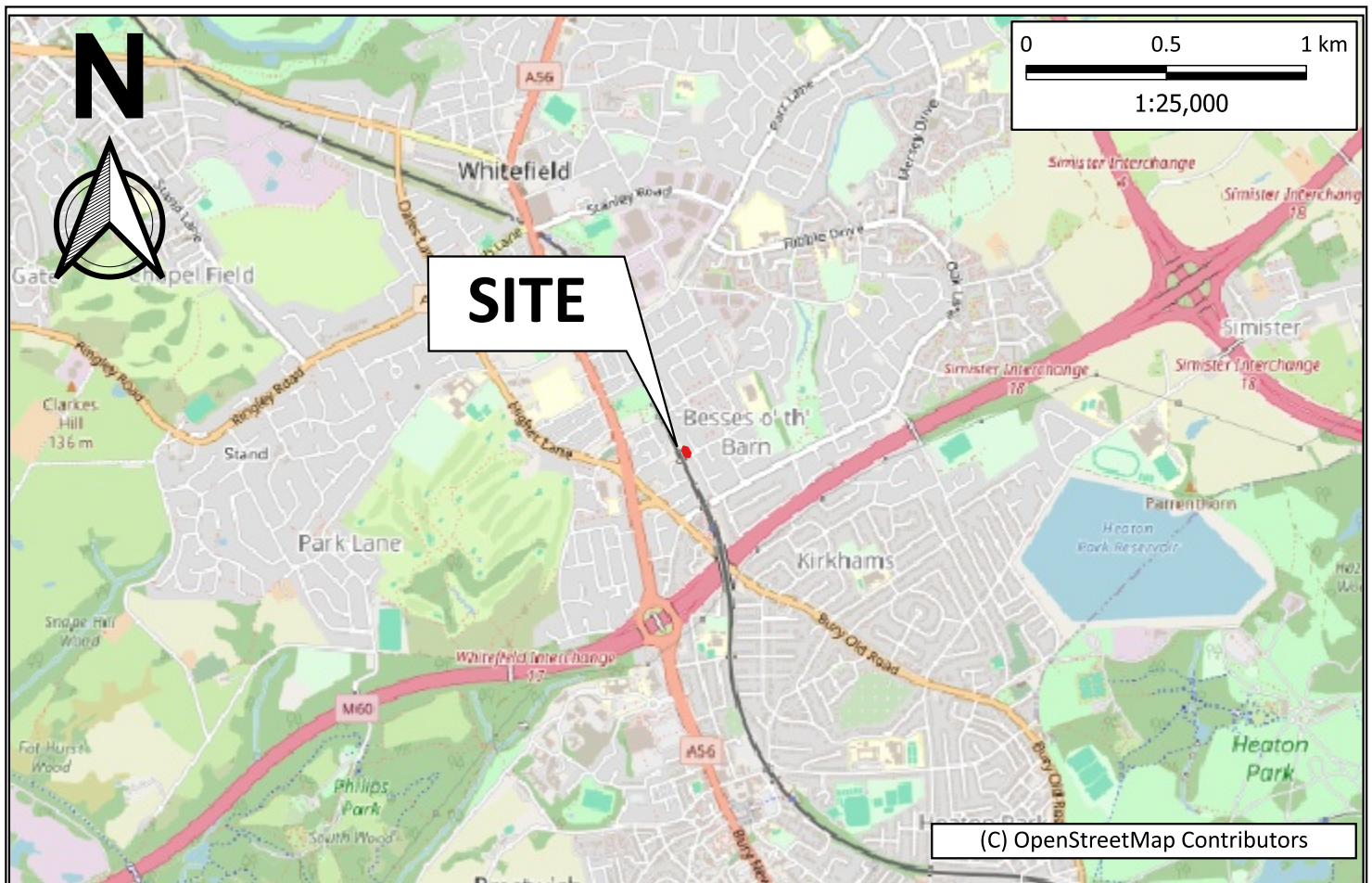
It should be ensured that the matrix of imported topsoil is suitable as a growing medium in line with BS3882¹². Topsoil soil shall be free of weeds, roots or perennial weeds, pests, diseases, debris, tree roots, sticks, subsoil and foreign matter and shall be capable of being broken down to a fine tilth. LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in gardens will be compared against residential with plant uptake criteria shown in Appendix C.

7.4. Site Completion Report

All remediation and validation work should be documented in a Site Completion Report. The Site Completion Report will allow discharge of relevant planning conditions.

Figures



Client:

Paul Power

Site:

Lancaster Avenue, Whitefield

Job
No.:

LKC 251560

Drawn By:
MB

Checked By:	CC
-------------	----

Drawn:

OCT 2025

Title:

Site Location & Boundary Plan

Scale (see scale bar):

1:25,000
1:1250 @ A4

Figure:

1

Revision:

1



LK CONSULT



1800mm high
close boarded
timber fence

proposed
new house
FFL - 102.45

existing
fence

RAILWAY
EMBANKMENT
(OVERGROWN)

bottom of —
embankment

existing
drop kerb



Site Boundary

Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.



LK CONSULT

Client:

Paul Power

Site:

Lancaster Avenue, Whitefield

Title:

Proposed Development Plan

Job No.:

LKC251560

Scale (See Scale Bar):

See Scale Bar

Figure:

Figure:	Revision:
---------	-----------

1

Revision:

REVISION.

Extract From: PWL Architecture
Drawing Ref: Boundary Treatment Plan, No.1392-PL10A



KEY

Site Boundary

Hand Dug Trial Pit (HD)

Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.

LK CONSULT

Client:			
Paul Power			
Site:			
Lancaster Avenue, Whitefield			
Title:			
Site Investigation Location Plan			
Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC251560	See Scale Bar	3	
Drawn By:	Checked By:		
AC	LD	Oct 2025	

Appendix A – Risk Matrix

RISK EVALUATION

The method for risk evaluation is a qualitative method of interpreting the output from the risk estimation stage of the assessment, based on CIRIA 552¹³. It involves the classification of the:

- Magnitude of the potential consequence (severity) of the risk occurring (Table A).
- Magnitude of the probability (likelihood) of the risk occurring (Table B).

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

Table A. Classification of Consequence

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

Table B. Classification of Probability.

These classifications are then compared to indicate the risk presented by each pollutant linkage (Table C). It is important that this classification is only applied where there is a possibility (which can range from high likelihood to unlikely) of a pollutant linkage existing.

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table C. Comparison of Consequence against Probability

Once the risk has been determined the corresponding action can be assessed (Table D).

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

Table D. Description of the Classification and Likely Action Required.

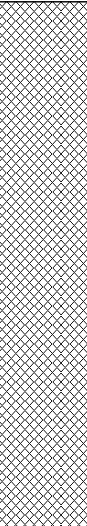
Where a very low risk is identified no specific remediation is required.

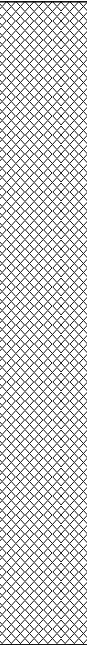
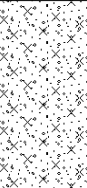
Where a low risk is identified, some form of remediation may be required depending on the pollutant linkage, the type and concentration of contaminants present and the proposed development.

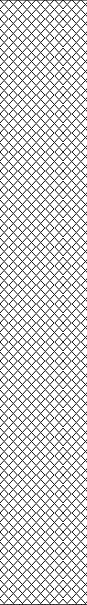
Where there is a moderate/low risk identified, an assessment will be undertaken to establish what category the pollutant linkage will fall into.

Where LKC identifies a moderate or higher risk, remediation or further investigation work is recommended.

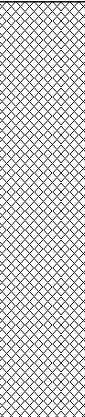
Appendix B – Profile Logs

 LK CONSULT		Trial Pit Log				Location Ref: HD101		
Project: Lancaster Avenue, Whitefield			Client: Paul Power			Date: 08/10/2025		
Project No. : LKC251560			Contractor: LKC			Co-ords: 381049.92E, 405339.44N +/- 5m		
Equipment: Hand Excavation Tools			Level	Logged By LGD		Scale 1:10	Page Number Sheet 1 of 1	
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description				
0.00-0.50 0.00-0.50 0.00-0.50	D ES PID=0.1ppm			MADE GROUND: Dark brown very gravelly silty SAND with frequent ash, brick fragments, occasional rootlets, whole brick, ceramic fragments, glass fragments and metal fragment. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and anthropogenic material.				0.5
		0.70		Soft consistency dark brown slightly gravelly sandy SILT. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. [Glaciofluvial Deposits, Devensian]				
		0.85		End of Borehole at 0.85m				1.0
								1.5
			Pit Dimensions				Pit Stability	
			Length (m)	Width (m)	Depth (m)	Stable		
			0.30	0.20	0.80			
Remarks: Hand excavated trial pit to 0.85mbgl. Trial pit dry. Trial pit terminated at 0.80mbgl due to cobble at base of trial pit.								

 LK CONSULT		Trial Pit Log				Location Ref: HD102				
Project: Lancaster Avenue, Whitefield			Client: Paul Power			Date: 08/10/2025				
Project No. : LKC251560			Contractor: LKC			Co-ords: 381062.44E, 405332.46N +/- 5m				
Equipment: Hand Excavation Tools			Level		Logged By LGD		Scale 1:10		Page Number Sheet 1 of 1	
Depth (m)		Samples / Tests		Depth (m)	Legend	Stratum Description				
0.00-0.85 0.00-0.85		ES PID=0.1ppm				MADE GROUND: Dark brown gravelly sandy SILT with occasional rootlets, ash, brick fragments, rare rubber, plastic fragments and ceramic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and anthropogenic material.				0.5
				0.85		Light brown slightly gravelly silty SAND. Sand is fine to coarse. Gravel is fine to medium, subrounded comprising sandstone. [Glaciofluvial Deposits, Devensian]				1.0
				1.10		End of Borehole at 1.10m				1.5
		Pit Dimensions				Pit Stability				
		Length (m)		Width (m)		Depth (m)		Stable		
		0.30		0.20		1.10				
		Remarks:								
Hand excavated trial pit to 1.10mbgl. Trial pit dry. Trial pit terminated at 1.10mbgl due to cobble at base of trial pit.										

LK CONSULT		Trial Pit Log				Location Ref: HD103	
Project: Lancaster Avenue, Whitefield			Client: Paul Power			Date: 08/10/2025	
Project No. : LKC251560			Contractor: LKC			Co-ords: 381062.40E, 405318.39N +/- 5m	
Equipment: Hand Excavation Tools			Level	Logged By LGD	Scale 1:10	Page Number Sheet 1 of 1	
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description			
0.80-1.10 0.80-1.10	ES PID=0.0ppm	0.80		MADE GROUND: Dark brown gravelly sandy SILT with frequent brick fragments, occasional ash, clinker, glass fragments, plastic fragments, rare ceramic fragments, metal fragments and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and anthropogenic material.			0.5
		1.10		Dark brown Pseudo fibrous slightly sandy silty PEAT. Sand is fine to medium [Glaciofluvial Deposits, Devensian]			1.0
		1.20		Soft consistency light brown sandy SILT. Sand is fine to coarse. [Glaciofluvial Deposits, Devensian]			
				End of Borehole at 1.20m			1.5
				Pit Dimensions			Pit Stability
				Length (m)	Width (m)	Depth (m)	Stable
				0.30	0.20	1.20	
				Remarks:			
				Hand excavated trial pit to 1.20mbgl. Trial pit dry.			

 LK CONSULT		Trial Pit Log					Location Ref: HD104	
Project: Lancaster Avenue, Whitefield			Client: Paul Power			Date: 08/10/2025		
Project No. : LKC251560			Contractor: LKC			Co-ords: 381055.59E, 405320.84N +/- 5m		
Equipment: Hand Excavation Tools			Level	Logged By LGD		Scale 1:10	Page Number Sheet 1 of 1	
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description				
				MADE GROUND: Dark brown gravelly sandy SILT with frequent brick fragments, occasional rootlets, ash, clinker, plastic fragments, ceramic fragments, cloth, metal fragments and breeze block fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and anthropogenic material.				0.5
		1.00		Soft consistency light brown slightly gravelly sandy SILT. Sand is fine to coarse. Gravel is fine to medium, subangular to subrounded comprising sandstone. [Glaciofluvial Deposits, Devensian]				1.0
		1.20		End of Borehole at 1.20m				1.5
			Pit Dimensions				Pit Stability	
			Length (m)	Width (m)	Depth (m)	Stable		
			0.40	0.20	1.20			
			Remarks:					
			Hand excavated trial pit to 1.20mbgl. Trial pit dry.					

 LK CONSULT		Trial Pit Log					Location Ref: HD105	
Project: Lancaster Avenue, Whitefield			Client: Paul Power			Date: 08/10/2025		
Project No. : LKC251560			Contractor: LKC			Co-ords: 381067.22E, 405325.62N +/- 5m		
Equipment: Hand Excavation Tools			Level	Logged By LGD	Scale 1:10	Page Number Sheet 1 of 1		
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description				Water Strikes
		0.55		MADE GROUND: Dark brown slightly gravelly slightly sandy SILT with occasional rootlets, rare brick fragments and clinker . Sand is fine to medium. Gravel is fine to medium, subangular to subrounded comprising sandstone.			0.5	
		1.00		Soft consistency light brown sandy SILT. Sand is fine to medium. [Glaciofluvial Deposits, Devensian]			1.0	
		1.20		Light brown silty SAND. Sand is fine to coarse. [Glaciofluvial Deposits, Devensian]				
				End of Borehole at 1.20m			1.5	▼
			Pit Dimensions				Pit Stability	
			Length (m)	Width (m)	Depth (m)	Stable		
			0.40	0.20	1.20			
			Remarks:					
			Hand excavated trial pit to 1.20mbgl. Groundwater strike at 1.20mbgl.					

Appendix C – Generic Assessment Criteria Values

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}	Source
Metals	Inorganic Arsenic	N/A	37	40	49	640	79	168	DEFRA C4SL
	Beryllium	N/A	1.7	1.7	35	12	2.2	63	LQM S4UL
	Boron	N/A	290	11,000	45	240,000	21,000	46,000	LQM S4UL
	Cadmium	N/A	26	149	4.9	410	220	880	DEFRA C4SL
	Chromium (III)	N/A	910	910	18,000	8,600	1,500	33,000	LQM S4UL
	Chromium (VI)	N/A	21.0	21.0	170.0	49	23.0	250	DEFRA C4SL
	Copper	N/A	2,400	7,100	520	68,000	12,000	44,000	LQM S4UL
	Lead	N/A	200	310	80	2,330	630	1,300	DEFRA C4SL
	Elemental Mercury	N/A	1.2	1.2	21	58 (25.8) ^{vap}	16	30 (25.8) ^{vap}	LQM S4UL
	Inorganic Mercury	N/A	40	56	19	1,100	120	240	LQM S4UL
	Methylmercury	N/A	11	15	6.0	320	40	68	LQM S4UL
	Nickel	N/A	130	180	53	980	230	800	LQM S4UL
	Selenium	N/A	250	430	88	12,000	1,100	1,800	LQM S4UL
Polycyclic Aromatic Hydrocarbons (PAHs)	Vanadium	N/A	410	1,200	91	9,000	2,000	5,000	LQM S4UL
	Zinc	N/A	3,700	40,000	620	730,000	81,000	170,000	LQM S4UL
	Acenaphthene	1%	210	3,000 (57.1) ^{sol}	34	84,000 (57.0) ^{sol}	15,000	29,000	LQM S4UL
		2.5%	510	4,700 (141) ^{sol}	85	97,000 (141) ^{sol}	15,000	30,000	LQM S4UL
		6%	1,100	6,000 (336) ^{sol}	200	100,000	15,000	30,000	LQM S4UL
	Acenaphthylene	1%	170	2,900 (86.1) ^{sol}	28	83,000 (86.1) ^{sol}	15,000	29,000	LQM S4UL
		2.5%	420	4,600 (212) ^{sol}	69	97,000 (212) ^{sol}	15,000	30,000	LQM S4UL
		6%	920	6,000 (506) ^{sol}	160	100,000	15,000	30,000	LQM S4UL
	Anthracene	1%	2,400	31,000 (1.17) ^{vap}	380	520,000	74,000	150,000	LQM S4UL
		2.5%	5,400	35,000	950	540,000	74,000	150,000	LQM S4UL
		6%	11,000	37,000	2,200	540,000	74,000	150,000	LQM S4UL
	Benz(a)anthracene	1%	7.2	11	2.9	170	29	49	LQM S4UL
		2.5%	11	14	6.5	170	29	56	LQM S4UL
		6%	13	15	13	180	29	62	LQM S4UL
	Benzo(a)pyrene (only)	1%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
		2.5%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
		6%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
	Benzo(a)pyrene (surrogate marker Coal Tar)	1%	0.8	1.2	0.32	15	2.2	4	LQM S4UL
		2.5%	1.0	1.2	0.67	15	2.2	5	LQM S4UL
		6%	1.1	1.2	1.20	15	2.2	5	LQM S4UL
	Benzo(b)fluoranthene	1%	2.6	3.9	0.99	44	7.1	13	LQM S4UL
		2.5%	3.3	4.0	2.1	44	7.2	15	LQM S4UL
		6%	3.7	4.0	3.9	45	7.2	16	LQM S4UL
	Benzo(ghi)perylene	1%	320	360	290	3,900	640	1,400	LQM S4UL
		2.5%	340	360	470	4,000	640	1,500	LQM S4UL
		6%	350	360	640	4,000	640	1,600	LQM S4UL
	Benzo(k)fluoranthene	1%	77	110	37	1,200	190	370	LQM S4UL
		2.5%	93	110	75	1,200	190	410	LQM S4UL
		6%	100	110	130	1,200	190	440	LQM S4UL
	Chrysene	1%	15	30	4.1	350	57	93	LQM S4UL
		2.5%	22	31	9.4	350	57	110	LQM S4UL
		6%	27	32	19	350	57	120	LQM S4UL
	Dibenzo(ah)anthracene	1%	0.24	0.31	0.14	3.5	0.57	1.1	LQM S4UL
		2.5%	0.28	0.32	0.27	3.6	0.58	1.3	LQM S4UL
		6%	0.3	0.32	0.43	3.6	0.58	1.4	LQM S4UL
	Fluoranthene	1%	280	1,500	52	23,000	3,100	6,300	LQM S4UL
		2.5%	560	1,600	130	23,000	3,100	6,300	LQM S4UL
		6%	890	1,600	290	23,000	3,100	6,400	LQM S4UL
	Fluorene	1%	170	2,800 (36.0) ^{sol}	27	63,000 (30.9) ^{sol}	9,900	20,000	LQM S4UL
		2.5%	400	3,800 (76.5) ^{sol}	67	68,000	9,900	20,000	LQM S4UL
		6%	860	4,500 (183) ^{sol}	160	71,000	9,900	20,000	LQM S4UL
	Indeno(123-cd)pyrene	1%	27	45	9.5	500	82	150	LQM S4UL
		2.5%	36	46	21	510	82	170	LQM S4UL
		6%	41	46	39	510	82	180	LQM S4UL
	Naphthalene	1%	15	15	65	1600 f	11000 f	800 f	C4SL
		2.5%	36	36	130	3700 f	15000 f	1200 f	C4SL
		6%	85	85	200	8400 f	17000 f	1900 f	C4SL
	Phenanthrene	1%	95	1,300 (36.0) ^{sol}	15	22,000	3,100	6,200	LQM S4UL
		2.5%	220	1,500	38	22,000	3,100	6,200	LQM S4UL
		6%	440	1,500	90	22,000	3,100	6,300	LQM S4UL
	Pyrene	1%	620	3,700	110	54,000	7,400	15,000	LQM S4UL
		2.5%	1,200	3,800	270	54,000	7,400	15,000	LQM S4UL
		6%	2,000	3,800	620	54,000	7,400	15,000	LQM S4UL
	Coal Tar (B(a)P as surrogate marker)	1%	0.79	1.2	0.32	15	2.2	4.4	LQM S4UL
		2.5%	0.98	1.2	0.67	15	2.2	4.7	LQM S4UL
		6%	1.1	1.2	1.2	15	2.2	4.8	LQM S4UL

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}	Source
BTEx Compounds	Benzene	1%	0.087	0.38	0.017	27	72	90	LQM S4UL
		2.5%	0.17	0.70	0.034	47	72	100	LQM S4UL
		6%	0.37	1.4	0.075	90	73	110	LQM S4UL
		6%	0.87	3.3	0.180	98	140	230	C4SL
	Toluene	1%	130	880 (869) ^{vap}	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}	LQM S4UL
		2.5%	290	1,900	51	110,000 (1,920) ^{vap}	56,000	95,000 (1,920) ^{vap}	LQM S4UL
		6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360) ^{vap}	LQM S4UL
	Ethylbenzene	1%	47	83	16	5,700 (518) ^{vap}	24,000	17,000 (518) ^{vap}	LQM S4UL
		2.5%	110	190	39	13,000 (1,220) ^{vap}	24,000	22,000 (1,220) ^{vap}	LQM S4UL
		6%	260	440	91	27,000 (2,840) ^{vap}	25,000	27,000 (2,840) ^{vap}	LQM S4UL
	o-xylene	1%	60	88	28	6,600 (478) ^{sol}	41,000	17,000 (478) ^{sol}	LQM S4UL
		2.5%	140	210	67	15,000 (1,120) ^{sol}	42,000	24,000 (1,120) ^{sol}	LQM S4UL
		6%	330	480	160	33,000 (2,620) ^{sol}	43,000	33,000 (2,620) ^{sol}	LQM S4UL
	m-xylene	1%	59	82	31	6,200 (625) ^{vap}	41,000	17,000 (625) ^{vap}	LQM S4UL
		2.5%	140	190	74	14,000 (1,470) ^{vap}	42,000	24,000 (1,470) ^{vap}	LQM S4UL
		6%	320	450	170	31,000 (3,460) ^{vap}	43,000	32,000 (3,460) ^{vap}	LQM S4UL
	p-xylene	1%	56	79	29	5,900 (576) ^{sol}	41,000	17,000 (576) ^{sol}	LQM S4UL
		2.5%	130	180	69	14,000 (1,350) ^{sol}	42,000	23,000 (1,350) ^{sol}	LQM S4UL
		6%	310	430	160	30,000 (3,170) ^{sol}	43,000	31,000 (3,170) ^{sol}	LQM S4UL
Petroleum Hydrocarbons	Aliphatic								
	EC 5-6	1%	42	42	730	3,200 (304) ^{sol}	570,000(304) ^{sol}	95,000 (304) ^{sol}	LQM S4UL
	EC>6-8	1%	100	100	2,300	7,800 (144) ^{sol}	600,000	150,000 (144) ^{sol}	LQM S4UL
	EC>8-10	1%	27	27	320	2,000 (78) ^{sol}	13,000	14,000 (78) ^{vap}	LQM S4UL
	EC>10-12	1%	130 (48) ^{vap}	130 (48) ^{vap}	2,200	9,700 (48) ^{sol}	13,000	21,000 (48) ^{vap}	LQM S4UL
	EC>12-16	1%	1,100 (24) ^{sol}	1,100 (24) ^{sol}	11,000	59,000 (24) ^{sol}	13,000	25,000 (24) ^{sol}	LQM S4UL
	EC>16-35	1%	65,000 (8.48)	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f	LQM S4UL
	EC>35-44	1%	65,000 (8.48)	65,000 (8.48) ^{f, sol}	260,000 ^f	160,000 ^f	250,000 ^f	450,000 ^f	LQM S4UL
	Aliphatic								
	EC 5-6	2.5%	78	78	1,700	5,900 (558) ^{sol}	590,000	130,000 (558) ^{sol}	LQM S4UL
	EC>6-8	2.5%	230	230	5,600	17,000 (322) ^{sol}	610,000	220,000 (322) ^{sol}	LQM S4UL
	EC>8-10	2.5%	65	65	770	4,800 (190) ^{vap}	13,000	18,000 (190) ^{vap}	LQM S4UL
	EC>10-12	2.5%	330 (118) ^{vap}	330 (118) ^{vap}	4,400	23,000 (118) ^{vap}	13,000	23,000 (118) ^{vap}	LQM S4UL
	EC>12-16	2.5%	2,400 (59) ^{sol}	2,400 (59) ^{sol}	13,000	82,000 (59) ^{sol}	13,000	25,000 (59) ^{sol}	LQM S4UL
	EC>16-35	2.5%	92,000 (21)	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f	LQM S4UL
	EC>35-44	2.5%	92,000 (21)	92,000 (21) ^{f, sol}	270,000 ^f	1,700,000 ^f	250,000 ^f	480,000 ^f	LQM S4UL
	Aliphatic								
	EC 5-6	6%	160	160	3,900	12,000 (1,150) ^{sol}	600,000	180,000 (1,150) ^{sol}	LQM S4UL
	EC>6-8	6%	530	530	13,000	40,000 (736) ^{sol}	620,000	320,000 (736) ^{sol}	LQM S4UL
	EC>8-10	6%	150	150	1,700	11,000 (451) ^{vap}	13,000	21,000 (451) ^{vap}	LQM S4UL
	EC>10-12	6%	760 (283) ^{vap}	760 (283) ^{vap}	7,300	47,000 (283) ^{vap}	13,000	24,000 (283) ^{vap}	LQM S4UL
	EC>12-16	6%	4,300 (142) ^{sol}	4,400 (142) ^{sol}	13,000	90,000 (142) ^{sol}	13,000	26,000 (142) ^{sol}	LQM S4UL
	EC>16-35	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f	LQM S4UL
	EC>35-44	6%	110,000 ^f	110,000 ^f	270,000 ^f	1,800,000 ^f	250,000 ^f	490,000 ^f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	1%	70	370	13	26,000 (1,220) ^{sol}	56,000	76,000 (1,220) ^{sol}	LQM S4UL
	EC>7-8(toluene)	1%	130	860	22	56,000 (869) ^{vap}	56,000	87,000 (869) ^{vap}	LQM S4UL
	EC>8-10	1%	34	47	8.6	3,500 (613) ^{vap}	5,000	7,200 (613) ^{vap}	LQM S4UL
	EC>10-12	1%	74	250	13	16,000 (364) ^{sol}	5,000	9,200 (364) ^{sol}	LQM S4UL
	EC>12-16	1%	140	1,800	23	36,000 (169) ^{sol}	5,100	10,000	LQM S4UL
	EC>16-21	1%	260 ^f	1,900 ^f	46 ^f	28,000 ^f	3,800 ^f	7,600 ^f	LQM S4UL
	EC>21-35	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	EC>35-44	1%	1,100 ^f	1,900 ^f	370 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	2.5%	140	690	27	46,000 (2,260) ^{sol}	56,000	84,000 (2,260) ^{sol}	LQM S4UL
	EC>7-8(toluene)	2.5%	290	1,800	51	110,000 (1,920) ^{sol}	56,000	95,000 (1,920) ^{sol}	LQM S4UL
	EC>8-10	2.5%	83	110	21	8,100 (1,500) ^{vap}	5,000	8,500 (1,500) ^{vap}	LQM S4UL
	EC>10-12	2.5%	180	590	31	28,000 (899) ^{sol}	5,000	9,700 (899) ^{sol}	LQM S4UL
	EC>12-16	2.5%	330	2,300 (419) ^{sol}	57	37,000	5,100	10,000	LQM S4UL
	EC>16-21	2.5%	540 ^f	1,900 ^f	110 ^f	28,000 ^f	3,800 ^f	7,700 ^f	LQM S4UL
	EC>21-35	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	EC>35-44	2.5%	1,500 ^f	1,900 ^f	820 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	6%	300	1,400	57	86,000 (4,710) ^{sol}	56,000	92,000 (4,710) ^{sol}	LQM S4UL
	EC>7-8(toluene)	6%	660	3,900	120	180,000 (4,360) ^{vap}	56,000	100,000 (4,360) ^{vap}	LQM S4UL
	EC>8-10	6%	190	270	51	17,000 (3,580) ^{vap}	5,000	9,300 (3,580) ^{vap}	LQM S4UL
	EC>10-12	6%	380	1,200	4	34,000 (2,150) ^{sol}	5,000	10,000	LQM S4UL
	EC>12-16	6%	660	2,500	130	38,000	5,100	10,000	LQM S4UL
	EC>16-21	6%	930 ^f	1,900 ^f	260 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
	EC>21-35	6%	1,700 ^f	1,900 ^f	1,600 ^f	28,000 ^f	3,800 ^f	7,900 ^f	LQM S4UL
	EC>35-44	6%	1,700 ^f	1,900 ^f	1,600 ^f	28,000 ^f	3,800 ^f	7,900 ^f	LQM S4UL
	Aliphatic +Aromatic >EC44	1%	1,600 ^f	1,900 ^f	1,200 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
		2.5%	1,800 ^f	1,900 ^f	2,100 ^f	28,000 ^f	3,800 ^f	7,800 ^f	LQM S4UL
		6%	1,900 ^f	1,900 ^f	3,000 ^f	28,000 ^f	3,800 ^f	7,900 ^f	LQM S4UL

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}	Source
Chloalkanes and Alkenes & Explosives	1,2 Dichloroethane (DCA)	1%	0.11	0.16	0.05	12.0	300	300	DEFRA C4SL
		2.5%	0.18	0.24	0.10	17.0	310	330	DEFRA C4SL
		6%	0.31	0.41	0.19	29.0	310	330	DEFRA C4SL
	1,1,1 Trichloroethane (TCA)	1%	8.8	9.0	48	660	140,000	57,000 (1,425) ^{vap}	LQM S4UL
		2.5%	18	18	110	1,300	140,000	76,000 (2,915) ^{vap}	LQM S4UL
		6%	39	40	240	3,000	140,000	100,000 (6,392)	LQM S4UL
	1,1,2,2-Tetrachloroethanes (PCA)	1%	1.6	3.9	0.41	270	1,400	1,800	LQM S4UL
		2.5%	3.4	8.0	0.89	550	1,400	2,100	LQM S4UL
		6%	7.5	17	2.0	1,100	1,400	2,300	LQM S4UL
	1,1,1,2-Tetrachloroethanes (PCA)	1%	1.2	1.5	0.79	110	1,400	1,500	LQM S4UL
		2.5%	2.8	3.5	1.9	250	1,400	1,800	LQM S4UL
		6%	6.4	8.2	4.4	560	1,400	2,100	LQM S4UL
	Tetrachloroethene (PCE)	1%	0.31	0.32	2.00	24	3,200	1400	DEFRA C4SL
		2.5%	0.70	0.71	4.8	55	3,300	1900	DEFRA C4SL
		6%	1.60	1.60	11.0	130	3,400	2,500	DEFRA C4SL
	Tetrachloromethane (carbon tetrachloride)	1%	0.03	0.03	0.45	2.9	890	190	LQM S4UL
		2.5%	0.06	0.06	1.0	6.3	920	270	LQM S4UL
		6%	0.13	0.13	2.4	14	950	400	LQM S4UL
	Trichloroethene (TCE)	1%	0.009	0.010	0.032	0.7	76.0	41.0	DEFRA C4SL
		2.5%	0.020	0.020	0.072	1.5	78.0	51.0	DEFRA C4SL
		6%	0.043	0.045	0.160	3.4	79.0	69.0	DEFRA C4SL
	cis 1,2-dichloroethene	1%	0.46	0.50	0.890	38	3,800	2,000	DEFRA C4SL
		2.5%	0.78	0.84	1.70	64	3,800	2,400	DEFRA C4SL
		6%	1.50	1.60	3.60	120	3,900	3,100	DEFRA C4SL
	Trichloromethane (chloroform)	1%	0.91	1.2	0.42	99	2,500	2,600	LQM S4UL
		2.5%	1.7	2.1	0.83	170	2,500	2,800	LQM S4UL
		6%	3.4	4.2	1.7	350	2,500	3,100	LQM S4UL
	Trans-1,2 Dichloroethene	1%	0.9	0.9	3.7	69	13,000	5,600	DEFRA C4SL
		2.5%	1.6	1.7	7.5	120	13,000	7,000	DEFRA C4SL
		6%	3.3	3.4	16.0	260	13,000	9,100	DEFRA C4SL
	Chloroethene (vinyl chloride)	1%	0.006	0.015	0.0017	1.1E+00	7.8	18.0	DEFRA C4SL
		2.5%	0.010	0.019	0.0031	1.4E+00	7.8	19.0	DEFRA C4SL
		6%	0.017	0.029	0.0058	2.20	7.8	19.0	DEFRA C4SL
	2,4,6-Trinitrotoluene (TNT)	1%	1.6	65	0.24	1,000	130	260	LQM S4UL
		2.5%	3.7	66	0.58	1,000	130	270	LQM S4UL
		6%	8.1	66	1.4	1,000	130	270	LQM S4UL
	RDX	1%	120	13,000	17	210,000	26,000	49,000 (18.7) ^{sol}	LQM S4UL
		2.5%	250	13,000	38	210,000	26,000	51,000	LQM S4UL
		6%	540	13,000	85	210,000	27,000	53,000	LQM S4UL
	HMX	1%	5.7	6,700	0.86	110,000	13,000	23,000 (0.35) ^{vap}	LQM S4UL
		2.5%	13	6,700	1.9	110,000	13,000	23,000 (0.39) ^{vap}	LQM S4UL
		6%	26	6,700	3.9	110,000	13,000	24,000 (0.48) ^{vap}	LQM S4UL
Pesticides	Aldrin	1%	5.7	7.3	3.2	170	18	30	LQM S4UL
		2.5%	6.6	7.4	6.1	170	18	31	LQM S4UL
		6%	7.1	7.5	9.8	170	18	31	LQM S4UL
	Dieldrin	1%	0.97	7.0	0.17	170	18	30	LQM S4UL
		2.5%	2.0	7.3	0.41	170	18	30	LQM S4UL
		6%	3.5	7.4	0.96	170	18	31	LQM S4UL
	Atrazine	1%	3.3	610	0.5	9,300	1,200	2,300	LQM S4UL
		2.5%	7.8	620	1.2	9,400	1,200	2,400	LQM S4UL
		6%	17.4	620	2.7	9,400	1,200	2,400	LQM S4UL
	Dichlorvos	1%	3.2E-02	6.4	4.9E-03	140	16	26	LQM S4UL
		2.5%	6.6E-02	6.5	1.0E-02	140	16	26	LQM S4UL
		6%	0.14	6.6	2.2E-02	140	16	27	LQM S4UL
	Endosulfanns (2 isomers)	1%	7.4	160 (3.0E-03) ^{vap}	1.2	5,600 (3.0E-03) ^{vap}	1,200	2,300	LQM S4UL
		2.5%	18	280 (7.0E-03) ^{vap}	2.9	7,400 (7.0E-03) ^{vap}	1,200	2,400	LQM S4UL
		6%	41	410 (1.6E-02) ^{vap}	6.8	8,400 (1.6E-02) ^{vap}	1,200	2,500	LQM S4UL
	Hexachlorocyclohexane (3 isomers), inc Lindane	1%	8.5E-02	3.7	1.3E-02	65	8.1	15	LQM S4UL
		2.5%	0.2	3.8	3.2E-02	65	8.1	15	LQM S4UL
		6%	0.46	3.8	7.7E-02	65	8.1	16	LQM S4UL
Chlorobenzenes	Chlorobenzene	1%	0.46	0.46	5.9	56	11,000	1,300 (675) ^{sol}	LQM S4UL
		2.5%	1.0	1.0	14	130	13,000	2,000 (1,520) ^{sol}	LQM S4UL
		6%	2.4	2.4	32	290	14,000	2,900	LQM S4UL
	Dichlorobenzenes (3 isomers)	1%	23	24	94	2,000 (571) ^{sol}	90,000	24,000 (571) ^{sol}	LQM S4UL
		2.5%	55	57	230	4,800 (1,370) ^{sol}	95,000	36,000 (1,370) ^{sol}	LQM S4UL
		6%	130	130	540	11,000 (3,240) ^{sol}	98,000	51,000 (3,270) ^{sol}	LQM S4UL
	Trichlorobenzenes (3 isomers)	1%	2.6	2.6	55	220	15,000	1,700 (318) ^{vap}	LQM S4UL
		2.5%	6.4	6.4	140	530	17,000	2,600 (786) ^{vap}	LQM S4UL
		6%	15	15	320	1,300	19,000	4,000 (1,880) ^{vap}	LQM S4UL
	Tetrachlorobenzenes (3 isomers)	1%	0.66	0.75	0.38	49 (39.4) ^{vap}	78	110 (39) ^{vap}	LQM S4UL
		2.5%	1.6	1.9	0.90	120 (98.1) ^{vap}	79	120	LQM S4UL
		6%	3.7	4.3	2.2	240 (235) ^{vap}	79	130	LQM S4UL
	Pentachlorobenzene	1%	5.8	19	1.2	640 (43.0) ^{sol}	100	190	LQM S4UL
		2.5%	12	30	3.1	770 (107) ^{sol}	100	190	LQM S4UL
		6%	22	38	7.0	830	100	190	LQM S4UL
	Hexachlorobenzene	1%	1.8 (0.20) ^{vap}	4.1 (0.20) ^{vap}	0.47	110 (0.20) ^{vap}	16	30	LQM S4UL
		2.5%	3.3 (0.50) ^{vap}	5.7 (0.50) ^{vap}	1.1	120	16	30	LQM S4UL
		6%	4.9	6.7 (1.2) ^{vap}	2.5	120	16	30	LQM S4UL

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS _{resi}	POS _{park}	Source
Chlorophenol	Chlorophenols (4 congeners)	1%	0.87 ^g	94	0.13 ^g	3,500	620	1,100	LQM S4UL
		2.5%	2.0	150	0.30	4,000	620	1,100	LQM S4UL
		6%	4.5	210	0.70	4,300	620	1,100	LQM S4UL
	Pentachlorophenol	1%	0.22	27 (16.4) ^{vap}	3.0E-02	400	60	110	LQM S4UL
		2.5%	0.52	29	8.0E-02	400	60	120	LQM S4UL
		6%	1.2	31	0.19	400	60	120	LQM S4UL
Others	Carbon Disulphide	1%	0.14	0.14	4.8	11	11,000	1,300	LQM S4UL
		2.5%	0.29	0.29	10	22	11,000	1,900	LQM S4UL
		6%	0.62	0.62	23	47	11,000	2,700	LQM S4UL
	Hexachlorobutadiene	1%	0.29	0.32	0.25	31	25	48	LQM S4UL
		2.5%	0.7	0.78	0.61	66	25	50	LQM S4UL
		6%	1.6	1.8	1.4	120	25	51	LQM S4UL
	Phenol	1%	120	440 (460)	23	440 ^{dir} (26,000)	440 ^{dir} (10,000)	440 ^{dir} (7,600)	LQM S4UL
		2.5%	200	690	42	690 ^{dir} (30,000)	690 ^{dir} (10,000)	690 ^{dir} (8,300)	LQM S4UL
		6%	380	1,200	83	1,300 ^{dir} (34,000)	1,300 ^{dir} (10,000)	1,300 ^{dir} (9,300)	LQM S4UL

sol/vap = solubility/vapour limit (potentially use if free product identified, although highly conservative)
f=naphthalene is based on comparison of inhalation exposure with TDI(inhal) for localised effect
f = oral, dermal and inhalation exposures compared to oral HCV
dir = S4ULs based on threshold protective of direct skin contact with phenol)brackets long term exposure for illustration purposes)
g = derived based on 2,3,4-tetrachlorophenol

Appendix D – References

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- ¹³ CIRIA, January 2001, "Contaminated land risk assessment. A guide to good practice", C552.

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