



Osbornes Yard, Manchester

Contamination Delineation Investigation and Removal Validation Report

Job Number
LKC231691

Report Date
July 2025

Client
Arca Construct Ltd



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Ground Investigation | Land Remediation | Project Management



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Site Address	Osbornes Yard, 271 Oldham Road, Miles Platting, Manchester, M40 7PS
Report Title	Contamination Delineation Investigation and Removal Validation Report
Job Number	LKC231691
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Revision	0	Date of Issue	July 2025
Document Ref:	LKC231691-C1-GI-Osbornes Yard R0		
Status	Final		
Written By	Rachel Peart		
Approved By	Rosie Cummings		

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EXECUTIVE SUMMARY

Site Details

Location	West of Oldham Road, south of Helga Street, Miles Platting, Manchester. Centred at approximate National Grid Reference 385594E 399565N.
Area	2,500m ² .
Current Site Use	Vacant, overgrown land to the northeast and southwest. Former hand car wash/petrol station with concrete and tarmac hardstanding in the centre of the site with a single storey building.
Proposed Development	5no. storey apartment building including car parking and limited soft landscaping.

Preliminary Risk Assessment

PRA Details	Undertaken by Renaissance Ltd (Ref: 2006-06, dated 5th August 2020).
Main Historical Features	Church school/Mission Hall in S from 1850-2009, Public House and terraced housing across the site from 1850-2009, Chimney in centre on 1891 mapping only, garage forecourt in centre from 1989-present.
Geology / Hydrogeology	Made ground adjacent NW, Glacial Till (Secondary undifferentiated Aquifer) over Pennine Upper Coal Measures (Secondary A Aquifer).
Mining	Northern part of the site within DHRA. Likely influence of working from 15 seams of coal 77-932m depth, last worked 1967. Coal believed to be at or close to the surface. Closest known coal outcrop is the Bradford Three Quarters Seam outcropping 22.1m N of the site and dipping below the site. No hafts recorded within 20m of the site.
Relevant Environmental Settings	River Irk 705m NW. No surface water or groundwater abstractions within 500m. Not within Source Protection Zone.
Preliminary Conceptual Model: PL=Pollutant Linkage	PL1 Direct Contact (Human Health): Moderate Risk (asbestos, metals, PAHs, petroleum hydrocarbons, solvents, surfactants). PL2 Inhalation of Vapours: Moderate Risk (volatile contaminants). PL3 Gas: Moderate Risk (hazardous and ground gas). PL4 Controlled waters: Moderate Risk (mobile contaminants). PL5 Sulphate Attack: Moderate/Low Risk (sulphate). PL6 Water Pipelines: Moderate Risk (organic contaminants). PL7 Phytotoxic: Very Low Risk (metals).
Recommendations	Site Investigation was recommended to further assess all the pollutant linkages.

Previous Phase 2 Ground Investigation

Date of Investigation	27 th April 2021, 10 th -14 th May 2021 and 2 nd February 2022.
Scope of Works	3no. cable percussive boreholes (CP101-CP103). 3no. rotary boreholes (RB101-RB103). 10no. mechanically excavated trial pits (TP101-TP107, TP201-TP203). 3no. foundation pits (FP101-FP103). Monitoring wells installed in CP101, CP102 and CP103. Soil and groundwater sampling.
Contamination Identified	Visual / olfactory evidence of hydrocarbons identified in TP103 at 0.55-0.8mbgl (slight odour), TP202 0.10->1.30mbgl (strong odour) and TP203 0.10->1.30mbgl (slight odour) only. The hydrocarbon contamination in TP202 and TP203 was not bottomed due to the presence of services.
Human Health (direct contact) Risk	Elevated heavy metals, PAHs and petroleum hydrocarbons identified and detectable asbestos.

Vapour Risk	Elevated volatile hydrocarbon fractions were identified.
Gas Risk	a significant gas source has not been identified
Controlled Water Risk	No elevated contaminants above detection limits were identified in any water sample.
Conceptual Model PL = Pollutant Linkage	PL1 Direct Contact (Human Health): Moderate Risk (metals, PAHs, TPHs, asbestos). PL2 Inhalation of Vapours: Moderate Risk (<EC16 petroleum hydrocarbons). PL3 Gas: Moderate / Low Risk (carbon dioxide, methane). PL4 Controlled waters: Moderate Risk (mobile contaminants). PL5 Sulphate Attack: Moderate/Low Risk (sulphate). PL6 Water Pipelines: Moderate Risk (organic contaminants). PL7 Phytotoxic: Low Risk (metals).

Delineation Investigation Work Undertaken

Date of Investigation	11 th to 18 th January 2024.
Intrusive Investigation Work Undertaken	Trial trenches mechanically excavated in 2no. areas associated with former tanks onsite. Contamination testing.
Soil Sampling	14no. samples tested for pH, TPHCWG, BTEX and SOM.

Ground Conditions

Made Ground	Made ground was recorded in all locations to depths of 0.70-4.00mbgl. The made ground comprised horizons of gravel, sand, silt, clay with anthropogenic material including ash, brick and glass. The areas where the tanks had been removed were backfilled with coarse gravel (demolition rubble).
Superficial	Superficial strata comprised horizons of firm to stiff clay.
Bedrock	Not encountered.
Obstructions	Concrete slab at the base of the western former fuel tanks at a depth of around 4.00mbgl. Concrete slab at approximately 1.5-2.00mbgl beneath the former forecourt. Relic brick walls to the east of the site and within the forecourt excavations.

Contamination Risk Assessment

PL	Contaminant	Risk	Recommendations
1	Arsenic, lead, PAHs, Chrysotile ACM	Moderate	Remediation required. Likely to include an environmental cover system in soft landscaping areas.
	Petroleum hydrocarbons	Low	No further remediation required.
	Surfactants (MBAS)	Low	No further remediation required.
2	Other volatile contaminants	Low	No further remediation required.
3	Methane, Carbon dioxide	Moderate / Low	No further remediation required.
4	Groundwater contaminants (mobile)	Low	No further remediation required.
5	Organic contaminants.	Low	Utility provider risk assessment to be completed. The site is unlikely require barrier piping.

Recommendations

PL	Recommendation
1	Environmental cover system required in soft landscaping and garden areas.
2	No remediation required.
3	No remediation required.
4	No remediation required.
5	Potable water pipe assessment required.

Environmental Cover System Requirements

Either (physical break layer)				Or (geotextile membrane)			
450mm landscaping (minimum topsoil)	shared	Chemically TOPSOIL ¹	validated	450mm landscaping (minimum topsoil)	shared	Chemically TOPSOIL ¹	validated
	100mm	Chemically SUBSOIL	validated		100mm	Chemically SUBSOIL	validated
		100mm (minimum) PHYSICAL BREAK LAYER ²	GEOTEXTILE MEMBRANE (at base of subsoil)				
Existing MADE GROUND							

Other Considerations

Unexpected Contamination
Grubbing Out of Inground Structures
Re-use of Site Generated Material
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1. Introduction

1.1. Background

LK Consult Ltd (LKC) has been commissioned to carry out a Contamination Delineation Investigation and Removal Validation report for Osbornes Yard, Manchester. The investigation was undertaken in support of a planning application (reference number 127971/FO/2020) to develop the site for residential use.

The following work has previously been undertaken:

- Preliminary Risk Assessment (PRA) report, undertaken by Renaissance Ltd (Ref: 2006-06, dated 5th August 2020).
- Report on Coal Mining Related Site Investigation Works Undertaken at Osbourne's Yard, undertaken by The Land Consultancy Ltd (Ref. TLC1140, dated June 2021).
- Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy, undertaken by LKC (ref. CL-602-LKC 20 1913-02, dated March 2022).
- Factual Report Probing, Locating, Drilling and Treatment of Shallow Mine Workings, undertaken by Van Elle Ltd (Ref. 233927, dated 5th March 2024).

This investigation has been undertaken to delineate the previously identified hotspots of contamination. In addition, the remediation has been undertaken to validate the ground conditions after delineation and material removal at the site. It will also aim to confirm the risks and potential pollutant linkages identified in the Phase 2 have been adequately dealt with as far as reasonably practicable to allow a further contamination assessment to be undertaken and to inform any update to the existing Remediation Strategy, as required.

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	West of Oldham Road, south of Helga Street, Miles Platting, Manchester. Centred at approximate National Grid Reference 385594E 399565N.
Area	2,500m ² .
Current Site Use	Vacant, overgrown land to the northeast and southwest. Former hand car wash/petrol station with concrete and tarmacadam hardstanding in the centre of the site with a single storey building.
Proposed Development	5no. storey apartment building including car parking and limited soft landscaping.

Table 1-1: Summary of site details.

2. Summary of Previous Work

2.1. Summary of Existing Information

A Report on Coal Mining Related Site Investigation Works Undertaken at Osbourne's Yard, undertaken by The Land Consultancy (Ref. TLC1140, dated June 2021) and Factual Report Probing, Locating, Drilling and Treatment of Shallow Mine Workings, undertaken by Van Elle Ltd (Ref. 233927, dated 5th March 2024) has previously been undertaken to assess and deal with the mining risk of the site. These reports will not be summarised in this Contamination and Delineation Investigation Report.

2.2. Phase 1 Preliminary Risk Assessment (PRA)

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

PRA Details	Undertaken by Renaissance Ltd (Ref: 2006-06, dated 5th August 2020).
Main Historical Features	Church school/Mission Hall in S from 1850-2009, Public House and terraced housing across the site from 1850-2009, Chimney in centre on 1891 mapping only, garage forecourt in centre from 1989-present.
Geology / Hydrogeology	Made ground adjacent NW, Glacial Till (Secondary undifferentiated Aquifer) over Pennine Upper Coal Measures (Secondary A Aquifer).
Mining	Northern part of the site within DHRA. Likely influence of working from 15 seams of coal 77-932m depth, last worked 1967. Coal believed to be at or close to the surface. Closest known coal outcrop is the Bradford Three Quarters Seam outcropping 22.1m N of the site and dipping below the site. No hafts recorded within 20m of the site.
Relevant Environmental Settings	River Irk 705m NW. No surface water or groundwater abstractions within 500m. Not within Source Protection Zone.
Preliminary Conceptual Model: PL=Pollutant Linkage	PL1 Direct Contact (Human Health): Moderate Risk (asbestos. metals, PAHs, petroleum hydrocarbons, solvents, surfactants). PL2 Inhalation of Vapours: Moderate Risk (volatile contaminants). PL3 Gas: Moderate Risk (hazardous and ground gas). PL4 Controlled waters: Moderate Risk (mobile contaminants). PL5 Sulphate Attack: Moderate/Low Risk (sulphate). PL6 Water Pipelines: Moderate Risk (organic contaminants). PL7 Phytotoxic: Very Low Risk (metals).
Recommendations	Site Investigation was recommended to further assess all the pollutant linkages.

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

2.3. Previous Site Investigations

Pertinent information has been summarised from the Site Investigation in Table 2-2.

Date of Investigation	27 th April 2021, 10 th -14 th May 2021 and 2 nd February 2022.
Scope of Works	3no. cable percussive boreholes (CP101-CP103). 3no. rotary boreholes (RB101-RB103). 10no. mechanically excavated trial pits (TP101-TP107, TP201-TP203). 3no. foundation pits (FP101-FP103). Monitoring wells installed in CP101, CP102 and CP103. Soil and groundwater sampling.
Contamination Identified	Visual / olfactory evidence of hydrocarbons identified in TP103 at 0.55-0.8mbgl (slight odour), TP202 0.10->1.30mbgl (strong odour) and TP203 0.10->1.30mbgl (slight odour) only. The hydrocarbon contamination in TP202 and TP203 was not bottomed due to the presence of services.

Human Health (direct contact) Risk	Elevated heavy metals, PAHs and petroleum hydrocarbons identified and detectable asbestos.
Vapour Risk	Elevated volatile hydrocarbon fractions were identified.
Gas Risk	a significant gas source has not been identified
Controlled Water Risk	No elevated contaminants above detection limits were identified in any water sample.
Conceptual Model PL = Pollutant Linkage	PL1 Direct Contact (Human Health): Moderate Risk (metals, PAHs, TPHs, asbestos). PL2 Inhalation of Vapours: Moderate Risk (<EC16 petroleum hydrocarbons). PL3 Gas: Moderate / Low Risk (carbon dioxide, methane). PL4 Controlled waters: Moderate Risk (mobile contaminants). PL5 Sulphate Attack: Moderate/Low Risk (sulphate). PL6 Water Pipelines: Moderate Risk (organic contaminants). PL7 Phytotoxic: Low Risk (metals).

Table 2-2: Summary of Site Investigation.

2.4. Conceptual Model

The revised contamination conceptual model using contaminant-pathway-receptor linkages based on guidance in LCRM¹ has been summarised in Table 2-3.

Each pollutant linkage is described along with an assessment of the risk based upon guidance on probabilities and consequences outlined in CIRIA C552². The risk matrix is provided in Appendix A.

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	Assessment and Recommendations
1	Arsenic, lead, PAHs	Dermal contact. Inhalation of soil, fibres, and dust. Ingestion of soils, dust. Windblown dust.	Future site users. Offsite receptors.	Likely	Medium	Moderate	Likely probability as elevated metals (arsenic and lead) and PAHs, identified in the made ground in the investigation undertaken to date. Recommendation: Remediation required. Likely to include an environmental cover system in soft landscaping areas.
	Chrysotile ACM Petroleum hydrocarbons (Aliphatic EC8-10, EC10-12, EC12-16 and aromatic EC12-16).			Likely (localised)	Medium	Moderate (localised)	Likely probability in localised areas of the site as elevated petroleum hydrocarbons and ACMs detected in the ground which could come into contact with site users in landscaped areas. Likely to be localised to the footprint of the former petrol station/hand car wash forecourt. Recommendation: Localised remediation required. Likely to include an environmental cover system in soft landscaping areas, delineation of the hydrocarbon contamination and removal where required.
	Surfactants (MBAS).			Unlikely	Medium	Low	Unlikely probability as no elevated VOCs/SVOCs identified in the soil samples tested. Although detectable levels of MBAS encountered within the former petrol station and hand car wash forecourt, not considered to post a risk due to the remediation required for hydrocarbon contamination. Recommendation: No further remediation required.
2	Petroleum hydrocarbons (<EC16)	Inhalation of vapours. Migration via permeable strata and preferential pathways.	Future site users. Offsite receptors.	Likely (localised)	Medium	Moderate (localised)	Likely probability in localised areas of the site as TPH fractions detected in TP202 which includes some lighter end volatile fractions. Recommendation: Localised remediation required. Likely include excavation and removal of hydrocarbon contaminated ground or the installation of a vapour barrier in the proposed development.
3	Hazardous / ground gas: methane, carbon dioxide.	Migration via permeable strata and preferential pathways. Inhalation of gas. Explosion in confined spaces.	Future site users. Buildings. Offsite receptors.	Unlikely	Severe	Moderate / Low	Gas monitoring was not carried out as part of this assessment. No significant depth of putrescible made ground was identified and no shallow coal workings have been identified. Unlikely probability as a significant gas source has not been identified. Recommendation: No remediation required.

Table 2-2: Preliminary Contamination Conceptual Model.

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk	Assessment and Recommendations
4	Mobile contaminants: Petroleum hydrocarbons.	Surface run-off. Migration via permeable strata and preferential pathways. Perched waters migration.	Groundwater (Secondary A Aquifer).	Likely	Medium	Moderate	No elevated dissolved phase contamination and substantial clay superficial deposits limiting any residual migration of contaminants. However, surface sheen noted in TP202 and TP203. Therefore, precautionary removal of hydrocarbon impacted soil to remove source. Recommendation: Localised remediation required. Likely to include the excavation and removal of hydrocarbon contaminated soils. Pumping and removal of ground water.
5	Organic contaminants: Petroleum hydrocarbons.	Permeation of pipes. Ingestion of tainted water supply.	Future site users. Water pipes.	Likely	Medium	Moderate	Likely probability as elevated TPH encountered which could permeate water pipes and contaminate water supply. Recommendation: UU risk assessment undertaken. Barrier piping likely to be required.

Table 2-3 (continued): Preliminary Contamination Conceptual Model.

3. Contamination Hotspot Delineation Investigation

3.1. Scope of Work

LKC were commissioned to undertake the supervision of the delineation and removal of previously identified contaminated areas, associated with historic use of the site as a Petrol Station.

Prior to the investigation, the underground fuel tanks to the west of the main petrol forecourt had been removed by the demolition contractor. A second smaller fuel tank was also found by the demolition contractor in the south east of the site and removed. LKC attended site to assess the remaining contamination.

The investigation was carried out between the 11th and 18th January 2024 and comprised the investigation around the 2no identified areas of concern. The area of concern area detailed below in Table 3-1 and area shown on Figure 3.

Site Investigation Locations	Rationale
Area 1	Delineation around a former fuel tank in the south east of the site.
Area 2	Delineation around former petrol station forecourt, underground fuel tanks and previously identified contamination in TP202.

Table 3-1: Summary of Sampling Locations.

Selected photographs and site diaries are presented in Appendix B.

3.2. Sampling Protocol and Rationale

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation³.

Soil was collected for onsite testing for total volatile organic compounds (TVOCs) using a photoionisation detector (PID) fitted with a 10.6eV lamp and moisture trap. A plastic zip bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested. The onsite monitoring was carried out in line CIRIA C665⁴ to aid in screening samples for volatile analysis.

The soil was screened using a 10ppm screening limit to represent the presence of detectable petroleum hydrocarbons. Any impacted material would be quarantined on bunded plastic sheeting ready to be sampled and disposed offsite, if necessary. Table 3-2 below details the PID sample readings from the delineation areas

Sample Ref.	Delineation Area	Sample Description	PID reading (ppm)
SP1	-	Stockpile of HC contaminated material from tank removal by demolition contractors	39.1
PID 1	1	Material from within the delineation hole with HC odour	15.7
PID 2	1	Material from within the delineation hole with HC odour	21.6
Base 1	1	Sample from base of excavation, assumed clean	0.0
Side 1	1	Sample from eastern side of excavation, assumed clean	0.2
Side 2	1	Sample from southern side of excavation, assumed clean	0.0
Side 3	1	Sample from western side of excavation, assumed clean	1.9
Side 4	1	Sample from northern side of excavation, assumed clean	0.0

Table 3-2: Summary of PID sample readings from the delineation areas.

Sample Ref.	Delineation Area	Sample Description	PID reading (ppm)
SP2	1	Stockpile of excavated material from Area 1 with HC odour	23.3
Side A	2	Sample from western side of excavation. Slight HC odour in granular MG remained due to site boundary	8.0
Side A2	2	Deeper sample from western side of excavation. Slight HC odour in granular MG remained due to site boundary	0.0
Backfill	2	Backfill material from tank removal	11.0
SP3	2	Stockpile excavated from Area 2 with HC odour	15.4
PID 3	2	Made ground above clay to the southern side of former fuel tanks	4.1
PID 4	2	Side of tank 1	2.2
PID 5	2	Black oily material from near Tank 1 at 1.5-2.0mbgl	1.1
Side B1	2	Sample from southern side of excavation, assumed clean	9.6
Base 3	2	Sample from base of excavation, assumed clean after removal of HC contaminated drain	0.4
Manhole	2	Soil near manhole in centre of former forecourt	105.8
Side B3	2	Sample from southern side of excavation, assumed clean	0.0
Side C1	2	Sample from eastern side of excavation, assumed clean	0.0
PID 6	2	MG about samples from Side D1	4.8
Side D1	2	Sample from northern side of excavation, assumed clean	4.5
Base 4	2	Sample from base of excavation, assumed clean	0.4
Side D2	2	Sample from northern side of excavation, assumed clean	0.0
Side D3	2	Sample from northern side of excavation, assumed clean	0.0

Table 3-2 (continued): Summary of PID sample readings from the delineation areas.

In addition, to establish if soil was impacted by petroleum hydrocarbons, validation samples from the base and sides of the excavations following source removal. Soil samples of approximately 500g were recovered in amber jars and plastic tubs. All the samples were sent to DETS laboratory for chemical testing.

Many of the contamination tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix C. Table 3-3 shows the soil testing undertaken.

Testing	No. Samples	Location	Justification
TPHCWG, BTEX, MTBE and SOM.	5	Base 1, Side 1, Side 2, Side 3, Side 4	Samples taken from the base and sides of the delineation excavation and tested for a Petroleum hydrocarbon suite to prove contamination is absent and that the extent of the contamination associated with a former tank in Area 1 has been proven.
	9	Side A, Side A2, Side B1, Side B3, Side C1, Side D2, Side D4, Base 2, Base 3	Samples taken from the base and sides of the delineation trench and tested for a Petroleum hydrocarbon suite to prove contamination is absent and that the extent of the contamination in Area 2 (TP202) has been proven.

Table 3-3: Summary of Soil Testing.

Notes: TPHCWG=carbon banded and aromatic/aliphatic split petroleum hydrocarbons; BTEX=benzene, toluene, ethylbenzene, and xylenes; MTBE=Methyl tert-butyl ether, SOM=Soil Organic Matter.

3.3. Offsite Disposal

LKC understand that approximately 54no. 8-wheeler wagon loads (approx.1,000 tonnes) of material was removed from site from the delineation excavations. Example disposal tickets are provided in Appendix F.

4. Ground Conditions

4.1. Geology

The ground conditions beneath the site are summarised below.

4.1.1. *Made Ground*

Made ground was recorded in all locations to depths of 0.70-4.00mbgl. The made ground comprised horizons of gravel, sand, silt, clay with anthropogenic material including ash, brick and glass.

The areas where the tanks had been removed were backfilled with coarse gravel (demolition rubble).

4.1.2. *Natural Strata*

Superficial strata comprised horizons of firm to stiff clay.

4.1.3. *Contamination*

Visual / olfactory evidence of contamination was identified as follows:

- Area 1: 0.00-0.70mbgl: slight hydrocarbon odour.
- Area 2: 0.5-4.00mbgl hydrocarbon odour. Varying at depths.

The majority of the contamination was either sat on buried concrete structures or just below, along any former drainage runs.

4.1.4. *Obstructions*

The following obstructions were encountered:

- Concrete slab at the base of the western former fuel tanks at a depth of around 4.00mbgl.
- Concrete slab at approximately 1.5-2.00mbgl beneath the former forecourt.
- Relic brick walls to the east of the site and within the forecourt excavations.

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 presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (LCRM⁵). 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. Methodology

With regards to the soil risk assessment LKC will use the following hierarchy:

- Category 4 Screening Levels (C4SLs) ^{6, 7}.
- LQM Suitable 4 Use Levels (S4ULs) ^{8, 9, 10, 11}.

The proposed development is for residential apartments with limited shared soft landscaping, therefore the assessment criteria for residential without plant uptake has been used.

All criteria have been generated using the CLEA V1.06 model¹² based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

A summary of the generic assessment criteria used in this assessment is provided in Appendix D.

5.2.2. Soil Results Comparison against Assessment Criteria

All analysis sheets are presented in Appendix C. All the data has been compared to relevant assessment criteria. Elevated results are presented in Table 5-1.

Sample Location / Depth (mbgl)	Contaminant	Criteria Value	Total No. of Samples Tested	Sample Result > Criteria
Base 3	MTBE	79	14	95

Table 5-1: Summary of Elevated Results.

Notes:

All units in mg/kg.

Only results that exceeded assessment criteria have been shown and results from all depths are noted.

Results have been compared to the nearest appropriate SOM for the assessment criteria hierarchy described in Section 5.2.

No asbestos was identified in any soil samples analysed.

5.2.3. Hazard Quotient

To examine the potential additivity of toxicological effects between the petroleum hydrocarbon fractions, a Hazard Index (HI) as described by the Environment Agency¹³ technical report was calculated for the samples. This should be undertaken when there are detectable petroleum hydrocarbons but not elevated when compared to appropriate assessment criteria.

HI results are presented in Table 5-2. The HI for sample Side A is presented in Appendix E.

Sample Location	Hazard Index	Further consideration required?
B1	0.16	No
Side 1	0.07	No
Side 2	0.06	No
Side 3	0.09	No
Side 4	0.05	No
Side A	0.13	No

Table 5-2: Hazard Index.

Sample Location	Hazard Index	Further consideration required?
Base 2	0.16	No
Side B1	0.06	No
Base 3	0.16	No
Side B3	0.23	No
Side C1	0.16	No
Side D2	0.16	No
Side D4	0.16	No
Side A2	0.16	No

Table 5-2 (continued): Hazard Index.

Notes:

Bold where HI is >1.

5.2.4. Outstanding Direct Contact Risk – Pollutant Linkage 1

Delineation Investigation

Only elevated MTBE was identified in one validation sample (Base 3) when compared to the generic assessment criteria. Given the number and location of elevated samples, the contamination is likely to be localised.

This location is beneath the foot print of the proposed building and 1.8mbgl therefore is not considered to pose a direct contract risk with regards to PL1. With a medium consequence, the risk is considered low and no further remediation is required.

No elevated levels of petroleum hydrocarbons were identified in any of the samples taken from the base and sides of the excavation. With a medium consequence, the risk is considered to be low and no further remediation is required.

Previous Site Investigation

Elevated PAHs and metal were identified onsite previously. The source of the contamination is expected to the ash, clinker and coal noted in the made ground.

At the concentrations identified, the contaminants are considered to pose a potential risk to future site users (residents) in soft landscaped areas, where made ground may be exposed. The principal pathways are the ingestion pathways (soil and dust) and dermal contact. Therefore, if areas of impact are under hardstanding, then a risk to human health is not present.

The probability of PAH and metal contamination affecting site users is still considered to be likely. With a medium consequence, the risk is considered to be moderate and remediation is recommended in areas of proposed landscaping.

5.2.5. Risk from Inhalation of Vapours – Pollutant Linkage 2

Previously elevated volatile hydrocarbons were identified in TP202. The area of petroleum hydrocarbon contamination has been delineated and the confirmatory soil analysis from the base and sides of the excavations did not detect any volatile fractions of petroleum hydrocarbons above the assessment criteria. The consequence is expected to be medium, giving a low risk and no further remediation is required.

5.3. Gas Risk Assessment

Gas monitoring was not carried out as part of this investigation. The ground conditions did not encounter any unforeseen organic or putrescible material. Therefore as per the previous site investigation report the probability of gas affecting receptors is unlikely. With a severe consequence, the risk is moderate to low. Given the ground conditions identified, LKC consider a low risk would be appropriate and no remediation is required.

5.4. Controlled Water Assessment

The previous site investigation report did not identify any elevated levels of contaminants above detection limits in groundwater samples. Precautionary remediation was recommended due free product (surface sheen) being present on the groundwater noted within the trial pits.

Based on the above, LKC considered the probability of contaminants on site affecting the Secondary A Aquifer as low. Given the medium consequence, a moderate/low risk is anticipated (Pollutant Linkage 4) and precautionary remediation is required (excavation and removal of petroleum hydrocarbon contaminated ground).

5.5. Potable Water Supply (Pollutant Linkage 5)

Soil results were compared to United Utilities (UU) guidelines for the selection of potable water pipes in land potentially affected by contamination. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed.

No elevated VOCs (based on naphthalene only) or petroleum hydrocarbons have been identified.

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 5.1-5.5. 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 5-3.

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	Assessment and Recommendations
1	Arsenic, lead, PAHs, Chrysotile ACM	Dermal contact. Inhalation of soil, fibres, and dust. Ingestion of soils, dust. Windblown dust.	Future site users. Offsite receptors.	Likely	Medium	Moderate	Likely probability as elevated metals (arsenic and lead) and PAHs, identified in the made ground in the investigation undertaken to date. Likely probability in localised areas of the site as ACMs detected in the ground which could come into contact with site users in landscaped areas. Recommendation: Remediation required. Likely to include an environmental cover system in soft landscaping areas.
	Petroleum hydrocarbons			Unlikely	Medium	Low	Unlikely probability as material with elevated petroleum hydrocarbons have been delineated and removed. Confirmatory base and side validation samples did not show any exceedances Recommendation: No further remediation required.
	Surfactants (MBAS).			Unlikely	Medium	Low	Unlikely probability as no elevated VOCs/SVOCs identified in the soil samples tested. Although detectable levels of MBAS encountered within the former petrol station and hand car wash forecourt, not considered to post a risk due to the remediation required for hydrocarbon contamination. Recommendation: No further remediation required.
2	Petroleum hydrocarbons (<EC16)	Inhalation of vapours. Migration via permeable strata and preferential pathways.	Future site users. Offsite receptors.	Unlikely)	Medium	Low	Unlikely probability as material with elevated petroleum hydrocarbons have been delineated and removed. Confirmatory base and side validation samples did not show any exceedances Recommendation: No further remediation required.
3	Hazardous / ground gas: methane, carbon dioxide.	Migration via permeable strata and preferential pathways. Inhalation of gas. Explosion in confined spaces.	Future site users. Buildings. Offsite receptors.	Unlikely	Severe	Moderate / Low	Gas monitoring was not carried out as part of this assessment. No significant depth of putrescible made ground was identified and no shallow coal workings have been identified. Unlikely probability as a significant gas source has not been identified. Recommendation: No remediation required.

Table 5-3: Revised Contamination Conceptual Model.

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk	Assessment and Recommendations
4	Mobile contaminants: Petroleum hydrocarbons.	Surface run-off. Migration via permeable strata and preferential pathways. Perched waters migration.	Groundwater (Secondary A Aquifer).	Unlikely	Medium	Low	No elevated dissolved phase contamination and substantial clay superficial deposits limiting any residual migration of contaminants. Removal of hydrocarbon impacted soil to remove source has been undertaken. Recommendation: No further remediation required.
5	Organic contaminants: Petroleum hydrocarbons.	Permeation of pipes. Ingestion of tainted water supply.	Future site users. Water pipes.	Unlikely	Medium	Low	Unlikely probability as elevated TPH encountered have been excavated and removed. Base and side validation samples do not exceed pipeline risk assessment values. Recommendation: UU risk assessment undertaken. Barrier piping unlikely to be required.

Table5-3: Revised Contamination Conceptual Model.

6. Conclusions

6.1. Ground Conditions

Ground conditions are summarised in Table 6-1 below.

Made Ground	Made ground was recorded in all locations to depths of 0.70-4.00mbgl. The made ground comprised horizons of gravel, sand, silt, clay with anthropogenic material including ash, brick and glass. The areas where the tanks had been removed were backfilled with coarse gravel (demolition rubble).
Superficial	Superficial strata comprised horizons of firm to stiff clay.
Bedrock	Not encountered.
Obstructions	Concrete slab at the base of the western former fuel tanks at a depth of around 4.00mbgl. Concrete slab at approximately 1.5-2.00mbgl beneath the former forecourt. Relic brick walls to the east of the site and within the forecourt excavations.

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	Arsenic, lead, PAHs, Chrysotile ACM	Moderate	Remediation required. Likely to include an environmental cover system in soft landscaping areas.
	Petroleum hydrocarbons	Low	No further remediation required.
	Surfactants (MBAS)	Low	No further remediation required.
2	Other volatile contaminants	Low	No further remediation required.
3	Methane, Carbon dioxide	Moderate / Low	No further remediation required.
4	Groundwater contaminants (mobile)	Low	No further remediation required.
5	Organic contaminants.	Low	Utility provider risk assessment to be completed. The site is unlikely require barrier piping.

Table 6-2: Summary Risk Table.

PL=Pollutant Linkage, see Table 5-3 for details.

7. Recommendations and Revised 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 verification¹⁴. 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	Environmental cover system required in soft landscaping and garden areas.
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)

In shared soft landscaping areas, an environmental cover system will be required and should comprise 450mm in shared soft landscaping. The environmental cover system should be constructed as shown in Plate 7-1.

Either (physical break layer)				Or (geotextile membrane)					
450mm landscaping (minimum topsoil)		shared		Chemically validated TOPSOIL ¹		450mm landscaping (minimum topsoil)		Chemically validated TOPSOIL ¹	
		100mm		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 Assessment¹⁵ is undertaken once the location and depth of potable water pipes are known. It is unlikely that barrier 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. Grubbing Out of In-ground Structures

Surface hard standing and relict features including former foundations and current foundations can be expected across the site wide. It is recommended that in-ground structures are grubbed out as part of the groundworks.

Hard materials can be used to generate suitable aggregates for re-use on site as part of engineered made ground and/ or construction platforms (subject to geo-environmental testing and client design specifications). Suitable materials derived from grubbing-up should be stored in a location on site, to be agreed with the Engineer, prior to crushing. Any unsuitable materials should be removed to a suitably licensed landfill site.

7.2.3. 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 used¹⁶):

- 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 Practice¹⁷ 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.

7.2.4. 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.

7.2.5. 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.

7.2.6. 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.

7.2.7. 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 guidance¹⁸) should be adopted by all workers involved with site enabling and construction works.

7.2.8. Piling in Contaminated Land

If a piled foundation is being considered this may provide a preferential pathway for contaminants to the underlying aquifer. A piling risk assessment may be required. Good practice for the drilling of piles on contaminated sites should be adhered to, such as guidance provided by the Environment Agency¹⁹.

7.2.9. Asbestos in Soils Management Plan

Due to the presence of asbestos containing material, it is recommended that additional precautions are taken during site clearance, earthworks, and construction in the area of concern. The presence of asbestos in the made ground at the site presents a potential risk of generation of airborne fibres if this material is disturbed, such as for excavations to construct new foundations.

LKC recommend that an appropriate 'Asbestos Management Strategy' is developed in line with CIRIA C733²⁰.

7.3. Validation of Imported / Site Won Soils

Chemical validation of all imported and site-won soils to be used on site shared soft landscaping areas 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, based on MCC 'Guidelines to Developer' (2021) ²¹. LKC consider no testing, but proof of provenance is sufficient for natural, virgin, quarried material.

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 soft landscaping to ensure suitability for use.

Material Type	Source	Suite of Analysis	Sampling Rate (min. 3 per source)		
			Garden	Landscape	Other *
Topsoil / subsoil / Fill material	Greenfield	Suite A	200m ³	200m ³	200m ³
	Remediated / Site-won	Suite A / B dependent upon original SI	100m ³	150m ³	200m ³
	Brownfield / Unknown	Suite B	50m ³	150m ³	200m ³
Quarried Fill	First Generation i.e., quarried sand (subsoil) or stone (break layer)	No testing is required.	Certification of material provenance is required.		

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.

*Other assumed to be stone / 6F2 / mass fill etc.

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

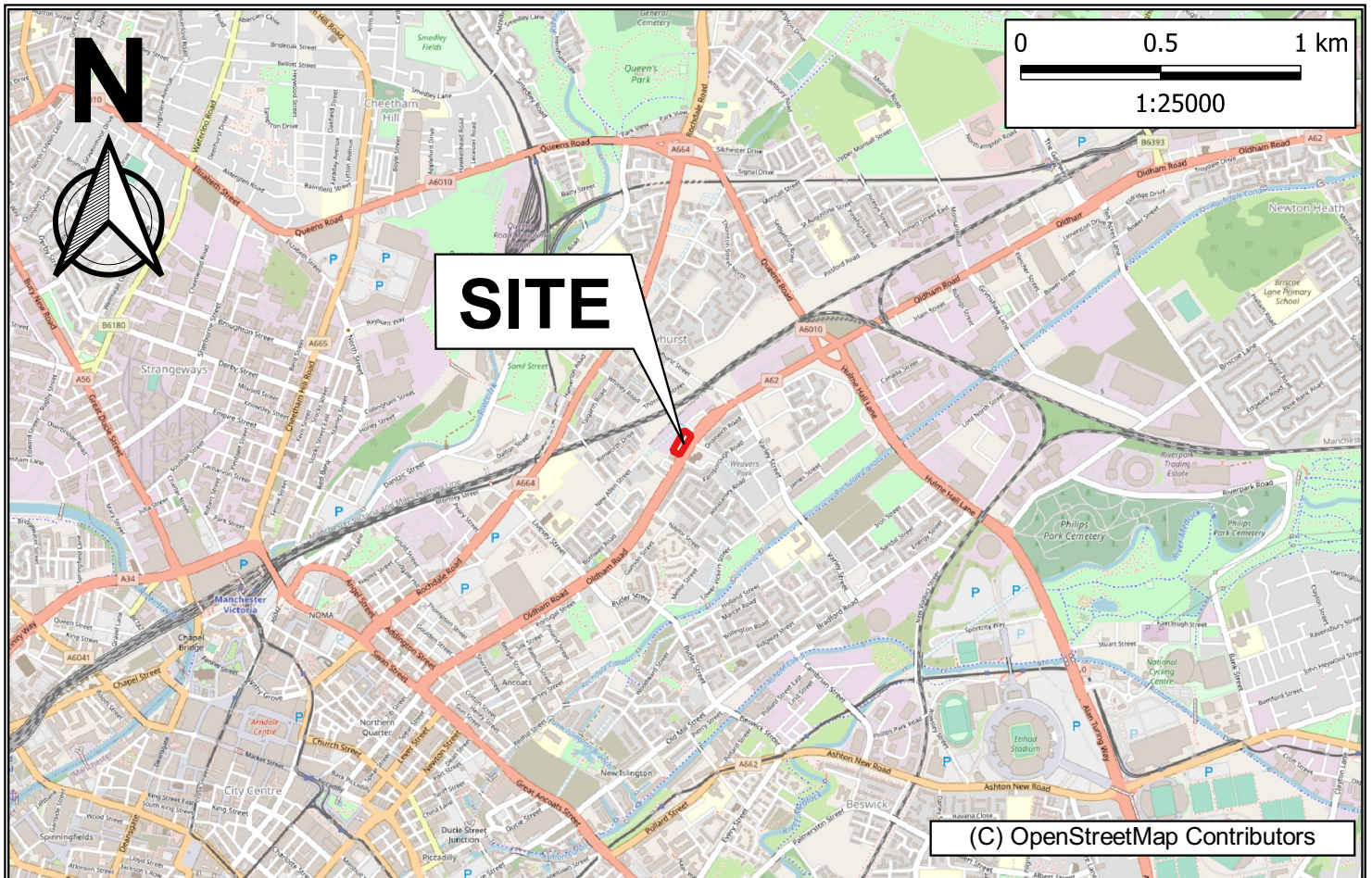
In addition, it should be ensured that the matrix of the topsoil is suitable as a growing medium and no undesirable material is present (in line with BS3882²²). LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in gardens will be compared against residential without plant uptake criteria (as used in the contamination risk assessment in Section 5).

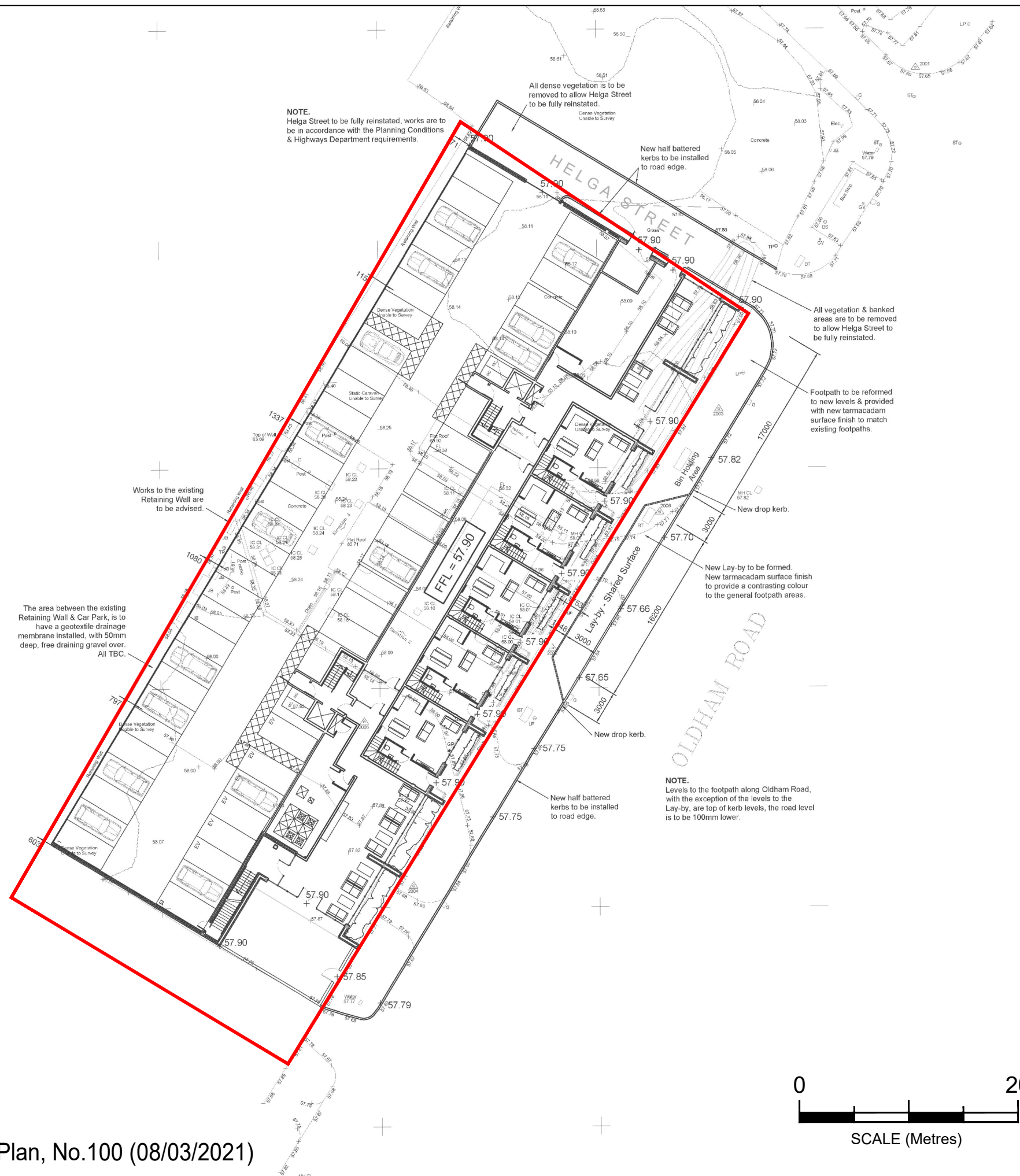
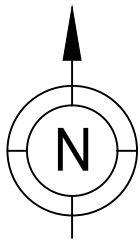
7.4. Site Completion Report

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: MPH Ancoats Ltd				Title: Site Location & Boundary Plan				
Site: Osborne's Yard, Miles Platting								
Job No.: LKC 20 1913				Scale (see scale bar): 1:25,000 & 1:1,000 @ A4		Figure: 1		Revision:
Drawn By: RP		Checked By: CC		Drawn: Apr 2021				



KEY

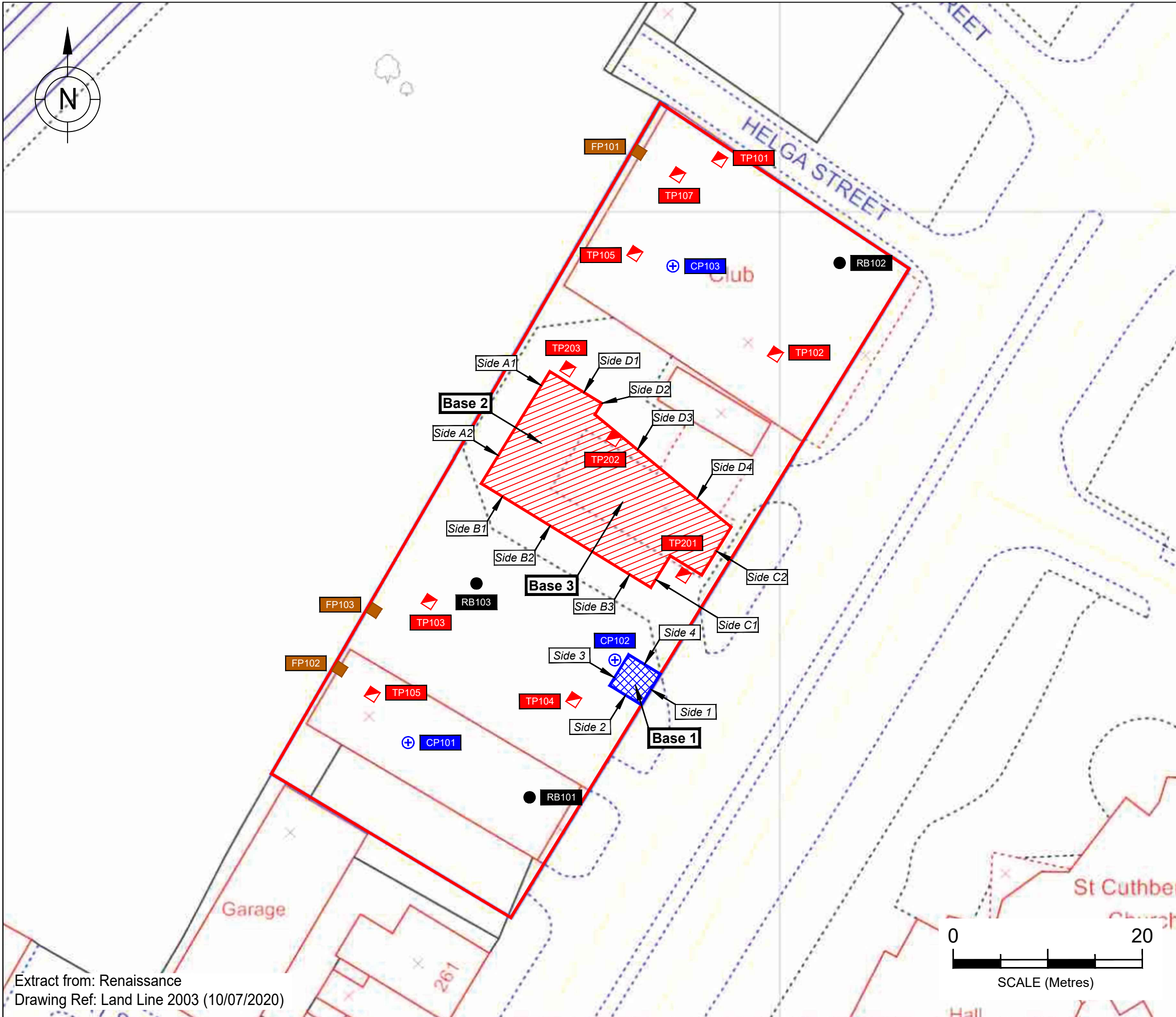
 Site Boundary

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.



Client:		MPH Ancoats Ltd		
Site:		Osborne's Yard, Miles Platting		
Title:		Proposed Site Use		
Job No.:	LKC 20 1913	Scale (See Scale Bar):	See Scale Bar	Figure:
Drawn By:	AC	Checked By:	RP	Revision:
		May 2021		2

Extract from: Elevate
Drawing Ref: Proposed Site Plan, No.100 (08/03/2021)



KEY

- Site Boundary
- Trial Pit (TP)
- Cable Percussive Borehole (CP)
- Rotary Borehole (RB)
- Foundation Pit (FP)

DELINIATION AREAS:

- Area 1
- Area 2

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: Arca Construct Ltd

Site: Osborne's Yard, Miles Platting

Title: Delineation & Sampling Location Plan

Job No.:	Scale (See Scale Bar):	Figure:	Revision:
LKC231691	See Scale Bar	3	
Drawn By: AC	Checked By: RP	Drawn: Jul 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 552²³. 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 is 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 – Photographs and Site Diaries

LKC SITE DIARY			
Project No.:	LKC 23 1691	LKC Engineer:	RP
Site Name:	Osbornes Yard, Manchester	Date:	11 th January 2024
Client:	Heatley Developments Ltd	Time on site:	09.00
Contractor:	-	Time off site:	16.00
Plant:	Tracked excavators	Weather:	Dry, overcast, cold AM, warmer PM.
Purpose of Visit:	Delineation and removal of any volatile contamination associated with former fuel tanks.		
Main activities:			
» Take site photographs before works. » Set up bunded areas for contaminated material stockpiling. » Delineate hotspot identified at TP202 in centre of site. Paused this pit due to perched groundwater present. » Delineate any contamination around the smaller tank in the east, which had been found by demolition contractors.			
Contamination Encountered:			
» Near to TP202 – hydrocarbon odour and sheen. » Grey colour identified in made ground in area of former small fuel tank in east of site. Made ground recorded to 0.70mbgl.			
No. of soil samples taken:	5no. validation samples (B1, Side 1-4). 2no. stockpile samples (SP1 contaminated material left by demo contractors, SP2-contaminated material dug out from Area 1).	Laboratory testing:	5no. TPH CWG, BTEX, MTBE, SOM. 2no. Metals, asbestos ID, PAHs, TPH CWG, BTEX
			
Photograph 1: View of former underground fuel tank area which demolition contractors have already removed the tanks and backfilled excavation with rubble.		Photograph 2: Site had reduced in levels by 0.5m.	
			
Photograph 3: Visqueen ready onsite for stockpiling of contaminated material.		Photograph 4: Areas to delineate from previous SI had been marked out and cordoned off.	

	
Photograph 5: Setting up bunded area in preparation to stockpile contaminated material.	Photograph 6: View of start of excavation in Area 1, site of former small fuel tank. Some dark grey HC contaminated layer and sheen of perched water noted.
	
Photograph 7: Contamination hotspot delineated. Excavated stopped at eastern site boundary.	Photograph 8: View of contamination at eastern site boundary.
	
Photograph 9: View of SP1 – material left by demolition contractor from tank removal.	Photograph 10: View of SP2 – material excavated from Area 1.

LKC SITE DIARY			
Project No.:	LKC 23 1691	LKC Engineer:	RP
Site Name:	Osbornes Yard, Manchester	Date:	12 th January 2024
Client:	Heatley Developments Ltd	Time on site:	09.00
Contractor:	-	Time off site:	14.00
Plant:	Tracked excavators	Weather:	Dry, overcast, cold AM, warmer PM.
Purpose of Visit:	Delineation and removal of any volatile contamination associated with former fuel tanks.		
Main activities:			
➤ Continued delineation of hotspot identified at TP202 in centre of site. Concrete encountered at base, need to break this out. ➤ Trial trench started at the west of the site behinds former underground fuel tanks (Side A).			
Contamination Encountered:			
➤ Near to TP202 – hydrocarbon odour and sheen on top of and below concrete slab. ➤ Seeping HC contamination along granular layer in the trial trench in the west of the site.			
No. of soil samples taken:	1no. validation samples (Side A). 1no. stockpile samples (SP3-contaminated material dug out from Area 2).	Laboratory testing:	1no. TPH CWG, BTEX, MTBE, SOM. 1no. Metals, asbestos ID, PAHs, TPH CWG, BTEX
			
Photograph 1: Setting up of second Visqueen bunded area.		Photograph 2: Visual start of HC contaminated ground at 0.7mbgl.	
			
Photograph 3: Visually HC contaminated rubble and perched water.		Photograph 4: HC contaminated material stockpile on visqueen.	

	
Photograph 5: Concrete base at 1.9mbgl with brick partitions. .	Photograph 6: Black HC contaminated present directly below concrete slab.
	
Photograph 7: Trial trench started at the west of the site, to the rear of the former underground fuel tanks.	Photograph 8: HC contamination can be seen seeping along granular layer.

LKC SITE DIARY			
Project No.:	LKC 23 1691	LKC Engineer:	RP
Site Name:	Osbornes Yard, Manchester	Date:	15 th January 2024
Client:	Heatley Developments Ltd	Time on site:	09.00
Contractor:	-	Time off site:	16.00
Plant:	Tracked excavators	Weather:	Dry, cold.
Purpose of Visit:	Delineation and removal of any volatile contamination associated with former fuel tanks.		
Main activities:			
➤ Continuation of trial trench started at the west of the site behind former underground fuel tanks (Side A). ➤ Backfill of Area 1 delineation with granular fill.			
Contamination Encountered:			
➤ Black staining to the clay in the west of the site.			
No. of soil samples taken:	2no. validation samples, Base 2 and Side B1.	Laboratory testing:	2no. TPH CWG, BTEX, MTBE, SOM.
			
Photograph 1: Area 1 backfilled with granular fill material.		Photograph 2: Extension of trial trench in western side of site.	
			
Photograph 3: Excavation is filled with demolition rubble from the removal of the tanks by the demolition contractor previously.		Photograph 4: HC contaminated staining in the clay at 2mbgl along the west of the site.	

	
Photograph 5: Concrete base at 3.9mbgl which tanks used to be sat on.	Photograph 6: Clay present beneath the concrete slab, appeared clean.

LKC SITE DIARY			
Project No.:	LKC 23 1691	LKC Engineer:	RP
Site Name:	Osbornes Yard, Manchester	Date:	16 th January 2024
Client:	Heatley Developments Ltd	Time on site:	09.00
Contractor:	-	Time off site:	16.30
Plant:	Tracked excavators	Weather:	Dry, very cold, snow.
Purpose of Visit:	Delineation and removal of any volatile contamination associated with former fuel tanks.		
Main activities:			
➤ Continuation of trial trench in Area 2, western side (Side A) and start of southern side (Side B). ➤ Backfill of Area 2 delineation with granular fill.			
Contamination Encountered:			
➤ Black staining to the buried concrete slabs. ➤ Black staining below concrete slab in area of a buried manhole cover.			
No. of soil samples taken:	1no. validation samples, Base 3.	Laboratory testing:	1no. TPH CWG, BTEX, MTBE, SOM.
			
Photograph 1: Shallower concrete slab encountered to the front of the former tanks, towards the former forecourt, at approximately 2.5mbgl. HC staining noted on concrete slab.		Photograph 2: Some black staining noted in a localised area beneath the concrete slab.	
			
Photograph 3: Buried manhole cover noted at approximately 1.8mbgl.		Photograph 4: Concrete slab continued towards the road in the east of the site.	