



## Remediation Strategy and Verification Plan

Crabtree Lane, Manchester  
Former Walkers Site  
Crabtree Lane  
Manchester  
M11 4GU

February 2024

546629.0004.0000

**Prepared For:**

Chancerygate Manchester Limited  
12a Upper Berkeley Street  
London  
England  
W1H 7QE

**Prepared By:**

TRC Companies Limited  
Arkwright House  
Manchester  
M3 2LF

Registered office: 150 Minories, London EC3N 1LS | Company number: 06749633

## Quality Control

|                 |                                            |
|-----------------|--------------------------------------------|
| Client Name:    | Chancerygate Manchester Limited            |
| Project Name:   | Crabtree Lane, Manchester                  |
| Project No.:    | 546629.0004.0000                           |
| Document Title: | Remediation Strategy and Verification Plan |
| Date:           | February 2024                              |

|              |                 |  |  |  |
|--------------|-----------------|--|--|--|
| Version:     | 1.0             |  |  |  |
| Date:        | 16/02/2024      |  |  |  |
| Prepared by: | Nyemh Johnson   |  |  |  |
| Reviewed by: | Jonathon Sander |  |  |  |
| Approved by: | Colleen Nunn    |  |  |  |

# Table of Contents

|            |                                                                         |           |
|------------|-------------------------------------------------------------------------|-----------|
| <b>1.0</b> | <b>Introduction .....</b>                                               | <b>1</b>  |
| 1.1        | Purpose.....                                                            | 1         |
| 1.2        | Proposed Development .....                                              | 1         |
| 1.3        | Scope of Services .....                                                 | 1         |
| 1.4        | Previous Reports .....                                                  | 1         |
| <b>2.0</b> | <b>Site Summary .....</b>                                               | <b>2</b>  |
| 2.1        | Site Details .....                                                      | 2         |
| 2.2        | Summary of Adjacent Land Uses .....                                     | 2         |
| 2.3        | Summary of Site History.....                                            | 2         |
| 2.4        | Summary of Environmental Setting.....                                   | 3         |
| 2.5        | Previous Environmental Assessments, Investigations or Remediation ..... | 3         |
| <b>3.0</b> | <b>Remediation Drivers.....</b>                                         | <b>8</b>  |
| 3.1        | Conceptual Site Model .....                                             | 8         |
| 3.2        | Summary of Remediation Drivers .....                                    | 10        |
| <b>4.0</b> | <b>Remediation Approach.....</b>                                        | <b>11</b> |
| 4.1        | Objectives .....                                                        | 11        |
| 4.2        | Outline Remediation Strategy .....                                      | 11        |
| 4.3        | Discovery Strategy .....                                                | 11        |
| <b>5.0</b> | <b>Outline Remediation Methodology.....</b>                             | <b>12</b> |
| 5.1        | Discovery Strategy .....                                                | 12        |
| 5.2        | Permits and Consents .....                                              | 12        |
| 5.3        | Additional Environmental Controls .....                                 | 12        |
| 5.4        | Soft Landscaping .....                                                  | 13        |
| 5.5        | Stockpile Management .....                                              | 13        |
| 5.6        | Asbestos Risk .....                                                     | 13        |
| 5.7        | Borehole Decommissioning.....                                           | 14        |
| 5.8        | Ground Gas Mitigation.....                                              | 15        |
| <b>6.0</b> | <b>Verification Plan.....</b>                                           | <b>16</b> |
| 6.1        | Purpose.....                                                            | 16        |
| 6.2        | Verification Actions .....                                              | 16        |
| 6.3        | Verification Report .....                                               | 17        |
| <b>7.0</b> | <b>Assumptions and Reliance .....</b>                                   | <b>18</b> |
| 7.1        | Significant Assumptions .....                                           | 18        |
| 7.2        | User Reliance .....                                                     | 18        |

---

## Table of Contents: Annexes

**Annex A: Figures**

**Annex B: Verification Criteria**

## 1.0 Introduction

### 1.1 Purpose

TRC Companies Limited (TRC) was commissioned by Chancerygate Manchester Limited (the 'Client') to prepare a Remediation Strategy and Verification Plan for the development located at the Former Walkers Site, Crabtree Lane, Clayton, Manchester, M11 4GU (hereafter referred to as the 'Site').

A Site location plan is provided as Figure 1 in Annex A.

The purpose of this Remediation Strategy is to support the pre-commencement conditions for the existing planning application for the Site (Former Walkers of Manchester Printing Site, Crabtree Lane, Manchester, M11 4GU, application number 138914/FO/2023).

### 1.2 Proposed Development

The proposed development comprises three warehouse units; a large single unit in the east of the Site, Unit 5 (1,241m<sup>2</sup>), and a further two structures in the north and south of the Site, each of which will house four adjoining warehouse units ranging in size from 372m<sup>2</sup> to 757m<sup>2</sup>. All units will have associated mezzanine floors, loading docks, parking and access roads.

A proposed development plan is presented as Figure 2 in Annex A.

### 1.3 Scope of Services

This report aims to present a Remediation Strategy for the Site to ensure appropriate measures are undertaken to mitigate contaminated land risk associated with the Site's historical uses.

The Remediation Strategy has been prepared with due regard to the following guidance:

- The National Planning Policy Framework;
- BS10175 (2017) Investigation of Potentially Contaminated Sites – Code of Practice;
- BS5930 (2020) Code of Practice for Ground Investigations;
- Land Contamination: Risk Management (LCRM) 2020 (amended 2023)
- BS8485 (2019) Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings;
- BS8676:2013 'Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds (VOCs);
- Control of Asbestos Regulations (2012); and
- CL:AIRE (2016) CAR-SOIL™ Control of Asbestos Regulations 2012 Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials: Industry Guidance.

### 1.4 Previous Reports

This report should be read in conjunction with the following documents:

- GVA Grimley LLP, Report Number 01A704444; Phase 1 Environmental Due Diligence Report, March 2007.
- Rogers Geotechnical Services LTD (RGS LTD), Report Number J2314/12/E; Report on a Geo-Environmental Investigation at Crabtree Lane, Clayton, Manchester, M11 4GU, January 2013.
- TRC, report ref: 546629.0000.0000; Desk Based Geo-environmental and Geotechnical Site Assessment, June 2023.
- TRC, report ref: 546629.0001.0000; Intrusive Geoenvironmental and Geotechnical Site Assessment, July 2023.
- TRC, report ref: 546629.0002.0000; Supplementary Geoenvironmental and Geotechnical Site Assessment, January 2024.
- TRC, report ref: 546629.0003.0000; Asbestos in Soils Management Plan. January 2024.

## 2.0 Site Summary

### 2.1 Site Details

**Table 1: Summary of Site Details**

|                         |                                                                                                                                                                                                            |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site Address</b>     | Former Walkers Site, Crabtree Lane, Clayton, Manchester, M11 4GU                                                                                                                                           |
| <b>Grid Reference</b>   | Easting 388756, Northing 398228                                                                                                                                                                            |
| <b>Approximate Size</b> | The Site is approximately 0.9 ha.                                                                                                                                                                          |
| <b>Site Location</b>    | The Site is located to the east of Crabtree Lane, approximately 3 miles from Manchester city centre.                                                                                                       |
| <b>Current Site Use</b> | The Site is currently a non-operational printworks comprising of a large warehouse unit in the centre of the Site, a smaller warehouse in the south eastern corner, and associated yard and loading areas. |

### 2.2 Summary of Adjacent Land Uses

Land uses in the immediate vicinity include the following principal features:

**Table 2: Adjacent Land Uses**

| <b>Direction</b> | <b>Land Use</b>                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------|
| North            | Aldi supermarket with residential estate approximately 100m from the Site.                                                     |
| East             | Retail stores and carpark with a residential estate approximately 150m from the Site.                                          |
| South            | Industrial units directly south of the Site beyond which is a canal. A residential estate is approximately 280m from the Site. |
| West             | Industrial and undeveloped land.                                                                                               |

### 2.3 Summary of Site History

Earliest available mapping (1848) shows that the Site partially comprised a brick works. By 1893 the Site had been redeveloped into a chemical works. In 1954 the Site was developed to reflect its current land use.

## 2.4 Summary of Environmental Setting

### 2.4.1 Geology and Hydrogeology

**Table 3: Summary of Geology and Hydrogeology**

| Strata                            | Description                                                                                                                                 | Aquifer Classification               |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Made Ground</b>                | Dark grey / black silty gravelly SAND or grey very sandy GRAVEL                                                                             | Not Classified                       |
| <b>Till</b>                       | Soft to very stiff brown sandy slightly gravelly CLAY, loose to very dense brown silty SAND or loose to very dense brown silty sandy GRAVEL | Secondary (Undifferentiated) Aquifer |
| <b>Manchester Marls Formation</b> | Mudstone                                                                                                                                    | Secondary B Aquifer                  |

During TRC investigations Made Ground was encountered from ground level to depths of between 2.0m and 4.20m bgl (114.01m to 106.16m aOD).

Made Ground at the Site was predominantly granular and comprised either dark grey / black silty gravelly sand or grey very sandy gravel. Sand was fine to coarse. Gravel was angular to rounded, fine to coarse of clinker, slag, asphalt, brick. Cobble content of brick varied locally.

Superficial deposits of Till were present underlying Made Ground, to a maximum recorded depth of 15.45m bgl, the base of the stratum was not confirmed during the investigation.

Till was found to be highly variable both vertically and laterally across the Site, comprising heterogenous deposits of interbedded granular and cohesive material. Till comprised either soft to very stiff brown sandy slightly gravelly CLAY or loose to very dense brown silty SAND or loose to very dense brown silty sandy GRAVEL. Sand was fine to coarse. Gravel was very-angular to well-rounded, fine to coarse of flint.

Bedrock of the Manchester Marls Formation was not encountered during TRC's intrusive investigation at the Site.

### 2.4.2 Groundwater

During the TRC ground investigations, groundwater was encountered locally at 3.20m and 15.30m bgl.

During subsequent gas and groundwater monitoring, groundwater resting levels were recorded between 2.20m bgl and 6.32m bgl. Two monitoring wells were dry during groundwater monitoring.

## 2.5 Previous Environmental Assessments, Investigations or Remediation

TRC have undertaken Phase I and Phase II Geo-environmental and Geotechnical Site Assessments. A summary of the previous assessments are detailed in Table 4. A figure showing the TRC exploratory hole locations is presented as Figure 3 in Annex 1.

**Table 4: Summary of Previous Site Assessments**

| Report Title                                                    | Summary of Findings                                                                                                                                                                                        |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GVA Grimley LLP, Report Number 01A704444; Phase 1 Environmental | <ul style="list-style-type: none"> <li>Undeveloped land and a chemical works in the 1890's. Since 1922 the whole Site has been in industrial use (chemical works, keg works and printing works)</li> </ul> |

| Report Title                                                                                                                                                                    | Summary of Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Due Diligence Report, March 2007.                                                                                                                                               | <ul style="list-style-type: none"> <li>• Boulder Clay and Manchester Marl, underlain by Coal Measures. Coal seams at 700m depth. Made Ground likely to be present, thickness of deposit unknown.</li> <li>• The underlying Marl is classified as a non-aquifer.</li> <li>• Ashton (Under Lyne) Canal located approximately 80m to the south. Not located in an area of flood risk.</li> <li>• Low Environmental Sensitivity primarily due to presence of non-aquifer. An asbestos survey has identified asbestos containing materials on Site.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Rogers Geotechnical Services LTD (RGS LTD), Report Number J2314/12/E; Report on a Geo-Environmental Investigation at Crabtree Lane, Clayton, Manchester, M11 4GU, January 2013. | Not provided to TRC for review.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| TRC, report ref: 546629.0000.0000; Desk Based Geo-environmental and Geotechnical Site Assessment, July 2023                                                                     | <p>Earliest available mapping (1848) shows that the Site comprised partially a brick works. By 1893 the Site had been redeveloped into a chemical works. In 1954 the Site was developed to reflect its current land use.</p> <p>Expected geology to comprise of Made Ground (unknown thickness), superficial deposits of Glacial Till (secondary (undifferentiated) aquifer), and bedrock geology of Manchester Marls Formation (secondary B aquifer).</p> <p>The Site does not lie within a groundwater SPZ.</p> <p>Potential on site sources of contamination comprise Made Ground and historical use of the Site as a chemical works/print works. Potential contamination includes asbestos fibres in soil, heavy metals, polycyclic aromatic hydrocarbons (PAH), petroleum hydrocarbons, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), sulphates, polychlorinated biphenyls (PCB's), and ground gases.</p> <p>Potential off site sources of contamination comprise the historic landfill south of the Site, adjacent substation, former bus station and former chemical works. Potential contamination of heavy metals, PAH, petroleum hydrocarbons, VOC, SVOC, sulphate, PCB's, and ground gases.</p> <p>Potential Geotechnical Hazards include:</p> <ul style="list-style-type: none"> <li>• Thick Made Ground due to past developments;</li> <li>• Infilled Ground, related to past excavations and brick field works;</li> <li>• Buried obstructions, such as old foundations and basements;</li> <li>• Ground conditions aggressive to buried concrete;</li> <li>• Volume change potential of soils;</li> <li>• Soil desiccation, in the vicinity of vegetation; and,</li> <li>• Settlement prone natural soils.</li> </ul> <p>The Site is in an area affected by historical UXO risk. A Preliminary UXO Risk Assessment was carried out by 1<sup>st</sup> Line Defence which determined that it was not possible to negate the risk from UXO at this stage.</p> |

| Report Title                                                                                                             | Summary of Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                          | <p>The Landmark Envirocheck indicates that the Site is within an area that may be affected by coal mining. The Site is located within the Coal Mining Reporting Area but outside the 'Development High Risk Area'. Therefore, a full Coal Mining Risk Assessment is not required.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>TRC, report ref: 546629.0001.0000; Intrusive Geoenvironmental and Geotechnical Site Assessment, July 2023.</p>        | <p>TRC carried out an intrusive investigation at the Site comprising of four cable percussive boreholes to 15.0m bgl and eight window sample boreholes to 5.0m bgl.</p> <p>The ground conditions encountered by TRC have been discussed in section 2.4 of this report.</p> <p>21 soil samples were sent for laboratory analysis. Minor concentrations of heavy metals and hydrocarbons were detected in soil samples (both Made Ground and natural soils). None of the concentrations exceeded the GACs. Asbestos fibres in soil and fibrous debris were encountered within four samples with quantifications of between &lt;0.001% and 8.33%. Three soil samples were tested for VOCs. No VOCs were identified above the laboratories limit of detection. One sample was tested for PCBs. No PCBs were identified above the laboratories limit of detection.</p> <p>One sample of asphalt type material exceeded six PAH values, which could potentially classify the material as hazardous. If asphalt type material is to be removed from Site as part of the redevelopment, it is recommended that further testing is undertaken to confirm the waste classification.</p> <p>Soil leachate and groundwater testing was undertaken. Exceedances of Drinking Water Standards (DWS) of arsenic and nickel were identified in three samples. Exceedances of Environmental Quality Standards (EQS) of copper, lead, nickel and zinc were identified in five samples. These exceedances are not considered to be a significant risk to groundwater or controlled water receptors.</p> <p>Ground gas monitoring was undertaken. Based on the results, a gas screening value (GSV) of 0.0528 l/hr was calculated for methane and carbon dioxide, which would classify the Site as Characteristic Situation (CS) 1 (very low risk). However, due to the carbon dioxide concentrations exceeding 5% in WS104, the guidance documents state that consideration should be given to increasing the risk classification to CS2 (low risk).</p> <p>A geotechnical assessment was undertaken and concluded the most suitable foundation solution would comprise shallow foundations on treated ground to at least 5.0m bgl. Following successful ground improvement, shallow pad or strip foundations should be possible.</p> |
| <p>TRC, report ref: 546629.0002.0000; Supplementary Geoenvironmental and Geotechnical Site Assessment, January 2024.</p> | <p>During previous exploratory works, asbestos was identified at the Site. The purpose of this report is to delineate areas of asbestos to inform future construction works. Further testing of soils at the Site was also undertaken for geotechnical purposes to further assess the subsurface soils aggressiveness to concrete, as aggressive soils were identified during previous exploratory works. Finally, additional ground gas monitoring was undertaken to increase the amount of ground gas data available for the Site and inform any potential ground gas mitigation measures required at the Site.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Report Title                                                                        | Summary of Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                     | <p>The ground conditions encountered by TRC were discussed in section 2.4 of this report.</p> <p>The investigation targeted two areas where asbestos had been identified (BH102 and WS108). Nine trial pits were excavated around these three areas to measure the extent of the asbestos. Three additional trial pits were excavated close to BH203 where soils aggressive to concrete were previously identified, and two further trial pits were excavated for general coverage. 14 trial pits were excavated in total.</p> <p>13 samples of Made Ground were sent for asbestos identification and quantification. Asbestos was identified in ten samples at quantifications of between &lt;0.001% and 0.095%.</p> <p>The asbestos identified in the samples is considered to pose a low risk to future site users as the Site will be predominantly covered in building footprints and hardstanding, which will act as a barrier between asbestos in soils and future site users. However, there is a moderate risk to construction workers through inhalation during the construction phase.</p> <p>Due to the presence of asbestos within soils above 0.001%, any works which have the potential to disturb asbestos must be carried out under a Plan of Work in accordance with Control of Asbestos Regulations 2012 (CAR2012). TRC recommends that an asbestos in soils management plan is produced to assess the risks associated with working with asbestos contaminated soils during the construction phase, identify the Health and Safety Executive's (HSE) licensing regime in relation to the proposed works on site, and identify suitable control measures which should be in place to manage risks from asbestos.</p> <p>15 soil samples were sent for geotechnical testing and a design sulphate class for location of DS-5 and an ACEC class for location of AC-5 was calculated for Made Ground.</p> <p>Further ground gas monitoring was carried out. Based on the results, a gas screening value (GSV) of 0.0528 l/hr was calculated for methane and carbon dioxide, which would classify the Site as CS 1 (very low risk). It has previously been reported that, due to the carbon dioxide concentrations exceeding 5% in WS104, consideration should be given to increasing the risk classification to CS2 (low risk). This would mean that ground gas protection are required to be incorporated into future development proposals. However, three further rounds of gas monitoring have been carried out which show carbon dioxide concentrations decreasing within WS104 and negligible flow at the Site. This additional data provides evidence that gas risk at the Site is very low and should be classified as CS1, therefore no ground gas protection measures are recommended for future proposed developments.</p> |
| TRC, report ref: 546629.0003.0000; Asbestos in Soils Management Plan. January 2024. | Due to asbestos being identified within Made Ground soils at the Site, an Asbestos in Soils Management Plan was recommended. The purpose of this plan was to assess the risks associated with working with asbestos contaminated soils during the construction phase, identify the Health and Safety Executive's (HSE) licensing regime in relation to the proposed works                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Report Title | Summary of Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              | <p>on site, and identify suitable control measures which should be in place to manage risks from asbestos.</p> <p>The Joint Industry Working Group (JIWG) document 'Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials, Industry Guidance' (CAR- SOIL) provides guidance on interpreting the Control of Asbestos Regulations (CAR) 2012 with respect to asbestos in soils. To support the above, JIWG produced the following two excel based Decision Support Tools (DST).</p> <p>Based on the findings of ground investigations carried out at the Site and subsequent laboratory testing of soil samples, the JIWG DST's were used to provide overall risk rankings, licensing status and control measures for construction works at the Site.</p> <p>The 'most likely' and 'worst case' scenarios for construction workers to be exposed to asbestos fibres were determined to be low risk.</p> <p>The 'most likely' licensing status for the work was considered to be 'non-licensed work' with the following risk management implemented:</p> <ul style="list-style-type: none"> <li>• EN149 type FFFP3 disposable face masks</li> <li>• Manual/localised dust suppression</li> <li>• Localised and basic personal decontamination facilities</li> </ul> <p>TRC recommended the following is adopted to support the construction work and further reduce risk on site:</p> <ul style="list-style-type: none"> <li>• Training of site operatives on risks from asbestos e.g. asbestos awareness course</li> <li>• Watching brief on site during any soil excavation by a trained asbestos surveyor to identify any ACM and advise on control measures</li> </ul> <p>A re-assessment of risk may need to be undertaken for the Site if additional ACMs are identified during the construction works. Factors that would require a re-assessment include the following:</p> <ul style="list-style-type: none"> <li>• Discovery of significant buried ACM, particularly fibrous debris or insulation materials</li> <li>• Significant change in proposed works where prolonged manhandling of excavated soils containing asbestos over two hours in a seven day period is expected</li> </ul> |

## 3.0 Remediation Drivers

### 3.1 Conceptual Site Model

The proposed development will comprise three warehouse units; a large single unit in the east of the Site, and a further two structures in the north and south of the Site.

Based on the intrusive investigation results and the proposed development design, TRC has prepared a revised Conceptual Site Model (CSM) to include the findings from the Site investigation, which is presented in the table below.

Past historical land uses on and off-site were considered to present a potential contaminated land risk. The potential contaminants included asbestos, heavy metals, PAH, petroleum hydrocarbons, VOC, SVOC, PCB's, and ground gases.

The previous ground investigations performed at the Site by TRC identified concentrations of six PAHs in one asphalt surfacing sample in excess of Generic Assessment Criteria (GAC) for the proposed commercial end use. Minor concentrations of heavy metals and hydrocarbons were detected in soil samples. None of the concentrations exceeded the GACs. Asbestos fibres in soil were also encountered in multiple locations during all ground investigations at the Site. The asbestos was quantified between <0.001% and 8.33%.

During the TRC ground investigations, groundwater was encountered between 3.20m and 15.30m bgl.

The Till is classified as Secondary (Undifferentiated) Aquifer and the Manchester Marls Formation is classified as a Secondary (B) Aquifer. The Site does not lie within a groundwater source protection zone (SPZ). One groundwater abstraction is located within 679m of the Site. The aquifers underlying the Site are not considered to have significant resource potential in this area and are not considered to be particularly sensitive to contamination.

The nearest surface water feature (Ashton Canal) is 58m to the south of the Site. The Site is underlain by low permeability strata and groundwater is considered unlikely to be in hydraulic connection with surface waters. Therefore, surface water receptors are also not considered to be sensitive to contamination.

Soil leachates and groundwater were analysed and the results were compared against relevant Drinking Water Standard (DWS) and Environmental Quality Standards (EQS). Exceedances of heavy metals were recorded. TRC considers that the concentrations recorded do not pose a significant risk to controlled waters receptors.

TRC has assessed the permanent ground gas concentrations in accordance with current guidance (BS8485:2015). Based on the results, a gas screening value (GSV) of 0.0528 l/hr was calculated for methane and carbon dioxide, which would classify the Site as CS1 (very low risk). Increasing the risk to CS2 (low risk) was considered due to carbon dioxide exceeding 5% in WS104. However, three further rounds of gas monitoring were carried out after the classification, which show carbon dioxide concentrations decreasing within WS104 and negligible flow at the Site. This additional data provides evidence that gas risk at the Site is very low and should be classified as CS1. Therefore, ground gas protection measures are not required for the proposed development.

TRC consider that the environmental sensitivity of the Site to be low.

**Table 5: Revised Conceptual Site Model**

| Source                                                                                                                                                                               | Pathway                                                          | Receptor                             | Risk                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>PAHs exceeding commercial GAC in asphalt surfacing.</p> <p>Asbestos fibres and fibrous debris in Made Ground soils with asbestos quantification between &lt;0.001% and 8.33%.</p> | Dermal contact, ingestion and inhalation pathways                | Future site users                    | <b>Low</b><br>The proposed development will be covered by buildings or hardstanding which will act as a physical barrier between the contamination and future site users.                                                                                                                                                                      |
|                                                                                                                                                                                      |                                                                  | Neighbouring site users/residents    | <b>Low to Moderate</b><br>Neighbouring site users/residents could be exposed to contaminated soil dust and/or respirable fibres of asbestos, particularly during the construction phase. Mitigation measures could include construction site management solutions such as dust control.                                                        |
|                                                                                                                                                                                      |                                                                  | Construction and maintenance workers | <b>Moderate</b><br>Risk pathway to be mitigated via Personal Protective Equipment (PPE), good hygiene practices and construction site management. Any works which may disturb asbestos must be undertaken in accordance with the Control of Asbestos Regulations (CAR) 2012 and a Plan of Work will be required to manage risks from asbestos. |
|                                                                                                                                                                                      | Contact with buried services                                     | Buried services                      | <b>Low</b><br>Proposed development to consider risk of residual contamination and incorporate protective measures as appropriate. This may include clean service corridors and / or use of chemically resistant pipework.                                                                                                                      |
| Localised slightly elevated levels of heavy metals in groundwater                                                                                                                    | Leaching of contaminants and vertical migration into groundwater | Groundwater                          | <b>Low</b><br>The Made Ground is underlain by the Glacial Till which is classified as a Secondary (Undifferentiated) Aquifer, and Manchester Marls Formation which is classified as a Secondary (B) Aquifer. These aquifers are of low permeability and therefore are not considered to be sensitive to contamination.                         |
|                                                                                                                                                                                      | Lateral migration into groundwater/surface runoff                | Surface water                        | <b>Low</b><br>The Made Ground is underlain by the Glacial Till which is classified as a Secondary (Undifferentiated) Aquifer, and Manchester Marls Formation which is classified as a Secondary B Aquifer. Therefore it                                                                                                                        |

| Source                                           | Pathway                                                                                     | Receptor             | Risk                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  |                                                                                             |                      | is considered not likely to be in hydraulic connection with surface water in the nearby canal. The canal is located 58m south of the Site. The low permeability soils present between the Site and the canal will likely prevent migration of contaminants, and the canal will have an impermeable clay core installed adding further protection from potential contamination. Therefore risk to surface waters is considered to be low. |
| Carbon dioxide concentrations above 5% in WS104. | Migration of ground gases within granular strata and ingress into buildings/confined spaces | Future site users    | <b>Low</b><br>The Site is classified as CS1 (very low risk), as although carbon dioxide concentrations have been recorded above 5% in WS104, concentrations have been observed to be decreasing over time, and flow rates at the Site are very low.                                                                                                                                                                                      |
|                                                  |                                                                                             | Construction workers | <b>Low</b><br>Pathway to be managed through good construction practices and mitigation of risks when working in confined spaces.                                                                                                                                                                                                                                                                                                         |

### 3.2 Summary of Remediation Drivers

Based on the findings of the environmental assessment to date, it is considered that no active remediation is required at the Site. Residual contaminant risks to future site users will be addressed through development design actions as follows:

- The presence of hardstanding/buildings across the majority of the Site, providing a physical barrier against contact with potential contaminants; and,
- Placement of engineered clean capping over a geotextile marker layer in areas of proposed landscaping – to remove potential pathways between underlying soils that may contain elevated contamination and future Site users. This capping layer will also serve to provide a suitable growing medium for landscaping purposes. The capping layer should be a minimum of 450mm thick comprising 150mm topsoil 300mm subsoil.

TRC notes that the following issues will be mitigated during construction:

- Risks to construction workers during redevelopment: worker exposure will be appropriately managed via PPE and good hygiene practices as expected on brownfield development projects;
- Use of appropriate materials for buried services in accordance with statutory provider requirements; and,
- Appropriate sealed drainage design to prevent potential infiltration of contaminants.

---

## **4.0 Remediation Approach**

### **4.1 Objectives**

The development design shall remove any pollutant linkages through severing of risk pathways to ensure that residual contaminant risks to human health and controlled waters are mitigated. The remediation approach for this Site does not include the protection of demolition or construction workers, as this will be managed through a health and safety plan, including the asbestos in soils management plan, and the protection of buried services.

### **4.2 Outline Remediation Strategy**

Based on the findings from the previous investigation at the Site, it is considered that the following remediation actions will be required at the Site.

#### **4.2.1 Active Remediation**

It is not considered that active remediation is required at the Site, therefore no remediation options appraisal will be required as part of this remediation strategy.

#### **4.2.2 Development Led Remediation**

Key development characteristics will complete the remediation via the removal of risk pathways. This will eliminate the key pollutant pathways ensuring protection of the future Site users and underlying soil and groundwater conditions. The design considerations will include:

- Construction of hardstanding across the majority of the Site including building footprints, paved roadways and footpaths;
- Placement of capping across area of proposed landscaping including a clean cover of 450mm (150mm topsoil and 300mm subsoil) overlying a geotextile membrane;
- Use of appropriate materials for buried services in accordance with statutory provider requirements; and,
- Appropriate sealed drainage design to prevent potential infiltration of contaminants.

### **4.3 Discovery Strategy**

TRC recognise that there may be unidentified contamination encountered during the groundworks phase of the development. Risks associated with this potentially variable ground conditions will be managed via a discovery strategy, as detailed in Section 5.1.

## 5.0 Outline Remediation Methodology

The following section provides an outline of the requirements for the Client to manage the required remediation works and appropriately mitigate contaminant risks. It is recommended that there is appropriate oversight and verification, where applicable.

### 5.1 Discovery Strategy

Due to the heterogeneous nature of Made Ground soils beneath the Site, consideration should be given towards the potential for the development works to encounter previously unidentified contamination. A discovery strategy will be employed to ensure that groundworkers identify and manage suspected areas of ground contamination should they be encountered.

In order to manage previously unidentified contamination, TRC recommends the following procedure if suspected contamination is identified:

1. Stop Works – cease current works to allow assessment and report to environmental manager;
2. Isolate – isolate the area of work to contain the contamination and minimise exposure to unauthorised persons and surrounding users;
3. Protect – take necessary actions to mitigate risks to surrounding environmental receptors through run-off, leaching or contamination of surrounding materials. Actions may include covering of materials, use of spill kits or containment and temporary sealing of drainage;
4. Report – notify the Local Planning Authority (LPA) within 48 hours of discovery;
5. Assess – investigate contaminated materials and identify an appropriate course of action which may comprise a revised risk assessment; and
6. Record – record findings and any changes in working method statements as necessary to mitigate risks in the Site files.

Findings of any contamination discovery would be documented and reported to regulatory stakeholders including the LPA and the EA. Any further assessment and remediation would be performed in consultation with those stakeholders to ensure compliance with regulatory, planning and permitting requirements as relevant.

### 5.2 Permits and Consents

Various environmental permits and consents may be required as part of any remediation / demolition / enabling works. These would include, but are not limited to, a Materials Management Plan (MMP) to manage movement of materials around the Site and off-Site, abstraction licence if groundwater is to be abstracted and discharge consents for disposal of perched water in excavations. The contractor should apply for and manage these consents and permits as relevant to ensure compliance.

### 5.3 Additional Environmental Controls

The contractor should implement management procedures to ensure the highest level of environmental management at the Site. Key considerations for the Site are:

- Management of potentially contaminated materials;
- Controls of dust and debris;
- Noise;
- Odours;
- Vibration
- Control of debris on highways;
- Vehicle movements;
- Access / egress; and,
- Working hours.

## 5.4 Soft Landscaping

Regraded soft landscaping is proposed within the development plans issued to TRC. Any soft landscaping within areas of Made Ground should be capped with a minimum thickness of 450mm of clean material over a geotextile marker layer (150 mm topsoil and 300 mm subsoil).

Imported or re-used Site won materials should be validated via sampling and laboratory testing for the following: heavy metals, PAH, Total Petroleum Hydrocarbons – Criteria Working Group (TPH-CWG) and asbestos screening. Testing frequency should be one sample for every 200 m<sup>3</sup> of proven greenfield material and one sample every 150m<sup>3</sup> for remediated or brownfield material (with a minimum of three per source). This testing frequency is in accordance with Manchester City Council document 'Planning Guidance in Relation to Ground Contamination: Guidance Note for Applicants, Developers, Land Owners and Consultants' version 6.0 (September 2016). In addition to chemical testing, any imported manufactured topsoil to be used for the Site should be tested to confirm it meets the specification for topsoil within BS3882:2015.

Hand pits shall be excavated within any soft landscaped areas to verify the thicknesses of the topsoil and subsoil. The frequency of this should be discussed with a qualified environmental professional.

## 5.5 Stockpile Management

It is anticipated that as part of the enabling works stockpiles will be generated. As mentioned previously, materials generated from the Site require suitability testing to verify their appropriateness for re-use within the development or classification for disposal.

A management plan should be adopted detailing the location and content of each stockpile (including source) and volumes of stockpiles. Should suspected contamination be present in the stockpile, these need to be bunded and covered to prevent contamination run-off.

Stockpiles should be managed in a manner that does not cause a nuisance to surrounding land users or create a risk to subsidence or surround properties.

## 5.6 Asbestos Risk

Asbestos fibres in soil were identified within ten samples of Made Ground across all intrusive investigations at the Site. The samples containing asbestos were found to contain Chrysotile, Crocidolite and Amosite in soil. Asbestos quantification was undertaken on these samples, with concentrations of between <0.001% and 8.33% fibres in soil recorded.

Based on these findings, an Asbestos in Soils Management Plan was developed for the Site in order to assess the risks associated with working with asbestos contaminated soils during the construction phase, identify the Health and Safety Executive's (HSE) licensing regime in relation to the proposed works on site, and identify suitable control measures which should be in place to manage risks from asbestos.

The 'most likely' and 'worst case' scenarios for construction workers to be exposed to asbestos fibres have been determined to be very low and low risk respectively.

The 'most likely' licensing status for the work is considered to be 'non-licensed work' with the following risk management implemented:

- EN149 type FFFP3 disposable face masks
- Manual/localised dust suppression
- Localised and basic personal decontamination facilities

TRC recommends the following is adopted to support the construction work and further reduce risk on site:

- Training of site operatives on risks from asbestos e.g. asbestos awareness course

- Watching brief on site during any soil excavation by a trained asbestos surveyor to identify any ACM and advise on control measures

A re-assessment of risk may need to be undertaken for the Site if additional ACMs are identified during the construction works. Factors that would require a re-assessment include the following:

- Discovery of significant buried ACM, particularly fibrous debris or insulation materials
- Significant change in proposed works where prolonged manhandling of excavated soils containing asbestos over two hours in a seven day period is expected

A Plan of Work should also be developed during the construction phase. As stated in the guidance, the Plan of Work should include the following information:

- The nature and probable duration of the work – including a plan showing the location of the asbestos and nature of the asbestos;
- The number of people involved in the work;
- The address and location where the work is to be carried out;
- The methods to be used to prevent or reduce exposure to asbestos; e.g. prevention and control measures and arrangements for the handling and disposal of asbestos waste;
- The type of equipment, including PPE and RPE, used for:
  - protecting and decontaminating those carrying out the work;
  - protecting other people present at or near the worksite.

The Plan of Work needs to be a practical and useful document that is suitable for site workers / employees to follow and needs to be produced by a suitably competent person.

Documents presenting how asbestos will be managed has been produced by the Contractor should be issued to the LPA and EA for approval.

If additional asbestos is encountered during the discovery phase, work should cease, and both the Asbestos in Soils Management Plan and Plan of Work should be reviewed and updated to reflect the risk from asbestos at the Site.

## 5.7 Borehole Decommissioning

There may be a need to decommission the existing boreholes on the Site in order to prevent potential preferential pathways for gas migration.

In preparing this document, TRC has consulted the publication of 'Good Practice for Decommissioning Redundant Boreholes and Wells'. The decommissioning methodology requires the backfilling the entire borehole annulus from the base back to ground level with a low permeability bentonite / cement grout. This methodology usually requires some time for the grout to settle in the well which may require more grout after decommissioning.

The headworks should be removed (if possible) and if not contaminated these will be removed from the Site as general waste. The final 2m to ground surface will be filled with a concrete cap that extends 1 m around the surface of the borehole. The borehole will be reinstated at surface to the same standard as the surrounding ground, which will include a concrete/aggregate or topsoil finish, depending upon the surrounding landscape.

Detailed records will be written during monitoring which will include:

1. The reason for the abandonment;
2. Groundwater level prior to decommissioning;
3. Any removal of pipework or attempt to remove the pipework;
4. The depth, position and nature of backfill materials; and,

5. Problems encountered during decommissioning.

### 5.8 Ground Gas Mitigation

Methane was detected in all monitoring wells on at least one occasion, with a maximum concentration of 0.2%v/v.

Carbon dioxide was detected in all of the monitoring wells on all monitoring occasions. Carbon dioxide concentrations ranged from 2.1% to 8.8%. All concentrations were below 5% in all monitoring wells except WS104.

TRC has assessed the permanent ground gas concentrations in accordance with current guidance (BS8485:2015). Based on the results, a gas screening value (GSV) of 0.0528 l/hr was calculated for methane and carbon dioxide, which would classify the Site as CS1 (very low risk). Increasing the risk to CS2 (low risk) was considered due to carbon dioxide exceeding 5% in WS104. However, three further rounds of gas monitoring were carried out after the classification, which show carbon dioxide concentrations decreasing within WS104 and negligible flow at the Site. This additional data provides evidence that gas risk at the Site is very low and should be classified as CS1. Therefore, ground gas protection measures would not be required for the proposed development.

## 6.0 Verification Plan

### 6.1 Purpose

A verification plan is required to document and record the work completed at the Site. The verification plan may serve to meet data requirements of future planning condition discharges and warranty providers.

### 6.2 Verification Actions

The following verification actions are proposed for the Site. It should be noted that the Site will undergo enabling works which are not covered within this environmental specific remediation strategy.

#### 6.2.1 Action Triggered by the Discovery Strategy

Any actions triggered by the discovery strategy should be reported in full. As required by the planning permission, this will include investigation, risk assessment and remediation as required to mitigate risks. These actions will be reported under separate cover and once complete would be summarised within the verification report.

#### 6.2.2 Buried Services

The contractor should contact the local water supplier to confirm that materials used for water pipe supply are compatible with ground conditions as well as the water supplier's requirements.

#### 6.2.3 Materials Import

Regraded soft landscaping is proposed within areas of Made Ground, the construction contractor shall complete the works through the placement of capping in areas of soft landscaping. This capping shall be formed of 300 mm layer of clean imported material (comprising 150 mm subsoil and 150 mm topsoil). In addition to this, a geotextile marker layer should be installed beneath the capped layer.

Should there be any material import, documentary evidence would be provided to confirm the source, materials quality (including chemical and geotechnical testing), acceptance procedures and use within the property development. The following testing for environmental suitability should be undertaken: heavy metals, PAH, TPH-CWG and asbestos screening. Testing frequency should be one sample for every 200 m<sup>3</sup> of proven natural material and one sample every 150m<sup>3</sup> for reused, recycled or manufactured material (with a minimum of three per source). This information would be included in the verification report.

#### 6.2.4 Materials Re-use

If site won material is to be re-used on Site, this should be undertaken in accordance with an appropriate Permit, Exemption or the CL:AIRE Definition of Waste Code of Practice (DoWCoP).

For any material's re-use, the material needs to be tested both environmentally and geotechnically to confirm its suitability for the development and proposed re-use. The following testing for environmental suitability should be undertaken: heavy metals, PAH, TPH-CWG and asbestos screening. Testing frequency should be one sample for every 150 m<sup>3</sup> (with a minimum of three per source) and results should be screened against appropriate suitable for use criteria.

#### 6.2.5 Materials Disposal

For materials disposal during the construction phases, a comprehensive materials management plan with waste records should be maintained by the Principal Contractor managing the phase of work. The documentary evidence shall include a minimum of materials testing, waste consignment and disposal documentation to demonstrate appropriate duty of care and compliance with relevant waste regulation. This information should be made available to the LPA.

Materials destined for off-site disposal to landfill may require further assessment in accordance with WM3 'Guidance on the classification and assessment of waste' (1st edition version 1.2 GB 2021) to determine their waste classification.

#### **6.2.6 Soft Landscaping**

Hand pits shall be excavated in the soft landscaped areas to verify the thicknesses of the topsoil and subsoil. Photographs of each pit will be taken to show the thicknesses of the capped areas.

#### **6.2.7 Verification Criteria**

Should any materials be either imported to Site or re-used on Site, suitable testing should be undertaken as stated in Sections 6.2.3 and 6.2.4. Results should be screened against the GAC for a Commercial End Use to confirm suitability.

The soil results should be screened against verification criteria based upon the following :

- Land Quality Management Limited and Chartered Institute of Environmental Health (November 2014), the LQM/CIEH S4ULs for Human Health Risk Assessment. Document reference: S4UL3435.
- Development of Category 4 Screening Levels for assessment of land affected by contamination - SP1010 (September 2014).
- LQM S4ULs: evaluation of 2017 USEPA Toxicological Review of Benzo[a]pyrene.
- LQM/CIEH S4ULs for Nickel according to land use (Revised August 2015).

Verification criteria are presented in Annex B.

### **6.3 Verification Report**

A verification report should be prepared to confirm that all necessary remediation actions have been satisfactorily completed at the Site. The report will contain the following key information:

- Summary of works carried out;
- Drawings showing the proposed building design;
- Field records including records of borehole decommissioning;
- Photographic and other media records;
- Findings of any actions triggered in association with the discovery strategy;
- Verification of ground gas membrane installation including as built drawing;
- Confirmation of materials compatibility for buried services; and,
- Confirmation of any material's re-use import or disposal from Site as may be relevant during the construction works.

---

## 7.0 Assumptions and Reliance

### 7.1 Significant Assumptions

This Remediation Strategy and Verification Plan presents TRC's observations, findings, and conclusions as they existed on the date that this report was issued. This report is subject to modification if TRC becomes aware of additional information after the date of this report that is material to its findings and conclusions.

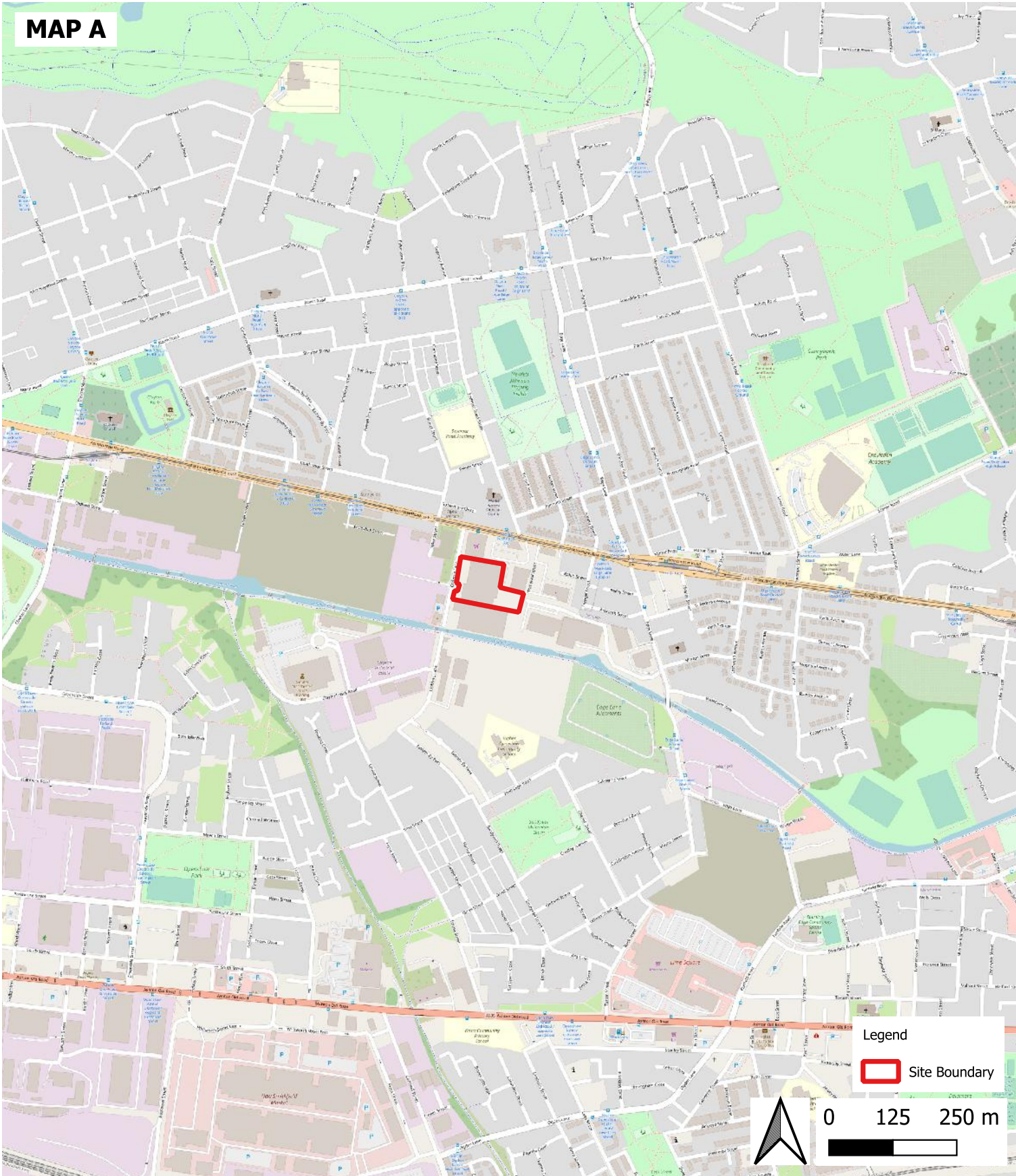
The reliability of information provided by others to TRC cannot be guaranteed to be accurate or complete. Performance of this Remediation Strategy is intended to reduce, but not eliminate, uncertainty of environmental conditions associated with the subject Site; therefore, the findings and conclusions made in this report should not be construed to warrant or guarantee the subject Site, or express or imply, including without limitation, warranties as to its marketability for a particular use. TRC found no reason to question the validity of information received unless explicitly noted elsewhere in this report.

### 7.2 User Reliance

This report was prepared for Chancerygate Manchester Limited. Reliance on the Report by any other third party is subject to requesting and fully executing a reliance letter between TRC and the third party that acknowledges the TRC Standard Terms and Conditions with the Client, to the same extent as if they were the Client thereunder.

TRC has been provided with information from third parties for information purposes only and without representation or warranty, express or implied as to its accuracy or completeness and without any liability on such third parties part to revise or update the information. Where reliance has been provided by third parties to potential purchasers this is noted in our report.

## **Annex A: Figures**



|          |                                                                                                                                                    |    |          |  |                                          |                                             |                                                                                                                                            |                     |                                           |  |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------|----|----------|--|------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------|--|
| NOTES    | COPYRIGHT NOTES                                                                                                                                    |    |          |  | REVISIONS                                |                                             | <div> Arkwright House<br/>Manchester<br/>M3 2LF</div> |                     | TITLE                                     |  |
|          | Google imagery June 2018<br><br>© OpenStreetMap contributors- data is available under the Open Database License. Cartography licensed as CC BY-SA. |    |          |  |                                          |                                             |                                                                                                                                            |                     | SITE LOCATION PLAN                        |  |
|          |                                                                                                                                                    |    |          |  | TRC PROJECT NO.                          | SCALE                                       |                                                                                                                                            |                     |                                           |  |
|          |                                                                                                                                                    |    |          |  | 546629                                   | MAP A - 1:10,000 @ A3<br>MAP B - 1:750 @ A3 |                                                                                                                                            |                     |                                           |  |
|          |                                                                                                                                                    |    |          |  | P01                                      | FIRST ISSUE                                 |                                                                                                                                            |                     | CLIENT<br>CHANCERYGATE MANCHESTER LIMITED |  |
| Initials | NJ                                                                                                                                                 | NJ | 31/01/24 |  |                                          |                                             |                                                                                                                                            |                     |                                           |  |
| REV.     | REVISION NOTES/COMMENTS                                                                                                                            |    |          |  | PROJECT<br><br>CRABTREE LANE, MANCHESTER |                                             | DRAWING NO<br><br>546629.0004.FIG01                                                                                                        | REVISION<br><br>PO1 |                                           |  |
|          | Initials                                                                                                                                           |    |          |  |                                          |                                             |                                                                                                                                            |                     |                                           |  |





|                   |                                                 |     |  |  |           |  |  |  |                                                                                                                                            |  |                                         |  |
|-------------------|-------------------------------------------------|-----|--|--|-----------|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------|--|
| NOTES             | COPYRIGHT NOTES<br><br>Google imagery June 2018 |     |  |  | REVISIONS |  |  |  | <div> Arkwright House<br/>Manchester<br/>M3 2LF</div> |  | TITLE<br>EXPLORATORY HOLE LOCATION PLAN |  |
|                   |                                                 |     |  |  |           |  |  |  |                                                                                                                                            |  | TRC PROJECT NO.<br>546629               |  |
|                   |                                                 |     |  |  | P01       |  |  |  | PURPOSE OF ISSUE                                                                                                                           |  | STATUS                                  |  |
|                   |                                                 |     |  |  |           |  |  |  | SUITABLE FOR INFORMATION                                                                                                                   |  | FINAL                                   |  |
|                   |                                                 |     |  |  |           |  |  |  | REV.                                                                                                                                       |  |                                         |  |
| 546629.0004.FIG03 |                                                 | PO1 |  |  |           |  |  |  |                                                                                                                                            |  |                                         |  |

## **Annex B: Verification Criteria**

## Human Health Generic Assessment Criteria

| Contaminant of Concern             | Units | Generic Assessment Criteria (mg/kg) |                    |                   |            | Source          |
|------------------------------------|-------|-------------------------------------|--------------------|-------------------|------------|-----------------|
|                                    |       | Residential (wHP)                   | Residential (woHP) | POS (Residential) | Commercial |                 |
| Heavy Metals                       |       |                                     |                    |                   |            |                 |
| Arsenic                            | mg/kg | 37                                  | 40                 | 79                | 640        | S4UL            |
| Boron                              | mg/kg | 290                                 | 11000              | 21000             | 240000     | S4UL            |
| Cadmium                            | mg/kg | 11                                  | 85                 | 120               | 190        | S4UL            |
| Chromium (hexavalent)              | mg/kg | 6                                   | 6                  | 7.7               | 33         | S4UL            |
| Chromium (III)                     | mg/kg | 910                                 | 910                | 1500              | 8600       | S4UL            |
| Chromium                           | mg/kg | 910                                 | 910                | 1500              | 8600       | S4UL            |
| Copper                             | mg/kg | 2400                                | 7100               | 12000             | 68000      | S4UL            |
| Lead                               | mg/kg | 200                                 | 310                | 630               | 2330       | C4SL            |
| Mercury                            | mg/kg | 40                                  | 56                 | 120               | 1100       | S4UL            |
| Nickel                             | mg/kg | 180                                 | 180                | 230               | 980        | S4UL            |
| Selenium                           | mg/kg | 250                                 | 430                | 1100              | 12000      | S4UL            |
| Zinc                               | mg/kg | 3700                                | 40000              | 81000             | 730000     | S4UL            |
| Polycyclic Aromatic Hydrocarbons   |       |                                     |                    |                   |            |                 |
| Naphthalene                        | mg/kg | 2.3                                 | 2.3                | 4900              | 190        | S4UL            |
| Acenaphthylene                     | mg/kg | 170                                 | 2900               | 15000             | 83000      | S4UL            |
| Acenaphthene                       | mg/kg | 210                                 | 3000               | 15000             | 84000      | S4UL            |
| Fluorene                           | mg/kg | 170                                 | 2800               | 9900              | 63000      | S4UL            |
| Phenanthrene                       | mg/kg | 95                                  | 1300               | 3100              | 22000      | S4UL            |
| Anthracene                         | mg/kg | 2400                                | 31000              | 74000             | 520000     | S4UL            |
| Fluoranthene                       | mg/kg | 280                                 | 1500               | 3100              | 23000      | S4UL            |
| Pyrene                             | mg/kg | 620                                 | 3700               | 7400              | 54000      | S4UL            |
| Benzo(a)anthracene                 | mg/kg | 7.2                                 | 11                 | 29                | 170        | S4UL            |
| Chrysene                           | mg/kg | 15                                  | 30                 | 57                | 350        | S4UL            |
| Benzo(b)fluoranthene               | mg/kg | 2.6                                 | 3.9                | 7.1               | 44         | S4UL            |
| Benzo(k)fluoranthene               | mg/kg | 77                                  | 110                | 190               | 1200       | S4UL            |
| Benzo(a)pyrene                     | mg/kg | 2.2                                 | 3.2                | 5.7               | 35         | S4UL            |
| Indeno(1,2,3-cd) pyrene            | mg/kg | 27                                  | 45                 | 82                | 500        | S4UL            |
| Dibenz(a,h)anthracene              | mg/kg | 0.24                                | 0.31               | 0.57              | 3.5        | S4UL            |
| Benzo(ghi)perylene                 | mg/kg | 320                                 | 360                | 640               | 3900       | S4UL            |
| Monoaromatics                      |       |                                     |                    |                   |            |                 |
| Benzene                            | µg/kg | 87                                  | 380                | 72000             | 27000      | S4UL            |
| Toluene                            | µg/kg | 130000                              | 880000             | 56000000          | 56000000   | S4UL            |
| Ethylbenzene                       | µg/kg | 47000                               | 83000              | 24000000          | 5700000    | S4UL            |
| p & m-xylene                       | µg/kg | 56000                               | 79000              | 41000000          | 5900000    | S4UL            |
| o-xylene                           | µg/kg | 60000                               | 88000              | 41000000          | 6600000    | S4UL            |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 49000                               | 73000              | -                 | 7900000    | EIC/AGS/CL:AIRE |
| Petroleum Hydrocarbons (Aliphatic) |       |                                     |                    |                   |            |                 |
| TPH-CWG – Aliphatic >EC5 – EC6     | mg/kg | 42                                  | 42                 | 570000            | 3200       | S4UL            |
| TPH-CWG – Aliphatic >EC6 – EC 8    | mg/kg | 100                                 | 100                | 600000            | 7800       | S4UL            |
| TPH-CWG – Aliphatic >EC8 – EC10    | mg/kg | 27                                  | 27                 | 13000             | 2000       | S4UL            |
| TPH-CWG – Aliphatic >EC10 – EC12   | mg/kg | 130                                 | 130                | 13000             | 9700       | S4UL            |
| TPH-CWG – Aliphatic >EC12 – EC16   | mg/kg | 1100                                | 1100               | 13000             | 59000      | S4UL            |
| TPH-CWG – Aliphatic >EC16 – EC21   | mg/kg | 65000                               | 65000              | 250000            | 1600000    | S4UL            |

## Human Health Generic Assessment Criteria

|                                          |       |        |        |           |          |                 |
|------------------------------------------|-------|--------|--------|-----------|----------|-----------------|
| TPH-CWG – Aliphatic >EC21 – EC35         | mg/kg | 65000  | 65000  | 250000    | 1600000  | S4UL            |
| <b>Petroleum Hydrocarbons (Aromatic)</b> |       |        |        |           |          |                 |
| TPH-CWG – Aromatic >EC5 – EC7            | mg/kg | 70     | 370    | 56000     | 26000    | S4UL            |
| TPH-CWG – Aromatic >EC7 – EC8            | mg/kg | 130    | 860    | 56000     | 56000    | S4UL            |
| TPH-CWG – Aromatic >EC8 – EC10           | mg/kg | 34     | 47     | 5000      | 3500     | S4UL            |
| TPH-CWG – Aromatic >EC10 – EC12          | mg/kg | 74     | 250    | 5000      | 16000    | S4UL            |
| TPH-CWG – Aromatic >EC12 – EC16          | mg/kg | 140    | 1800   | 5100      | 36000    | S4UL            |
| TPH-CWG – Aromatic >EC16 – EC21          | mg/kg | 260    | 1900   | 3800      | 28000    | S4UL            |
| TPH-CWG – Aromatic >EC21 – EC35          | mg/kg | 1100   | 1900   | 3800      | 28000    | S4UL            |
| <b>Volatile Organic Compounds</b>        |       |        |        |           |          |                 |
| Chloromethane                            | µg/kg | 8.3    | 8.5    | -         | 1000     | EIC/AGS/CL:AIRE |
| Chloroethane                             | µg/kg | 8300   | 8400   | -         | 960000   | EIC/AGS/CL:AIRE |
| Bromomethane                             | µg/kg | -      | -      | -         | -        | -               |
| Vinyl Chloride                           | µg/kg | 0.64   | 0.77   | 3500      | 59       | S4UL            |
| Trichlorofluoromethane                   | µg/kg | -      | -      | -         | -        | -               |
| 1,1-Dichloroethene                       | µg/kg | 230    | 230    | -         | 26000    | EIC/AGS/CL:AIRE |
| 1,1,2-Trichloro 1,2,2-Trifluoroethane    | µg/kg | -      | -      | -         | -        | -               |
| Cis-1,2-dichloroethene                   | µg/kg | 110    | 120    | -         | 14000    | EIC/AGS/CL:AIRE |
| MTBE (Methyl Tertiary Butyl Ether)       | µg/kg | 49000  | 73000  | -         | 7900000  | EIC/AGS/CL:AIRE |
| 1,1-Dichloroethane                       | µg/kg | 2400   | 2500   | -         | 280000   | EIC/AGS/CL:AIRE |
| 2,2-Dichloropropane                      | µg/kg | -      | -      | -         | -        | -               |
| Trichloromethane                         | µg/kg | 910    | 1200   | 2500000   | 99000    | S4UL            |
| 1,1,1-Trichloroethane                    | µg/kg | 8800   | 9000   | 140000000 | 660000   | S4UL            |
| 1,2-Dichloroethane                       | µg/kg | 7.1    | 9.2    | 29000     | 670      | S4UL            |
| 1,1-Dichloropropene                      | µg/kg | -      | -      | -         | -        | -               |
| Trans-1,2-dichloroethene                 | µg/kg | 190    | 190    | -         | 22000    | EIC/AGS/CL:AIRE |
| Benzene                                  | µg/kg | 87     | 380    | 72000     | 27000    | S4UL            |
| Tetrachloromethane                       | µg/kg | 26     | 26     | 890000    | 2900     | S4UL            |
| 1,2-Dichloropropane                      | µg/kg | 24     | 24     | -         | 3300     | EIC/AGS/CL:AIRE |
| Trichloroethene                          | µg/kg | 16     | 17     | 120000    | 1200     | S4UL            |
| Dibromomethane                           | µg/kg | -      | -      | -         | -        | -               |
| Bromodichloromethane                     | µg/kg | 16     | 19     | -         | 2100     | EIC/AGS/CL:AIRE |
| Cis-1,3-dichloropropene                  | µg/kg | -      | -      | -         | -        | -               |
| Trans-1,3-dichloropropene                | µg/kg | -      | -      | -         | -        | -               |
| Toluene                                  | µg/kg | 130000 | 880000 | 56000000  | 56000000 | S4UL            |
| 1,1,2-Trichloroethane                    | µg/kg | 600    | 880    | -         | 94000    | EIC/AGS/CL:AIRE |
| 1,3-Dichloropropane                      | µg/kg | -      | -      | -         | -        | -               |
| Dibromochloromethane                     | µg/kg | -      | -      | -         | -        | -               |
| Tetrachloroethene                        | µg/kg | 180    | 180    | 1400000   | 19000    | S4UL            |
| 1,2-Dibromoethane                        | µg/kg | -      | -      | -         | -        | -               |
| Chlorobenzene                            | µg/kg | 460    | 460    | 11000000  | 56000    | S4UL            |
| 1,1,1,2-Tetrachloroethane                | µg/kg | 1200   | 1500   | 1400000   | 110000   | S4UL            |
| Ethylbenzene                             | µg/kg | 47000  | 83000  | 24000000  | 5700000  | S4UL            |
| p & m-Xylene                             | µg/kg | 56000  | 79000  | 41000000  | 5900000  | S4UL            |
| Styrene                                  | µg/kg | 8100   | 35000  | -         | 3300000  | EIC/AGS/CL:AIRE |
| Tribromomethane                          | µg/kg | -      | -      | -         | -        | -               |
| o-Xylene                                 | µg/kg | 60000  | 88000  | 41000000  | 6600000  | S4UL            |

## Human Health Generic Assessment Criteria

|                             |       |       |       |          |         |                 |
|-----------------------------|-------|-------|-------|----------|---------|-----------------|
| 1,1,2,2-Tetrachloroethane   | µg/kg | 1600  | 3900  | 1400000  | 270000  | S4UL            |
| Isopropylbenzene            | µg/kg | 11000 | 12000 | -        | 1400000 | EIC/AGS/CL:AIRE |
| Bromobenzene                | µg/kg | 870   | 910   | -        | 97000   | EIC/AGS/CL:AIRE |
| n-Propylbenzene             | µg/kg | 34000 | 40000 | -        | 4100000 | EIC/AGS/CL:AIRE |
| 2-Chlorotoluene             | µg/kg | -     | -     | -        | -       | -               |
| 4-Chlorotoluene             | µg/kg | -     | -     | -        | -       | -               |
| 1,3,5-Trimethylbenzene      | µg/kg | -     | -     | -        | -       | -               |
| tert-Butylbenzene           | µg/kg | -     | -     | -        | -       | -               |
| 1,2,4-Trimethylbenzene      | µg/kg | 350   | 410   | -        | 42000   | EIC/AGS/CL:AIRE |
| sec-Butylbenzene            | µg/kg | -     | -     | -        | -       | -               |
| 1,3-Dichlorobenzene         | µg/kg | 400   | 440   | 300000   | 30000   | S4UL            |
| p-Isopropyltoluene          | µg/kg | -     | -     | -        | -       | -               |
| 1,2-Dichlorobenzene         | µg/kg | 23000 | 24000 | 90000000 | 2000000 | S4UL            |
| 1,4-Dichlorobenzene         | µg/kg | 61000 | 61000 | 17000000 | 4400000 | S4UL            |
| Butylbenzene                | µg/kg | -     | -     | -        | -       | -               |
| 1,2-Dibromo-3-chloropropane | µg/kg | -     | -     | -        | -       | -               |
| 1,2,4-Trichlorobenzene      | µg/kg | 2600  | 2600  | 15000000 | 220000  | S4UL            |
| Hexachlorobutadiene         | µg/kg | 290   | 320   | 25000    | 31000   | S4UL            |
| 1,2,3-Trichlorobenzene      | µg/kg | 1500  | 1500  | 1800000  | 102000  | S4UL            |

| Key              |                                                                                                                                                                                                                                                              |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source Reference | Document                                                                                                                                                                                                                                                     |
| S4UL             | Nathanail, CP et al (2015) The LQM/CIEH S4ULs for human health risk assessment.                                                                                                                                                                              |
| C4SL             | Department for Environment, Food and Rural Affairs (2014) SP1010: Development of category 4 screening levels for assessment of land affected by contamination – policy companion document.                                                                   |
| EIC/AGS/CL:AIRE  | Environmental Industries Commission, The Association of Geotechnical and Geoenvironmental Specialists and Contaminated Land: Applications in Real Environments (2009) The EIC/AGS/CL:AIRE soil generic assessment criteria for human health risk assessment. |

### Notes:

The above GAC are for guidance only when assessing risk to human health receptors for specific development scenarios.

The absence of GAC for a substance does not necessarily imply there is no risk.

Some substances may be known by alternative names.

GAC given for organic compounds are based on the assumption of 1% soil organic matter.

### Abbreviations:

|      |                             |
|------|-----------------------------|
| GAC  | Generic Assessment Criteria |
| wHP  | With homegrown produce      |
| woHP | Without homegrown produce   |
| POS  | Public open space           |