

## LAND OFF LANCASTER AVENUE, WHITEFIELD, MANCHESTER

### Phase 1 - Preliminary Risk Assessment



Prepared for:

Shaw Power

Report Ref: BEK-23024-1

February 2023

## Project Quality Assurance Information Sheet

|               |                                                                                                                                                                                         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site          | Land off Lancaster Avenue, Whitefield, Manchester                                                                                                                                       |
| Report Title  | Phase 1 - Preliminary Risk Assessment                                                                                                                                                   |
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| Date          | February 2023                                                                                                                                                                           |
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# LAND OFF LANCASTER AVENUE, WHITEFIELD, MANCHESTER

## Phase 1 - Preliminary Risk Assessment

**PROJECT NO:** 23024  
**REPORT REF:** BEK-23024-1  
**DATE:** February 2023

### REVISION STATUS / HISTORY

| Rev | Date | Issue / Comment | Prepared | Checked |
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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by BEK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Unless explicitly agreed otherwise, in writing, this report has been prepared under BEK's limited standard Terms and Conditions as included within our proposal to the Client.

The report needs to be considered in the light of the BEK proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

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## **1. INTRODUCTION**

### **1.1 Appointment**

- 1.1.1 BEK Enviro (BEK) has been commissioned by Shaw Power to prepare a Phase 1 Preliminary Risk Assessment (PRA) for a parcel of land located off Lancaster Avenue, Whitefield, Manchester (hereafter referred to as 'the site'). The PRA will assess the potential risks associated with contamination considering a change of use to residential (with homegrown produce).
- 1.1.2 The site location and layout are presented on BEK Drawing No 23024-1 and BEK Drawing No 23024-2, respectively. Copies of these drawings are presented in Appendix F.

### **1.2 Proposed Development**

- 1.2.1 This report has been prepared to support a planning application for the construction of one residential dwelling with access, parking and private garden.
- 1.2.2 A copy of the 'Proposed Site Layout' is shown on PWL Architecture Drawing No: 1392-PRE03A, a copy of which is presented in Appendix F.

### **1.3 Objective & Scope of Work**

- 1.3.1 The objective of this report is to provide a qualitative assessment of the potential risks from contamination and ground with consideration to the proposed end use residential (with homegrown produce).
- 1.3.2 To achieve the objective BEK will undertake the following:
- Carry out a site inspection and collect photographs
  - Review the available relevant background information for the site, including:
    - Recent Ordnance Survey Maps
    - Site Specific GroundSure Reports
    - Site Specific Historical Maps
    - Coal Authority Website
    - Drawings provided by PWL Architecture Ltd
    - Zetica UXO Information
  - Develop a preliminary conceptual site model in accordance with guidance to identify potentially significant pollutant linkages specific to the proposed development
  - Establish areas of potential concern based on identified risks and/or potential risks
  - Identify any actions required to assess or reduce the risks identified

## **1.4 Limitations**

- 1.4.1 The conclusions and recommendations presented in this report are the result of our professional interpretation of the information currently available. BEK reserves the right to amend the conclusions and recommendations if further information becomes available.
- 1.4.2 However, it should be noted that much of the information has been derived from reports written by others and BEK takes no responsibility for the accuracy of that information. Notwithstanding the above, the reports reviewed have all been written by professional environmental consultants with a duty of care to provide relevant and accurate information.
- 1.4.3 This report does not include an invasive plant species assessment.

## **2. SITE DESCRIPTION**

### **2.1 Site Location**

- 2.1.1 The site occupies a parcel of land situated to the north of the Lancaster Avenue and immediately east of the Manchester Metro line (railway). The site is approximately 5.4 km south of Bury town center and some 9 km north-west of Manchester City Centre.
- 2.1.2 The National Grid Reference for the centre of the site is 381028, 405340. The site location is shown on BEK Drawing No 23024-1, a copy of which is presented in Appendix F.

### **2.2 Site Layout & Description**

- 2.2.1 A walkover/inspection was conducted by an engineer from BEK on 10<sup>th</sup> February 2023. It is noted that the site was accessed via gated access off Lancaster Avenue.
- 2.2.2 The site occupies a rectangular shaped plot of vacant land of some 100 m<sup>2</sup> with a slight downwards gradient towards the north-east from the south-west. The site is occupied by an open section of land that had been cleared to underlying soils.
- 2.2.3 The site is generally devoid of features. The exposed soil contains inclusions including gravels, cobbles of brick, concrete, metal and plastic. In the northern corner of the site there is a small stockpile of broken concrete fence panels, bricks, gravels, rubble and a plastic sheet. A small stockpile of bags of cement was located south of the center along the eastern site boundary.
- 2.2.4 Photographs of the site are presented in Appendix E and the general site layout is shown on BEK Drawing No 23024-2, a copy of which is presented in Appendix F.

### **2.3 Surrounding Land Use**

- 2.3.1 The site is located in a residential area. Lancaster Avenue is located immediately south of the site. A steep embankment is located immediately west of the site, at the top of which is the Manchester Metro line, approximately 5 m higher than the site. An old bridge is located approximately 15 m south-west of the site.

### 3. SITE HISTORY

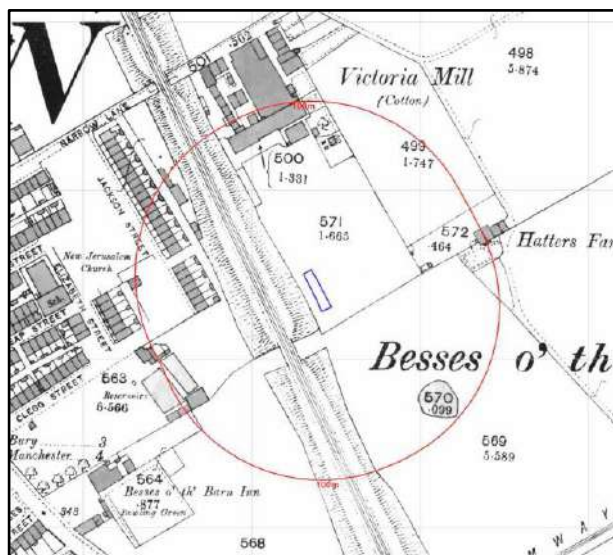
- 3.1 The history of the site has been established using historical OS maps supplied by Groundsure. A selection of historical OS maps reviewed is presented in Appendix A.

#### 1848

- 3.2 The earliest available maps show the site to occupy part of a semi-rural area. The site is vacant and immediate surrounding area occupies open fields. A large pond is located some 80 m south-east of the site. An area of residential housing is located approximately 130 to 250 m west of the site. A Cotton Mill is located approximately 130 m west of the site. A number of buildings marked as 'Five Houses' is located some 100 m north of the site. 'Horrocks Field' Farm house is located some 100 m south-west of the site.

#### 1893

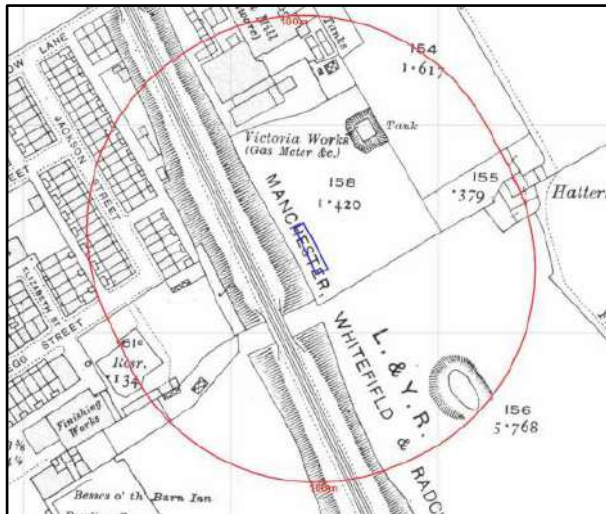
- 3.3 This map shows the site to remain vacant. A railway line is now present approximately 15 m east of the site on an embankment. Residential development has taken place approximately 70 m west and north-west of the site (beyond the railway). Two reservoirs are located approximately 90 and 100 m south-west of the site. The buildings marked as Five Houses are absent have been replaced by a mill marked as 'Victoria (cotton) Mill'. Horrock's Field farm house is now marked as Hatters Farm. A school is located approximately 140 m west of the site. A bowling green is located approximately 150 m south-west of the site. A tramway is located approximately 170 m south of the site. A second, larger school is located approximately 180 m south-west of the site.



**Figure 1: Extract from 1893 Map**

### 1909-1922

- 3.4 The 1909 maps shows the site to remain vacant. A Tank is located some 60 m north-east of the site on the 1922 map with additional smaller Tanks located further north, associated with Victoria Mills. The two reservoirs to the south-west of the site appear to have formed into one. A building marked as 'Finishing Works' is located approximately 110 m south-west of the site. Further residential development has taken place to the west of the site, beyond the railway line.



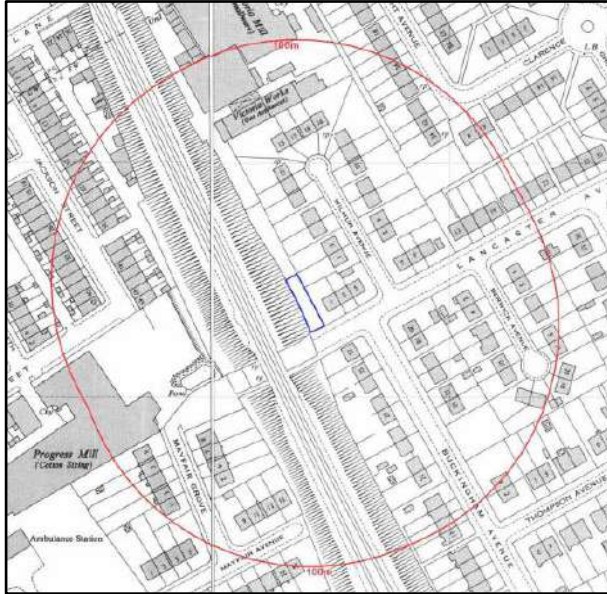
**Figure 2: Extract from 1992 Map**

### 1932

- 3.5 The site remains vacant. Extensive residential development has taken place from approximately 60 m east, 90 m north-east 100 m south-east, 140 m north and 150 m south of the site and beyond. The tramline is absent on this map.

### 1955-1992

- 3.6 The site remains vacant. Residential development has taken place in all areas surrounding the site and dwellings now mark the east and north site boundaries. Lancaster Road now is located along the southern site boundary. The tank located approximately 60 m north-east and the large pond located approximately 80 m south-east of the site are absent and have been replaced by residential housing. A pond is located approximately 60 m south-west of the site and an adjacent refuse tip is marked on the map on the 1970 map, both appear absent on the 1977 map. The reservoir to the south-west of the site is absent and has been replaced by a large building marked as 'Progress Mill (Cotton Sizing)', this appears to be an extension of the works building located approximately 110 m south-west of the site.



*Figure 3: Extract from 1955 Map*

1995-2023

- 3.7 The site remains vacant. Progress Mill is absent. There are no other significant changes to the surrounding area.



*Figure 4: Aerial Image from 2019*

## 4. ENVIRONMENTAL SETTING

4.0.1 An Enviro+GeoInsight Report has been obtained from Groundsure and information provided in these reports has been used within this section. A copy of the report is presented in Appendix B.

### 4.1 Geology

4.1.1 The site geology is illustrated in the Enviro+GeoInsight Report which has sourced data from several sources including British Geological Society (BGS), BRITPITS database and the Coal Authority.

4.1.2 In addition, BEK has sought site investigation information from the BGS website. There are eight available exploratory locations available to view within 250 m of the site, only one of which is within 100 m of the site. BEK has reviewed the closest borehole to the site which is located 92 m east of the site, named Prestwich 2.

4.1.3 Ground conditions encountered within the borehole consisted of topsoil underlain by superficial strata with bedrock at 57 m bgl. Coal bands were proven in the bedrock with the shallowest at 63 m bgl. The borehole terminated at 146 m. A copy of the borehole record is presented in Appendix C.

#### Made Ground

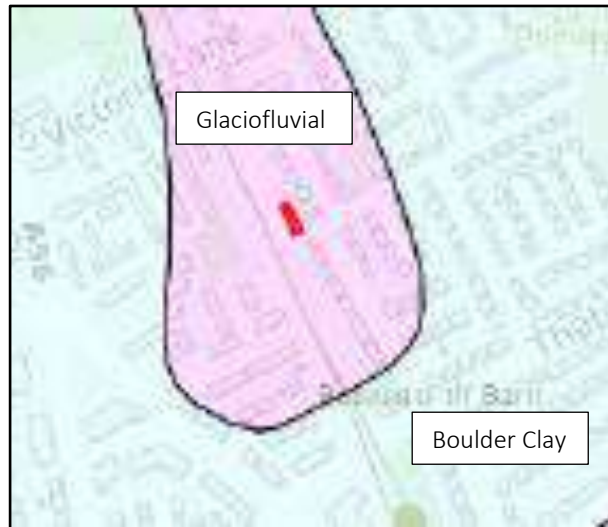
4.1.4 According to the Enviro&GeoInsight report the site is underlain with made ground on which is associated with the railway line to the west. (see Figure 5).



*Figure 5: Artificial and Made Ground Map*

### Superficial Geology

- 4.1.5 The Enviro+GeoInsight Report states that the superficial deposits beneath the site are 'Glaciofluvial Deposits' which comprise of sand and gravel and have high permeability. These deposits are likely to be underlain by regionally continuous Devensian Till (Boulder Clay) which has low permeability (see Figure 6).



*Figure 5: Superficial Deposits at the Site and Surrounding Area*

### Bedrock

- 4.1.6 The Enviro+GeoInsight Report indicates that the underlying solid geology comprises of the 'Nob End Rock' which is dominated by sandstone. This strata has a moderate to high permeability.

### Faults/Linear Features

- 4.1.7 There is one linear feature located within 175 m south-west of the site. This is described as a fossil horizon, marine band.

## **4.2 Mining & Ground Stability**

- 4.2.1 Information in the Enviro+GeoInsight Report indicates that the site is located in an area that may have been affected by coal mining. However, the site is not located within a Coal Authority designated 'Development High Risk Area' and in accordance with the Coal Authority 'Risk Based Approach to Development Management' the risks from coal mining are not considered further.
- 4.2.2 The Enviro+GeoInsight Report indicates that there are seven surface ground workings within 250 m of the site as shown in Table 1 below:

| Location        | Land Use         | Year of Mapping |
|-----------------|------------------|-----------------|
| 62 m South-east | Pond             | 1915            |
| 64 m South-east | Pond             | 1923            |
| 86 m South-west | Reservoir        | 1915            |
| 86 m South-west | Reservoir        | 1907            |
| 86 m South-west | Reservoir        | 1923            |
| 87 m South-west | Ponds            | 1891            |
| 247 m South     | Unspecified Heap | 1981            |

**Table 1:** Summary of Surface Ground Workings

- 4.2.3 The Enviro+GeoInsight Report provides hazard ratings associated with ground subsidence at the site, as summarised below:

|                               |            |
|-------------------------------|------------|
| Shrink-Swell Clay:            | Negligible |
| Landslides:                   | Very Low   |
| Dissolution of Soluble Rocks: | Negligible |
| Compressible Deposits:        | Negligible |
| Collapsible Deposits:         | Very Low   |
| Running Sands:                | Very Low   |

- 4.2.4 It can be seen from the above that the site is unlikely to be affected by natural ground instability issues.

### 4.3 Hydrogeology

- 4.3.1 The underlying superficial deposits underlying the site are classified as a 'Secondary A Aquifer' which is described as 'permeable layers capable of supporting water supplies at local rather than strategic scale, and in some cases form an important source of base flow to rivers'. These aquifers were formerly referred to as minor aquifers.

- 4.3.2 The underlying bedrock is also classified as a 'Secondary A Aquifer'.

- 4.3.3 The Enviro+GeoInsight Report indicates the site is not located within a groundwater source protection zone.

- 4.3.4 There are no groundwater abstractions located within 250m of the site.

### 4.4 Hydrology

- 4.4.1 There are no surface water features on site or within 250 m of the site.

- 4.4.2 There are no registered licensed discharge consents located within 250 m of the site.

#### **4.5 Contaminated Land & Landfill Activities**

- 4.5.1 Information provided in the Enviro+GeoInsight Report indicates that there is a historic landfill site located 43 m south-west of the site. This refers to a refuse tip which was recorded in on the 1969 mapping.
- 4.5.2 There are no current landfill sites, waste sites or waste exemptions within 250 m of the site.
- 4.5.3 There has been no EA recorded pollution incidents within 250 m of the site.
- 4.5.4 There are no NIHHS or COMAH sites, recorded Part A(1), Part A(2), Part B or IPPC Authorised Activities within 250 m of the site.
- 4.5.5 There are three historical garages located within 250 m of the site. The closest of which refers to a garage 221 m west of the site.
- 4.5.6 There are nine historical tanks located within 250 m of the site. The closest of which is an unspecified tank located 48 m north-east of the site.
- 4.5.7 According to the Enviro+GeoInsight Report there are eight potentially contaminative land uses located within 250 m of the site, the closest of which is described as a Travelling Crane located 63 m north-west of the site.
- 4.5.8 According to the Enviro+GeoInsight Report there are no historical potentially contaminative land uses for the site.

#### **4.6 Sensitive Land Uses**

- 4.6.1 The site is not affected by any of the ecological systems identified as a statutory receptor in the DETR Circular 01/2006.
- 4.6.2 The site is not located within a designated nitrate vulnerable zone.
- 4.6.3 The site is subject to SSSI impact risk zone.

#### **4.7 Radon**

- 4.7.1 The Enviro+GeoInsight Report indicates that 'between 1 % and 3 % of the homes are affected by Radon and that no radon protective measures are not required.

#### **4.8 Unexploded Ordnance**

- 4.8.1 The regional unexploded bomb risk map from Zetica indicates that the site is in an area of LOW risk from Unexploded Ordnance (UXO) resulting from the Second World War.
- 4.8.2 BEK do not consider any further assessment to be required with respect to UXO.

## **5. POTENTIAL POLLUTANT LINKAGES**

### **5.1 General**

5.1.1 This section identifies the potential sources of contamination along with specific contaminants of concern, pathways and receptors that may be associated with the site based on its known history and the current condition and with respect to the re-development of the site for residential use (with homegrown produce).

5.1.2 This information is used to develop a preliminary conceptual model which is a qualitative description of potential sources of environmental pollutants, the pathways by which they are transported and the receptors:

- i) Potential sources of contamination: these include any actual or potentially contaminating materials and activities, located either on or in the vicinity of the site
- ii) Potential pathways for contamination migration: these comprise the routes or mechanisms by which contaminants may migrate from the source to the receptor including environmental migration pathways and human health exposure pathways
- iii) Potential receptors of contamination: these include future land users, ecological systems, water resources and property.

### **5.2 Potential Sources of Contamination**

5.2.1 Based on the earliest available maps dating from 1848, the site appears to be vacant until present.

5.2.2 Given the historic use of the site as a vacant piece of land, the potential significant contamination to be present is relatively low. Notwithstanding, during the site walk over made ground was present in the form brick and rubble. The nature, source and extent of any made ground present at the site is unknown and may contain potential contaminants of concern.

5.2.3 In addition the presence of railway tracks and the raised embankment adjacent to the western site boundary could represent a potential source of contamination. Information on the various activities and contaminants of concern associated with the railway line along the western site boundary are provided in the Department of Environment (DoE) Industry Profile for 'Railway' and are summarised below:

- Railway lines are constructed on a layer of crushed or broken rock (ballast) that provided a level formation to support the track. Ash ballast (possibly containing heavy metals, phenols, sulphates and polycyclic aromatic hydrocarbons (PAHs)) would be found in sidings complexes and could have migrated to the site.

- Fuel oils, lubricating oils and greases may cause localised contamination of ballast and of areas where locomotives and multiple units have stood for significant periods of time.
- Tracks and the immediate trackside margins may be subject to the accumulation of contamination through spillages and leaks or materials stored.

5.2.4 The potential contaminants of concern that may be present at the site are summarised below:

| Contaminants Associated with Made Ground/Railway Land |                                         |
|-------------------------------------------------------|-----------------------------------------|
| Arsenic                                               | Zinc                                    |
| Cadmium                                               | Cyanide                                 |
| Chromium                                              | Phenols                                 |
| Copper                                                | Sulphate                                |
| Lead                                                  | Polycyclic Aromatic Hydrocarbons (PAHs) |
| Mercury                                               | Total Petroleum Hydrocarbons (TPHCWG)   |
| Nickel                                                | pH                                      |
| Selenium                                              | Asbestos                                |

**Table 2: Potential Contaminants of Concern**

5.2.5 It should be noted that the above list represents a broad range of potential contaminants of concern. Additional contaminants of concern may be present if ground conditions differ from those anticipated.

5.2.6 Potential sources of carbon dioxide and methane are considered to be low. However, if the site investigation/groundworks provide a significant thickness of made ground (>3 m) or natural strata has a high organic content, it may be necessary to re-assess the potential risks from ground gas. The nature of the underlying ground conditions needs to be considered before gas risk can be discounted.

### 5.3 Potential Pathways

5.3.1 The pathways through which contaminants may reach receptors are in part dependent by the nature and behaviour of the contaminant and the intended end use of the site (residential with homegrown produce).

5.3.2 The following potential pathways have been identified with respect to the existing site condition, historical use of the site as a farm, the environmental setting and the re-development of the site to residential (with homegrown produce) which are assessed in the conceptual model:

- Dermal contact of contaminated soil
- Ingestion of contaminated soil/home grown vegetables

- Inhalation of contamination dust
- Dissolution or suspension (leaching) of contaminants into pore waters affecting plant growth
- Indoor inhalation of organic vapours and ground gas
- Dissolution or suspension (leaching) of contaminants from site soils leading to contamination of groundwater
- Dissolution or suspension (leaching) of contaminants from site soils leading to vertical migration within perched waters to underlying ground water. Potential significant pathways include more permeable layers within the made ground/natural strata, underground services and piles/foundations
- Contamination affecting the integrity of service pipelines by direct contact
- Buildings affected by direct contact with elevated concentrations of sulphate and/or extreme pH

## **5.4 Receptors**

- 5.4.1 Potential site-specific receptors that may be affected by contamination at the site are listed below:

### Future Site Users

- 5.4.2 Future residents of the site could be at risk from contamination present at the site.
- 5.4.3 Potential risks are associated with ingestion of soils and home grown vegetables as well as inhalation of contaminated dust/vapours (including asbestos fibres) and dermal contact with contaminants of concern. These risks are all associated with the garden areas, or any open spaces of the proposed development.
- 5.4.4 Risks associated with indoor inhalation of organic vapours and ground gas need to be considered.

### Construction Workers

- 5.4.5 The primary risks to construction workers are associated with shallow excavations as asbestos could be present. Asbestos fibers (if present) can be released into the atmosphere during earthworks.
- 5.4.6 Standard personal protective equipment and site specific risk assessments and method statements should reduce risks associated with other contaminants of concern due to short exposure duration.

#### Off Site Receptors

- 5.4.7 Off site receptors include residents to the east and west of the site. Human health could be at risk if asbestos fibres are released during the development.

#### Flora

- 5.4.8 Heavy metals can be phytotoxic and if present can represent a potential risk to flora in the landscaped areas.

#### Buildings & Services

- 5.4.9 The integrity of service pipes can be affected by concentrations of organic contamination.

#### Controlled Waters

- 5.4.10 There are no significant surface water features on or within 250 m of the site.
- 5.4.11 The superficial strata (Glaciofluvial Deposits) and underlying bedrock are both as 'Secondary A Aquifers' and represent a significant receptors. Boulder Clay may be present which may inhibit vertical migration of contamination to the underlying bedrock.
- 5.4.12 The site is not located within a groundwater source protection zone and there are no groundwater abstractions located within 250m of the site.

### **5.5 Preliminary Conceptual Model**

- 5.5.1 The identified potential sources of contaminants, pathways and receptors have been assessed to establish plausible pollutant linkages. All potentially significant pollutant linkages are detailed in Table B, in Appendix D.

### **5.6 Potentially Significant Pollutant Linkages**

- 5.6.1 A number of possible 'significant pollutant linkages' have been identified associated with the site.
- 5.6.2 Potential risks relating to the potential harm to the health of humans and/or domestic pets both on and off site due to the potential for direct contact with contaminants in the made ground and the ingestion of contaminated soil/dust (**Link 1**).
- 5.6.3 There is also the possibility of windblown particulates being inhaled by people/animals both on site and off site (**Link 2**).

- 5.6.4 Home grown produce could be affected by ground contamination (**Link 3**) and human health could be at risk by the ingestion of home grown produce affected by contamination (**Link 4**).
- 5.6.5 Human health could be at risk by the inhalation of ground gases (**Link 5**) and/or volatile contamination migrating into properties on site (**Link 6**).
- 5.6.6 Property (including services, flora and fauna) could be affected by direct contact to high concentrations of contaminants (**Link 7**).
- 5.6.7 Dissolution or suspension (leaching) of contaminants from site soils leading to impact on the underlying Secondary A within the superficial and bedrock strata (**Link 8**).
- 5.6.8 Site investigation is required to identify site specific conditions and assess the risks associated with each identified plausible pollutant linkage.

## 6. RECOMMENDATIONS

- 6.1 Based on the findings of the Preliminary Risk Assessment herein, potential risks associated with contamination have been identified with respect to the construction of a residential dwelling with residential garden and associated infrastructure.
- 6.2 Risks have been identified to human health, controlled waters, flora and property (including services). The risks are associated with the potential presence of made ground at the site and the potential for this made ground to be present within landscaped areas present within the proposed development. Moreover, risks associated with the potential presence of contamination associated with the railway line adjacent to the western site boundary could have affected the site.
- 6.3 BEK recommends that the following site investigation works are carried out to characterise the shallow ground conditions and quantify the potential risks identified. The site investigation will also provide sufficient information to support a geotechnical assessment to inform foundation design options.

### Site Investigation

- 6.4 The investigation should comprise the excavation of a series of trial pits and/or boreholes to confirm ground conditions across the site as anticipated. This will help to inform possible re-use of existing soils at the site for use within residential gardens or landscaped areas.
- 6.5 In-situ strength testing will be carried out (shear vane/SPTs) and samples recovered for chemical and geotechnical testing. All samples for chemical testing will be collected in appropriate sampling vessels, stored in a pre-cooled cool box and dispatched to the laboratory within 24 hours.
- 6.6 The site investigation should be supervised by an experienced engineer who will be responsible for recording ground conditions encountered.

### Laboratory Testing

- 6.7 Following a review of ground conditions encountered, a selection of samples will be tested for the contaminants of concern listed in Table 2 of this report. If visual or olfactory evidence of contamination is encountered (including any made ground) during the site investigation then it may be necessary to undertake additional testing.
- 6.8 Depending on ground conditions encountered, samples will be submitted for geotechnical testing to inform foundation design options.
- 6.9 All testing will be carried out by a UKAS accredited laboratory to MCERTS standard (where applicable).

#### Risk Assessment

- 6.10 The investigation findings will be assessed as part of a quantitative risk assessment to amend the conceptual site model and identify any potential significant pollutant linkages.
- 6.11 The assessment will be undertaken in accordance with current UK guidance and policy.

#### Reporting

- 6.12 The works undertaken will be detailed in a Site Investigation & Ground Assessment report along with full justifications for the assessment and the conclusions and any recommendations.

#### Other Considerations

- 6.13 It may be necessary to carry out soakaway testing to BRE365 to inform surface water drainage options.
- 6.14 We would also recommend that consideration is given to the requirements of the water supply service provider and the completion of the UKWIR risk assessment for water pipe selection.