



# **PHASE I GEO-ENVIRONMENTAL SITE ASSESSMENT**

## **BRIDGEWATER HOUSE**

AT

**BRIDGEWATER HOUSE, GREAT JACKSON STREET, MANCHESTER,  
M15 4AX**

**G79223**

**JUNE 2022**

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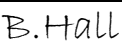
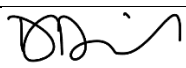
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| Project Number   | G79223                                                                              |            |            |

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## EXECUTIVE SUMMARY

| Site Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bridgewater House, Great Jackson Street, Manchester, M15 4AX                                                                                                                                                                                                                                                                        |
| Grid Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SJ 83205 97342                                                                                                                                                                                                                                                                                                                      |
| Site Area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.21 ha                                                                                                                                                                                                                                                                                                                             |
| Current Site Use                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The site is currently occupied by closed derelict buildings in the northern area of the site, and a tarmacadam covered car park over the southern area of the site.                                                                                                                                                                 |
| Proposed Use                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Refurbishment of the existing Bridgewater house on the western and northern side of the site adjacent to Chester road, and the construction of a new 4 storey apartment block building on the corner of Great Jackson street and Silvercroft Street, with associated private gardens.                                               |
| Environmental Setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The site is underlain by Glaciofluvial Sheet Deposits, of sands and gravels overlying bedrock of sandstones of the Chester Pebble Beds formation.<br>The site is underlain by a secondary A aquifer with high vulnerability in the superficial deposits, and principal aquifer with high vulnerability in the bedrock.              |
| Site History                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Occupied by the existing bridgewater house in the northern area of site since 1851. The southern area of site was occupied by existing unknown buildings between 1851 and 1977. The south of site is then occupied by the existing car park located on site. No other significant developments have occurred up to the present day. |
| Landfill Sites & Ground Gases                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | No landfill sites were identified within 250 m of the site. Potential source of ground gas from unknown Made Ground on-site and from offsite surface ground workings.                                                                                                                                                               |
| Radon                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The site is situated within an area where less than 1% of properties are above the Radon Action Level and therefore no radon protection measures are required for developments.                                                                                                                                                     |
| Mining / Land Stability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | No significant geotechnical risks from mining identified on the site.<br>The site is at negligible risk from slope movement.                                                                                                                                                                                                        |
| Initial Conceptual Site Model (CSM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                     |
| Low to moderate risk to human health, flora and fauna buildings and services receptors, and controlled water receptors from the unknown Made Ground on-site, historical industrial uses and surface ground workings in the surrounding area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                     |
| Conclusions & Recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                     |
| <p><u>Environmental</u></p> <p>Based on the information presented within this report and with due regard to the proposed development, it is the opinion of Ensaf that the site generally represents a low to moderate risk to human health, flora and fauna buildings and services receptors, and controlled water receptors from the unknown thickness of Made Ground, on-site historical industrial uses, surrounding historical industrial uses and surface ground workings</p> <p><u>Geotechnical</u></p> <p>Based on the information presented within this report, it is the opinion of Ensaf there is low risk to the proposed development from geotechnical hazards. However, with due respect to the proposed development design, there is a risk from unknown buried foundations and infilled basements associated with the former buildings on site.</p> <p><u>Recommendations</u></p> <p>Based on the preliminary risk assessment findings, a Phase II intrusive investigation is recommended to provide an updated conceptual site model. The thickness and composition of the Made Ground should be investigated to determine the presence of contaminants within the underlying site strata and the potential for ground gas production from within the Made Ground and migrating from offsite sources. The underlying ground conditions should be assessed to determine the suitability for the proposed residential with gardens end use and the potential risk to human health receptors, flora and fauna, and buildings and services. An investigation of contaminants within the underlying groundwater from the principal and superficial aquifers should be undertaken to assess the impact of potential sources on controlled waters.</p> |                                                                                                                                                                                                                                                                                                                                     |

A geotechnical investigation to inform foundation design is also recommended, given the proposed nature and size of the development.

## 1.0 INTRODUCTION

Ensafe Consultants is the trading name of Challen Commercial Investigations Limited (03426833) incorporating the wholly owned subsidiary Ensaf Consultants (ROI) LTD (646123).

Ensafe Consultants has been commissioned by HBL Associates Ltd, hereafter referred to as “the Client” to undertake a Phase I Geo-Environmental Site Assessment at the Bridgewater House, Great Jackson Street, Manchester, M15 4AX.

### 1.1. Objectives

The purpose of the report is to provide a preliminary assessment of the site using published information in relation to the proposed development of the site.

This report has been devised to comply with the relevant principles and requirements of a range of guidance with regards to potentially contaminated land, including but not limited to:

- Part IIA of the Environment Protection Act, 1990;
- Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, April 2012);
- National Planning Policy Framework (HCA, February 2019);
- BS5930:2015: “Code of practice for site investigations”;
- BS10175: 2011 +A2:2017 “Investigation of Potentially Contaminated Sites - Code of Practice”;
- The Building Regulations 2010. Part C (HM Government 2013)
- Environment Agency Guidance (October 2020) Land Contamination Risk Management Land Contamination (LCRM);
- Environment Agency (2011) Report GPLC1 “Guiding Principles for Land Contamination”;
- Environment Agency (2017) “The Environment Agency’s Approach to Groundwater Protection” November 2017 Version 1.1

The objectives of the desk-based study are to:

- Provide understanding of the ground conditions and a Phase 1 desk study for submission as part of planning permission.

### 1.2. Proposed Development

It is understood that the proposed development comprises the refurbishment of the existing Bridgewater house on the western and northern side of the site adjacent to Chester road, and the construction of a new 4 storey apartment block building on the corner of Great Jackson street and Silvercroft Street. The proposed development plans are presented in **Appendix III**.

The findings and conclusions of the risk assessments have been set out and recommendations given for the proposed residential end use. If there is a subsequent change in the proposed land the risk assessments and conclusions should be reviewed to determine whether they are still applicable for the revised end use.

### 1.3. Sources of Information

Background information was sought from the following sources:

- Groundsure Insight Report (report reference GS-8812813)
- Groundsure Historical Mapping (report reference GS-8812812)
- Environmental Agency
- Radon: Guidance on Protective Measures for New Buildings (BRE Document BR 211, 2015) and HPA Indicative

- Radon Atlas for England and Wales/Scotland)  
British Geological Survey Online Map Database

#### 1.4. Confidentiality

Ensafe Consultants has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Ensaf Consultants. A charge may be levied against such approval.

#### 1.5. Limitations

The full limitations of this report are presented in **Appendix I** and a glossary is presented in **Appendix II**.

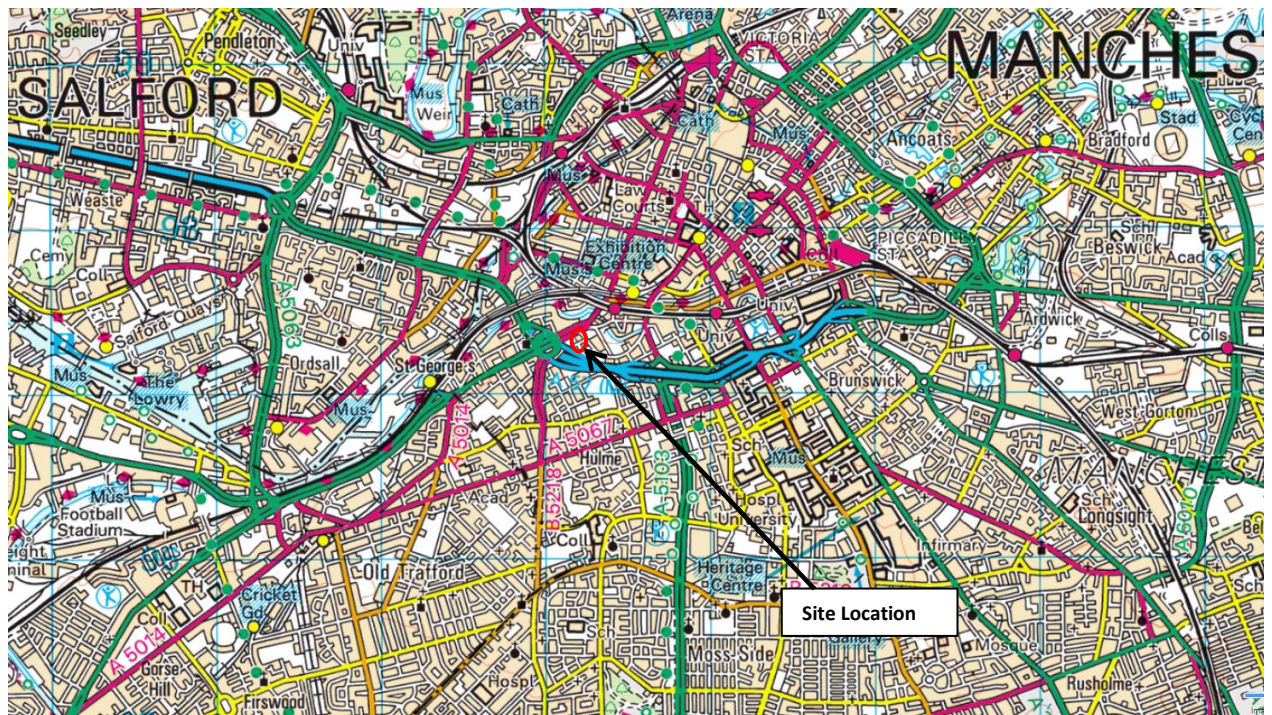
## 2.0 SITE SETTING

### 2.1. Site Details

**Table 1** below provides details of the location and size of the site, including site address, grid reference and current land use both on and in the vicinity. The site location is shown in **Figure 1** and the approximate site boundary in **Figure 2**. Site photographs are presented in **Appendix IV**.

**Table 1: Site Location**

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site Address</b>                          | Bridgewater House, Great Jackson Street, Manchester, M15 4AX                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Nearest Town/City</b>                     | Manchester City Centre situated 1km north east.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Grid Reference</b>                        | SJ 83205 97342                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Size of Site (Approx.)</b>                | 0.21 ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Site Shape</b>                            | Approximately rectangular.58m by 42m.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Topography</b>                            | The site is approximately 33 m AOD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Site Description and Current Land Use</b> | A site walkover was undertaken by a representative of Ensafe Consultants on 21 <sup>st</sup> June 2022. The site is currently occupied by closed derelict buildings in the northern area of the site, and a tarmacadam covered car park over the southern area of the site. The site is surrounded by commercial buildings under construction in the south and west of the site. The A56 is situated to the north of site with commercial properties further north. To the east of the site is a construction car park. |



**Figure 1: Site Location**



Figure 2: Site Area

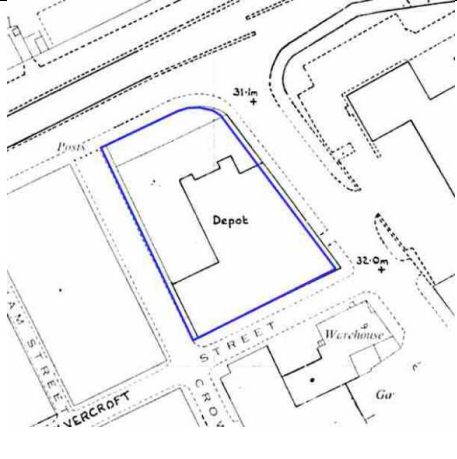
### 3.0 SITE HISTORY

#### 3.1. On-Site Historical Development

A review of historical maps pertinent to the site is summarised in **Table 2** below. The historical maps are presented in **Appendix V**.

**Table 2: Summary of Potentially Contaminative Historical Land Uses**

| Map Edition                                                                                                                                                                              | Historical Land Use                                                                                                                                    | Map Extract                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1851 Scale Town Plan 1:1056<br><br>1848 Country Series Plan 1:10,560                                                                                                                     | The site is occupied by commercial buildings (labelled as "The Bridgewater Trustees Office").<br><br>The northern area of site is occupied by gardens. |   |
| 1893-1922 Country Series Plan 1:2,500<br><br>1891-1923 Country Series 1:10,560                                                                                                           | No significant changes on-site.                                                                                                                        |  |
| 1932 Country Series Plan 1:2,500<br><br>1949 National Grid 1:2,500<br><br>1953 – 1699 National Grid 1:1,250<br><br>1931-1956 Country Series 1:10,560<br><br>1972 Country Series 1:10,000 | The Bridgewater Trustees Office relabelled as the "Bridgewater Canal Offices".                                                                         |  |

|                                                                                       |                                                                                                                                                                    |                                                                                      |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>1977-1995 National Grid Plan 1:1,250</p> <p>1985 - 2001 National Grid 1:10,000</p> | <p>The buildings located along the southern edge of the site are no longer indicated.</p> <p>The gardens in the northern area of site are no longer indicated.</p> |   |
| <p>2003 Landline 1:1,250</p> <p>2010-2022 National Grid 1:10,000</p>                  | <p>No significant changes noted</p>                                                                                                                                |  |

### 3.2. Off-Site Historical Development

A review of potentially contaminative land uses identified on historical Ordnance Survey maps within a 250m radius of the site is summarised below in **Table 3**:

**Table 3: Summary of Potentially Contaminative Off-Site Historical Land Uses**

| Surrounding Feature        | Dates        | Distance (m) | Direction |
|----------------------------|--------------|--------------|-----------|
| Timber Yard                | 1851 -       | 50 m         | Northeast |
| Waterloo Brewery           | 1851         | 40 m         | West      |
| Coal Yard                  | 1851         | 100 m        | Southwest |
| Stables and manure pit     | 1851         | 70 m         | North     |
| Pryme Street Mill (Cotton) | 1851-1932    | 75 m         | West      |
| Warehouse                  | 1851-1990    | 100 m        | Northwest |
| Railway                    | 1851-Present | 250 m        | North     |
| Knott Mill Iron Works      | 1893-1932    | 150 m        | East      |
| Castlefield Iron Works     | 1893-1922    | 150 m        | North     |
| "Middle" Warehouse         | 1893-1992    | 225 m        | Northwest |
| Warehouse                  | 1893-1908    | 150 m        | Northeast |
| Castlefield Coal Wharf     | 1893-Present | 110 m        | North     |

|                                         |                |           |            |
|-----------------------------------------|----------------|-----------|------------|
| Knott Mill Automobile Engineering Works | 1949-1977      | 150 m     | East       |
| Castlefield Works                       | 1922-1969      | 150 m     | North      |
| Timber yards and Saw Mill               | 1922-1995      | 240 m     | North      |
| Pryme Street Mill (Cotton)              | 1949-1957      | 75 m      | West       |
| Corn Mill                               | 1949-1960      | 250m      | Northwest  |
| Works and Warehouse                     | 1960-1965      | 75 m      | West       |
| Engineering Works                       | 1969-Present   | 75 m      | West       |
| Starch Works                            | 1949-1965      | 50 m      | East       |
| 3No depots                              | 1969 - Present | 0-75 m    | South      |
| Factory                                 | 1980-Present   | 90 m      | South      |
| Garage                                  | 1980- Present  | 30 m      | East       |
| Garage                                  | 1953-Present   | 20 m      | South      |
| 2No Warehouse                           | 1981-Present   | 120-220 m | South east |

### 3.3 Planning History

Planning records held by the Local Planning Authority (Flintshire County Council) did not yield any environmentally pertinent information with regards to historical development of the site.

## 4.0 ENVIRONMENTAL SETTINGS

The anticipated environmental setting (geology, hydrogeology, hydrology, landfill etc.) for the site are summarised and discussed within **Tables 4 to 9** below. Full listings are provided in the Groundsure Report, as presented in **Appendix VI**.

### 4.1. Geology & Hydrogeology

A review of the online British Geological Survey (BGS) mapping for the site indicates that the site is underlain by the following geological sequence:

**Table 4: Published Geology**

| Geological Unit   | Classification                | Description                                                                                                                                                                                                                                                                                               |
|-------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Artificial Ground | Made Ground                   | No artificial ground is noted underneath the site; however, given the development history of the site, an unknown thickness of Made Ground is expected.<br>The nearest area of Made Ground noted by the BGS records is situated 184m north east of the site, comprising undivided artificial Made Ground. |
| Superficial       | Glaciofluvial Sheet Deposits  | Glaciofluvial Sheet Deposits, Devensian - Sands and Gravels                                                                                                                                                                                                                                               |
| Bedrock           | Chester Pebble Beds Formation | Sandstones of coarse-grained, typically well-cemented to fine-grained, less well-cemented.                                                                                                                                                                                                                |
| Faults            | -                             | There are no faults noted within 250m of the site.                                                                                                                                                                                                                                                        |

There is one historical borehole records within 50m of the site (BGS Reference: SJ89NW3977). This borehole was undertaken to 7.70m depth and indicated:

|                               |                |
|-------------------------------|----------------|
| Made Ground:                  | 0.00-1.52 mbgl |
| Very dense Sands and Gravels: | 1.52-3.66 mbgl |
| Gravel clays:                 | 3.66-7.62 mbgl |
| Red Sandstone:                | 7.62-7.88 mbgl |

### 4.2. Geotechnical Data

Preliminary Geotechnical data presented within the data search identifies the following ground conditions shown in **Table 5**:

**Table 5: Summary of Desk Study Geotechnical Information**

| Hazard               | Hazard Potential | Description                                                                                                                                                     |
|----------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shrink-Swell Clay    | Negligible       | Ground conditions predominantly non-plastic.                                                                                                                    |
| Landslides           | Very Low         | Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered. |
| Soluble Rocks        | Negligible       | Soluble rocks are either not thought to be present within the ground, or not prone to dissolution.                                                              |
| Compressible Ground  | Negligible       | Compressible strata are not thought to occur.                                                                                                                   |
| Collapsible Deposits | Very Low         | Unlikely to be present.                                                                                                                                         |
| Running Sand         | Very Low         | Running sand conditions are unlikely.                                                                                                                           |

This information is obtained via a desk-based data search and should not be used in detailed design; instead, should be used for reference only.

#### 4.3. Hydrogeology

**Table 6: Summary of Hydrogeology**

|                                           | Description                                                                                                                                                                                                     |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aquifers                                  | Glaciofluvial Sheet Deposits – Secondary (A) Aquifer.<br>Chester Pebble Beds Formation – Principal Aquifer.                                                                                                     |
| Groundwater Vulnerability                 | Superficial aquifer with high vulnerability and recharge potential.<br>Principal bedrock aquifer with high leaching potential and high vulnerability.                                                           |
| Groundwater Bodies                        | Manchester and East Cheshire Permo-Triassic Sandstone Aquifers.                                                                                                                                                 |
| Groundwater Source Protection Zone (GSPZ) | None identified within 500 m of the site.                                                                                                                                                                       |
| Groundwater Abstraction Licenses          | Eleven groundwater abstraction licenses noted within 500m of the site. These abstraction license are situated within 125m to the south of site and are noted as for dewatering and are active until march 2023. |
| Surface Water Abstraction Licenses        | Two historical abstraction license were identified within 2000 m of the site. The nearest situated 672m west of site for coolant purposes. There are no active abstraction licenses.                            |
| Potable Abstraction Licenses              | There are nine historical abstraction licenses were identified within 2000 m of the site. The nearest situated 1922m west of site for. There are no active abstraction licenses.                                |

#### 4.4. Hydrology and Flood Risk

**Table 7: Summary of Hydrology**

|                              | Description                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Surface Water Feature        | There are 6 surface water features noted within 250 m of the site. The nearest is the Bridgewater Canal situated 92m to the north of site, a manmade watercourse for inland navigation. The five other watercourses are also situated to the north of site.                                                                                                                                              |
| Surface Water Classification | Site located within WFD river water body catchment for Medlock (Lumb Brook to Irwell).                                                                                                                                                                                                                                                                                                                   |
| Flooding                     | The site is not within a floodplain.<br>RoFRaS data for the site indicates a “Negligible” (greater than or equal to 1 in 30 chance) risk of flooding (depth between 0.10 m – 0.30 m) in any given year, for the site.<br>The site is located within a “Moderate to High” risk zone of groundwater flooding, with a “Moderate to High” risk zone of groundwater flooding located within 50 m of the site. |

#### 4.5. Radon Risk Potential

The site is situated within an area where less than 1% of properties are above the Radon Action Level, and therefore no radon protection measures are required for developments.

#### 4.6. Industrial Land Uses

The site is situated within a predominately commercial and industrial use area. There are 14 no. records of current industrial activities within 250m of the site and 141 no historical industrial activities within 250 m of the site including 1 No record of a historical industrial usage on the site.

**Table 8: Summary of Features Environmentally Pertinent**

|             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| On-site     | There is one historical record of industrial activity on site of an unspecified Depot in 1971.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Within 250m | <p><u>Historical</u></p> <ul style="list-style-type: none"> <li>• A garage was noted 10m south east of site in the 1959 to 1997 historical maps. A second garage was noted 16m north east of site between 1980 and 1997.</li> <li>• An unspecified depot was noted 30m northwest of site in the 1978 to 1994 maps.</li> <li>• A quay was located 33m north of site between 1851 until 1938.</li> <li>• A warehouse was indicated 57m north west of site in the 1851 mapping.</li> <li>• A garage was noted north east of site between 1969 and 1980.</li> <li>• An unspecified works was located 89m north east of site in the 1851 until the 1938 historical maps</li> <li>• Unspecified and automotive works were noted 100m north east of site in the 1956 till 1978 maps.</li> <li>• An unspecified tank is situated 101m west of the site in the 1960 to 1980 historical mapping. A second unspecified tank was noted 212m south west of site in the 1891 mapping.</li> <li>• Railway ridings and station were identified on the 1905 to 1994 maps 240m north of the site.</li> <li>• A brewery was situated 258m east of the site in the 1851 maps.</li> <li>• A sand pit was situated 278m west of the site in the 1851 maps.</li> <li>• A timber wharf was identified in the 1851 historical maps 283m north west of site.</li> <li>• A glass works was noted 319m east of site in the 1851 historical maps.</li> <li>• A number of unspecified mills and works were identified 332m west of site between 1905 and 1971.</li> </ul> <p><u>Current</u></p> <ul style="list-style-type: none"> <li>• An electrical substation is noted 82m north east of site.</li> <li>• Mooring and unloading facilities are situated 82m to 109m north of site.</li> <li>• A publishing industrial products company is situated 89m north west of site.</li> <li>• A civil engineering services company is located 201m north east of site.</li> </ul> |

#### 4.7. Landfill/Waste Sites

There are no active or recent landfill sites, historical landfills, or licensed waste sites identified within 500 m of the site.

There are 4 No, historical waste sites identified within 500m of the site. The nearest was noted in the 1948 maps situated 61m north of site as a refuse destructor.

**Table 9: Historical Waste Sites**

| Map date  | Direction and distance | Description       |
|-----------|------------------------|-------------------|
| 1948      | 61m North              | Refuse destructor |
| 1968-1997 | 239m East              | Scrap Yard        |
| 1979-1986 | 273m North             | Scrap Yard        |

|           |                 |            |
|-----------|-----------------|------------|
| 1995-1997 | 375m North West | Scrap Yard |
|-----------|-----------------|------------|

There are 11 waste exemptions noted within 500 m of the site. The nearest is a waste exemption for treating waste situated 183 m north of site for the sorting and controlled disposal of drugs. The second nearest waste exemption is for the storage of waste in secure containers located 240m east of the site. The remaining waste exemptions are located over 400m northwest and northeast of site for the use of waste in construction.

#### 4.8. Sensitive Land Uses

The following sensitive land uses have been identified within close proximity to the site:

- A Nitrate vulnerable zone associated with the Irwell Manchester shipping canal is located 1100m north west of the site.
- The site is situated within an SSSI Impact Risk Zone, consultation with the LA is only required for developments including livestock and poultry infrastructure and general combustion processes, including energy from waste incineration.
- The Castlefield conservation area is located 15m north west of site.
- A grade II listed building is noted on site: The Bridgewater Canal offices.
- Ten other grade II listed buildings are noted within 250m of the site with the nearest located 84m north west of site, listed as the “Middle Warehouse” at the former Castlefield goods yard.

There are no other significant sensitive land uses within 2000 m of the site.

#### 4.9. Mining

**Table 10: Summary of Mining and Ground Workings**

|                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Coal Mining</b>                                  | The site is noted as within a coal mining area as defined by the coal mining authority, however the site is not within a high risk development zone and there are no records of mine entries, shallow workings, or coal seam outcroppings noted within 250m of the site.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Mining/Historical Workings/ Natural Cavities</b> | <p>There are no natural cavities, mining cavities, brit pits, underground workings, brine areas, gypsum, Tin mining or clay mining noted within 500 m of the site.</p> <p>There is 24 No. records of surface ground workings noted within 250 m of the site relating to 8 No. locations. The nearest surface working is noted as workings in relation to a “quay” situated 33m north of the site between 1851 and 1938. The second closest is an unspecified ground working situated 77 m W of the site. The remaining surface ground working are associated with the canals to the north of site.</p> <p>The site is situated within a JPB mining area.</p> |

#### 4.10. Unexploded Ordnance (UXO)

The publicly available regional unexploded bomb risk maps indicate the site is in a moderate UXO risk area.

## **5.0 CONCEPTUAL SITE MODEL (CSM)**

### **5.1 Initial CSM**

In accordance with LCRM – Land Contamination Risk Management (Environment Agency, Oct 2020) and BS 10175:2011+A2:2017 (Investigation of Potentially Contaminated Land. Code of Practice), Ensaf Consultants has developed a preliminary Conceptual Site Model (CSM) to identify potential contamination sources, migration pathways, and significant receptors within the study area.

### **5.2 Contaminant Sources**

A number of potential sources of contamination have been identified as follows:

#### **5.2.1 On-site Potential Sources**

- Unknown thickness of Made Ground; and,
- Contaminants from the historical unspecified depot including asbestos, metals, PAHs, hydrocarbons and ground gases.

#### **5.2.2 Off-site Potential Sources**

- Mooring and unloading facilities to the north of site, possible source of metals, oils and ground gases;
- Electrical substation situated 82m north east of site; possible source of PCB's;
- Historical garages near site possible source of metals, oils and ground gases;
- Mobile contaminants and ground gas production from surrounding historical depots, quays, and warehouses; and,
- Metals and asbestos associated with historic automotive works northeast of site.

### **5.3 Potential Receptors**

Ensaf Consultants has identified the following potential receptors:

- Human Health Receptors (Future Site Users);
- Controlled Waters (principal aquifer);
- Flora and fauna; and,
- Buildings and Services.

Construction workers are not considered to be a plausible receptor as exposure will be managed through the use of appropriate PPE and hygienic working practices, as required under HSE/ CDM regulations. Furthermore, potential exposure to possible contaminants is typically on a short-term basis during the duration of works thereby limiting any potential impact to ground workers.

### **5.4 Potential Pathways**

Receptors may be potentially at risk from the identified potential sources of contamination via the following pathways:

- Migration of mobile contaminants on or off-site via services, sewers, and manmade conduits;
- Migration of mobile contaminants on or off site via underlying secondary and principal aquifers;
- Direct contact, ingestion, and inhalation of contaminants on-site; and,
- Uptake of toxins/phytotoxins by plants.

### **5.5 Risk Assessment**

CIRIA 552: Contaminated Land Risk Assessment 'A Guide to Good Practice' provides guidance on risk assessment taking into account factors such as severity of the potential harm that may arise from a successful pollutant linkage, potential magnitude of the hazard, and the sensitivity of the target receptor. Risk assessment is initially assessed by determining

the severity of the potential hazard, which takes into account receptor sensitivity and the magnitude of the potential impact as detailed in **Tables 11 & 12** below.

### 5.5.1 Severity

**Table 11: Receptor Sensitivity**

| Category        | Human Sensitivity                | Environmental Sensitivity                 |
|-----------------|----------------------------------|-------------------------------------------|
| <b>Very Low</b> | Ground workers                   | Non-sensitive water course                |
| <b>Low</b>      | Commercial / Industrial          | Secondary Aquifer                         |
| <b>Medium</b>   | Residential without plant uptake | Principal Aquifer / Sensitive Watercourse |
| <b>High</b>     | Residential with plant uptake    | Groundwater Source Protection Zone        |

**Table 12: Magnitude of Impact**

| Category               | Examples                                                         |
|------------------------|------------------------------------------------------------------|
| <b>No Impact</b>       | No identified or potential pollutants present                    |
| <b>Slight Impact</b>   | Minor leaks and spills from fuel infrastructure, inert landfills |
| <b>Moderate Impact</b> | Major leaks and spills from fuel infrastructure                  |
| <b>Gross Impact</b>    | Heavily contaminated industrial sites, hazardous landfills       |

Severity is subsequently assessed considering the potential receptor and magnitude of impact as outlined within **Table 13**.

**Table 13: Determination of Level Severity for Potential Hazards**

| Impact                 | Receptor Sensitivity |       |        |        |
|------------------------|----------------------|-------|--------|--------|
|                        | Very Low             | Low   | Medium | High   |
| <b>No Impact</b>       | Minor                | Minor | Minor  | Minor  |
| <b>Slight Impact</b>   | Minor                | Minor | Minor  | Mild   |
| <b>Moderate Impact</b> | Minor                | Minor | Mild   | Medium |
| <b>Gross Impact</b>    | Minor                | Mild  | Medium | Severe |

### 5.5.2 Likelihood

The likelihood of an event is assessed while considering the potential for presence of a contaminant, presence of receptor, and the substantiality of the pollutant pathway. Likelihood is broken down into four separate categories within the CSM as shown in **Table 14** below:

**Table 14: Definitions of Likelihood Categories**

| Category              | Definitions                                                                                                                            |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unlikely</b>       | Pollutant linkage may be present, but the circumstances under which harm would occur are improbable.                                   |
| <b>Low Likelihood</b> | Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so. |
| <b>Likely</b>         | Pollutant linkage may be present, and it is probable that the risk will occur over the long term.                                      |

|                        |                                                                                                                                   |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>High Likelihood</b> | Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor. |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

### 5.5.3 Risk Rating

**Table 15** demonstrates the methodology used to provide an overall risk rating within the preliminary CSM with respect to any potential sources of contamination that may affect the site. An overall risk rating is assigned to each potential contaminant considering the assessed likelihood and severity as determined using the methodologies within **Tables 11 to 14**:

**Table 15: Level of Risk Rating for Hazard Definition**

| Likelihood             | Severity       |                |                |                |
|------------------------|----------------|----------------|----------------|----------------|
|                        | Minor          | Mild           | Medium         | Severe         |
| <b>Unlikely</b>        | Very Low       | Very Low       | Low            | Low / Moderate |
| <b>Low Likelihood</b>  | Very Low       | Low            | Low / Moderate | Moderate       |
| <b>Likely</b>          | Low            | Low / Moderate | Moderate       | High           |
| <b>High Likelihood</b> | Low / Moderate | Moderate       | High           | Very High      |

## 5.6 Conceptual Site Model

A site-specific CSM has therefore been created using the above information and is provided on the following page(s) and is summarised in **Figure 16**.

**Table 16: Conceptual Site Model**

| Source                                                   | Contaminant                                      | Potential Migration Pathway                                                  | Potential Receptors                    | Likelihood of Occurrence | Severity | Overall Risk Rating | Active / Inactive                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------|--------------------------|----------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>On-Site</b>                                           |                                                  |                                                                              |                                        |                          |          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Unknown thickness of Made Ground<br><br>Historical Depot | Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se Zn) | Direct contact, ingestion, and inhalation of contaminants on-site.           | Human Health                           | High Likelihood          | Mild     | Moderate            | <b>Potentially Active</b> – requires further investigation.<br><br>Given the proposed residential with gardens development, a Phase II intrusive investigation of the underlying ground conditions will be required to perform a generic quantitative risk assessment and provide an updated conceptual site model.                                                                                                                     |
|                                                          | Polycyclic Aromatic Hydrocarbons (PAHs)          | Uptake of toxins/ phytotoxins by plants.                                     | Flora and Fauna                        | Likely                   | Mild     | Low/Moderate        |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                          | Total Petroleum Hydrocarbons (TPH)               | Vertical migration of mobile contaminants off-site into underlying aquifers. | Controlled Waters (Principal Aquifers) | Likely                   | Mild     | Low/Moderate        | <b>Potentially Active</b> – Given the underlying secondary A aquifer in the superficial strata and principal bedrock aquifer there is considered to be a significant potential risk to the underlying controlled waters in the bedrock aquifer, a Phase II intrusive investigation of the underlying ground conditions will be required to perform a generic quantitative risk assessment and provide an updated conceptual site model. |
|                                                          | Asbestos Fibres in Soil                          | Inhalation of contaminants on-site.                                          | Human Health                           | Likely                   | Mild     | Low/Moderate        | <b>Potentially Active</b> – requires further investigation.<br><br>Given the proposed residential with gardens development, a Phase II intrusive investigation of the underlying ground conditions will be required to perform a generic quantitative risk assessment and provide an updated conceptual site model.                                                                                                                     |
|                                                          | Ground Gas Production (CH4 & CO2)                | Migration and inhalation of                                                  | Human Health                           | Unlikely                 | Severe   | Low/Moderate        | <b>Potentially Active</b> – requires further investigation.                                                                                                                                                                                                                                                                                                                                                                             |

| Source                                                                                                                                                      | Contaminant                                                                                                                               | Potential Migration Pathway                                                    | Potential Receptors                    | Likelihood of Occurrence | Severity | Overall Risk Rating | Active / Inactive                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|--------------------------|----------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                             |                                                                                                                                           | contaminants (leading to asphyxiation).                                        |                                        |                          |          |                     | Given the proposed residential with gardens development, a Phase II intrusive investigation of the underlying ground conditions will be required to perform a generic quantitative risk assessment and provide an updated conceptual site model.                                                                    |
|                                                                                                                                                             |                                                                                                                                           | Accumulation of gases forming an explosive or anoxic atmosphere.               | Buildings and Services                 | Unlikely                 | Severe   | Low/Moderate        |                                                                                                                                                                                                                                                                                                                     |
| Off-Site                                                                                                                                                    |                                                                                                                                           |                                                                                |                                        |                          |          |                     |                                                                                                                                                                                                                                                                                                                     |
| Current Electrical substation                                                                                                                               | PCB's                                                                                                                                     | Vertical migration of mobile contaminants on-site through underlying aquifers  | Human Health                           | Unlikely                 | Mild     | Low                 | <b>Inactive</b> – Given the distance from the site of the source and the low mobility of PCB's it is unlikely to be a significant risk to the receptors on-site from the off-site source.                                                                                                                           |
|                                                                                                                                                             |                                                                                                                                           |                                                                                | Controlled Waters (Principal Aquifers) | Unlikely                 | Minor    | Very Low            |                                                                                                                                                                                                                                                                                                                     |
| Current mooring and unloading facilities<br><br>Historical garages<br><br>Historical depots, quays, and warehouses; and,<br><br>Historical automotive works | Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se Zn)<br><br>Polycyclic Aromatic Hydrocarbons (PAHs)<br><br>Total Petroleum Hydrocarbons (TPH) | Vertical migration of mobile contaminants on-site through underlying aquifers. | Human Health                           | Likely                   | Mild     | Low/Moderate        | <b>Potentially Active</b> – requires further investigation.<br><br>Given the proposed residential with gardens development, a Phase II intrusive investigation of the underlying ground conditions will be required to perform a generic quantitative risk assessment and provide an updated conceptual site model. |
|                                                                                                                                                             |                                                                                                                                           |                                                                                | Flora and Fauna                        | Unlikely                 | Mild     | Low/Moderate        |                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                             |                                                                                                                                           |                                                                                | Controlled Waters (Principal Aquifers) | Likely                   | Minor    | Low                 |                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                             | Ground Gases Production (CH4 & CO2)                                                                                                       | Migration and inhalation of contaminants (leading to asphyxiation).            | Human Health                           | Unlikely                 | Severe   | Low/Moderate        | <b>Potentially Active</b> – requires further investigation.<br><br>Given the proposed residential with gardens development, a Phase II intrusive investigation of the underlying ground conditions will be required to perform a generic quantitative risk assessment and provide an updated conceptual site model. |
|                                                                                                                                                             |                                                                                                                                           |                                                                                | Buildings and Services                 | Unlikely                 | Severe   | Low/Moderate        |                                                                                                                                                                                                                                                                                                                     |

## 6.0 GEOTECHNICAL CONSIDERATIONS

### 6.1 Introduction

In addition to the environmental hazards, there are also geotechnical hazards associated with the stability of ground. Local Authorities follow the National Planning Policy Framework (NPPF, 2019) which requires that “site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining.”

A summary of the geotechnical considerations is provided in **Table 17** below:

**Table 17: Geotechnical Design Considerations**

| Hazard Type                       | Description                                                                                                                                                                                                                                                                            |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ground Stability                  | Negligible to low hazard potential.                                                                                                                                                                                                                                                    |
| Geotechnical Hazards (Mining)     | Low risk: no special precautions required to be made in relation to the proposed development.                                                                                                                                                                                          |
| Site Clearance                    | Removal of the existing hardstanding of the car park.                                                                                                                                                                                                                                  |
| Trees                             | No trees in the current site area.                                                                                                                                                                                                                                                     |
| Existing Buildings / Obstructions | Existing public house to the north of site is a grade II listed building and must not be damaged during works or refurbishment.<br>Obstructions from buried foundations or infilled basements in the area of the previous depot and historical buildings in the southern area of site. |
| Foundations                       | Foundation designs may require further investigation to determine ground strength characteristics.                                                                                                                                                                                     |
| Groundwater                       | Groundwater conditions unknown; however shallow groundwaters could impact the development and foundation design.                                                                                                                                                                       |
| Earthworks                        | Earthworks are not expected to be required for the proposed development.                                                                                                                                                                                                               |
| Slopes                            | Slope stability is considered a negligible risk for the proposed development as there are no significant changes in topography noted on the site.                                                                                                                                      |
| Retaining Structures              | Retaining structures are not relevant to the proposed development. However an existing brick wall was noted along the eastern boundary of the site.                                                                                                                                    |
| Ground Aggressivity               | Ground aggressivity is not considered relevant to the proposed development.                                                                                                                                                                                                            |

## **7.0 CONCLUSIONS & RECOMMENDATIONS**

### **7.1 Conclusions**

#### ***Geo-Environmental***

The Geoindex records indicate the ground conditions comprise strata of Glaciofluvial Sheet Deposits, of sands and gravels overlying bedrock of sandstones of the Chester Pebble Beds formation. However, given the history of development at the site, Made Ground is expected to overlay the glaciofluvial sheet deposits strata.

Given the sites history of development, there are potential sources of contamination on the site from Made Ground of indeterminate thickness, and from migration of contaminants from offsite sources from historical industrial uses in the surrounding area.

Based on the information presented within this report and with due regard to the proposed development, it is the opinion of Ensafe that the site generally represents a low to moderate risk to human health, flora and fauna buildings and services receptors, and controlled water receptors.

#### ***Geotechnical***

Based on the information presented within this report, it is the opinion of Ensafe there is low risk to the proposed development from geotechnical hazards. However, with due respect to the proposed development design, there is a risk from unknown buried foundations and infilled basements associated with the former buildings on site.

### **7.2 Recommendations**

Based on the preliminary risk assessment findings, a Phase II intrusive investigation is recommended to provide an updated conceptual site model. The thickness and composition of the Made Ground should be investigated to determine the presence of contaminants within the underlying site strata and the potential for ground gas production from within the Made Ground and migrating from offsite sources. The underlying ground conditions should be assessed to determine the suitability for the proposed residential with gardens end use and the potential risk to human health receptors, flora and fauna, and buildings and services. An investigation of contaminants within the underlying groundwater from the principal and superficial aquifers should be undertaken to assess the impact of potential sources on controlled waters.

A geotechnical investigation to inform foundation design is also recommended, given the proposed nature and size of the development.

The Local Authority should be informed immediately if any unexpected contamination is encountered within on-site soil or soils imported to site as part of its development.

***END OF REPORT***

## APPENDIX I – LIMITATIONS

## APPENDIX I - LIMITATIONS

## LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Ensaf Consultants and the Client as indicated in Section 1.0.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not be made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. In addition to the above Ensaf Consultants note that when investigating, or developing, potentially contaminated land it is important to recognise that sub-surface conditions may vary spatially and also with time. The absence of certain ground, ground gas, and contamination or groundwater conditions at the positions tested is not a guarantee that such conditions do not exist anywhere across the site. Due to the presence of existing buildings and structures access could not be obtained to all areas. Additional contamination may be identified following the removal of the buildings or hard standing.
7. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
8. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
9. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
10. This report presents an interpretation of the geotechnical information established by excavation, observation, and testing. Whilst every effort is made in interpretative reporting to assess the soil conditions over the Site it should be noted that natural strata vary from point to point and that manmade deposits are subject to an even greater diversity. Groundwater conditions are dependent on seasonal and other factors. Consequently, there may be conditions present not revealed by this investigation.
11. Ensaf Consultants cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Ensaf Consultants is owned by them and no such plans or documents may be reproduced, published, or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Ensaf Consultants in this connection without their explicit written agreement there to by Ensaf Consultants.
12. Rather, this investigation has been undertaken to provide a preliminary characterisation of the existing sub-surface geotechnical characteristics and make up and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.
13. This investigation has been undertaken to reasonably characterise existing sub-surface conditions and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

## APPENDIX II – GLOSSARY

## APPENDIX II - GLOSSARY

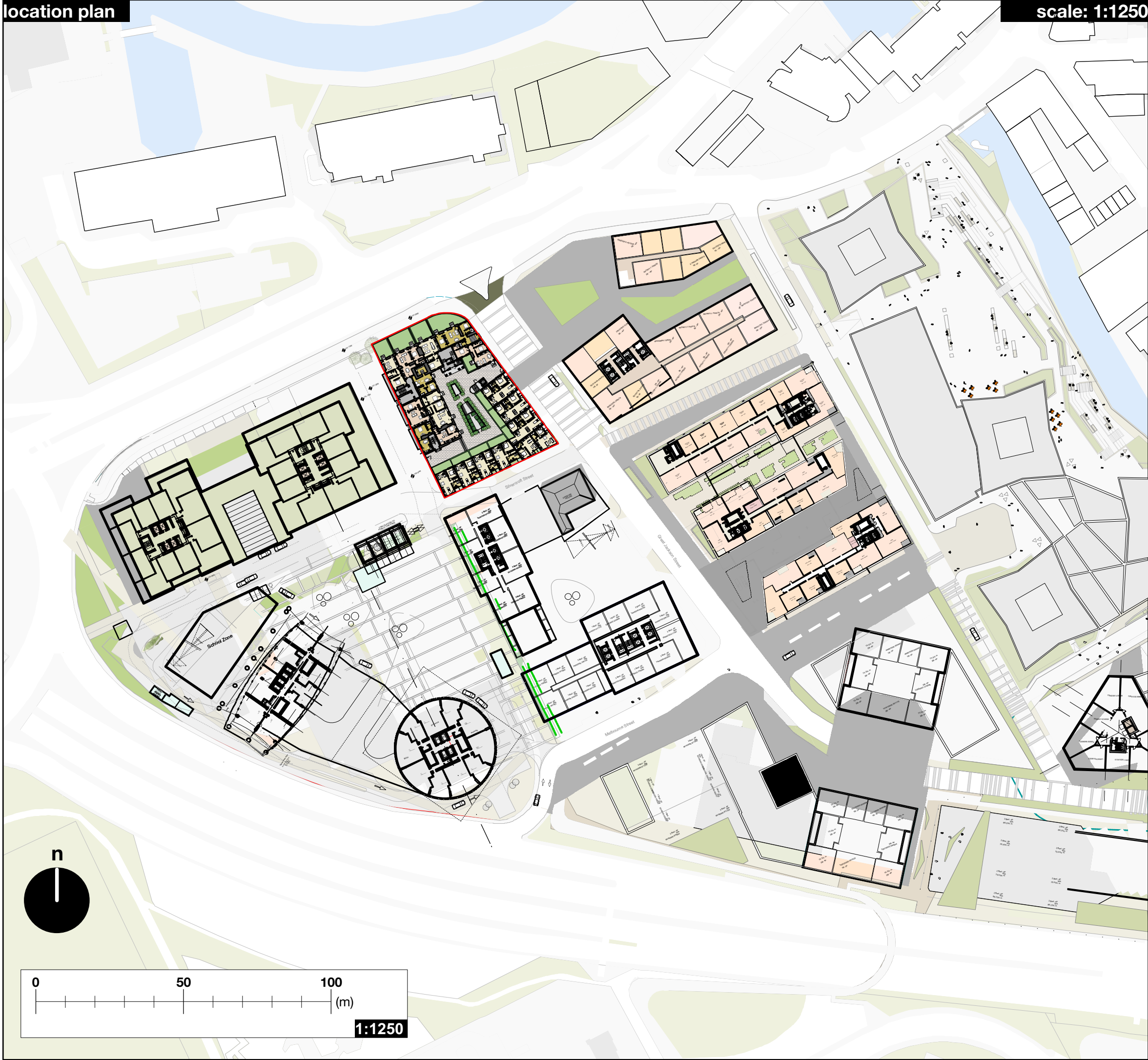
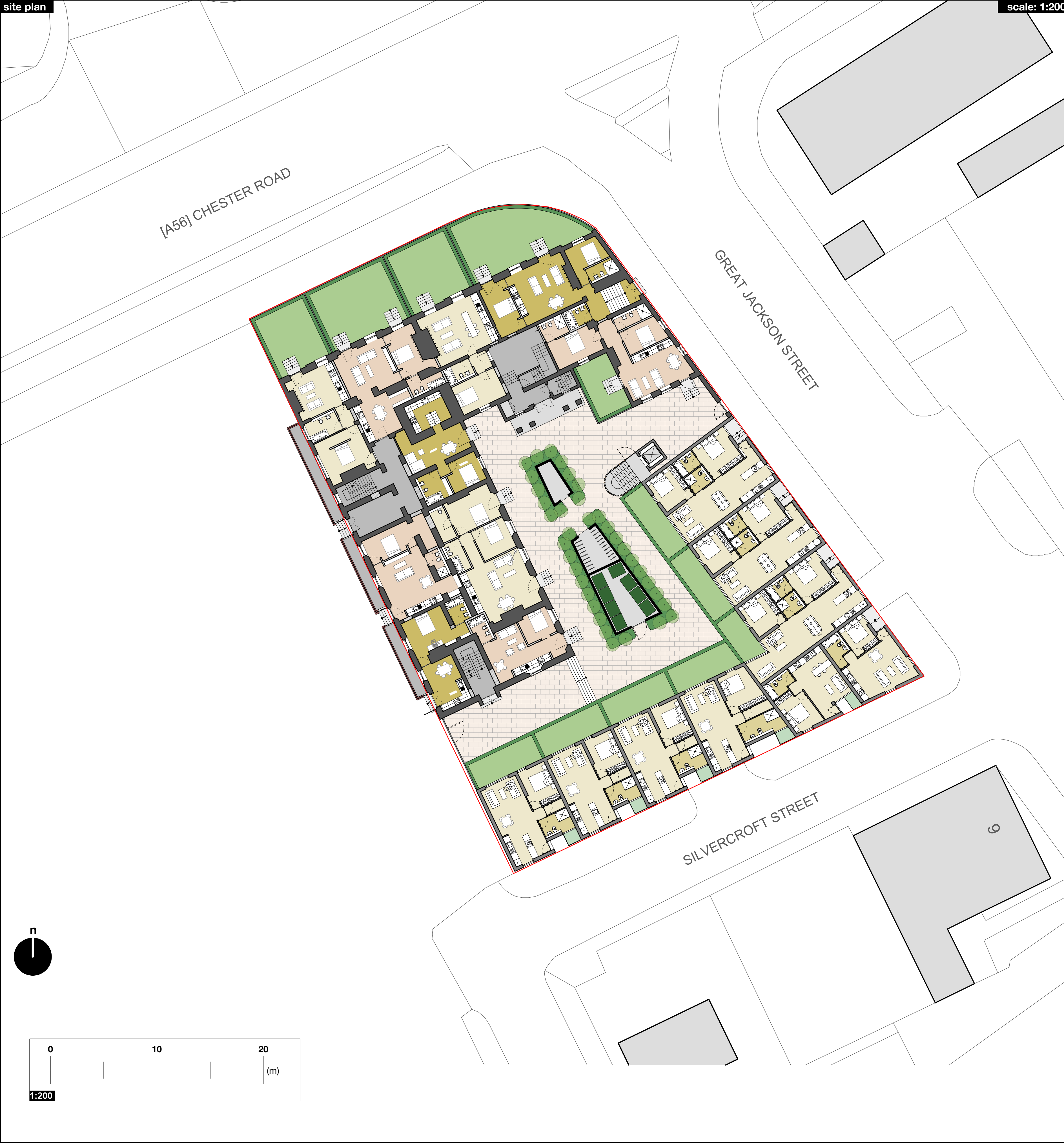
## GLOSSARY

|              |                                                            |
|--------------|------------------------------------------------------------|
| AST          | Above Ground Storage Tank                                  |
| BGS          | British Geological Survey                                  |
| BSI          | British Standards Institute                                |
| BTEX         | Benzene, Toluene, Ethylbenzene, Xylenes                    |
| CIEH         | Chartered Institute of Environmental Health                |
| CIRIA        | Construction Industry Research Association                 |
| CLEA         | Contaminated Land Exposure Assessment                      |
| CSM          | Conceptual Site Model                                      |
| DNAPL        | Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB) |
| DWS          | Drinking Water Standard                                    |
| EA           | Environment Agency                                         |
| EQS          | Environmental Quality Standard                             |
| GAC          | General Assessment Criteria                                |
| GL           | Ground Level                                               |
| GSV          | Gas Screening Value                                        |
| HCV          | Health Criteria Value                                      |
| ICSM         | Initial Conceptual Site Model                              |
| LNAPL        | Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)  |
| ND           | Not Detected                                               |
| LMRL         | Lower Method Reporting Limit                               |
| NR           | Not Recorded                                               |
| PAH          | Poly Aromatic Hydrocarbon                                  |
| PCB          | Poly-Chlorinated Biphenyl                                  |
| PID          | Photo Ionisation Detector                                  |
| QA           | Quality Assurance                                          |
| SGV          | Soil Guideline Value                                       |
| SPH          | Separate Phase Hydrocarbon                                 |
| Sp.TPH (CWG) | Total Petroleum Hydrocarbon (Criteria Working Group)       |
| SPT          | Standard Penetration Test                                  |
| SVOC         | Semi Volatile Organic Compound                             |
| UST          | Underground Storage Tank                                   |
| VCCs         | Vibro Concrete Columns                                     |
| VOC          | Volatile Organic Compound                                  |
| WTE          | Water Table Elevation                                      |

APPENDIX III – DRAWINGS

| Company          | Drawing No | Revision | Title                  |
|------------------|------------|----------|------------------------|
| Snook Architects | 001        | -        | Site and Location Plan |
| Snook Architects | 027T       | T        | Proposed Ground Floor  |

APPENDIX III - DRAWINGS



Do not scale from this drawing

All dimensions are to be checked on site prior to commencing works on site. Discrepancy found between information given on this drawing and that given elsewhere or recorded on site shall be notified immediately to the project architect in writing

**PRELIMINARY ISSUE**



**snook**  
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| rev.     | date | description                     |
|----------|------|---------------------------------|
| project: |      | <b>bridgewater house</b>        |
| dwg no:  |      | <b>001</b>                      |
| dwg:     |      | <b>site &amp; location plan</b> |
| scale:   |      | <b>1:200 / 1:1250 @ a1</b>      |

