

Network Space Limited

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# **PARCEL 1, ALCHEMY WAY, KNOWSLEY**

Remediation Strategy



## Network Space Limited

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### Parcel 1, Alchemy Way, Knowsley Remediation Strategy

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# 1 INTRODUCTION

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## 1.1 TERMS OF REFERENCE

ADS Consult (ADS) was instructed by Network Space Ltd (the Client) to provide a Remediation Strategy for the Site referred to as Parcel 1, Land off Alchemy Way, Knowsley L33 7AQ.

A Site Location Plan is presented as Figure A.1 and Site Boundary Plan presented in Figure A.2 (Appendix A).

## 1.2 PROPOSED DEVELOPMENT

The site is subject to Planning Permission (23/00456/FUL dated 23 June 2023) for the erection of 2 no. units with ancillary office space, car parking and vehicular, pedestrian circulation with access onto Alchemy Way.

The proposed Development Plan is presented as Figure A.3 (Appendix A).

## 1.3 SCOPE AND OBJECTIVES

The purpose of this report is to provide a review of the site investigation information and enablement works remediation, and to present a Remediation Strategy, as required by Condition 6B of the planning permission as set out below.

**Submission of Remediation Scheme** *Where land affected by contamination is found which poses unacceptable risks, no development shall take place until a detailed remediation scheme has been submitted to and approved in writing by the Local Planning Authority. The scheme must include an appraisal of remediation options, identification of the preferred option(s), the proposed remediation objectives and remediation criteria, and a description and programme of the works to be undertaken including the verification plan. As a minimum, the scheme must ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to its intended use.*

## 1.4 LIMITATIONS

This report is addressed to and may be relied up on Network Space Limited.

This document has been prepared for the sole use and reliance of the above-named party. This report shall not be relied upon or transferred to any other parties without the express written authorisation of ADS. ADS neither owes nor accepts any duty to any third party and shall not be liable for any loss, damage or expense of whatsoever nature which is caused by their reliance on the information contained in this report. The findings and opinions in this report are based upon information derived from a variety of information sources. ADS has endeavoured to assess all information provided and believe these information sources to be reliable.

## 2 SITE SUMMARY

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### 2.1 SITE LOCATION AND SETTING

The Site is located to the west of Alchemy Way, Knowsley which is accessible via the East Lancashire Road (A580). It comprises an 'L' shaped parcel of disused land to the North of the existing Mercedes Benz dealership. The Site has an approximate area of 3.54 hectares (ha) and is at National Grid Reference (NGR) SJ 42541 97039 as shown on Figure A.1 and Figure A.2 (Appendix A).

### 2.2 SITE HISTORY

The earliest historical map dated 1892/3 shows the Site to originally comprise farmland with two streams running across the site flowing Southwest. In 1907, there appears to be a garden/enclosed space in the Southwest corner. From 1907 to 1959 there are limited changes on site, however the East Lancashire Road (A580) was constructed 50m South of the site. The 1959-1960 map shows indications of a bund along the Eastern boundary and cut down to site level at the Northern site boundary. Industrial factories are also constructed around the Site. In 1966 the garden and stream are no longer present. From 1966 to 2025 there was no significant change with some possibility of the Site being utilised as a sports ground. During that timeframe Alchemy Way and Platinum court were constructed along with increased development of surrounding areas before finally the current Industrial Units were erected.

Aerial photographs available since 21/07/2000 indicate the site to be open space with grass/shrubs/trees. This extends south to the East Lancs Road, north and west to a factory site. A sports pitch is present to the southeast. By 11/06/2015 Alchemy Way is present along the eastern site boundary with commercial development beyond. The current commercial development is shown to the south of the site by 18/10/2022. The site area appears disturbed with earthworks plant tracking surface tracks/scarring. There are no significant changes to the most recent photograph dated 20/05/23.

### 2.3 ENVIRONMENTAL SETTING

There are no available BGS boreholes records on or in close proximity to the site. The Aquifer status at the site is;

The BGS Geology of Britain Viewer, Groundsure and BGS Geology Mapping of Bedrock and Superficial Deposits (1:50,000 Runcorn Sheet 97) indicate the site to have superficial deposits of Devensian Diamicton Till comprising silts and clays, underlain by bedrock of the Chester Formation comprising mudstones and red sandstones. There are no available BGS boreholes records on or in close proximity to the site.

The aquifer status is:

- Secondary Undifferentiated – Devensian Diamicton Till
- Principal – Chester Formation Sandstone

The site is located within a total catchment Zone 3 Source Protection Zone.

According to the environmental database, there are 7 active groundwater abstraction licences within 2000m, most locally 1320m East.

The nearest surface water feature is the Knowsley Brook, which is partially culverted, located approximately 80m south of the site and has an overall quality classification as moderate.

## **2.4 RADON**

The Site is within a lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level), therefore no radon protective measures are necessary.

## **2.5 LANDFILL**

The Phase 1 Report indicates that there are no recorded licensed or known historical landfill sites located within 250m of the site.

## **2.6 COAL MINING**

The Site is not located in a Coal Mining Reporting Area as designated by the Mining Remediation Authority (MRA).

## **2.7 UNEXPLODED ORDNANCE**

The site is in an area of low risk of UXO presence.

## 3 GROUND CONDITIONS

### 3.1 OVERVIEW

This report considers site investigation from the two reports (Refs 2 and 4) available to determine appropriate remediation requirements. A summary of key points of each is presented below.

### 3.2 2026 SITE INVESTIGATION

The strata encountered in the investigation comprises of two types of Made Ground with occasional black, organic rich, relic topsoil layers, overlying Devensian Diamicton Till (sandy gravelly silty clays). Bedrock was shown to be a red sandstone, not encountered in any trial pits, but consistently found in all boreholes and very weak. Table 3-1 presents a summary of the geological strata encountered.

**Table 3-1 – Summary of Ground Encountered**

| Strata                                     | Thickness range<br>m | Typical description                                                                                                                                                                                                                                                                 |
|--------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Made Ground 1</b>                       | 0-0.6                | MADE GROUND: Grass over topsoil: firm brown sandy gravelly clay with some rootlets. Gravel is angular to subrounded, fine to coarse of various lithologies, brick, plastic and concrete.                                                                                            |
| <b>Made Ground 2</b>                       | 0.8-2.3              | MADE GROUND: Firm dark brown mottled black gravelly sandy clay. Gravel is angular to subrounded fine to coarse of various lithologies, brick and concrete. Soft and with increased water present in WS103 and TP105 (possible Stream) and WS101A and TP103 (possible infilled pond) |
| <b>Devensian<br/>Diamicton Till</b>        | 0.3-2.3              | Firm to stiff reddish brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of sandstone.                                                                                                                                                           |
| <b>Chester<br/>Formation<br/>Sandstone</b> | >0.45                | Bedrock was initially encountered as heavily weathered very weak red SANDSTONE.                                                                                                                                                                                                     |

Trial holes TP108 and 109 were excavated into the northern bund and indicate a firm dark brown mottled black gravelly sandy clay with some thin roots. Gravel is angular to subrounded fine to coarse of various lithologies, brick and concrete.

Groundwater was not encountered within the window sampling boreholes during drilling. Window Sample boreholes were installed to allow for groundwater monitoring. Subsequent monitoring results are summarised as:

**Table 3-2 – Groundwater Monitoring**

|                 | CP03 | CP04 | WS05 | WS06 | WS07 | WS101A | WS102 | WS103 | WS104 | WS105 |
|-----------------|------|------|------|------|------|--------|-------|-------|-------|-------|
| <b>15/05/26</b> | 1.08 | 1.85 | 0.92 | 2.65 | 1.08 | 1.87   | 0.45  | 2.25  | 0.53  | 1.72  |
| <b>01/06/26</b> | 1.12 | 1.85 | 0.94 | 2.64 | 1.21 | 1.78   | 0.48  | 2.30  | 0.61  | 1.75  |
| <b>15/06/26</b> | 1.13 | 1.80 | 0.97 | 2.55 | 1.32 | 1.67   | 0.54  | 2.29  | 0.68  | 1.71  |
| <b>06/07/26</b> | 1.21 | 1.83 | 1.02 | 2.74 | 1.47 | 1.77   | 0.72  | 2.66  | 0.69  | 1.85  |

Locations CP03, CP04, WS05, WS06 and WS07 were part of the previous RPS Site investigation and since the install pipes were intact, they were monitored for groundwater.

The potential sources of contamination identified in the Updated Conceptual Site Model (Ref.2) are summarised as:

- Made Ground potentially including demolition material.
- Potential asbestos and asbestos containing materials within the shallow ground.
- Unlikely local spillages of oils/fuels associated with machinery on the site.

### 3.3 2022 SITE INVESTIGATION

The 2022 site investigation proved ground conditions as follows:

- Made Ground to depths of between 1.20m and >3.80m bgl.
- At the base of the Made Ground was a black organic rich deposit founds at depths of 1.45m to 3.1m bgl (25.9m to 24.73 m AOD) between 0.10 and 0.30m thick. The locations where this was encountered are in similar locations to the former streams and ponds on site identified in the Desk Study (Ref. 1). Organic rich soils may represent a former topsoil, on which Made Ground may have been placed.
- The Chester Formation was encountered underlying the sediment deposits/Made Ground at depths between 1.65m and 3.20m bgl (25.78m to 24.63 mAOD).

Groundwater was encountered during drilling within the Chester Formation between 3.60m and 9.00m bgl. Shallow groundwater was observed within trial pits between 1.10m and 1.90m bgl.

No visual or olfactory evidence of contamination was observed.

No contaminants of concern were recorded at concentrations above their respective assessment criteria within the soil samples collected from either Made Ground or natural strata.

Asbestos was identified as free fibres within three of 17 samples of Made Ground submitted for screening. One positive identification was detected within the Made Ground sample taken from CP03 (0.50m bgl). Asbestos quantification analysis undertaken on the sample did not identify asbestos above the limit of detection (0.001%).

Marginal exceedances of the assessment criteria for groundwater have been detected for Nickel in WS04 and Fluoranthene in CP04.

### 3.4 GROUND GAS

In 2022 ground gas monitoring was completed at six locations on three occasions under conditions of steady or rising atmospheric pressures between 15 August and 5 September 2022. Significant concentrations of methane and carbon dioxide were recorded consistently throughout the monitoring. RPS recommended further monitoring to be undertaken to determine the long-term gas generation at the site and to enable confirmation of the gas characterisation situation and design of the gas protection measures.

ADS completed gas monitoring at ten locations on four occasions under conditions of steady or falling atmospheric pressures ranging between 1008 mbar and 1017mbar between 15 May and 6 July 2026.

RPS locations WS05, WS06 and WS07 were available to monitor by ADS in 2026.

Methane was only detected in WS105 with a peak concentration during the first visit of 17.9%. Gas flow was not detected in any of the boreholes.

Carbon Dioxide was recorded at a peak of 3.2% in WS105 during the first and third visit.

Oxygen was as low as 9.9% in WS105 during the first visit. Oxygen levels ranged between 16.9% to 20.7% in the remaining boreholes.

The combined data set between 2022 and 2026 is seven monitoring occasions across a range of conditions. No gas significant gas generation has been detected. A CS2 classification is deemed appropriated based upon elevated concentrations of carbon dioxide and methane readings in WS105.

### 3.5 CONTROLLED WATERS

The site is located over a Principal Aquifer (Chester Beds) and within a Groundwater Source Protection Zone 3 although the nearest groundwater abstraction licence is 1320m East. The nearest surface water is 199m east of the site.

The distance to the surface water receptors and the closest groundwater abstraction point is such that migration of contaminants presents a low risk to controlled waters in the vicinity of the site.

No specific contaminative past uses of the site have been identified. Made Ground is present across the site and thought to be part of a general land raise for future development and soils from surrounding developments have been used. Chemical analysis of Made Ground has not identified contaminant concentrations above commercial end use thresholds (human health) or results indicative of free phase hydrocarbons being present.

Chemical analysis of Made Ground has identified some elevated concentrations of PAH in one borehole located in the centre of the site and are not wide spread. The source is considered to be clinker, coal and other man-made constituents which are known to be high in PAHs but generally have a low leachability. In addition, the final development will effectively cover the site with hardstanding and buildings as well as intercepting surface water via drainage so that potential for leaching of contaminants will be significantly reduced.

Groundwater analysis within the Made Ground in WS02 in 2022 indicates concentrations of some speciated PAH compounds and total cyanide above their EQS AC within the groundwater sample collected from the shallow groundwater body encountered.

Hydrocarbon odours are limited to one location within Made Ground in 2022 at TP07 (2022).

Risks to controlled waters are considered to be low and the development will further reduce long term risk so that no remediation measures are required.

## 4 REMEDIATION STRATEGY

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### 4.1 SCOPE OF REMEDIATION WORKS

The assessment of the two available site investigations indicates that the appropriate remediation tasks are:

- Ongoing watching brief / discovery strategy (for areas of unexpected contamination) by the ground worker during construction.
- Decommissioning of borehole installations.
- Installation of barrier pipework for potable water supply.
- Installation of Gas Protection Measures (CS2).
- Installation of the Engineered Cover System to landscape areas.

The planning condition also requires a timetable of works, site management procedures and roles and responsibilities. At the time of writing, the Contractor responsible for completing groundworks and construction have not been appointed so these details are not available.

### 4.2 GENERAL REQUIREMENTS, ROLES AND RESPONSIBILITIES

Remediation and verification requirements shall be implemented by the Contractor. It is also the responsibility of the Contractor to ensure that the required Materials Management Plans (MMPs), Qualified Person Declarations, Environmental Permits, Health and Safety Plans, Risk Assessments and Method Statements (RAMS), Discharge Consents and any other permits/consents/exemptions etc. relevant to the construction phase are obtained/approved to enable successful implementation of the specified remediation and verification measures.

Verification evidence shall be issued to the appointed project geo-environmental consultant by the Contractor. The project geo-environmental consultant shall be a competent person as defined in the NPPF and LCRM guidance. The project geo-environmental consultant shall attend site only for the specific activities where this is identified, such as the installation of clean cover layers, as specified in detail herein. On satisfactory completion of the remediation and verification works, and on receipt of the specified verification evidence from the Contractor, the project geo-environmental consultant shall prepare a Verification Report.

If deviations from the Remediation Strategy become necessary, then these shall be agreed between the Contractor and project geo-environmental consultant prior to being implemented.

It is not possible to submit an accurate timetable of activities at this stage as no Contractor has been appointed.

An overview of the remedial requirements and materials management is provided in the following sections of this report.

### 4.3 WATCHING BRIEF - UNEXPECTED CONTAMINATION

A watching brief should be employed during the earthwork's operations in case visual and/or olfactory evidence of potential contamination is encountered, including asbestos and unexpected below ground structures e.g. tanks etc. If any unexpected contaminants are identified (visible bulk wastes/concentrations of liquids), the Regulatory Bodies will be notified. If necessary, changes to the Remediation Strategy will be made in consultation with Sefton Council.

Examples of unexpected contamination are provided in Table 4.1.

**Table 4-1 –Typical observations for a watching brief and examples**

| Evidence  | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Visual    | <p>Fuel or oil-like substances mixed in with or smeared on the soil or floating on perched groundwater.</p> <p>Waste materials (refuse, barrels, industrial waste, ash or tar) buried on site. Marked variations in colour (such as red, orange, yellow, green, light or dark blue) may indicate the presence of a range of contaminants.</p> <p>Soils including large amounts of ash and clinker.</p> <p>Asbestos containing material (ACM) fragments.</p> |
| Odours    | <p>Fuel, oil and chemical type odours including solvents.</p> <p>Unusual odours such as sweet odours or fishy odours.</p>                                                                                                                                                                                                                                                                                                                                   |
| Wellbeing | <p>Feeling lightheaded or nausea when near excavations or at the working face of an excavation.</p> <p>Burning of nasal passages, throat, lungs or skin.</p> <p>Blistering or reddening of skin due to contact with soil.</p>                                                                                                                                                                                                                               |

If unexpected contamination is encountered during excavations, the following steps will be undertaken as a minimum:

- Work will stop in that area to discuss the findings and proposed plan of action with an appropriately trained, qualified and experienced geo-environmental consultant.
- Implement immediate measures to contain and control any unexpected contamination and prevent any additional environmental impacts.
- Assess whether additional investigation and assessment is required; and
- Depending on the nature of the contamination encountered and potential risks identified, liaising with the Client and Regulators to agree proposals for dealing with this material.

If contaminated soils are encountered as hotspots, after the above procedure, they will be subject to chemical testing at a frequency of a minimum of 5 no. samples per hotspot and one sample per 250m<sup>3</sup> thereafter.

Where contaminated material is excavated, this will be segregated and stockpiled on an hardstanding or impermeable liner in a bunded area separately to prevent leaching and mixing with uncontaminated soils. Depending on the nature of the contamination, mitigation measures could be required for stockpiled material such as to prevent leaching and infiltration of contaminants into underlying soils or run-off or emissions such as dust / vapours / fibres.

## 4.4 DECOMMISSIONING OF MONITORING STANDPIPES

Existing gas/groundwater monitoring boreholes are :

- ADS Boreholes - WS101A, WS102, WS103, WS104 and WS105
- RPS Boreholes - CP03, CP04, WS05, WS06 and WS07

The monitoring wells should be decommissioned prior to groundworks commencing. The Contractor shall undertake decommissioning by filling each monitoring standpipe with bentonite and cutting the standpipe below finished formation level after removing the headworks. The method for decommissioning and the volume of bentonite used in each well shall be recorded. The Contractor must ensure that no 'bridging' of the wells occurs during decommissioning and application of bentonite using a tremie pipe is recommended to achieve this. All decommissioning records shall be provided to the project geo-environmental consultant.

## 4.5 POTABLE WATER PIPE MATERIAL SPECIFICATION

Based on the site investigation information, risk to water supply pipes may be considered to be low. However, the level and chemical composition of Made Ground materials are variable. In the absence of targeted tests along proposed routes of water supply pipes it is specified that barrier pipes e.g Protectaline or similar should be installed for the development.

## 4.6 GAS PROTECTION MEASURES

Based on the combined gas monitoring of RPS (2022) and ADS (2026), carbon dioxide and methane were identified as the primary hazardous gases. It is considered that the site should be classified as Characteristic Situation 2 and therefore ground gas protection measures are required to mitigate the risk to the property and end-users.

Proposed Ground Gas Protection Measures are:

- 1) A 175mm suspended precast concrete slab.
- 2) Installation of a gas membrane (2000 gauge with low permeability to carbon dioxide and methane, and resistance to hydrocarbons eg. JUTA GPH, Visqueen Gas Barrier, or similar.
- 3) Specialist Contractors must install the gas protection measures in accordance with an appropriate QA system including sealing around protrusions.

With reference to BS8485, the proposed buildings conform to either Type C or D buildings and require ground gas protection measures to achieve a minimum score of 2.5 based on CS2.

Based on contemporary standards/guidance, the following ground gas protection measures shall be incorporated to achieve the required score (2.5) the proposed development in accordance with BS 8485:2015+A1:2019.

The required scores for gas protection elements and measures to achieve the scores are presented in Table 4.2 below.

**Table 4-2 –Ground Gas Protection Measures Specification for CS2**

| <b>Gas Protection Measure</b>                                                                                                                                                | <b>Points</b> | <b>Office areas<br/>(Type C<br/>Building)</b> | <b>Open Shop Floor<br/>Area (Type D<br/>Building)</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------------------|-------------------------------------------------------|
| Cast in-situ ground-bearing floor slab (nominal mesh reinforcement) with minimal penetrations.                                                                               | 0.5-1.5       | ✓                                             | ✓                                                     |
| Installation of a gas resistant membrane across the entire extent of the proposed building, with all joints and penetrations sealed and appropriate installation validation. | 2             | ✓                                             | ✓                                                     |
| <b>Required Points</b>                                                                                                                                                       |               | <b>2.5</b>                                    | <b>1.5</b>                                            |
| <b>Points achieved by measures</b>                                                                                                                                           |               | <b>2.5</b>                                    | <b>2.5</b>                                            |

## 4.7 ENGINEERED COVER SYSTEM

The development includes limited external soft landscaping area. In these locations, a cover of clean subsoil and topsoil should be provided. The cover soil specification is:

- A minimum of 300 mm of clean suitable soil (150 mm topsoil and 150 mm subsoil). The capping soils should be underlain by a 100 mm granular no-dig layer or a geotextile membrane to prevent mixing. Trees will require 1000mm deep holes backfilled with clean soils to allow for rooting.

No suitable soils are present on site so the clean engineered cover soil will require the import of suitable soils to site.

Import Criteria have been derived to prevent new contaminants or elevated levels of contaminants being brought on to site.

All imported soils used across the site will be for a commercial end use and tested when received on site for chemical suitability for the suite in Appendix B at the frequencies described in Section 5.3 below.

## 5 REMEDIATION IMPLEMENTATION PLAN

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### 5.1 MATERIALS MANAGEMENT PLAN (MMP)

Cut and fill is likely to be required to achieve final proposed levels. A cut and fill plan is not available at the time of writing.

The watching brief will be maintained during the cut and fill operations as well as in later excavations for drainage, the attenuation tank and foundations.

Earthworks materials movements should be managed under the CL:AIRE Definition of Waste Code of Practice (DOWCOP), (CL:AIRE, 2011) in the management of soil that is appropriate for use. A MMP would be required for the works. The MMP will outline how materials are to be tracked and re-distributed on site for re-use. The MMP will be completed and submitted to CL:AIRE prior to commencing groundworks. It will require an independent Qualified Person (QP) sign off and declaration.

Materials classified as unacceptable will be subject to the appropriate testing to determine the most appropriate disposal route.

Additional options for the reuse of soils on site may be:

- Registration of a U1 exemption – limited to <1000 tonnes for reuse;
- Treatment of suitable materials under a T5 exemption to produce aggregates under the WRAP Protocol.

The development will utilise a MMP to demonstrate that reused materials will be used in accordance with the DOWCOP. The MMP will be reviewed by a Qualified Person who is independent of the project and if suitable, declared using the CL:AIRE web portal.

Natural soil that is uncontaminated and excavated in the course of construction activities where it is certain that the materials will be reused in its natural state on the site from which it is excavated, is excluded from waste regulation by the Waste Framework Directive (2008).

### 5.2 POTABLE WATER PIPE MATERIAL INSTALLATION

The following verification information is required to be provided to the project geo-environmental consultant by the Contractor:

- As-built diagrams showing where water supply pipes have been installed.
- Proof of purchase.
- Proof of delivery of the materials.
- Photographic record of the installation of the pipework.

### 5.3 ENGINEERED COVER SYSTEM

#### 5.3.1 CHEMICAL VERIFICATION

Following selection of the source of soil materials for soft landscaping areas, the Contractor should appoint an environmental consultant to check suitability of proposed import material prior to importation. The notification should include details of the origin of the material and supporting analytical data.

All imported soils will be tested for chemical suitability for the suite and frequencies set out below (in accordance with Sefton Council guidance - Land Affected by Contamination: Technical Guidance for Applicants/Developers and Environmental Consultants Version No: 4 Revised: August 2016).

**Table 5-1 –Soil Test Suites and Frequencies**

| Source and Validation Testing Rate                                     | Chemical Analysis Suite                                                           |                      |                          |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------|--------------------------|
|                                                                        | General Soil Suite<br>(As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn, PAH, pH and SOM) | Asbestos<br>(screen) | Hydrocarbons<br>(TPHCWG) |
| <b>TOPSOIL</b>                                                         |                                                                                   |                      |                          |
| Greenfield Source 1 per 100m <sup>3</sup> minimum 4 samples per source | ✓                                                                                 |                      |                          |
| Brownfield Source 1 per 50m <sup>3</sup> minimum 4 samples per source  | ✓                                                                                 | ✓                    | ✓                        |
| <b>SUBSOIL</b>                                                         |                                                                                   |                      |                          |
| Greenfield Source 1 per 200m <sup>3</sup> minimum 4 samples per source | ✓                                                                                 |                      |                          |
| Brownfield Source 1 per 50m <sup>3</sup> minimum 4 samples per source  | ✓                                                                                 | ✓                    | ✓                        |
| Quarried Source – no requirement for testing                           |                                                                                   |                      |                          |

Topsoil shall be checked by the Contractor for acceptability and compliance with BS3882:2015 at the frequency given above and/or the presentation of appropriate certificates from the source supplier.

All soil will be free from obvious contamination and odours and from unsuitable material e.g. bricks, timber and glass. There will be no signs of asbestos fibres or asbestos containing materials (ACM's).

The chemical criteria appropriate to imported soils for residential with plant uptake end use are presented in Appendix B.

### 5.3.2 PHYSICAL VERIFICATION

Validation of installed cover system thickness will be undertaken by an independent geoenvironmental engineer on a visiting basis.

Upon installation of the cover system, verification pits shall be excavated by the ground worker under the supervision of the geoenvironmental engineer, in order to measure the thickness of Topsoil and Subsoil. These pits will be excavated in the soft landscaping at a rate at a rate of one per area of landscape (these are generally small, eg verges). If the thickness is deemed to be insufficient, the Site Manager will be informed and advised on how much more material is needed for the cover soil layer to be adequate. In instances where the cover system is measured to be inadequate, following the addition of soils, the verification pits will be re-excavated to confirm that a sufficient thickness of soils is present.

The verification of the cover system will be included in the Remediation Verification Report to be compiled for the site and will be issued to the Local Authority. The verification of this aspect of the works is to include:

- Confirmation of the source of imported material.
- Confirmation of the volume of imported material.
- Confirmation of the physical suitability of the material.
- Chemical test results for the samples taken from the stockpiles of Topsoil and Subsoil and confirmation that the material is visually consistent with that tested or the chemical test results for samples taken once the capping has been placed.
- Confirmation that the required frequency of testing has been completed and results available.
- Confirmation of the capping thicknesses, using a measuring staff and datum bar laid across the surrounding topsoil at ground level. The base of each validation hole will be clearly photographed to confirm the placement of the coloured permeable geotextile separator layer. Photographs of each exploratory hole will include a point of reference to confirm the location within the development.

All samples will be taken in accordance with relevant guidance (e.g. BS 10175:2011). Soils for inorganic analysis will be sealed in air-tight polythene tubs. Soils for organic analysis will be sealed in amber glass jars with the minimal practicable headspace. All samples will be scheduled on chain of custody forms prior to being dispatched to the UKAS accredited laboratory for analysis.

Should any discrepancies occur, the Contractor shall inform the Engineer and re-sampling maybe necessary at the Contractors cost.

## 6 GROUND GAS DESIGN REPORT

---

BS 8485:2015+A1:2019 specifies that the detailed design and specification of the protection measures should be recorded in a design report. The buildings are to have a ground slab. For this development gas protection measures are a combined system of gas protection membrane and ground bearing concrete slab.

### 6.1 MEMBRANE

The specialist contractor installing the membrane will provide operatives with NVQ level 2 training in ground gas installation (lead operative).

The verification inspectors will be suitably experienced and/or have the NVQ level 4 qualification in ground gas verification.

The gas resistant membrane required below the proposed buildings on-site shall be in accordance with the below specification:

- The membrane shall be appropriately designed, installed and verified in accordance with BS8485. The membrane shall meet all the criteria set-out in BS8485 Table 7 in order to achieve 2.0i gas protection score points.
- A membrane with a methane gas transmission rate <40.0 ml/day/m<sup>2</sup>/atm (average) for sheets and joints (testing in accordance with BS ISO 15105-1:2007 manometric method) is regarded as sufficiently impervious.
- The membrane shall be sufficiently durable to remain serviceable for the anticipated life of the building.
- The membrane shall be capable, after installation, of providing a barrier to significant passage of carbon dioxide and methane into the relevant areas of the proposed buildings.
- The membrane shall be installed across the entire footprint of the buildings, as a minimum, and detailing of the membrane / foundation interfaces shall be in accordance with BS8485.

### 6.2 FLOOR SLABS

The buildings will be traditional steel framed, steel clad structures. No concrete mezzanine / upper floors form part of the design. The floor slabs and foundations will be supported on ground that has likely been improved with vibro columns/rigid inclusions.

Floor slab thickness is 175mm with one layer mesh set at a minimum 50mm from the bottom for all Units. Slab Plans will be made available prior to construction.

### 6.3 SERVICES AND PENETRATIONS

All penetration through the concrete slab will be sealed to the membrane to ensure no short cuts for gas intrusion are formed.

Sealing to drainage pipes and service ducts are required to use top hats welded to the base membrane and sealed onto the pipes with the recommended manufacturers products between pipe and membrane.

All service ducts through the floor slab (used and spare) such as water pipe and electrical cable ducts will require sealing internally. A permanent metal imprinted tag shall be attached to all ducts advising that the sealant in the duct is to stop the ingress of gas and should not be removed without consulting the local authority.

The duct sealing will require verification.

## 6.4 GAS PROTECTION MEASURES VERIFICATION PLAN

The gas protection measures will be installed by competent and qualified persons. The independent inspector will verify the effectiveness and compliance of gas protection measures implemented on site, including photographs and a verification report outlining if the measures are compliant to the specifications.

The independent inspector will ensure the specialist installer is made up of suitably trained personnel and obtain a statement detailing their qualifications and relevant experience, a copy of which is to be included in the Verification Report for the site. A minimum of one on-site operative will hold an NVQ Level 2 Qualification in Gas Protection Installation. It is the responsibility of the specialist installer to:

- Ahead of site works, provide an Installation Plan for the ground gas mitigation measures.
- Provide sub-grade acceptance forms for all areas of membrane installation.
- Complete QA sign-off sheets for all areas of membrane installation.

The independent person will attend site at key stages of the membrane installation to conduct a visual verification inspection to establish the adequacy of the ground preparation and, subsequently, the installed gas membrane. A pro forma should be completed for each inspection visit. All pro-formas should be retained for inclusion within the final verification report in order to demonstrate the involvement of the verifier throughout the process and provide evidence of the appropriate installation of the protection measures. The inspection should include:

- The surface prepared for the membrane which should be clean and free from stones etc.
- Confirmation of the specified membrane being delivered and used on site.
- The installation of the membrane to an acceptable standard.
- The membrane itself, over the whole floor area, paying particular attention to laps, welds, edges and the sealing of service entries and penetrations such as columns.
- Pick testing of 100% of all joints / penetrations of the membrane in accordance with the ASTM D4437-08:2013.
- Collation of verification evidence of the above together with the information provided by the Specialist Installer.
- A photographic record confirming the above.
- Targeted photographs of key details and repairs eg that penetrations through the ground gas membrane are suitably sealed.

All follow-on trades should be made aware of the presence and purpose of the membrane, and who they should contact if they believe their actions have had the potential to compromise it.

## 7 ENVIRONMENTAL CONTROLS

---

### 7.1 GENERAL

Remediation operating procedures will be based around guidance contained within the HSE document entitled “Protection of Workers and the General Public During the Redevelopment of Contaminated Land” (HS(G)66) (no longer current but cited within Building Regulations for England and Wales).

The mitigation of any significant temporary impacts upon the overall local environment during remediation is an important consideration for this site. Asbestos fibres have been identified in soils on-site; all site works will need to be undertaken in accordance with CAR (2012) regulations.

Environmental considerations will be assessed and monitored with control measures put in place to limit the impacts from such. Emphasis will be placed on prevention and control at source rather than mitigation following release. Site operations will be conducted in order to reduce such environmental impacts to a practical minimum.

### 7.2 DEWATERING OF EXCAVATIONS

The recent site investigation encountered groundwater within all monitored exploratory locations ranging from 0.45mbgl to 2.74mbgl.

The Contractor will be responsible for the control of all surface water within the working area during the Works.

Pumping / dewatering operations will be used as required in the works areas.

The Contractor will ensure that any unexpected potentially contaminated waters and leachate from the excavations do not reach drains etc. The Contractor will manage such contaminated waters so that they do not discharge onto the ground, internal or external to the site.

Direct discharge of groundwater is not permitted into the public or private foul or surface water sewers or any other standing body of water without specific consent or approval. The Contractor will check that all necessary consents are in place if discharge to sewer is the proposed disposal route. Groundwater is considered to be free of contamination but should be passed through an interceptor or silt trap before any direct discharge off site.

If contamination is suspected, such waters will be transferred by tanker off site for disposal or treated (if required) on site for subsequent disposal to sewer.

### 7.3 SITE WASTE MANAGEMENT

The Contractor is to hold appropriate Environmental Permits or exemptions from such associated with earthworks and stockpiling activities including any sorting, screening or crushing of soils and demolition arisings.

For waste leaving site for disposal, loading of vehicles will be performed in an organised manner to prevent the spread of contaminants. Any loads leaving the site will be sheeted and vehicles cleaned if required prior to leaving site. The sheeting of these loads will be checked and recorded by the Contractor to check for appropriate and complete coverage of the load.

The sheeting will be of durable construction, undamaged, continuous and of sufficient size to completely cover the enclosed load. The sheeting will be tied down in an appropriate manner and with sufficient tension such that there will be no loss of material during transport.

## 7.4 IMPORTED MATERIALS

Any material which is imported to Site as part of the Proposed Development (i.e. fill material potentially required as sub-base for structures, granular blankets around pipework etc) must be inert and free from contamination.

Any material imported to Site (whether for landscaping or to address further development requirements) should be of a verifiable origin and where applicable (soils etc) should be supported by appropriate analytical data.

The testing frequency for imported materials is set out in Table 5.1. The importance of adopting a sampling frequency that is suitably protective of end users will need to be taken into consideration.

Any imported soils should be inert and free from contamination, including being free from all deleterious materials and no detectable asbestos fibres. Any material failing to meet the above criteria will not be deemed suitable and will require removal from Site.

Imported soils should in no way include anything which is classified as a 'waste' material (as defined within current waste management legislation or have an applicable waste code). Where recycled materials are proposed to be used on-Site, the Contractor should obtain documentary evidence that the materials are a 'product' and not a 'waste.' Where the material was a former 'waste' and has been treated to become a 'product,' the Contractor should obtain documentary evidence from the relevant regulatory body that the treatment process is appropriate and hence the material is no longer legally a 'waste' material and hence waste management legislation requirements are not applicable.

The Contractor will be responsible for inspecting all deliveries of imported material to ensure that it meets the criteria outlined above. The Contractor cannot discharge this responsibility to the Client or Client advisors. All deliveries should be inspected prior to importation. In the event that any evidence of contamination / unsuitable anthropogenic materials are evident (odours, staining, presence of waste materials) the material should be rejected and removed from Site. If there is any suspicion that the material is potentially unsuitable, the material should be stored in a dedicated area (on hardstanding / geotextile) and subjected to further testing before deposition on-Site.

## 7.5 WASTE DISPOSAL

Should an excess of soils be generated during the cut and fill or excavations for site foundations/infrastructure, they should be sent to the appropriate licensed waste facility.

The Principal Contractor is responsible for providing the project geo-environmental consultant all waste information and classifying all wastes generated in accordance with the Landfill Directive, Landfill Regulations, Waste Regulations and the Hazardous Waste Regulations, current and applicable at the time of works. The Contractor shall ensure that no mixing of generated wastes occurs and that no cross-contamination of waste streams occurs. Where practicable and cost effective, materials requiring off-site disposal should be selected and pre-treated to minimise waste volumes and to reduce the volume of Hazardous waste.

The Contractor will be responsible for liaison with waste disposal operators and to compile a complete chain of custody in addition to complying with current waste legislation and regulation. The Contractor shall collate documentary evidence to demonstrate their compliance with the duty of care arising with regards to waste legislation, including:

- Waste management licenses or exemptions.
- Completed Waste Transfer Notes.
- Completed Hazardous Waste Consignment Notes.
- Waste acceptance criteria (WAC) testing.
- Certificate of Registration for Registered Waste Carriers.

There are no requirements for the Contractor to provide evidence in relation to waste for the site Verification Report, as this is not relevant for demonstrating that the site is suitable for use. However, the Contractor must have waste duty of care documentation available for review on client request.

## **7.6 PROTECTION OF WORKERS AND THE GENERAL PUBLIC**

A Construction Environmental Management Plan (CEMP) for the development works will be prepared by the Contractor. The CEMP is designed to set out the standards of construction logistics and practices that will minimise or eliminate where possible the impacts of the project on the surrounding environment.

### **7.6.1 CONSTRUCTION WORKERS**

The health and safety of all construction workers and visitors on-Site will be managed during the development works through provision of appropriate welfare facilities, decontamination facilities, appropriate storage of fuels, chemicals, and construction materials.

Personal protective equipment (PPE) suitable for the contaminants present on the Site and the activities being undertaken will be provided where necessary. The Contractor will complete a method statement for all demolition and construction activities.

The Contractor will ensure they meet the responsibilities of the Health and Safety at Work Act 1974 and CDM Regulations 2015, and that all works are progressed carefully, in a controlled manner and in line with the approved method statements.

Previous ground investigation reports detailing the Site's history, ground conditions and the potential for contaminated soils and groundwater will be provided to the Contractor. Asbestos has been recorded in the Made Ground, and there is the potential for further asbestos fibres to be encountered during construction. The Contractor will follow the Asbestos Management Plan presented in this report and update it as appropriate to encountered site conditions to form a plan of work produced in accordance with the Control of Asbestos Regulations 2012.

### **7.6.2 SURROUNDING SITE RECEPTORS**

Mitigation measures will be employed to minimise airborne dust emission from excavated soils, transported soils and, if required stockpiled materials. The appointed Contractor will determine the methods for appropriate handling and storage of materials, which may include use of hoardings, damping down and covering of stockpiles where necessary. Where material is sent off-Site via

highways, wheel washing facilities and road sweeping may be employed to prevent material being tracked into the road. These measures will ensure the public are protected throughout the duration of the works.

On-Site fuel storage will be adequately bunded, with drip trays and spill kits provided as necessary. Site workers will be familiar with the use of spill kits, and any leaks or spills will be recorded and reported to Site management, regardless of volume.

## 8 ASBESTOS MANAGEMENT PLAN

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### 8.1 RISK TO WORKERS

Asbestos fibres have not been widely detected but fibres were detected at two locations in the form of loose asbestos fibres (chrysotile and amosite) below 0.001%.

Given that the development will comprise the placement of a building / hardstanding, it is considered that asbestos may be encountered in excavations during development. To avoid possible migration (through airborne dust) during development appropriate dust suppression / management measures should also be adopted, together with the use of appropriate tool box briefings and personal protective equipment for construction workers.

The final development is hardstanding/buildings with clean cover soil layers in soft landscaping which will provide sufficient protection to future Site users and therefore prevent the risk of exposure to asbestos in soils. This approach allows for a sustainable method for the management of potential asbestos in soils. However, since made ground potentially impacted by asbestos is to remain in place post-development, associated risks to future ground workers will need to be appropriately documented and managed.

Where soft landscaping is proposed, a suitable 300mm thick, clean cover system is required including a warning membrane at the base.

CL:AIRE have published guidance to aid in the classification of remediation works on Asbestos Containing Soils (ACS) compliant with Control of Asbestos Regulations 2012 (CAR). This is detailed in CL:AIRE (2016) "Control of Asbestos Regulations 2012 - Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials: Industry Guidance.

Based on the Made Ground testing results, the soils are classed as non-licensed works.

### 8.2 DUST MANAGEMENT

A daily inspection of the site boundary in the vicinity of the work area, haulage routes and welfare area will be made, by the Principal Contractor, to check for abnormal levels of dust deposition and the transfer of dusty material beyond the site boundary. If abnormal levels are found, the Principal Contractor will investigate the cause. Immediate remedial action will be taken where necessary.

A site log will be maintained that records the details of all visual inspections undertaken at the site. This will need to include a description of the dust, when and where it was found, the meteorological conditions at the time (with reference to the data being collected), whether or not evidence suggested that it was as a result of the works being undertaken at the site, and the corrective actions taken. The log should also record inspections when no dust deposition was noticed.

Water will be available on site for dust suppression at all times during all elements of the works.

### 8.3 PREVENTING/REDUCING THE SPREAD OF ASBESTOS

Where, from the site investigations, materials are known to contain asbestos fibres, good practice (JIWG CAR-Soil and CAR 2012) prescribes such material to be segregated to ensure materials would not cross-contaminate other soils and to reduce the risk of further fibre release to site workers. At the site, asbestos fibres are not able to be attributed to any specific areas or types of

Made Ground. Therefore, basic measures to avoid excessive transport distances across site should be adopted.

## 8.4 REMOVAL OF VISIBLE ACM

No visible ACM was noted in investigations at the site. However, fibres were identified in lab testing at two locations, both recording  $<0.0001\%$  concentrations. Should ACM be encountered during bulk excavations, good practice prescribes that any fragments or asbestos containing materials where identified should be picked where possible and to be kept separated in line with those from any soil arisings. This is typically carried out by picking visible fragments at the point of excavation.

This operation is to be carried out by suitably qualified staff, wearing disposal overalls (type 5/6), gloves and fine dust (FPP3) masks in combination with adoption of dust suppression techniques and monitoring or other applicable methods as recommended by the Asbestos Management Specialist. The qualified staff are to be trained in the identification of asbestos at source. The qualification and competencies of all operatives undertaking monitoring and calibration documentation of equipment should be provided to the Client or their representative.

## 9 VERIFICATION PLAN

---

On completion of the remediation works, a verification report will be compiled and copies will be provided to all relevant regulatory bodies.

The Contractor will provide full details of the works covered by this Remediation Strategy that were undertaken and the status of the site. The objective of the report will be to provide verification that all works associated with dealing with the contamination issues have been carried out in accordance with this Remediation Strategy.

In summary, the report content will be as follows:

- A summary of all earthworks undertaken including cut and fill e.g. volumes used, where taken from and placed etc.
- Copies of any Material Management Plans, Exemption registrations and Environmental Permits;
- Any necessary and agreed variations to this strategy.
- Records of the watching brief and unexpected contamination encountered and dealt with.
- Records of monitoring well decommissioning.
- Evidence of water pipe specification actually installed and diagrams showing where pipes have been installed.
- Records and verification of ground gas protection measures installed.
- Verification of any imported soils including visual inspection records, photographs and assessment of chemical test results.
- Detailed verification records for the clean cover layer to be installed in the proposed areas of soft landscaping
- An assessment of residual risks.

## REFERENCES

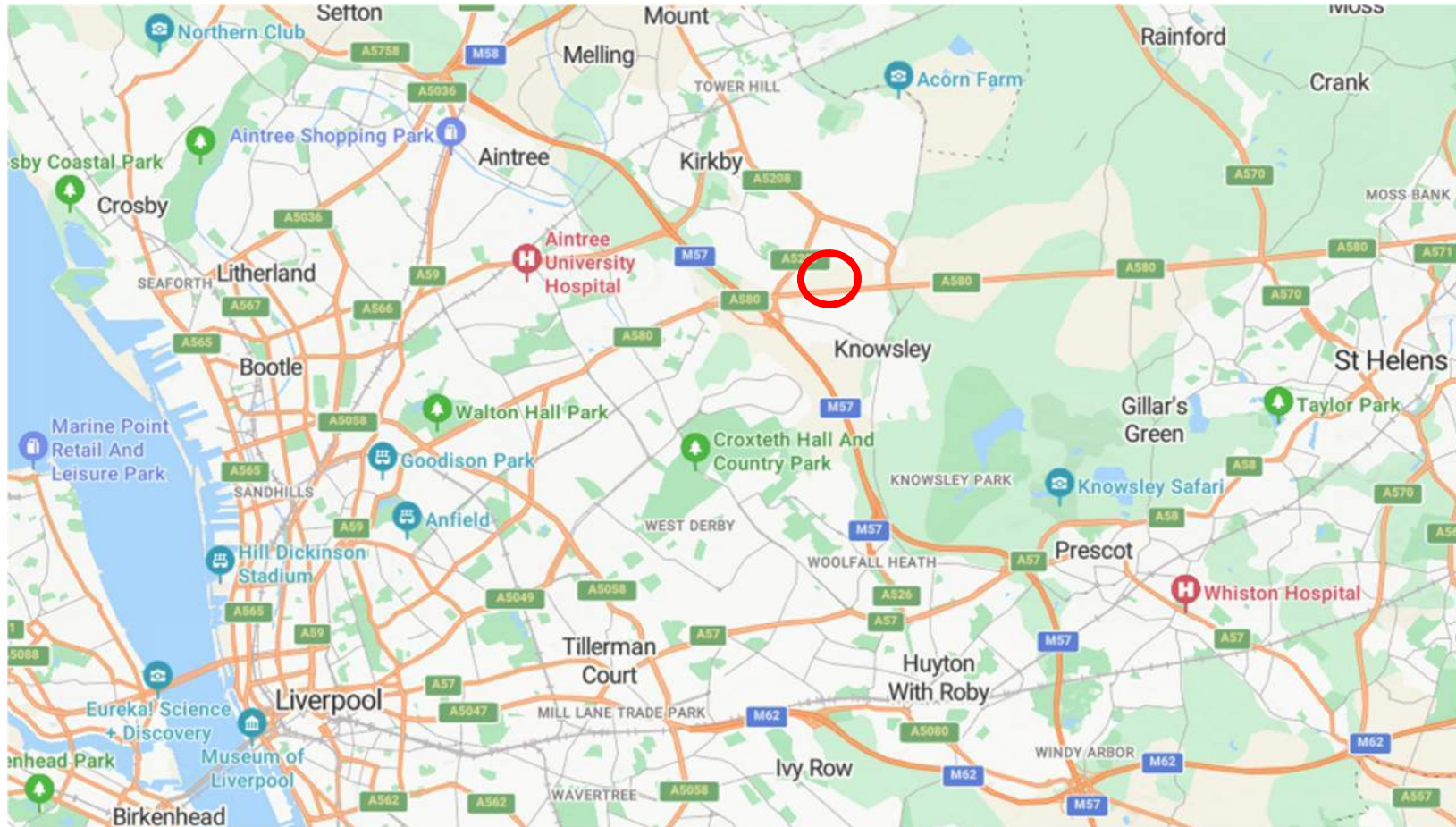
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1. Phase 1 Preliminary Risk Assessment for Parcel 1, Alchemy, Knowsley prepared by ADS Consult on behalf of Network Space Limited reference 11110-DTS-001, dated June 2026.
2. Phase 2 Ground Investigation Report for Land at Alchemy Way, Knowsley prepared by ADS on behalf of Network Space Limited, reference 11110-SI-002, dated July 2026.
3. Phase 1 Geo-Environmental Desk Top Study for Land at Alchemy Knowsley, prepared by WYG on behalf of Network Space Limited, reference A094359, dated June 2016.
4. Phase 2 Geo-Environmental and Geotechnical Report for Land at Alchemy Way, Knowsley Industrial Park, Kirby, L33 7AQ, prepared by RPS on behalf of Network Space Limited, reference JER9563, dated October 2022.

# Appendix A

## FIGURES





**Key**

 Development Boundary



ADS Consult  
107 Mere Grange Business Park  
Leaside  
St Helens  
WA9 5GG  
Tel: +44 (0) 203 823 2800

**Figure A.1  
Site Location Plan**

Project:  
**Alchemy Way, Knowsley**

Project No.:  
**11110**

Client:  
**Network Space**



## Key



Development Boundary



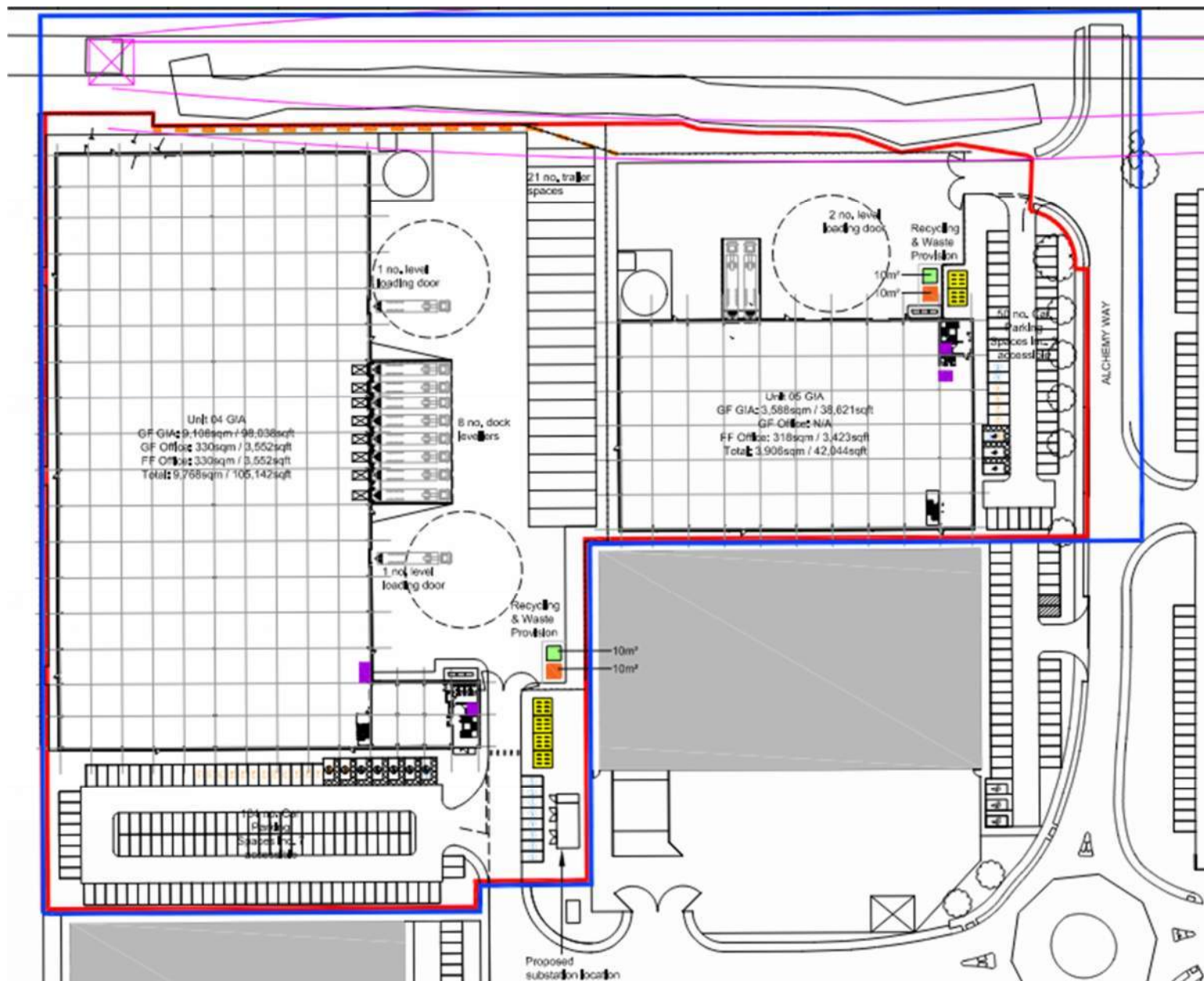
ADS Consult  
107 Mere Grange Business Park  
Leaside  
St Helens  
WA9 5GG  
Tel: +44 (0) 203 823 2800

## Figure A.2 Site Boundary Plan

Project:  
**Alchemy Way, Knowsley**

Project No.:  
**11110**

Client:  
**Network Space**



## Key



ADS Consult  
 107 Mere Grange Business Park  
 Leaside  
 St Helens  
 WA9 5GG  
 Tel: +44 (0) 203 823 2800

**Figure A.3**  
**Site Development Plan**

**Project:**  
**Alchemy Way, Knowsley**

**Project No.:**  
**11110**

**Client:**  
**Network Space**

# Appendix B

## **CHEMICAL CRITERIA FOR IMPORTED SOILS**

Imported will be subject to chemical testing at an MCERTS/UKAS accredited laboratory as follows:

**Standard Suite** (derived from Land Affected by Contamination: Technical Guidance for Applicants/Developers and Environmental Consultants Version No: 4 Revised: August 2016)

- Asbestos Screen
- pH
- Metals
  - Arsenic
  - Cadmium
  - Total chromium
  - Copper
  - Lead
  - Mercury
  - Nickel
  - Selenium
  - Zinc
  - Cyanide (total and free)
- Total Petroleum Hydrocarbons – Criteria Working Group (TPH-CWG) with aromatic and aliphatic splits.
- Speciated 16 Polycyclic Aromatic Hydrocarbons (PAHs)

A visual inspection of all materials will be undertaken to ensure that there is no visible evidence of contamination (e.g. free phase hydrocarbons, asbestos containing materials, putrescible / organic wastes, notable discolourations) or odours present.

The results will be required to meet the residential with plant uptake GACs presented below. The GACs selected are primarily for a residential end use with plant uptake (assumed 1% SOM) to represent the most conservative thresholds considered protective of human health. To avoid inadvertent reuse of soils that may be considered as hazardous waste, the thresholds have been updated for :

- Metal concentrations (copper and zinc) are reduced to non-hazardous concentrations.
- TPH (total) is limited to the inert waste criteria.

Further restrictions may be placed by the landscape architect.

---

| Parameter                    | Import Thresholds<br>(mg/kg, unless otherwise stated) |
|------------------------------|-------------------------------------------------------|
| <b>Asbestos</b>              | Not detected                                          |
| <b>Metals/metalloids</b>     |                                                       |
| Arsenic                      | 37                                                    |
| Beryllium                    | 1.7                                                   |
| Boron                        | 290                                                   |
| Cadmium                      | 11                                                    |
| Chromium III                 | 910                                                   |
| Chromium VI                  | 6                                                     |
| Copper                       | 500                                                   |
| Lead                         | 200                                                   |
| Mercury (elemental)          | 1.2                                                   |
| Mercury (Inorganic)          | 40                                                    |
| Methylmercury                | 11                                                    |
| Nickel                       | 130                                                   |
| Selenium                     | 250                                                   |
| Vanadium                     | 410                                                   |
| Zinc                         | 500                                                   |
| <b>Other</b>                 |                                                       |
| Total Sulphate               | 2,400                                                 |
| Water Soluble Sulphate (g/l) | 0.5                                                   |
| Cyanide                      | 34                                                    |

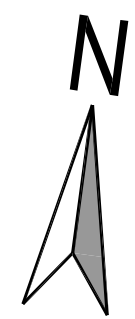
| Parameter                | Import Thresholds<br>(mg/kg, unless otherwise stated) |                           |                         |
|--------------------------|-------------------------------------------------------|---------------------------|-------------------------|
| SOM                      | For soil with SOM<br>1%                               | For soil with SOM<br>2.5% | For soil with SOM<br>6% |
| <b>PAHs</b>              |                                                       |                           |                         |
| Naphthalene              | 2.3                                                   | 5.6                       | 13                      |
| Acenaphthylene           | 170                                                   | 420                       | 920                     |
| Acenaphthene             | 210                                                   | 510                       | 1100                    |
| Fluorene                 | 170                                                   | 400                       | 860                     |
| Phenanthrene             | 95                                                    | 220                       | 440                     |
| Anthracene               | 2400                                                  | 5400                      | 11000                   |
| Fluoranthene             | 280                                                   | 560                       | 890                     |
| Pyrene                   | 620                                                   | 1200                      | 2000                    |
| Benzo(a)anthracene       | 7.2                                                   | 11                        | 13                      |
| Chrysene                 | 15                                                    | 22                        | 27                      |
| Benzo(b)fluoranthene     | 2.6                                                   | 3.3                       | 3.7                     |
| Benzo(k)fluoranthene     | 77                                                    | 93                        | 100                     |
| Benzo(a)pyrene           | 2.2                                                   | 2.7                       | 3                       |
| Indeno(1,2,3- cd) pyrene | 27                                                    | 36                        | 41                      |
| Dibenz(a,h)anthracene    | 0.24                                                  | 0.28                      | 0.3                     |
| Benzo(g,h,i)perylene     | 320                                                   | 340                       | 350                     |

|                     | For soil with SOM<br>1% | For soil with SOM<br>2.5% | For soil with SOM<br>6% |
|---------------------|-------------------------|---------------------------|-------------------------|
| <b>TPHs</b>         |                         |                           |                         |
| Aliphatic EC 5-6    | 42                      | 78                        | 160                     |
| Aliphatic EC >6-8   | 100                     | 230                       | 530                     |
| Aliphatic EC >8-10  | 27                      | 65                        | 150                     |
| Aliphatic EC >10-12 | 130 (48)V               | 330 (118)V                | 760 (283)V              |
| Aliphatic EC >12-16 | 1100 (24) S             | 2400 (59) S               | 4300 (142) S            |
| Aliphatic EC >16-35 | 65000 (8.48)S           | 92000 (21)S               | 110000                  |
| Aliphatic EC >35-44 | 65000 (8.48)S           | 92000 (21)S               | 110000                  |
| Aromatic EC 5-7     | 70                      | 140                       | 300                     |
| Aromatic EC >7-8    | 130                     | 290                       | 660                     |
| Aromatic EC >8-10   | 34                      | 83                        | 190                     |
| Aromatic EC >10-12  | 74                      | 180                       | 380                     |
| Aromatic EC >12-16  | 140                     | 330                       | 660                     |
| Aromatic EC >16-21  | 260                     | 540                       | 930                     |
| Aromatic EC >21-35  | 1100                    | 1500                      | 1700                    |
| Aromatic EC >35-44  | 1100                    | 1500                      | 1700                    |
| Aromatic EC >44-75  | 1600                    | 1800                      | 1900                    |

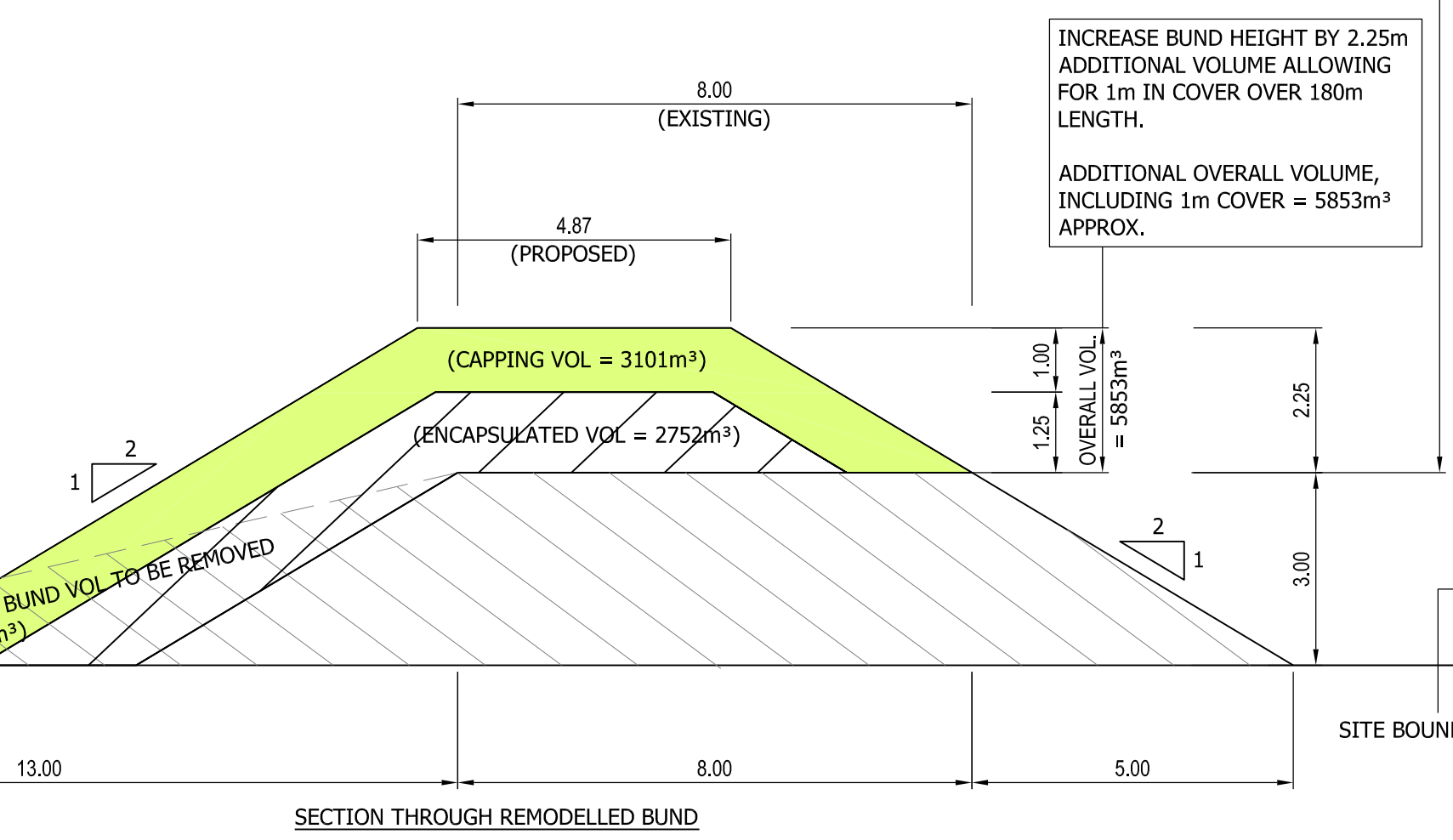
LQM/CIEH S4UIs for Human Health Risk Assessment Publication Number S4UL381

# Appendix C

## **JAPANESE KNOTWEED ENCAPSULATION PLAN**



EXCESS BUNDING VOLUME TO BE REMOVED FROM EXISTING PROFILE  
= 2158m<sup>3</sup> APPROX.  
VOLUME REQUIRED TO REPROFILE BUND = 3101m<sup>3</sup> APPROX.  
= 943m<sup>3</sup> SHORTFALL, APPROX.



- NOTES:
- JAPANESE KNOTWEED ENCAPSULATION EARTHWORKS STRATEGY:**
1. REFER TO JAPANESE KNOTWEED SPECIALIST FOR TREATMENT, QUANTITY AND RELOCATION METHODOLOGY OF ARISING.
  2. THE ESTIMATED VOLUME OF ARISING FROM THE JAPANESE KNOTWEED ZONE IS 2500m<sup>3</sup> (+/-10%).
  3. THE EXISTING BUND WHICH CONSISTS OF UNCLASSIFIED GENERAL FILL (ARISING) (U1A) IS TO BE UTILISED AS THE DEPOSIT AND ENCAPSULATION ZONE FOR JAPANESE KNOTWEED ARISING.
  4. THE EXISTING BUND IS LOCATED UNDER AN OVERHEAD ELECTRICITY TRANSMISSION LINE AND ANY WORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH HSE G8.
  5. THE EXISTING BUND (SOUTH SIDE) IS TO BE REPLACED TO REDUCE THE EXTENT OF THE BATER AS INDICATED ON DRAWING A094359/JK001.
  6. EXPOSED BUND FORMATION IS TO HAVE ALL VEGETATION REMOVED PRIOR TO PLACEMENT OF ARISING AND FILL.
  7. ARISING FROM THE JAPANESE KNOTWEED ZONE ARE TO BE TRANSPORTED AND PLACED IN ACCORDANCE WITH THE SPECIALISTS GUIDANCE AND SUPERVISION.
  8. ENCAPSULATION OF THE JAPANESE KNOTWEED ARISING IS TO BE CARRIED OUT TO THE DEFINED PROFILE WITH RECOVERED OR IMPORTED SELECTED/GENERAL FILL MATERIAL.
  9. ALL EARTHWORKS TO BE CARRIED OUT TO SERIES 600 SPECIFICATION FOR HIGHWAY WORKS (SHW), JAPANESE KNOTWEED SPECIALIST GUIDANCE AND SUPERVISION AND LANDSCAPE STRATEGY PROPOSALS.

## FOR PLANNING PURPOSES ONLY

|     |                                                    |    |     |     |          |
|-----|----------------------------------------------------|----|-----|-----|----------|
| P3  | ARCHITECTS LAYOUT REVISED, KNOTWEED AREA INDICATED | AK | APF | APF | 31.08.16 |
| P2  | OPTION 2 ADDED                                     | AK | APF | APF | 17.06.16 |
| P1  | PRELIMINARY ISSUE                                  | AK | APF | APF | 15.06.16 |
| REV | DESCRIPTION                                        | BY | CHK | APP | DATE     |

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Project:  
ALCHEMY  
KNOWSLEY

Drawing Title:  
INDICATIVE JAPANESE KNOTWEED  
ENCAPSULATION WORKS

|             |         |        |        |             |        |          |        |
|-------------|---------|--------|--------|-------------|--------|----------|--------|
| Scale @     | A0      | Drawn  | Date   | Checked     | Date   | Approved | Date   |
| AS SHOWN    | A.K.    | A.K.   | JUN 16 | APF         | JUN 16 | APF      | JUN 16 |
| Project No. | A094359 | Office | Type   | Drawing No. | JK001  | Revision | P3     |



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