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Welcomb Street Remediation Strategy & Verification Plan

For NS CW4 (Network Space)

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1. Introduction

1.1 Terms of reference

Hydrock Consultants Ltd. (Hydrock, now Stantec, referred to hereafter as Hydrock) has been commissioned by NS CW4 Ltd (Network Space) (the Client) to prepare a Remediation Strategy and Verification Plan (RSVP) for land at Welcomb Street (the "site").

The works have been undertaken in accordance with Hydrock's proposal (Ref. 22975-HYD-XX-XX-FP-GE-0002).

1.2 Background

A Phase 1 Desk Study and separate Phase 2 Ground Investigation report have been prepared by RPS Group for the site. Since completion of the Ground Investigation in 2022 the site has since been vacated and all above ground structures have recently been demolished (December 2024) by PP O'Connor under planning reference 140741/DEM/2024 . Approximately 1,800m³ of processed demolition material remains on site and is proposed for re-use within the site earthworks.

The proposed development is to comprise four commercial units and associated highways, vehicle parking and soft landscaping. A proposed development layout (AEW Architecture drawing number 12481-AEW-XX-XX-DR-A-0503, dated 2nd May 2024) is presented in Appendix A.

1.3 Objectives

The objective of this Remediation Strategy and Verification Plan is to fulfil Stage 3: Remediation and Verification of the Environment Agency's (EA) Land Contamination Risk Management (LCRM), specifically the development of a remediation strategy to ensure that, on completion, the site can be shown to be suitable for its intended use, such that it will not pose an unacceptable contamination risk to the identified receptors.

This document ultimately seeks to agree the remediation concept for the proposed development with the relevant regulatory authorities and discharge of Condition 5 of planning application 139997/FO/2024. Significant departures and/or variations to this strategy will require approval from the regulators.

1.4 Scope

This Remediation Strategy and Verification Plan has been undertaken in general accordance with Environment Agency guidance Land Contamination Risk Management (LCRM), (EA, 2023) and the scope comprises:

- » Provide a summary of the conceptual site model;
- » Include a review of the risk assessment;
- » Provide an outline of the remedial strategy;
- » Detail the remedial strategy implementation during the enablement and construction phases;
- » Outline monitoring (if required) and maintenance requirements;
- » Detail supervision, verification and reporting requirements;
- » Summarise requirements for reuse of soils on site and material management; and
- » Provide a contingency plan for areas of unexpected contamination.

This report provides an overview of the site development proposals and discusses the remediation measures required to ensure the site is suitable for use with respect to the identified receptors. This document does not cover the geotechnical requirements for the proposed development.

1.5 Available information

The following notable documents have been used in the preparation of this report:

- » RPS Group. May 2022. Phase 1 Preliminary Geo-environmental and geotechnical Risk Assessment. Reference: 220518 R JER9536 Welcomb Street Phase 1 Preliminary Risk Assessment V1 RO.
- » RPS Group. August 2022. Phase 2 Geo-environmental and Geotechnical Site Investigation Report. Reference: JER9536 Welcomb Street Phase 2 Site Investigation Report V1 RO.

It is assumed that the reader has full knowledge of the ground conditions as detailed in the above documents.

1.6 Limitations

The report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, all of the potential environmental constraints or liabilities associated with the site may not have been revealed.

The report has been prepared for the exclusive benefit of the Client for the purpose of providing information on the remediation options for development of the site. The report contents should only be used in that context. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Hydrock has used reasonable skill, care and diligence in the design of the remediation of the site. The inherent variation in ground conditions allows only definition of the actual conditions at the locations and depths of exploratory locations at the time of the investigations. At intermediate locations, conditions can only be inferred.

Information provided by third parties has been used in good faith and is taken at face value. However, Hydrock cannot guarantee the accuracy or completeness of any information provided by others.

The Remediation Strategy and Verification Plan has been carried out in general accordance with Environment Agency guidance Land Contamination Risk Management (LCRM), (EA, 2023). Other relevant guidance that has been cross-referenced is indicated in the report text.

This report is subject to review and approval by the regulators as per Planning Condition 5.

2. Site description and Conceptual Site Model

2.1 Site location

The site is located off Welcomb Street, Openshaw, Manchester M11 2NJ. The National Grid Reference of the approximate centre of the site is 387929, 397226. The existing site layout is shown in Figure 2-1 below.

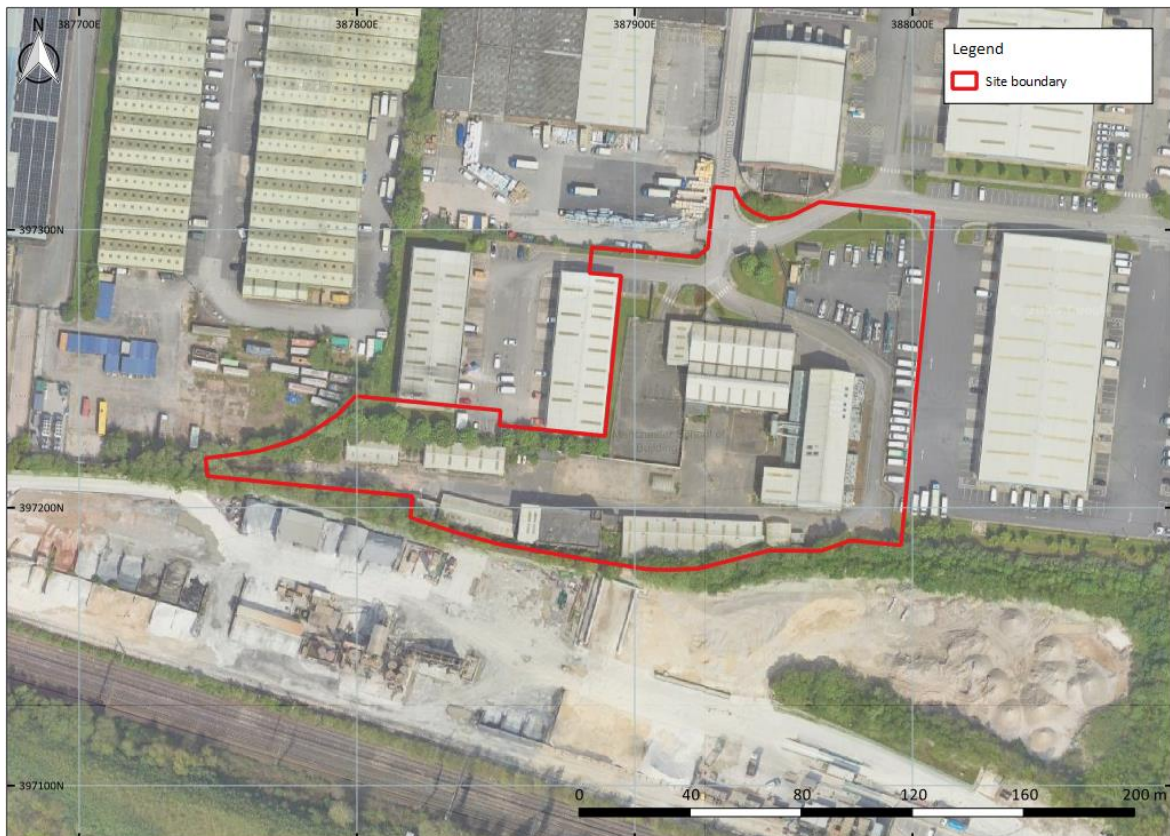


Figure 2-1: Site location plan (Google © 2025)

2.2 Site description

The site comprises a former business/light industrial park with associated access road and car parking. At the time of the works completed by RPS, the site was vacant, excluding the car park in the north west of the site which serviced the wider business park and was occupied by two adjoining light industrial units in the east of the site and a row of smaller units along the southern site border.

The site is mainly flat lying at an approximate elevation of 62m OD. There is a large embankment on the southern perimeter of the site sloping steeply down towards the site. Brick retaining walls are present along the southern boundary. The majority of the site is covered with hard standing with some small areas of soft landscaping in the north east of the site and overgrown vegetated area in the west of the site.

The site is within an industrial area with commercial units to the north of the site, a business park to the east, asphalt plant and aggregates suppliers to the south and a bus graveyard and asphalt plant to the west.

Historically the site has been part of the adjacent engineering works with auxiliary buildings and railway networks and tanks present from the late 1800s until 1938. After a vacancy between 1938 and c.1950 the site continued as before for the adjacent foundry. by 2010 the site was reconfigured for light industry/commercial use. In December 2024 all buildings were demolished with stockpiles of processed demolition material remain on site for re-use in the site redevelopment.

2.3 Summary of Conceptual Site Model

As part of the Phase 1 Desk Study, RPS group identified the following source-pathway-receptor 'contaminate linkages' at the site:

2.3.1 *Potential on-site sources of contamination*

- » Made ground associated with previous construction and demolition and infilled ground beneath the site containing contaminants of potential concern and/or ground gas.
- » Leakage and spillages of hydrocarbons from oil cans and jerry cans located in the service yard in the south east of the site, along with historical refuelling activities.
- » PCBs from electrical sub stations on site.
- » Historical railway sidings.
- » Leakage of contaminants from historical tanks on site, specifically along the southern site boundary.

2.3.2 *Potential off-site sources of contamination*

- » Asphalt plant located approximately 125m south west of the site.
- » Made ground associated with historical railway sidings, inspection pits and clay pits the south and north east of the site.

2.3.3 *Potential pathways*

The following potential pathways were identified:

- » Ingestion, skin contact, inhalation of dust and outdoor air by people.
- » Leaching of mobile contaminants through unsaturated zone into groundwater.

2.3.4 *Potential receptors*

The following potential receptors were identified:

- » People (neighbours, site end users).
- » Groundwater: Principal aquifer status of the Chester Formation)

2.4 Ground model

The ground conditions as proven by RPS ground investigations undertaken to date are summarised in

Table 2.1 below.

Table 2.1: Summary of ground conditions encountered in previous GI

Stratum	Depth to top (mbgl)	Thickness (range) (mbgl)
Asphalt	0.00	0.05 - 0.10
Concrete	0.00	0.25
Made Ground	0.00 - 0.30	1.20 - 3.55 (where proven)
Glacial Till	1.20 - 3.60	7.90 - 9.00 (where proven)
Chester Formation	10.50 - 12.20	Not fully penetrated in any location

2.4.1 Made Ground

Made Ground was generally present beneath tarmac and concrete, ranging in thickness from approximately 1.20m to 3.55m, where proven. It is noted that in some areas of the site the full thickness of the Made Ground was not proven and as such may extend to greater depths. Significant in-ground obstructions were also encountered which prevented full penetration of the Made Ground.

The Made Ground was variable in nature, generally consisting of a granular upper layer predominantly comprising historical building and industry materials including pottery, clinker, ash and coal, and a lower cohesive layer comprising reworked Glacial Till, featuring a small proportion of anthropogenic materials.

2.4.2 Glacial Till

Glacial Till was encountered underlying Made Ground in all locations where Made Ground was fully penetrated. The top of the stratum ranged from approximately 1.20m to 3.60m bgl (58.84m to 56.35m AOD). The thickness of the stratum ranged from approximately 7.90m to 9.00m.

The Glacial Till was variable in nature, but generally comprised a firm to stiff brown mottled grey slightly gravelly clay. The gravel was well rounded to sub-rounded, fine to medium of mudstone, sandstone, quartzite and occasionally coal. The stratum occasionally featured thin bands of dark grey silt and relic plant rootlets.

2.4.3 Chester Formation

The Chester Formation was encountered beneath the Glacial Till at depths ranging from approximately 10.50m to 12.00m bgl (59.99m to 57.52m AOD).

The Chester Formation was recovered as a fine to coarse red sand or sandy sub-angular to very angular gravel of sandstone, occasionally conglomerate, indicating an extremely weak to weak, highly to completely weathered red fine-grained sandstone.

2.5 Hydrology and hydrogeology

The Glacial Till is classified as a Secondary Undifferentiated aquifer and is considered to represent an impermeable barrier to the underlying principal aquifer of the Chester Formation. There are no

licensed groundwater abstractions within 1km of the site and the site is not within a designated groundwater Source Protection Zone.

Groundwater monitoring undertaken as part of the site investigation by RPS indicated that there is limited shallow groundwater within the Made Ground and Glacial Till. The deeper groundwater body within the Chester Formation shows the hydraulic gradient falling from east to west.

No groundwater was encountered during the site investigation and limited samples were collected and tested throughout the subsequent monitoring period.

Ground gas monitoring was undertaken on six occasions over a period of 6 weeks. During the monitoring visits methane was not recorded at detectable concentrations in any monitoring well on any visit. Carbon dioxide was recorded at a maximum concentration of 11.1% on one occasion within a well screened for Made Ground. Throughout the monitoring period the maximum recorded peak ground gas flow rate was 0.1L/hr, in all monitoring wells.

2.6 Outcome of risk assessments

2.6.1 Human health risk assessment

The conclusions from the RPS human health assessment are as follows:

- » Polycyclic aromatic hydrocarbons (PAHs) (benzo(a)anthracene, benzo(a)pyrene, dibenz(a,h)anthrene and benzo(b)fluorathene) and lead in samples of Made Ground were above their generic assessment criteria (GAC) for commercial land use and were assessed as potentially presenting a risk to end users. Analysis of the PAH ratios indicates these contaminants are representative of a coal source, which is consistent with observations of coal and charcoal in the logs at the depths the samples were collected. The ground investigation logs indicate that these coal containing soils represent discrete layers which could be segregated.
- » Asbestos fibres and/or Asbestos Containing Materials (ACMs) were identified within samples of Made Ground.
- » Organic matter (OM) percentages in samples of Made Ground across the site were generally between 2.3% and 17.8% with one sample containing 92.9%. Whilst the average results are high (>5%) it is assumed that the samples from WS05a of 92.9% OM is an outlier due to possible presence of coal in the sample.
- » RPS concluded that no potentially volatile compounds were detected at concentrations considered to represent a potential risk to the future site. However, Hydrock notes that within WS02a, trichloroethene (TCE) was detected at a concentration of >2,571 µg/kg in soils sampled at 0.7 to 0.8m. This concentration, which is a minimum value, possibly exceeds RPS's commercial GAC of 2,600 µg/kg and does exceed Hydrock's GAC of 1,500 µg/kg for the same scenario. As this location is nearby to the former tanks in the south of the site it is considered possible that a localised area of TCE contamination may exist in that area which may pose a vapour risk, particularly in Unit 2. Refer to Figure 2-2 and Figure 2-3 below for the location.

The contaminant linkages identified are summarised below in Table 2.2.

2.6.2 Controlled waters risk assessment

The conclusions from the RPS controlled waters assessment are as follows:

- » No contaminants of potential concern (CoPC) were recorded within groundwater samples at concentrations above the relevant assessment criteria.

- » Due to the limited samples collected and tested, leachate analysis was undertaken on two samples of Made Ground and recorded exceedances of chromium and a number of speciated PAHs.

The contaminant linkages identified are summarised below in Table 2.2.

2.6.3 *Ground Gas risk assessment*

The risk from ground gas has been assessed in Hydrock Technical Design Note Ref 22975-HYD-XX-XX-RP-GE-0001 and summarises the following:

- » No significant sources with high gas generating potential were identified on site and this was confirmed via ground gas monitoring;
- » It is considered the risk posed by ground gas at the site to be low;
- » RPS characterised the site as CS-2 based on slightly elevated carbon dioxide levels, which Hydrock considers to be a conservative approach given the lack of flow recorded.

The contaminant linkages identified are summarised below in Table 2.2.

2.6.4 *Updated Conceptual Site Model*

On the basis of the above, a remediation strategy for the site is required to address the issues, and specifically will need to consider:

- » Management of asbestos in Made Ground;
- » Elevated concentrations of lead and PAHs in Made Ground; and
- » Elevated concentrations of ground gas (carbon dioxide).

Following the RPS ground investigation the following sources have been removed from the updated CSM based on the findings of the ground investigation:

- » Historical railway sidings;
- » Historical engineering works and auxiliary buildings;
- » Historical off-site bleach works, garage, instrument works and engineering works; and
- » Off-site made ground and asphalt plant.

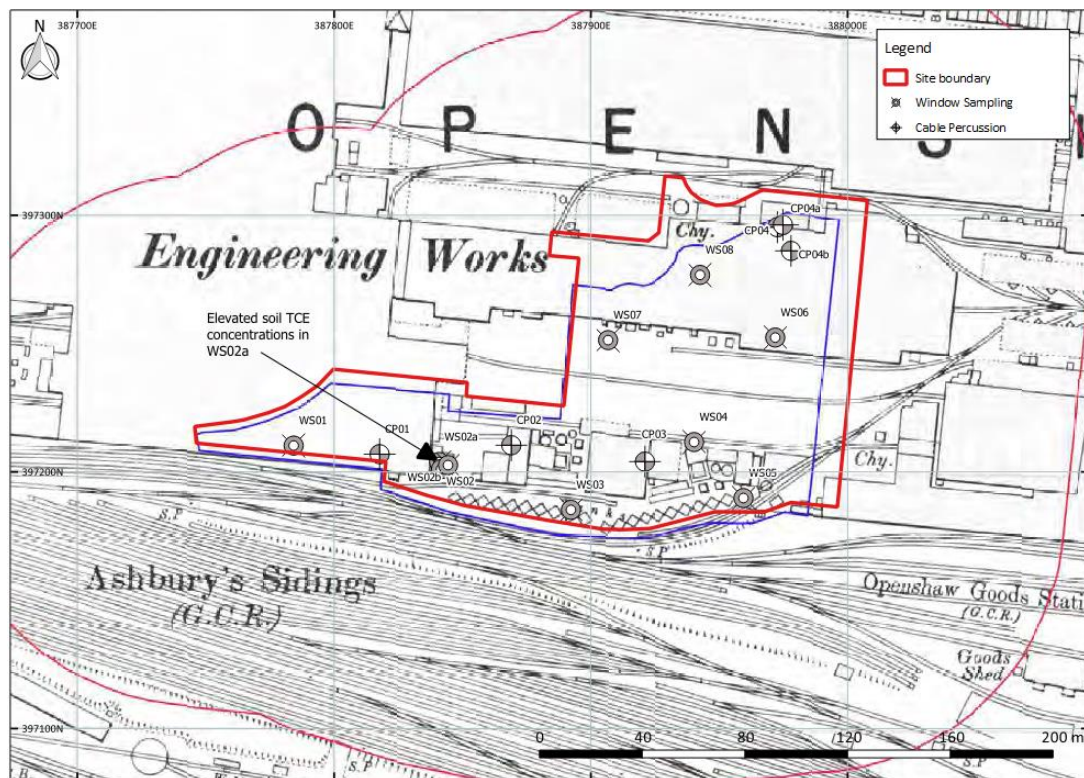


Figure 2-2: RPS borehole location plan over 1908 1:10,560 Ordnance Survey map

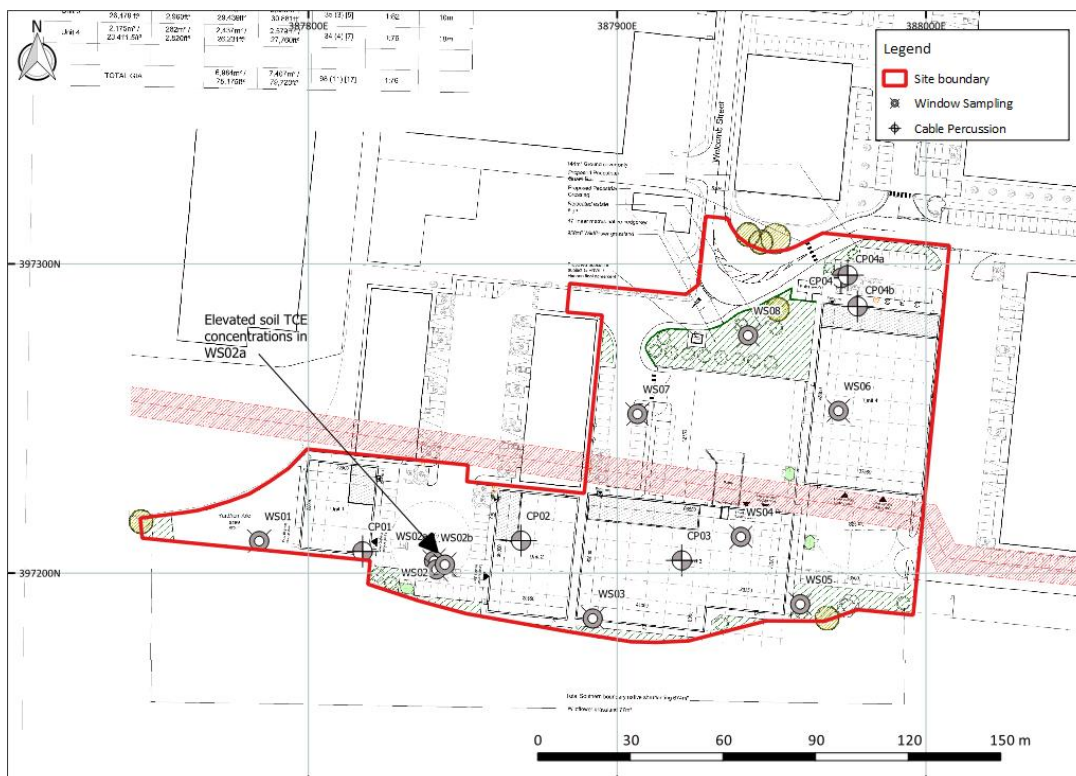


Figure 2-3: RPS borehole location plan over proposed development layout

Table 2.2: Updated Conceptual Site Model

Source	Pathway	Receptor	Qualitative Risk Rating	Comments / mitigation measures
Metals, PAHS and asbestos from Made Ground	Direct Contact/ingestion	Future site users	Low	Asbestos, lead and PAHs identified in soil samples above the commercial GAC. However, this is unlikely to pose a risk to site end users given the site will mostly be covered by hard standing and buildings and with the exception of TCE in WS02a, no volatile contaminants exceeded the GAC which may otherwise pose a risk via vapour inhalation. Mitigation will be required in areas of soft landscaping.
	Leaching of mobile contaminants	Principal aquifer of the Chester Formation	Low	Significant thickness of impermeable Glacial Till beneath the Made Ground will mitigate vertical migration to the more sensitive aquifer within the Chester Formation. Presence of hard standing across the site post development will rainfall infiltration into the shallow soils on site. Piled foundations are not proposed for the development which may otherwise create pathways to the underlying Chester Formation Principal aquifer.
Electrical sub-stations	Direct contact/ ingestion	Future site users	Low	No volatile contamination exceedances recorded. The electrical substations will remain in situ.

Source	Pathway	Receptor	Qualitative Risk Rating	Comments / mitigation measures
Possible spillages and leakages of hydrocarbons from historical and current underground tanks	Direct contact/ ingestion	Future site users	Low	No free phase contamination was observed and no visual or olfactory evidence of hydrocarbon contamination identified during the Phase 2 ground investigation. However, note TCE contamination was detected within WS02a above.
Ground gas	Inhalation/ Migration through construction gaps	Future site users	Low/moderate	CS-2 conditions apply. Mitigation required in the form of basic gas protection measures.

3. Remediation Strategy

3.1 Introduction

The following section of this report is to outline the remediation strategy which will be applied in order to achieve a site which is suitable for the proposed development.

The objectives of the remediation works are to:

- » Break the linkage between the contamination in soils and future site users (including users of neighbouring properties);
- » Demonstrate that the remediation is a sustainable approach;
- » Avoid unacceptable environmental impacts, health and safety issues and minimise long term liabilities associated with the remedial approach;
- » Avoid the requirement for long term monitoring or maintenance; and
- » Complete the remediation within the programme timescale of the development.

The Remediation Strategy and Verification Plan detailed in the following sections is based on Stage 3: Remediation and Verification of LCRM, specifically the development of a remediation strategy (Step 1).

The remediation strategy is generally structured as follows:

- » Summarising the key remediation criteria, including the derivation of Remedial Target Values (where applicable).
- » Summarising the remediation stages and their implementation.
- » Summarising the regulatory controls that need to be in place.
- » Detailing the monitoring requirements.
- » Detailing how the remediation will be verified.
- » Contingency planning and unexpected contamination.

3.2 Remediation requirements

The conceptual site model has identified that the risks to human health at the site can be mitigated by use of a cover system, which will break the exposure pathway, and ground gas protection will be required within buildings. It is proposed to re-use site won soils within the site earthworks. The soils will be placed below hard surfacing and will need to be tested to demonstrate that they meet risk based geochemical remediation criteria (see Section 3.3). Furthermore, in the small area of soft landscaping proposed in the north of the site, a clean cover system will be required.

The main elements of this remediation therefore comprise:

- » Delineation of TCE contamination in the area around WS02a, risk assessment and develop mitigation as needed.
- » Ground gas protection measures in all buildings in line with the requirements of CS-2 (as set out in BS8485:2015+A1:2019).
- » Chemical validation of soils reused within site earthworks and clean cover system installed within soft landscaping areas.

Further details of the proposed ground gas mitigation are included in Section 4.2.1 and the clean cover system are presented in Section 4.2.2.

3.3 Remediation criteria

Remediation criteria are required to demonstrate and verify the performance of the remediation. In accordance with LCRM these can be both numerical (for example model-derived concentration values) and/or qualitative/descriptive (for example “the removal of all visually contaminated material”).

Materials re-used or imported to site shall comply with the following:

- » Meet the site-specific remedial target values (RTVs) presented in Appendix C.
- » no visual or olfactory contamination (oil staining, odours etc.);
- » limited deleterious material (organics, wood, metal etc.), in accordance with any geotechnical specification;
- » no visible asbestos containing material (ACM); and
- » asbestos fibres content <0.1%.

The Contractor will need to have an experienced Geo-environmental Engineer or Consultant present during excavation, to inspect for suspect material and oversee effective segregation, stockpiling and verification of removal of soils. All soils that are potentially impacted with contamination shall be stored in a manner to protect the site surface and therefore end users such as placing on a low permeability membrane and preventing run off and leaching by covering the stockpile.

3.4 Summary of remedial target values

The proposed RTVs and justifications described above are summarised in Table 3.1 below.

Table 3.1: Proposed remedial target values

Contaminant	Proposed reuse criteria (mg/kg)	Justification (commercial GAC unless noted)
Arsenic	640	
Beryllium	12	
Boron	240,000	
Cadmium	410	
Chromium III	8400	
Chromium VI	49	
Copper	68,000	
Lead	2,300	
Inorganic mercury	5,100	
Nickel	980	
Selenium	12,000	
Vanadium	9000	

Contaminant	Proposed reuse criteria (mg/kg)	Justification (commercial GAC unless noted)
Zinc	730,000	
Free cyanide	24	
Total phenols (monohydric)	440	
Benzo[a]pyrene	25	See note 1
Benz(a)anthracene	35	See note 1
Benzo(b)fluoranthene	37	See note 1
Chrysene	28	See note 1
Dibenz(ah)anthracene	3.5	
Sum of 16 PAHs	500	
Total TPH	500	See note 2
Trichloroethene (TCE)	1.5	
Asbestos	No visible ACM. Quantitative concentrations <0.001%wt/wt	

¹ Mean of recorded site concentrations where this is lower than the commercial land use GAC.

² A limit of **500mg/kg** has been applied to prevent odorous or visually oily material being reused. This is in essence an empirical criterion. The soil saturation limit has been rejected as an appropriate criterion in this case as the soil saturation limits for TPH fractions tend to be unnecessarily low. This applies to the summation of all TPH fractions, not to the fractions individually. **This value can be revisited if it can be demonstrated that site-won soil with higher concentrations is equally suitable.**

3.5 Implementation phases

It is envisaged that the remediation will be undertaken in the following phases as part of the wider project:

3.5.1 Enabling works

The following works are considered necessary during the enabling works phase and are discussed in more detail in Section 5:

- » Delineation in the area of WS02a to confirm the TCE concentrations present in soils during the earthworks in that area.
- » Excavation of relic foundations and floor slabs.
- » Excavation to a depth of around 0.5m to 1m, but up to 2m to remove obstructions and backfill with site won materials to achieve formation levels and in accordance with the earthworks strategy;
- » Crushing and screening of concrete and brick prior to re-use as a general fill.

- » Removal of relic underground infrastructure (e.g. redundant drainage).
- » Off-site disposal of unsuitable waste materials.
- » Installation of a piling mat.
- » Ground improvement by vibro stone columns (VSC).

3.5.2 *Construction phase*

The following works are considered necessary during the construction phase and are discussed in more detail in Section 5:

- » Installation of ground gas protection measures.
- » Installation of the clean cover system.

3.6 *Other considerations*

3.6.1 *Management of asbestos containing materials*

Asbestos fibres were identified across the site during testing of samples of Made Ground soils. The potential exists for discovery of and exposure to ACM and asbestos fibres during any stage of works. Such discoveries will require agreed management and action protocols to be adopted where suspected ACM is identified to ensure proper management and control of impacted volumes.

The Principal Contractor shall have in place at the start of the contract, work procedures designed to ensure they are working in full compliance of all Health and Safety requirements (including, but not exclusively CAR 2012 and CAR soils) and that the control measures are sufficiently robust to prevent release of airborne asbestos fibres into the surrounding environment. Appropriate PPE, and if required RPE, shall be provided and utilised.

There is the potential for asbestos to be encountered during all phases of development and it is important that the control measures in place are sufficiently robust to prevent release of airborne asbestos fibres into the surrounding environment.

If asbestos is encountered the Contractor shall comply with all Health and Safety requirements (including, but not exclusively CAR 2012).

The Principal Contractor must manage the risks in accordance with their legal requirements and will need to prepare appropriate health and safety documentation and obtain appropriate approvals, licences, consents and permits prior to commencement.

Prior to commencing ground works, the Contractor shall ensure a detailed Method Statement and Risk Assessment, and any other necessary information, are written and submitted to Network Space for approval. It will be the responsibility of the Contractor to ensure that the methods adopted for the removal of the asbestos is of a standard acceptable to the Health & Safety Executive (HSE) and in accordance with relevant guidance and legislation.

4. Implementation

The anticipated stages of work required to implement the remediation strategy are detailed below. The Contractor will be required to prepare a Detailed Remediation Method Statement to address, in detail, the design and working methods by which the requirements of this strategy will be implemented. The details below are therefore interim and indicative only, and are subject to confirmation by the appointed Contractor. The stages of work have been split into an enabling works phase and construction phase to indicate at what stage in the wider site programme the stages in the remediation scope are expected to be implemented.

4.1 Enabling Works

The anticipated stages of the remediation during the enabling works phase are detailed below.

4.1.1 *Delineation of TCE contamination*

A sample of made ground collected from WS02a, which is located in the area of former tanks in the south of the site, recorded concentrations of TCE which are > 2,571 ug/kg and therefore potentially exceed the GAC for a commercial land use scenario. Additional delineation and chemical analysis is recommended to confirm the concentrations present to determine whether it will be possible to re-use soils from within this area as part of the earthworks without treatment, whether the material can remain in situ without posing a risk via vapour intrusion, and confirm the waste classification should the material require disposal offsite.

It is recommended that initially a series of nine trial pits are excavated within a 40m radius of WS02a to allow collection of samples of made ground in the uppermost 2m. As shown in Figure 4-1, two of the trial pits are to be located adjacent to WS02a in a cross pattern. These trial pits are proposed to be approximately 10m x 1m and will allow samples of soils arising to be collected and where appropriate samples along the base and side walls. These works will need to be undertaken/ supervised by an geoenvironmental consultant experienced in ground investigation to BS10175: +A2:2017 and contamination delineation.

All excavated soils are to be screened with a PID to assist with identification of samples for lab testing. A minimum of 3 samples will be tested from each location and sampling will consist of volatile organic compounds (VOC) with selected samples also tested for metals, inorganics, speciated TPH CWG, and PAH (US EPA Priority 16) to allow for waste classification, and WAC testing. Indicative sample locations are shown in Figure 4-1 below.

The results of the TCE analysis (and any other VOCs detected) should be compared to appropriate commercial GAC and assessed to determine the risk posed by these contaminants to allow for an appropriate strategy to be developed and implemented to mitigate the risk.

During earthworks in this area, excavated materials will be inspected by an experienced geoenvironmental consultant. Selected samples of soils will be screened using a PID. Testing for TCE will be undertaken as appropriate if visual, olfactory evidence of contamination is encountered. The lab results for these samples will need to be compared to the validation criteria in Table 7.2 to identify whether the material can be re-used or will require additional risk assessment, treatment prior to re-use or offsite disposal.

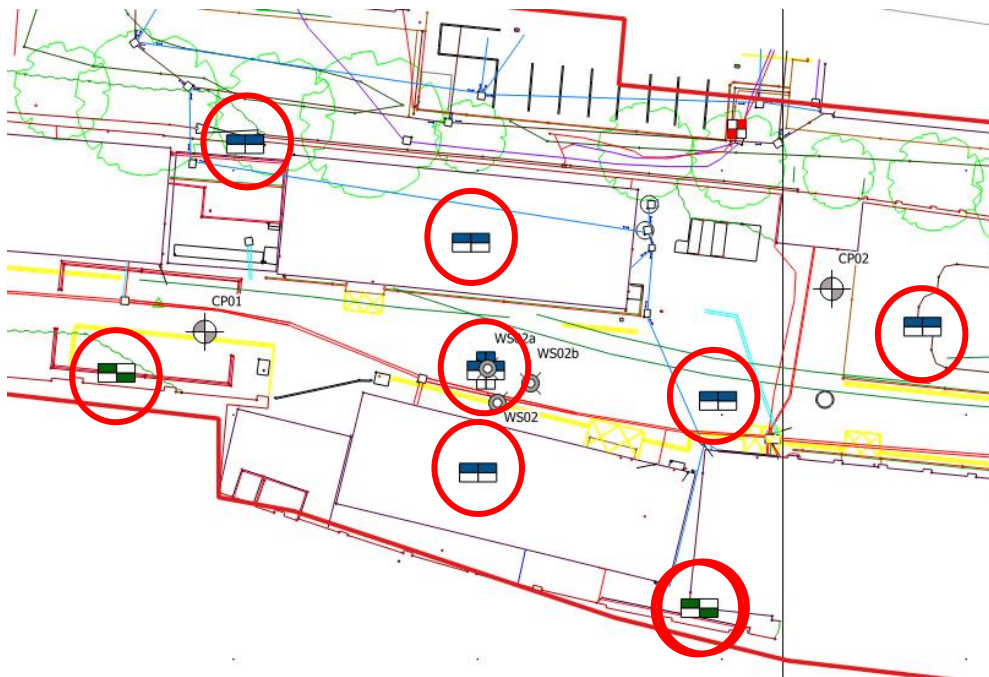


Figure 4-1: Indicative TCE delineation sampling location (trial pits highlighted in red circles).

4.1.2 Removal of relic underground structures

The Contractor is to remove all relic underground structures as specified in the enabling works contract, including but not limited to, hardstanding, foundations, slabs, historical services, inspections pits, obstructions, etc.

The recovery of suitable material for crushing/reuse should be undertaken in accordance with the EA/WRAP Quality Protocol for recycled aggregates and/or the site-specific Earthworks Specification. All broken up materials shall be segregated and stockpiled within an approved working area of the site, and the crushing and screening should be undertaken to achieve a suitable capping class for reuse.

Where unforeseen contamination is encountered upon breaking out of the near surface layers, including, but not limited to, visual ACM above occasional/random fragments or significant contamination not previously encountered during ground investigation, works should stop within this part of the site and the guidance provided in Appendix B on unexpected/unforeseen contamination is to be followed.

The Contractor is to ensure that the contents of any pipes or relic structures are assessed prior to disturbance to avoid the uncontrolled release of contaminants (which could include but not limited to, asbestos fibres, light non aqueous phase liquids (LNAPL), chlorinated solvents, petroleum hydrocarbons, etc.). If significantly impacted materials are recorded during excavation, over and above what is anticipated, then these materials should be segregated and stockpiled separately for testing prior to their reuse, if determined to be suitable.

4.1.3 Other considerations

4.1.3.1 Supervision

The Contractor is to provide appropriate supervision at all times during excavation works to ensure that materials are appropriately segregated and classified. Therefore, excavation works are to be

undertaken under a full-time watching brief by a suitably qualified and experienced Geo-environmental Engineer or Consultant.

4.1.3.2 *Earthworks and reinstatement of excavations*

The reinstatement of excavations as part of the earthworks is to be undertaken in accordance with an Earthworks Specification that details the methodology for placement of fill and should also detail associated geotechnical testing and verification requirements. Chemical testing of site won soils and comparison against the import criteria presented in Appendix C will be required prior to reuse of site won soils within earthworks.

4.1.3.3 *Off-site disposal of unsuitable materials.*

The works should seek to reduce and control impacts upon the natural environment, therefore, the Contractor shall seek to reuse materials within the works, where appropriate.

However, the earthworks strategy has identified that there will be a surplus of material which shall be disposed of off-site by the Contractor. Where identified, unsuitable soils (i.e., soils which cannot be treated and/or reused in an appropriate location), or are geotechnically unsuitable for use in the earthworks, shall be disposed of off-site by the Contractor.

If a material does not comply with the relevant criteria for its intended use (e.g., reinstatement of excavations in line with reuse criteria, clean cover system, etc.), then, by definition, the material is not suitable for use.

Given that the soils with elevated PAH and organic matter are expected to form discrete layers efforts should be made to segregate this material during excavation works. This will allow the for material to be processed to remove organic rich material, or sampled and tested prior to re-use/ to determine the waste classification prior to offsite disposal.

All waste materials generated during the works shall be dealt with in full compliance with the statutory Duty of Care as defined by the Environmental Protection Act (1990) and all subsequent amendments. The Contractor shall be the waste producer and is responsible for the production of all documentation required under relevant legislation, ensuring this is kept up to date and is available on-site for inspection.

Further details on the disposal of unsuitable materials, and a preliminary waste classification of the soils recorded on-site, is presented in Section 6.4.

4.1.3.4 *Permitting*

To undertake treatment of soils and contaminated material, a Contractor must hold a Standard Rules Permit SR2008 No27 (or a bespoke mobile plant permit). The permit allows the use of certain technologies and associated plant for the purpose of remedial action.

Before the Contractor can use their mobile plant permit, they must also complete a site-specific deployment form and send it to the EA, along with the necessary additional information. Guidance is available on the gov.uk website for completing the deployment form and it states that the Contractor must allow at least 25 working days from the time they send in the completed form for the EA to assess their application. In addition, once the deployment form is approved the Contractor must then inform the EA at least 7 days in advance of the works starting, including the mobilisation of plant to site.

The Contractor is to ensure that sufficient time is allowed for to ensure the correct permits are in place and any comments are fully addressed in advance of the works.

There is an exemption for Standard Rules Permit SR2008 No27 if certain conditions apply, notably:

- » The exemption can only be used once in a 3-year period for an individual site;
- » The treatment is not for disposal; and
- » The specified volumes of contaminated soils and groundwater treated at any site must not exceed 1,000 m³.

4.1.3.5 *Dewatering*

It is considered unlikely that groundwater pumping will be required to facilitate the construction, however, if required then any groundwater pumped will likely need to be treated prior to discharge. Any short-term dewatering of strata using boreholes or wells to enable construction must now have an abstraction licence following changes to Environment Agency guidance in November 2024.

4.1.3.6 *Unexpected contamination*

Whilst ground investigation has been undertaken by RPS, there is a possibility for encountering unexpected contamination, such as past fuel spills, buried tanks, contaminated surface water drainage. A strategy will need to be developed for dealing with such instances as set out in Appendix B.

4.2 *Construction phase*

The anticipated stages of the remediation during the construction phase are detailed below.

4.2.1 *Installation of ground gas protection measures*

The site has been classified as CS2 in accordance with BS8485:2015+A1:2019. In accordance with BS 8485:2015 the ground floor entrance lobbies, stairs and welfare areas (Type C Building) require a minimum gas protection score of 2.5 points; the main warehouse (Type D Building) requires a minimum gas protection score of 1.5 points.

The proposals to achieve the required gas protection score in all areas of the units are as follows:

- » Cast in situ ground floor slab (with nominal reinforcement) – 0.5 points
- » Gas resistant membrane meeting all the criteria of Table 7 BS8484:2015+A:2019 – 2.0 points.

If installed correctly and accordance with relevant guidance and the manufacturer's instructions, these measures provide a gas protection score of 2.5 points and would achieve the necessary level of protection.

Depending on the outcome of the TCE delineation work, subsequent risk assessment, and the strategy to deal with TCE impacted soils (if present), it may be necessary to install a membrane that limits the permeation of TCE vapours to mitigate the risk posed by this contaminant.

A detailed gas protection design report will be required in accordance with BS8585:2015+A1:2019 Sections 7.4 and 8.3 prior to membrane installation. Additional vapour permeability calculations may be required should the membrane be needed to mitigate TCE vapour ingress as well as carbon dioxide.

4.2.2 Installation of the cover system

A clean cover system is required for areas of soft landscaping. The cover system should be designed and validated in accordance with NCLOG, 2024. The general principles for the cover system design are:

- » Building footprints as per the structural design (by others): the floor slab will break the linkage between the soils and potential receptors
- » Areas of hardstanding (roads, pavements, etc.) as per the design (by others): the hardstanding will break the linkage between the soils and potential receptors.
- » Soft landscaped areas 300 mm clean cover system to reach final ground level with clean soils complying with the import criteria presented in Appendix C.

Where hardstanding is present, this is considered to have suitably severed the pathway from underlying contamination to future users. The design thickness of the hardstanding (e.g., concrete or asphaltic material, and not loose gravel or shingle at surface) and the underlying subbase should be of the required thicknesses for the construction build ups.

A clean cover system shall be installed in all soft landscaping areas across areas of public open space in accordance with NCLOG guidance.

The clean cover system is to comprise (from base up):

- » A suitable basal geo-fabric separation layer; and
- » A minimum 300 mm combined thickness of topsoil and subsoil (minimum 150mm topsoil).

The clean cover system installation should be undertaken in the following steps:

1. Check the elevation of the formation level to ensure that it is at the correct level and allows for the placement of the full required thickness of the clean cover system.
2. Install the basal geo-fabric separation layer.
3. Place the required thickness of topsoil and subsoil as detailed above (of which a minimum 150 mm is to be topsoil).

Chemical testing of the soils against the import criteria presented in Appendix C is to be undertaken to ensure that the clean cover is suitable for use. The soils should also comply with any additional criteria stipulated by the landscape architect. It is recommended that the Contractor also samples and analyses the materials prior to placement to avoid the requirement for abortive works and removal of such materials.

For areas of proposed trees, the depth of growing medium will be deeper and tree pits will need to be excavated as per the requirements of an arboriculturist and/or landscape architect.

The clean cover systems shall also give consideration to their permeability and the consequential impact upon both the surface runoff. This principally relates to their composition (e.g., granular, cohesive or composite).

Soils used as part of the clean cover system should be free of asbestos and significant quantities of anthropogenic materials (e.g., brick, concrete, etc.) or other potentially hazardous foreign material which could cause injury. In addition, all materials must be free from aggressive / invasive weeds (especially Japanese Knotweed and Giant Hogweed) and bulk vegetative growth, in order to ensure negligible risk of subsequent weed problems.

Verification of the installed thicknesses and the chemical quality of the soils should be completed in public open space. The full construction phase verification requirements are detailed in Section 5.2

All soils moved and placed as part of the clean cover system need to be transported and stored with care to prevent cross contamination. This is to include, but not be limited to, the following:

- » The stockpiling of soils on a geotextile separator layer.
- » Using dedicated plant to move the cover system soils, or washing plant thoroughly before use to move cover system soils.
- » Minimising tracking over contaminated soils.
- » Separating clean and dirty areas of the site.
- » Placing the soils into the final position and not pushing soils across the surface.

Due to the lack of a clean growing medium on-site, it is anticipated that the topsoil to be used within clean cover systems will require import. The clean cover soils are to comply with the import criteria presented in Appendix C. It is recommended that the topsoil is tested and demonstrated to meet the criteria prior to import.

If clean naturally occurring site-won soils are used within the cover system, they similarly need to comply with the criteria presented in Appendix C. For clarity, treated materials should not be used as part of clean cover systems.

To protect future maintenance workers, the use of clean service corridors may be required for underground services that are to be excavated beneath the formation level (in effect below the enabling works level). The earthworks strategy aims to maximise on-site reuse of excavated materials to create the development platform, therefore, site-won Made Ground and treated soils will be placed below the formation level during the earthworks.

5. Verification and reporting

The remediation works presented in this document need verification such that the regulating bodies can be satisfied that the strategy has been fully complied with, and ultimately, such that any associated planning conditions relating to land quality can be discharged. The verification process is also required to provide a permanent record of the remedial works undertaken at the site. The sections below summarise the various activities requiring verification and also comment upon the verification reporting process.

The following remediation works require verification:

Enabling works:

- » Delineation in the area of WSO2a to confirm the TCE concentrations present in the soils in that area, confirm the level of risk posed by these soils and develop appropriate mitigation measures.
- » Removal of relic underground structures.
- » Validation that soils re-used within earthworks meet the chemical re-use criteria
- » Off-site disposal of unsuitable waste materials.

Construction phase:

- » Installation of ground gas protection measures.
- » Installation of the cover system

Verification visits shall be made by a suitably experienced and qualified independent Geo-environmental Engineer or Consultant who shall undertake the necessary works outlined below.

5.1 Enabling works verification

Upon completion of the enabling works, the supporting evidence demonstrating that the remediation objectives and criteria have been met is to be compiled into an Enabling Works Verification Report that meets the reporting requirements set out in LCRM (EA, 2023).

The verification report should be prepared using a multiple line of evidence approach to demonstrate the successful implementation, and should include the following information as a minimum:

- » A general description of the remediation works completed.
- » Records of relic underground structure encountered and removed, including location within the site and at the site boundary.
- » Details of all excavated material classifications, including site location, excavation extents and volumes.
- » The volumes of excavated materials reused within earthworks (either with or without treatment).
- » Details of all imported material classifications and volumes.
- » Results of all chemical testing, including both excavated and imported materials.
- » Details of the final placement of materials.
- » Details of the materials sentenced for off-site disposal, including waste classification, volumes and final disposal location.
- » Results of all WAC testing to support off-site disposal.

- » All waste management documentation for the materials disposed of off-site.
- » Records of stockpiled materials.
- » Details of any discharge consents required as part of the works, including chemical testing and volumes discharged.
- » Details of required permits and compliance with permit conditions.
- » Details of any alterations and amendments made to the Remediation Strategy.
- » Details of any contingencies undertaken during the works, notably any unexpected contamination or identification of additional sources (e.g., unexpected underground tanks).
- » Details of correspondence with the regulatory authorities during the works.
- » Details of correspondence with relevant stakeholders.
- » Description of the final condition of the site at completion.
- » As-built drawings showing surveyed levels of base of temporary excavations, temporary sides of excavations and positions of samples and tests carried out.
- » As-built drawings showing surveyed formation levels and positions of any samples and tests carried out at formation level.

5.2 Construction phase verification

5.2.1 Ground gas protection measures

Validation of the gas membrane installation in accordance with CIRIA C735 is recommended to ensure that the performance of the membrane meets the requirements set out in Table 7 of BS8485:2015+A:2019, in particular the jointing of membranes and where utilities penetrate the floor slabs.

5.2.2 Clean cover system

Cover system verification should be in accordance with NCLOG, 2024 and YALPAG, 2021 unless local regulatory guidance prevails.

The installation of the clean cover system should be verified by verification visits made by a suitably experienced and qualified independent Geo-environmental Engineer or Consultant who should undertake a visual inspection of the installation and take samples for laboratory testing. This should be carried out at a minimum rate of 1 verification trial pit for every 500 m² of public open space to verify the presence of the basal geofabric and the thickness of clean cover (with photographs), and collect samples of both topsoil and subsoil for chemical analysis.

Verification trial pits will be excavated at random locations as designated by the nominated verifier. This will take the form of a photograph with scale marker and accompanying photographic board detailing the measured clean cover system thickness.

The topsoil and subsoil samples should be analysed for compliance with the import criteria presented Appendix C.

It is recommended that the Contractor also samples and analyses the materials prior to placement to avoid the requirement for abortive works and removal of such materials. The soils should also comply with any criteria stipulated by the landscape architect.

If the clean cover system is deemed to be insufficient, the Contractor will be informed. In instances where the soil thicknesses are measured to be inadequate, following the addition of further soil, the

verification pits will be re-excavated to confirm that a sufficient thickness of soil is now present. Verification of the clean cover system will only be carried out on areas where the cover system has been completed to finished surface level across the area of public open space.

The cover system verification documentation should include:

- » The source of imported materials (topsoil), with accompanying desk study report if not from a greenfield source.
- » The presence of a suitable basal geofabric separation layer.
- » The clean cover system thicknesses, including photographs of the verification pits with a scaled marker;
- » The chemical test results for the samples of topsoil and subsoil*.
- » Comparison of the topsoil and subsoil samples against the import criteria presented in Appendix C.

Soil samples may be taken from stockpiles prior to placement in the clean cover system (this will require confirmation during verification that the placed materials are visually/physically consistent with those tested) or the samples are to be taken in situ once the clean cover system has been placed.

6. Materials management

The materials management strategy currently comprises maximising on-site reuse of excavated materials including recent processed demolition materials, and minimising off-site disposal and import as far as reasonably practicable.

The reuse and imported of site-won soils on-site, should be managed in accordance with a Materials Management Plan (MMP) that is prepared in accordance with 'The Definition of Waste: Development Industry Code of Practice', Version 2 (CL:AIRE, 2011) (the 'DoWCoP'). The Materials Management Plan will need to be signed off and Declared with CL:AIRE by a Qualified Person prior to commencing the earthworks. It should be noted that Version 3 of the DoWCoP is undergoing preliminary consultation, and recommendations within this report with regard to waste and re-use of soils will require review when the DoWCoP Version 3 is adopted. It is unknown at this stage whether MMPs for which a declaration has been accepted under version 2 will be impacted by changes in version 3.

6.1 Reuse of site-won soils

The general reuse criteria for site-won materials are presented in Appendix C.

The proposed criteria are all based on Generic Assessment Criteria (GAC) for a commercial land use scenario. These criteria are to initially act as a trigger value to ensure further consideration (if exceeded) of where the site-won material proposed for reuse is to be placed as part of the materials management strategy. An exceedance does not necessarily mean that the site-won material cannot be reused on-site, however, this may need to be beneath cover, buildings or hardstanding for example. Therefore, further consideration is required.

Chemical testing should be undertaken on site won materials using a sampling frequency of 1 sample per 150m³ of soil, with a minimum of 3 samples per stockpile.

Site won asphalt should not be reused due to potential presence of coal tar, see section 6.4 for further detail on disposal of hazardous materials.

6.2 Sourcing of imported materials

Due to the lack of a clean growing medium on-site, it is anticipated that the topsoil and subsoil used within the soft landscaping area clean cover systems will require import. The clean cover soils are to comply with the criteria presented in Appendix C.

Every effort should be made to ensure soils to be imported are accompanied by proof of provenance to demonstrate that there is no potential for the soils to have been contaminated as a result of past land uses or in the process of their creation, if a manufactured material. This information should be obtained in advance of the import on to site.

Chemical testing should be undertaken on the materials at source and prior to despatch to the site at a frequency of 1 sample per 150 m³ of soil with a minimum of 3 samples per source (topsoil and subsoil to be sampled separately).

The requirements set out in the DoWCoP for importing materials under the 'Direct Transfer' scenario are clear. For clarity, the DoWCoP requirements for direct transfer of materials from one development site to another are:

- » Material must be clean naturally occurring soils and mineral materials.

- » 'Clean' is defined as devoid of anthropogenic contamination to a degree or level that is considered harmful to living organisms (i.e. harmful is not a site-specific definition).
- » Naturally occurring materials are defined as:
 - » Soil, both topsoil and subsoil;
 - » Parent material;
 - » Clays, silts, sands and gravels;
 - » Underlying geology; and
 - » Made Ground consisting of the above materials only.

The following protocol applies to all imported soils.

- » The soil is from an identified site, which is clean and has no history of potentially contaminative uses. This should be supported by appropriate reporting, such as a Phase 1 Desk Study.
- » A map and site plan showing the location of the site and area that the soils are from (with an approximate grid reference). When checking the source site, accurate details of where on the site the soil was derived are required, not just where they were stockpiled or screened.

The imported soils are to comply with the criteria presented in Appendix C.

6.3 Stockpiling

Any materials that are proposed for reuse shall be stockpiled separately by material type. Similarly, any materials being imported to site, for example clean topsoil or construction aggregates, or material awaiting disposal off-site, shall be stockpiled separately. Stockpile management shall be undertaken in accordance with the following protocol:

- » Separate stockpiles shall be created for each material type, whether site-won or imported materials, and shall be appropriately labelled / identified on-site.
- » The Contractor shall identify all stockpiles with clear signage.
- » Stockpiles shall not be cross-contaminated, double handling shall be avoided and stockpiles shall remain quarantined until ready for use.
- » Topsoil shall not be placed during or after heavy or prolonged periods of rainfall.
- » For imported materials, copies of the carrier's Consignment Notes shall be retained on-site and made available for inspection and as part of verification reporting.
- » A record of all imported materials shall be maintained by the Contractor recording details of material type, source of the imported material and Consignment Note reference numbers. In addition, the Contractor shall record the status of each stockpile, in terms of material type, source site, volume and intended use on-site.
- » Stockpiles of significantly contaminated materials (either generated during remediation of previously identified impacts or due to encountering unexpected finds) are to be placed in lined above-ground treatment areas comprised of impermeable membranes to prevent leaching and run off of the potential contaminant(s).

6.4 Disposal of materials

The Waste Framework Directive (WFD) (2009/98/EC) defines waste as '*any substance which the holder discards or intends to discard*'. In a geo-environmental context, the waste is most often 'soil' and the two main scenarios are offsite disposal of the material as a waste and/or reuse of the material on-site. For cost and sustainability reasons, reuse is preferred to off-site disposal.

The site is brownfield and based on the site history, if suitable segregation of different types of waste is put in place, it is considered that:

- » The natural unimpacted subsoils are likely to be classified as non-hazardous waste.
- » The majority of the Made Ground soils are likely to be classified as hazardous waste.
- » Any soils containing > 0.1% asbestos fibres or visible asbestos containing materials (ACM) would be considered as hazardous.
- » Due to the history of the site, bituminous bound pavement may contain coal tar residues and should be assumed to be classified as hazardous waste unless testing demonstrates otherwise.

It should be noted that:

- » The above preliminary assessment has been made on the basis of the soils tested as part of the ground investigations undertaken to date and is only intended to provide an indication of potential waste classification. Prior to disposal, the characteristics of the actual soils to be disposed of will need testing and classification in consultation with landfill sites and waste disposal Contractors. The receiving landfill will make the final decision on the classification and acceptability of the waste.
- » Non-hazardous soils require pre-treatment (separation, sorting and screening) prior to disposal.
- » The costs for disposal of non-hazardous and hazardous soils are significant compared to disposal of inert material. Waste segregation (and especially hazardous waste) should always be undertaken where practicable.

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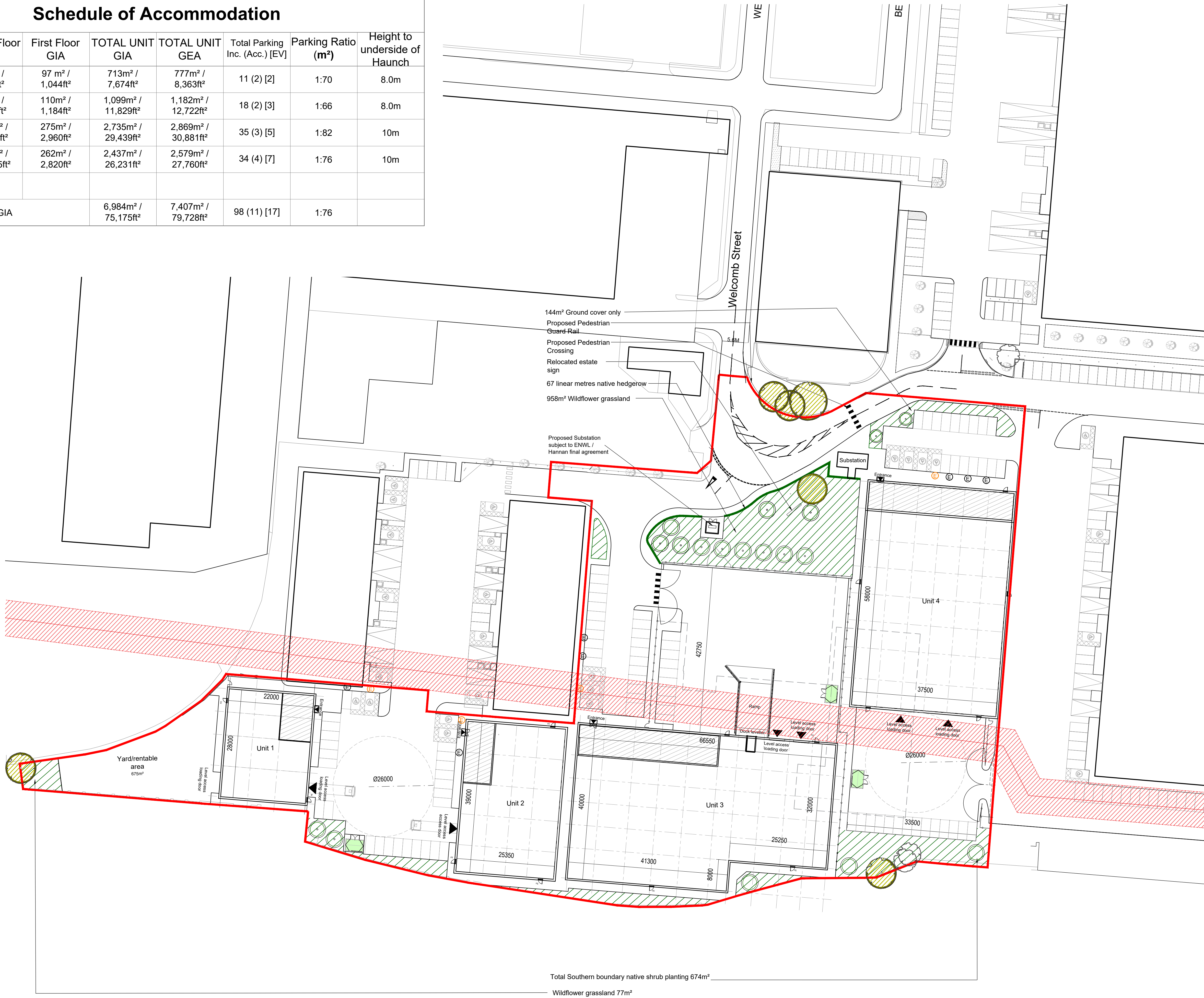
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Appendix A Drawings

Schedule of Accommodation							
Unit	Ground Floor GIA	First Floor GIA	TOTAL UNIT GIA	TOTAL UNIT GEA	Total Parking Inc. (Acc.) [EV]	Parking Ratio (m²)	Height to underside of Haunch
Unit 1	616m² / 6,630ft²	97 m² / 1,044ft²	713m² / 7,674ft²	777m² / 8,363ft²	11 (2) [2]	1:70	8.0m
Unit 2	989m² / 10,645ft²	110m² / 1,184ft²	1,099m² / 11,829ft²	1,182m² / 12,722ft²	18 (2) [3]	1:66	8.0m
Unit 3	2,460m² / 26,479 ft²	275m² / 2,960ft²	2,735m² / 29,439ft²	2,869m² / 30,881ft²	35 (3) [5]	1:82	10m
Unit 4	2,175m² / 23,411.5ft²	262m² / 2,820ft²	2,437m² / 26,231ft²	2,579m² / 27,760ft²	34 (4) [7]	1:76	10m
TOTAL GIA			6,984m² / 75,175ft²	7,407m² / 79,728ft²	98 (11) [17]	1:76	



NOTES

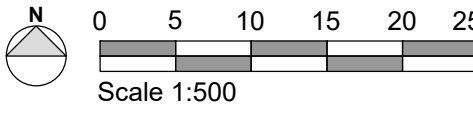
- All dimensions and levels are to be checked on site.
- Any discrepancies are to be reported to the architect before any work commences
- This drawing shall not be scaled to ascertain any dimensions. Work to figured dimensions only.
- This drawing shall not be reproduced without express written permission from AEW.
- Title overlay drawings and ownership boundaries are produced using all reasonable endeavors. AEW cannot be responsible for the accuracy or scale discrepancy of base plans supplied to them.
- All works are to be undertaken in accordance with Building Regulations and the latest British Standards.
- All proprietary materials and products are to be used strictly in accordance with the manufacturers recommendations.

CDM 2015

Client notified of duties: 07/04/21

Principal Designer: Client

Unless noted below, all known hazards have been highlighted on the drawing:



- Site Boundary 4.45ac / 1.80ha
- Mezzanine Extends
- 30" combined sewer with 30ft easement. Exact alignment TBC by survey

Footprint of existing Zone A + B

Landscape Planting to Landscape Architect Specification. Existing trees and shrubs to be retained where possible.

Existing trees to be retained

Proposed tree planting

Manchester City Council Maximum parking standards:

B2 = 1:45 sq.m
B8 = 1:100 sq.m

Proposed Bin store

Pedestrian gate with panic hardware
Electrical Vehicle Charging spaces
Future provision Electrical Vehicle Charging spaces with cable routes

NOTES

HGV circulation subject to tracking analysis

P15	02/05/24	MW	DRS
Title block amended			
P14	26/04/24	MW	DRS
Fencelines amended			
P13	24/04/24	MW	DRS
Landscaping amended			
P12	16/04/24	MW	DRS
Planning Issue			
REV	Date	Drawn by -	Checked by -

Status Purpose of Issue
S4 For Planning

drawing stage Stage 3

client
NSJV Ltd

project
Welcomb Street
Openshaw

drawing title
Proposed Site Plan

date Apr 2024 drawn MW
scale@A1 1:500 checked DRS

Appendix B Unexpected and unforeseen contamination protocol

Due to the development history of the site, the potential exists for encountering materials that were not recorded during the original ground investigations. Outside of the known areas of contamination, any significant quantities of suspected oily or odorous material, significant ashy soils and/or unusual brightly coloured or asbestos containing materials should be considered as possibly contaminated.

All relic underground structures and services will require appropriate management and decommissioning to reduce the potential for additional contamination of soils and groundwater during the works. Furthermore, given the potential presence of unidentified sources of contamination existing within discrete areas across the site it is recommended that a watching brief be adopted by a suitably qualified Geo-environmental Engineer or Consultant for all excavation activities and during the removal of relic underground structures.

Should any previously unidentified material suspected of being contaminated be encountered during the development of the site (by visual or olfactory means), then the following protocol should be implemented.

- » Site activities in the immediate vicinity shall cease and an independent Geo-environmental Engineer or Consultant should be contacted (if not on-site already) and provided with a summary of the observations made.
- » The Local Authority should be contacted.
- » Should there be a perceived risk to Controlled Waters, the EA should also be contacted.
- » The Geo-environmental Engineer or Consultant should undertake appropriate investigations to establish the extent of the materials in question. Depending upon the extent and volume of material present, the materials may be removed and temporarily stockpiled (on heavy grade polythene sheeting to prevent leaching/runoff) to enable activities to continue.
- » The Geo-environmental Engineer or Consultant should identify an appropriate suite of chemical testing and agree this with the relevant regulator(s).
- » The resultant chemical analyses shall be compared with the appropriate criteria for the land use in question. The findings and recommendations shall be discussed and agreed with the relevant regulator(s).
- » Updates will be made to this Remediation Strategy and Verification Plan, if required. In the majority of cases it would be proposed that unexpected contamination is dealt with via independent correspondence, but on occasion it may be necessary to revisit and update this document.
- » Prior to implementing any amendments to the Remediation Strategy and Verification Plan, the relevant regulator(s) shall be consulted and the amendments agreed in writing.

Appendix C Import and reuse criteria

Chemical limits for imported topsoil and subsoil

Table 7.1 below sets out the chemical criteria for imported naturally-occurring soils (i.e. topsoil and subsoil). These limits are based on the principles of (1) the protection of human health and the environment, (2) the practicality of sourcing soils with chemical concentrations that are below naturally occurring regional levels, (3) not introducing new chemical hazards to the site by importing soil containing chemical concentrations significantly elevated compared to existing site and regional concentrations, and (4) balancing chemical limits with other considerations such as visual and olfactory contamination. In addition to the criteria set out in Table 7.1, the topsoil will need to meet the requirements of BS3882:2015

The criteria are subject to review and amendment should any of the values prove impractical to achieve or define soil that is otherwise unsuitable for use based on wider project suitability requirements.

Table 7.1: Import criteria for naturally occurring soils

Contaminant	Proposed import criteria (mg/kg)	Justification (residential GAC unless noted)
Arsenic	25	See note 1 below
Beryllium	1.7	
Boron	300	
Cadmium	1.8	See note 1 below
Chromium III	90	See note 1 below
Chromium VI	21	
Copper	200	
Lead	200	
Inorganic mercury	40	
Nickel	45	See note 1 below
Selenium	260	
Vanadium	410	
Zinc	300	
Free cyanide	24	
Total phenols (monohydric)	230	
Benzo(a)pyrene	5	
Benz(a)anthracene	8.9	
Benzo(b)fluoranthene	2.6	

Contaminant	Proposed import criteria (mg/kg)	Justification (residential GAC unless noted)
Chrysene	15	
Dibenz(ah)anthracene	0.25	
Sum of 16 PAHs	250	
Total TPH	100	See note 2 below
Asbestos	No visible ACM. Quantitative concentrations <0.001%wt/wt	

1 - Limit has been reduced to not exceed the background soil concentration

2 - A limit of 100 mg/kg has been applied to prevent visually oily or odorous material being imported to site. This is in essence an empirical criterion. The soil saturation limit has been rejected as an appropriate criterion in this case as the soil saturation limits for all total petroleum hydrocarbon fractions tend to be unnecessarily low. This applies to the summation of all total petroleum hydrocarbon fractions, not to the fractions individually. This value can be revisited if it can be demonstrated that site-won soil with higher concentrations is equally suitable.

In addition, all imported soils must also comply with the following wider suitability criteria:

- » No visible anthropogenic materials (e.g., asbestos containing materials, brick, concrete, etc.).
- » No visible or olfactory evidence of organic contamination, including free phase liquids.
- » No visible evidence of invasive plant species (e.g., Japanese Knotweed or Giant Hogweed).
- » No visible organic or putrescible material that could constitute a source of ground gas (e.g., wood).
- » Meet any additional requirements set by other disciplines involved in the design and implementation of the project, such as arboriculturists, ecologists, and/or landscape architects.

The import criteria above have been developed based on the understanding that imported material will be required as part of the clean cover systems that are required within landscaped areas.

Chemical limits for site won soils including demolition material processed to 6F2

Site won and imported soils shall meet the criteria set out in Table 7.2 (refer to the earthworks specification for geotechnical performance criteria).

Table 7.2: Criteria for the reuse of site-won materials

Contaminant	Proposed reuse criteria (mg/kg)	Justification (commercial GAC unless noted)
Arsenic	640	
Beryllium	12	
Boron	240,000	
Cadmium	410	

Contaminant	Proposed reuse criteria (mg/kg)	Justification (commercial GAC unless noted)
Chromium III	8400	
Chromium VI	49	
Copper	68,000	
Lead	2,300	
Inorganic mercury	5,100	
Nickel	980	
Selenium	12,000	
Vanadium	9000	
Zinc	730,000	
Free cyanide	24	
Total phenols (monohydric)	440	
Benzolaprene	25	See note 1
Benz(a)anthracene	35	See note 1
Benzo(b)fluoranthene	37	See note 1
Chrysene	28	See note 1
Dibenz(ah)anthracene	3.5	
Sum of 16 PAHs	500	
Total TPH	500	See note 2
Trichloroethene (TCE)	1.5	
Asbestos	No visible ACM. Quantitative concentrations <0.001%wt/wt	

¹ Mean of recorded site concentrations where this is lower than the commercial land use GAC.

² A limit of 500mg/kg has been applied to prevent odorous or visually oily material being reused. This is in essence an empirical criterion. The soil saturation limit has been rejected as an appropriate criterion in this case as the soil saturation limits for TPH fractions tend to be unnecessarily low. This applies to the summation of all TPH fractions, not to the fractions individually.

The proposed criteria are all based on Generic Assessment Criteria (GAC) for a commercial land use scenario. These criteria are to initially act as a trigger (if exceeded) for further consideration of where the site-won material proposed for reuse is to be placed as part of the materials management strategy. An exceedance does not necessarily mean that the site-won material cannot be reused on-site, however, this may need to be beneath cover, buildings or hardstanding for example.

The risk assessments completed to date show that the on-site concentrations of the above contaminants do not pose a significant risk to Controlled Waters and therefore site reuse is not constrained by this consideration.